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**RESTRUCTURING OF THE COAL INDUSTRY IN ECONOMIES IN TRANSITION**

**(Submitted by the Government of Ukraine)**

**BASIC STRATEGY OF THE STRATEGY FOR DEVELOPING  
THE COAL INDUSTRY IN UKRAINE**

**Overview**

1. Ukraine's own natural energy resources supply the country with approximately 47% (fuel - 37%) of its requirements. The problem lies in the monopolistic nature of Ukraine's dependence on imports. Ukraine is extremely disadvantaged in its energy-consumption structure, which for years has grown less, rather than more, independent. The fundamental thrust of its energy strategy is towards the use of local energy resources. No country in the world bases its own energy strategy on imported fuels to the exclusion of its own energy resources. In Ukraine the supply of natural gas (virtually all of which is imported) is 1.7 times greater than the supply of coal (largely domestic in origin). Imported natural gas is nearly twice as important in Ukraine's fuel-energy balance as it is in the world fuel-energy balance. The structure of the fuel-energy balance in Ukraine is not economically viable. It is essentially necessary to reduce both absolute indicators and the share of consumption of natural gas while simultaneously increasing coal production.

2. On the competitive world fuel market, coal clearly ranks first in terms of quantities consumed. This position is conditioned chiefly by coal prices that are low (as compared with oil and gas prices) and stable, by large coal deposits, and by the possibility of importing from many stable sources. This last feature guarantees the regular and stable functioning of energy facilities where coal is used to generate power. Coal is still one of the primary sources of power, and will become even more important in the future. Coal is the predominant source of electric power, supplying 40% of Europe (UN/ECE region) and 44% at the global level. It will continue to be one of the main energy sources of the future as well. The world's known coal resources are five times greater than oil or gas resources, and potential coal resources are 15 times greater than oil resources. Annual coal output of up to 250 million tons a year will be sufficient to meet Ukraine's needs for 400 years. Trends in the mining and utilization of coal around the world point to broad prospects for the use of coal as a fuel for the production of electric power. One major advantage of using coal is that it is economical. The cost of coal on the world market is roughly twice as low as the cost of natural gas. A second factor is political and is related to the energy independence of countries. Over the next 20 years world consumption of solid fuels (especially coal) will increase by nearly 57% (from 3.7 billion to 5.8 billions tons).

3. Ukraine's main subterranean raw materials that produce energy are coal and associated methane gas. Coal mining is of great importance to Ukraine: it accounts for nearly 25% of the country's fuel-energy balance (recalculated against conventional fuels). Ukraine possesses significant coal deposits. The remaining coal reserves amount to 49 billion tons in the Donetsk basin, 2.3 billion tons in the Lvov-Volyn basin and 2.5 billion tons in the Dnieper basin.

### **Current situation**

4. In 2000 Ukraine's coal-mining enterprises produced 80.3 million tons (1.4 million tons less than in 1999). The principal reason for this decline in output is inadequate financing. As a result, the preparation of cleaned faces has been delayed. In general, over a 10-year period industrial capacity has been cut back by 93 million tons and only 8.6 million tons of new production capacity has been introduced, leading to a severe (more than twofold) decline in coal output: from 164.8 million tons in 1990 to 80.3 million tons in 2000. The Government has taken steps to enhance the effectiveness of the coal sector. During four months in 2001 some 28.58 million tons of coal (107.6% of scheduled output) were mined by enterprises in Ukraine, exceeding anticipated output by 2 million tons, and representing 564,000 tons over the corresponding period of the previous year. The main reason for the unsatisfactory performance of coal-mining enterprises is the delay in the preparation of cleaned faces caused by a lack of funds. Ash content of mined coal is 36.8% and of opencast coal 23.1%, which is better than the planned indicators of 0.2% for mined coal or 0.2% and 1.7% for opencast coal.

5. Worker productivity in the coal-mining sector exceeded the four-month planned figure by 4.3 tons, and by 2.7 tons during the previous period, to reach 25.6 tons per month. Wages have increased in four months as compared with the previous year to 35.4%, from 375.2 hryvni to 508.3 hryvni, reflecting an 11.8% increase in labour productivity. As regards capital

formation, the volume of State investment in the coal industry has decreased by a factor of nearly 12 over the last 10 years. The critical situation of capital formation has led to a significant decline in coal output. The coal industry has 1,257 incomplete facilities that will require a total investment of 5.8 hryvni billion to build. The cost of starting 753 of these is estimated at 5.4 billion hryvni, including five new deep mines with a planned annual production capacity of 8.7 million tons. To prevent any further decline in the production capacity of Ukraine's coal enterprises, in 2001 additional production capacity of 1.5 million tons a year must be activated, including in the Nikanor-Novaya (300,000 tons), Samsonovskaya-Zapadnaya (500,000 tons), Yuzhno-Donbasskaya No. 3 (300,000 tons), Krasnoarmeyskaya-Zapadnaya (150,000 tons) and Zapadno-Donbasskaya No. 6/42 (250,000 tons) mines, and work on the rebuilding of the sixth deep mine and one opencast mine, which have a total annual production capacity of 2.1 million tons, must continue.

6. In general, the economic, financial, technical and social situation of Ukraine's coal industry is complex, owing to:

- Macroeconomic factors: inter-sectoral price disparities and the poorly developed finance and credit system;
- Factors relating to ownership: the fact that the coal industry lags behind the general pace of government reform in the area of property ownership;
- Intra-sectoral factors: shortfall in resources for reproducing production, the unfinished state of reform of the system for managing a key industry;
- Regional factors: social backwardness and environmental considerations.

The main reason for the decline in production capacity and the low level of its exploitation is the inadequate volume of capital investment in the construction, reconstruction and technical re-equipment of coal-mining enterprises and the acquisition of mining equipment for the outfitting of coal faces and the replacement of worn-out stationary equipment. The negative trend of declining production capacity indicates the possibility of a further decline in coal output. So long as production capacity levels are inadequate, coal output is likely to decline further. It should be noted that given the deficit in capital investment in support for the operation of deep and opencast mines, the use by enterprises of their own resources (more than 460 million hryvni in 2000) has significantly increased.

Major problems in this sector are:

- Unattractiveness of investment in coal-mining enterprises;
- Lack of a real mechanism for the privatization of coal-mining enterprises;
- Disparities between coal prices and production costs;
- Lack of market mechanisms for coal price formation and sales;

- Balance-of-payments deficit owing to the fact that creditors have a higher level of indebtedness than debtors;
- Lack of resources for the development of deep and opencast mines, financing of science, geological prospecting, mining rescue services and social support;
- Imperfections in the system for managing the sector;
- Socio-economic, environmental and technical problems associated with the liquidation of deep and opencast mines.

### **Basic trends in sectoral reform**

7. Future development of the coal industry can occur only with scientific support, the introduction of new mining science and technology. New technology for coal mining and utilization is extremely important. Today the coal industry has convincing proof that the effectiveness of coal mining can be increased through the use of a new generation of mining technology created in Ukraine. The sector has 72 mines (prospective groups) with an annual production capacity of 69.8 million tons, in which are concentrated significant reserves of coal with seams that present favourable mining/geological conditions. These mines, of which a series are being built, must first of all be outfitted with new highly efficient technology in order to focus on mining using special, purpose-built equipment to carve out a niche in the technological sections of enterprises.

8. In order to obtain optimal results, the technical re-equipment of prospective coal-mining enterprises will be expediently carried out in two stages. In the first phase (through 2005) mines must be equipped with new technology developed in Ukraine and tested for use under different mining and geological conditions. The technology must be given only to those mines that can ensure a daily output of 1,250 to 1,500 tons and effective use of it over the next five years. With the entry into service each year of 15 to 20 MKD 90 cleaning complexes, real growth in output of 3 to 5 million tons a year can be achieved. Then, during the first phase (2000-2005) experimental models using technology for assembly-line mining of coal should be developed, built and approved: these include facilities comprising frontal 7 units, ploughing and automated combine units, which, depending on coal seams, will yield an output of 1,500 to 6,000 tons per day, including for seam capacities of 0.8-1 m, and also transport and tunnelling technology, which will make it possible to realize these output levels in future mines. Assuming a planned capacity at these facilities of 2,000 to 12,000 tons per day, this technology should ensure stable operations of enterprises working with two to three faces, and offers the possibility of switching to the “mine-wall” system. Only through the ongoing and planned introduction of such mining equipment during the second phase of the technical re-equipping of mines (2006-2015) can the technological and economic indicators of Ukrainian coal-mining enterprises be raised and the price of coal brought down (by 1.5 to 2.5 times).

9. There is a large group of mines in Ukraine (125-135 units) with limited capacity. These mines, which have an average output of 1,000 tons a day, will in the next 10 to 20 years play a major role in Ukraine’s fuel-energy supply by virtue of their number. A radical solution to the complex economic situation of most of these mines is the transfer to a “mine-wall” system of

operation. In order to fully exploit reserves remaining in pillars that no longer serve a protective function, the techniques and technology of the compartmental system of mining with highly economic anchored reinforcement of the chambers and remote-controlled combines must be mastered in 2001-2003. High speeds make it possible to increase output concentration. The number of active clean faces must be reduced from the 1999 level of 573 to 400-450 by 2005. There must be no fewer than 120 productive facilities rich in resources to supply the annual volume of 50-55 million tons of coal from faces equipped with such facilities. Annual coal output will grow by 4-5 million tons, with real capacity reaching 100 million tons of ordinary coal by 2005. The cost of coal will decline by 30%. This period should see major improvements in mine infrastructure, as preparation for intensive technological mining is completed. This will lay the groundwork for the second phase of streamlining of production, so that by 2015 the mean daily yield per face will be 2,000 to 2,500 tons, for a total of approximately 150 to 180 modernized clean complexes and units; this means that practically all annual coal output will be obtained only from high-yield mechanized faces. The number of these in operation will be at least half of 1999 levels (up to 150-200 faces).

10. Ukraine's machine works have the capacity to create highly productive tunnelling technology with parameters that meet international standards. Mine construction and design organizations have relevant experience and technologies that will make it possible to reduce the time needed to build a mine by as much as five years. Protective means and reinforcements for large-scale underground mining have already been developed and introduced which ensure the reliability and cost-effectiveness of Ukraine's coal mining operations with a guaranteed capacity of 100-120 million tons of coal a year. Implementation of these plans for the construction of ventilated shafts 1,500 metres deep in the O. F. Zasyadko mine, about which a series of decisions have been taken to reinforce it, will provide an average of 15,000 tons of coal a day and 5 million tons a year. The working life of mines will be prolonged by 50 years, which means the saving of some 6,000 jobs. The introduction during shaft construction of proposed intensive and cost-efficient technologies will have sped up the pace of work by two to three times above the norm, which means 85 to 100 metres a month. An example of an effective coal-mining enterprise is the State holding company Dobropoleugol. Dobropol is a Donbass industrial region with industrial reserves of 505 million tons high-quality coking and steam coal in highly concentrated seams and undisturbed mining conditions.

11. Another means of enhancing the effectiveness of the coal-mining sector are the production of high-quality fuel by means of deep concentration of the mining mass and increasing the level of extraction of combustible mass through the processing of secondary resources (coal silt, sludge and slag heaps). The models and algorithms developed from a reliable database will make it possible to realize savings in resources and electricity hitherto unattainable in underground mining.

12. Ukraine's coal deposits include considerable deposits of methane. It is very likely that they amount to 2.5-3.0 trillion m<sup>3</sup>. According to American researchers, total methane resources in the Donbass total 25 trillion m<sup>3</sup>. It is clear that coal deposits should be viewed as both coal and gas reserves. Methane extraction in Ukraine may help to reduce natural gas imports. Domestic and foreign experience testifies to the expediency of extracting methane from coal deposits. The application of modern and forward-looking technologies for methane extraction

will make it possible in the next five years to obtain 10-15 billion m<sup>3</sup>, and in the long term (2010-2012) methane extraction in Ukraine will reach 25-30 billion m<sup>3</sup> a year. This will require a suitable legislative base providing for concessions for methane exploration, extraction and utilization.

13. The effective development of Ukraine's coal industry will require implementation of the following strategic measures:

- Increasing the role of the coal industry in ensuring national energy security and promoting the development of a rational metallurgical complex:
  - Increasing output of competitive coal by developing and making optimum use of its resource potential, the construction of new, modern deep and opencast mines, the reconstruction and technological re-equipment of active coal-mining and coal-processing enterprises;
  - Application of scientific research findings and reform of the sector's scientific departments;
  - Reform of mine-construction facilities;
  - Changing patterns of consumption of primary sources of energy with increased use of coal and a reduction in energy imports.
- Reform of ownership of coal industry enterprises and creation of an effective system of management:
  - Improvement of the structures of the State coal industry department;
  - Creation of conditions for determining ownership of mines (deep and opencast) through a major series of ownership reforms in the coal industry;
  - Privatization on a competitive basis of mines capable of attracting investment whose profitability affords an opportunity to ensure auto-financing of their development, including packages;
  - Liquidation of unpromising coal-mining and coal-processing enterprises;
  - Ending the compulsory recovery of property of State coal enterprises and organizations in order to cancel debts under the State budget and earmarking of government funds for their reform;
  - Transfer of social infrastructure facilities to communal ownership or privatization thereof;

- Improvement of the coal market:
  - Provide full accounts of coal production;
  - Improvement of coal pricing policy;
  - Adaptation of the existing system for bringing coal output into line with European and world standards and norms;
- Rehabilitation of the finances of coal industry enterprises:
  - Minimizing, to the extent possible, outstanding indebtedness of coal industry enterprises;
  - Better use of budget resources by coal industry enterprises;
  - Diversification of sources of investment in the development of the coal industry (State capital investment, private investment, investment of coal enterprises' own resources, other innovative methods);
  - Call for tenders for the procurement of equipment, goods and services for mines that have a share of government property or are financed from the State budget.
  - Resolution of social and economic problems, increasing labour protection and security:
    - Ensure that remuneration levels for mineworkers are correlated with the minimum wage in accordance with the terms of sales contracts concluded by enterprises;
    - Discharging of debt and timely payment of current wages;
    - Introduction of social protection mechanisms for workers released following liquidation or reorganization of an enterprise;
    - Creation of an incentive system for mineworkers tied to enterprise performance, and implementation of measures to enhance the prestige of mine labour;
    - Ensure a suitable level of technical security, labour security, environmental protection and medical and health-care services for mineworkers;
    - Overcoming of depression-related factors in mining regions.

The structural rebuilding of the coal sector is possible during the transition to a phase of forming coal-and-metallurgical and fuel-and-energy firms, State and mixed financial-industrial groups.

In this process, the moving forces and criteria for effectiveness will be a reduction in domestic cost of producing final products and the acquisition of maximum profits by all participants in the production process.

### **Conclusions**

14. Most countries rely on solid fuels as their main source of energy. Coal continues to make a major contribution to the world we live in and will continue to have an impact in the centuries ahead, particularly in the developing countries. According to forecasts, coal will play a role for some time to come as a fuel for the production of electric power in many countries, and particularly in the countries of Central and Eastern Europe. Coal will be important in ensuring energy security and may foster competitiveness and may be an environmentally acceptable source of energy for use in modern technology. For this reason coal may be considered to be part of the strategy for achieving sustainable development of energy throughout the world.

15. Only a sound global energy policy will make it possible to objectively consider coal as an integral part of this policy and an equal partner in the energy market. The closing down of Ukraine's coal industry may result in access to coal resources and markets becoming expensive or even impossible in the future. The formulation of a strategy for the sustainable development of the coal industry in Ukraine as an important component of the country's energy-supply economy is of critical importance. The use of coal in Ukraine is crucial, both in ensuring national independence and in its importance for achieving a high level of coal-mining and modern coal energy technology.

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