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Actual and projected prices of coal on the international markets

Key words

Coal, coal prices, inter-fuel comparison, forecast

Abstract

The paper analyses the development of coal prices on the international markets. The comparison of prices in Asia and Europe is given as well as comparison of coal prices with prices of crude oil and natural gas. Some projections of future coal prices development is shown.

Introduction

About 15% of total world coal productions are internationally traded. The paper deals with this part of coal and the stress is put on identified main coal markets.

Depending on the conditions of its coalification, location of deposits, geological and technical conditions of exploitation and preparation as well as many other factors coal is used for different purposes. Generally there exist separate markets for steam coal and coking coal. For those two different commodities the main markets are identified on the geographical basis.

Analyses of coal prices are usually done basing on international contract and spot prices reported in the trade press. Contract prices are the prices that relate to specific long-term transactions (one year or more) and are the average prices under different terms of specific contract conditions. As such they may not reflect the current market conditions. Spot prices are the prevailing prices of one-time transactions at the given market and reflect more accurately the short-term market conditions. International Energy Agency (Coal Information 2001) derives

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also customs unit values (total value of coal imported or exported to or from a given market divided by total volume).

Coal prices analyses are carried on the base of cif prices paid in the two main importing regions (EU and Japan) or on the base of fob prices in main exporting countries.

The periodical changes in the price tendencies depend on many factors. Generally recovery of prices is caused by relative excess of demand over supply. It causes the increase of supply and when the supply exceeds the demand for coal, the rise of prices is stopped. Cif prices depend very heavily on the cost of transportation both in the country of exporter (between minemouth and ports) and ocean freights.

1. Steam coal prices

Average import unit values of steam coal imported to European Union from non-EU countries and imported to Japan in the years 1980—2000 are shown in Fig. 1. Average import unit values in both regions show the similar tendencies. After a rapid increase in 1981 to US\$/t 62.3 or 21.2% in EU and to US\$/t 65.2 or 19.5% in Japan, prices had a decreasing tendency both in EU and Japan to the level of US\$/t 41.5 in 1997. In the years 1997—1990 prices rose and then in the years 1991—1994 declined again to about US\$/t 40.0 in EU and US\$43.9 in Japan. In the next years prices rose. The pick price in EU was achieved in 1995 (US\$/t 46.2), while in Japan in 1996 (US\$/t 49.3). Since then, coal prices measured by import unit values have declined to about US\$/t 34.3 in EU in 1999 and US\$/t 34.6 in Japan. In 2000 the average unit value of steam coal imported to EU increased by 1.8% a year to US\$/t 34.9.

Average unit export values of main coal exporters are shown in Fig. 2. The prices measured by export unit values of main steam coal exporting countries show very similar tendencies as the import unit values of main importers. Only the prices of US coal are a little different. The

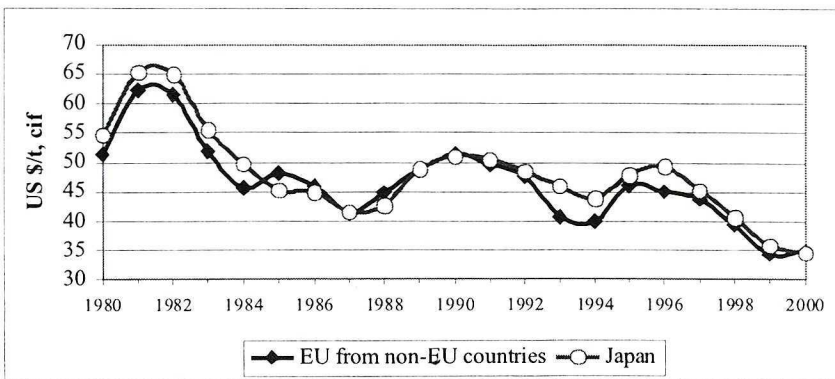


Fig. 1. Average import unit values, US\$/t cif of steam coal imported to European Union from non-EU countries and imported to Japan

Source: IEA, Coal Information 2001

Rys. 1. Średnie jednostkowe wartości importowe węgla energetycznego w imporcie do Unii Europejskiej z krajów nie należących do Unii oraz w imporcie do Japonii, USD/t cif

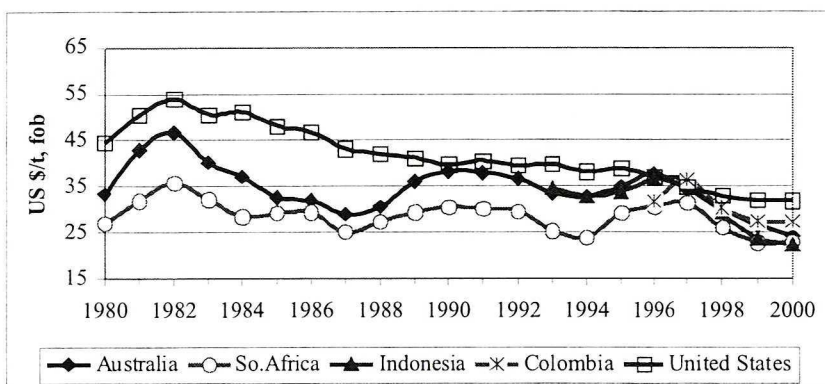


Fig. 2. Average export unit values, US\$/t fob of steam coal

Source: IEA, Coal Information 2001

Rys. 2. Średnie jednostkowe wartości eksportowe węgla energetycznego, USD/t fob

differences in price levels of main exporters depend mainly on the quality of coal exported. The prices are also a derivative of costs of coal production.

Both European and Asian customers continue shifting out of long-term purchase commitments relying either upon either spot purchases or long term arrangements covering committed volumes but with prices renegotiated annually. The contract prices and also custom values of all transaction generally follow the spot prices with a lag of up to one year.

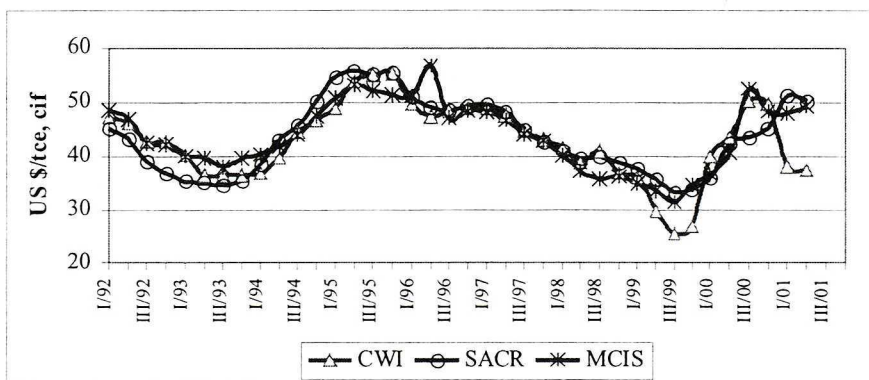


Fig. 3. Spot prices for steam coal on the European market

CWI — Quarterly average of range of prices published in *Coal Week International* for Amsterdam/Rotterdam fob barge 6400 kcal/kg GAR, 6000 kcal/kg GAR from IV /00, 1% sulphur, 16% ash

SACR — Quarterly average of range of prices published in *South African Coal Report* for South African coal delivered to Amsterdam/Rotterdam/Antwerp fob barge 5900 kcal NAR

MCIS — Quarterly average of MCIS European Steam Coal Marker 6000 kcal/kg NAR, <1% sulphur, cif Northwest Europe published in *International Coal Report*

Series recalculated to 7000 kcal/kg NAR.

Source: IEA, Coal Information 2001

Rys. 3. Ceny spot węgla energetycznego na rynku europejskim

Trade press has evaluated different spot coal prices indexes to report the current tendencies in coal prices. The indexes are built up in a different way. They take into account different coals and different sets of transactions. The method of establishing the price for the report varies. The representative spot prices for steam coal on both European and Asia — Pacific markets are shown in Fig. 3 and 4. These are averaged quarterly prices recalculated into prices of coal equivalent (7000 kcal/kg).

The quarterly average price indexes both for the European and Asian markets show the similar tendencies. There were years of coal prices decrease followed by the years of price recoveries.

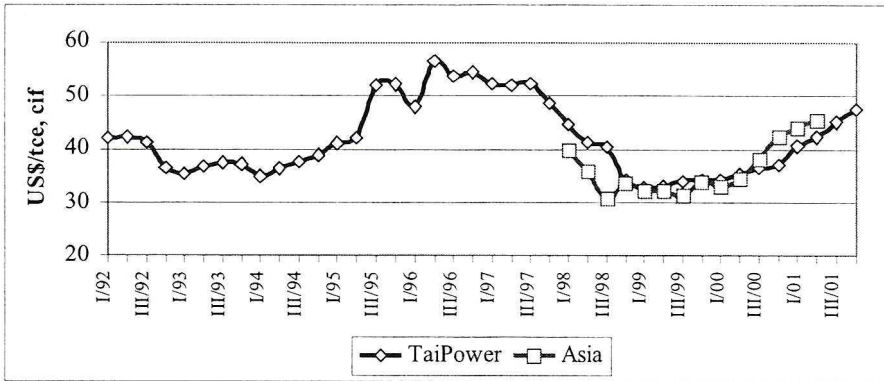


Fig. 4. Spot prices for steam coal on the Asian market

TaiPower — Average prices calculated from TaiPower awards as published in *King's International Coal Trade* evaluated on 6200 kcal/kg GAR cif basis

Asia — Quarterly average of MCIS Steam Coal Marker 6000 kcal/kg, <1% sulphur, cif for appropriate vessel sizes, based on KEPCO, TaiPower and Japanese utilities spot purchases, weighted on spot purchase volumes (*ICR 465/12*)

Series recalculated to 7000 kcal/kg NAR

Source: IEA, Coal Information 2001

Rys. 4. Ceny spot węgla energetycznego na rynku azjatyckim

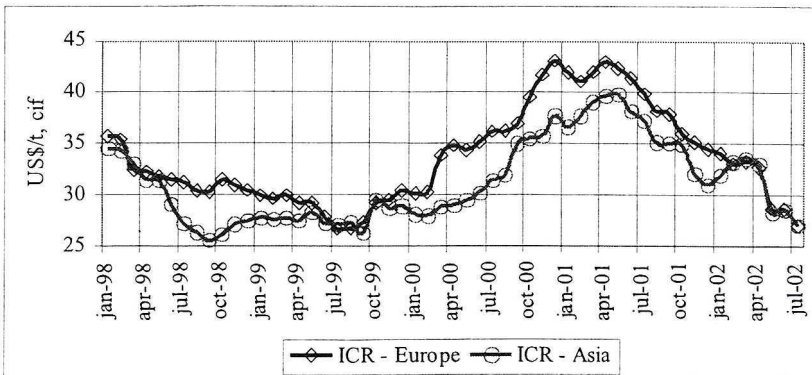


Fig. 5. International Coal Report Steam Coal Marker Price in Europe and Asia

Source: ICR, selected issues

Rys. 5. Wskaźnik cenowy węgla energetycznego publikowany przez International Coal Report w Europie i Azji

In Fig. 5 the European and Asian marker price indexes published by the International Coal Report are shown. The identical methods of building up the indexes allow the comparison of these two markets. The prices are given on the monthly basis. The analysis is done from January 1998 when ICR started to publish the Asian price index. The similar tendencies can be observed. Generally the prices go up and down in a cycle. The prices were decreasing from January 1998 with the lowest level in July 1999. Then the period of rising prices from July 1999 till April 2001 occurred, followed by the period of price decrease till July 2002. Prices in Europe were usually a little higher than in Asia, but in 2002 both European and Asian ICR marker prices are at the same level.

2. Coking coal prices

Average import unit values of coking coal imported to European Union from non-EU countries and imported to Japan in the years 1980—2000 are shown in Fig. 6.

The general decrease of prices in the years 1982—1987 can be observed: in Europe to the level of US\$ 55.19 or by 26.1% comparing to the year 1982 and in Japan to the level of US\$ 53.97 or by 27.5%. The rise of prices in the years 1988—1990 to US\$64.09 in Europe and to US\$ 60.73 in Japan was followed by the four years period of prices decrease. Then the prices recovered a little and reached in 1996 US\$ 59.83 in Europe and US\$ 56.39 in Japan. In 1997—2000, as the result of constant falls in import costs, the average custom unit values for coking coal were falling down. In Japan average custom unit values for coking coal imports fell to US\$ 39.46 in 2000, down 8.1% from 1999. In the EU (15) average customs unit values fell in 2000 to US\$ 47.89, by 2.6% compared to 1999 levels.

General tendencies are very similar on the identified markets. It should be noted here that the lower average import unit values recorded in recent years in Japan are the results of accounting

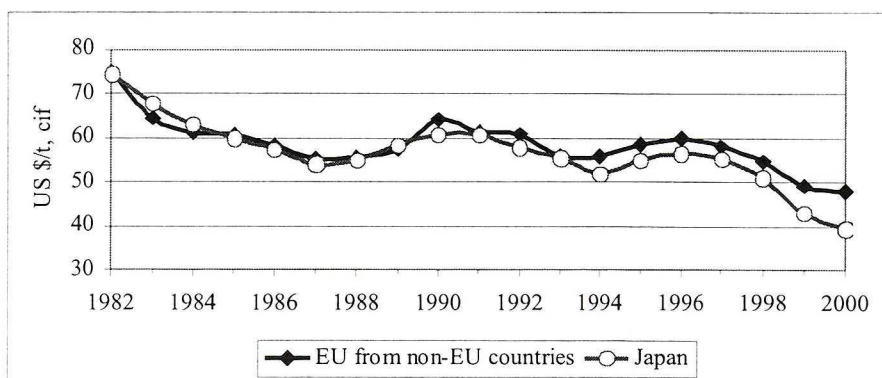


Fig. 6. Average import unit values, US\$/t cif of coking coal imported to European Union from non-EU countries and imported to Japan

Source: IEA, Coal Information 2001

Rys. 6. Średnie jednostkowe wartości importowe węgla koksowego w imporcie do Unii Europejskiej z krajów nie należących do Unii oraz w imporcie do Japonii, USD/t cif

by customs the Indonesian coal as coking coal even though it is not generally used in the metallurgical industry. From 1991 onwards, the average import unit values are therefore lower than they should be if only the coals imported to Japan for metallurgical use were accounted to the averages.

The leading role in establishing the level of coking coal prices plays Japan. Japan is the biggest coking coal importer. Additionally the Japanese Fiscal Year (JFY) starts in April, so the contract prices settled for JFY are the leading for the other contracts. The prices in contracts for coking coal deliveries agreed by steel mills in Japan for JFY 2001 with major Australian and Canadian suppliers were higher than in previous year by about US\$/t 3.18. The tendency of the price increase was observed in 2001 year for all types of coking coal. The European Commission Directorate General for Energy and Transport indicates that in 2001 the trend in the average value cif major European Community ports for reference grade of coking coal imported from four non-member countries (USA, Australia, Poland and Canada) was rising from US\$/t 46.26 in 4th quarter 1999 to US\$/t 56.95 in 4th quarter 2001.

The biggest coking coal exporter is Australia. The prices set by this country tend to be lower than other exporters prices. Fig. 7 shows export unit values of main exporting countries in 1982—2000.

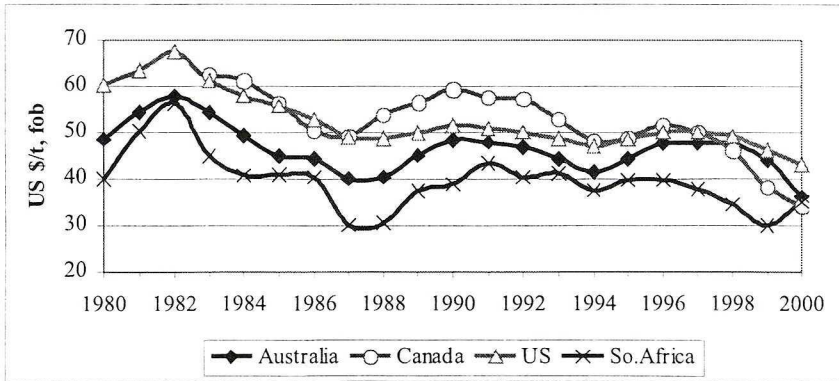


Fig. 7. Average export unit values, US\$/t fob of coking coal
Source: IEA, Coal Information 2001

Rys. 7. Średnie jednostkowe wartości eksportowe węgla koksowco, USD/t cif

3. Comparison of steam and coking coal prices

Coking coal prices, in spite of minor discrepancies in long-term tend to follow the steam coal prices with the price bonus of US\$ 11—15. To demonstrate this dependency the comparison of coking coal and steam coal prices in Europe in the years 1982—2000 is shown in Fig. 8.

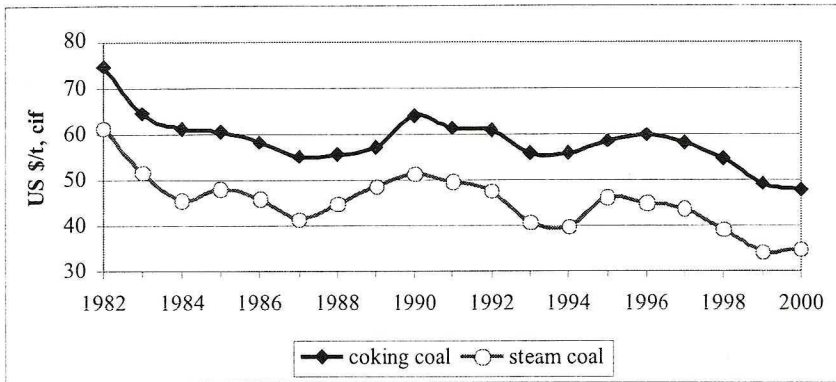


Fig. 8. Comparison of coking coal and steam coal prices in Europe (measured by import unit values US\$/t cif)
Source: IEA, Coal Information 2001

Rys. 8. Porównanie cen węgla energetycznego i koksowego w Europie (mierzone wartością jednostkowych wartości importowych, USD/t cif)

4. Comparison of coal prices with other fuels

Coal prices are often compared with prices of other energy carriers, like crude oil and natural gas. The comparisons are difficult as each fuel has the specific price per unit that depends on the form in which it is sold. For example the average price of crude oil (Brent) in 2001 was US\$ 24.77 per barrel, while the average price of natural gas imported to EU cif was US\$ 4.17 per million Btu. The price per billion cubic meters is also very popular. As it was said before, coal prices are usually recalculated into a specified heat content. According to MCIS marker price (concerns coal of 6000 kcal/NAR) the average price cif of coal imported to Northwest Europe was US\$/t 39.29 in 2001.

If all the prices are recalculated in such way that they finally show the price per the same amount energy carried in the fuel, they can be compared. Such comparison is given in Fig. 9.

Out of the three fossil fuels, oil is the only one that is widely traded on an integrated international market. Existing exchange quotation like Brent or WTI are easy to map and have a global significance (Radetzki 2002). High transport costs decided that three major separate markets for gas have developed: in Europe, in North America and in Asia Pacific.

The prices shown in Fig. 9 focus on the European market. The leading role in fossil fuels prices development plays crude oil. The price of oil reflects not only the situation on the oil market but also depends on many other factors, out of which the political situation of main oil exporting countries plays a crucial role. Prices of gas and coal generally follow the oil prices trends with about one-year lag (when yearly averages are compared). Short-term changes in the level of prices may be caused by unexpected events in the country of exporter or importer that disturbs the market equilibrium. The permanent changes in the level of prices for fossil fuels are the result of the constant adjustment of the market to the equilibrium between supply and demand. Recently, after the period of high prices their decrease is expected.

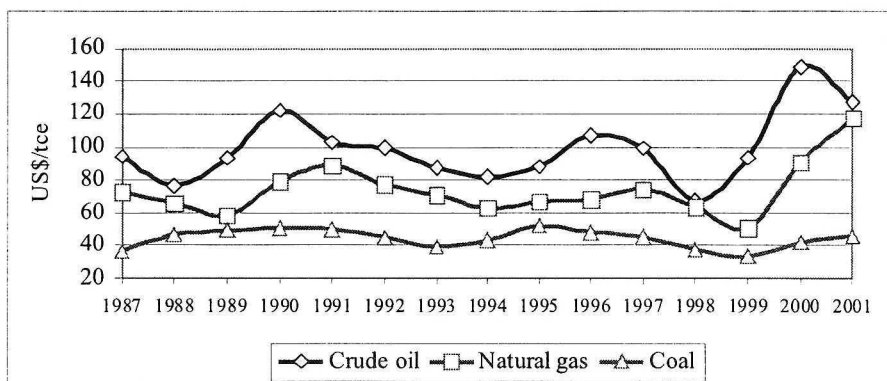


Fig. 9. Prices development of crude oil, natural gas and coal in the years 1987—2001

Crude oil — Brent, spot; Natural gas — imported to EU, cif; Coal — MCIS marker price, Northwest Europe, cif
Series recalculated to tce (tonnes of coal equivalent); 1 tce = 7000 kcal/kg

Source: BP, 2002

Rys. 9. Kształtowanie się cen ropy, gazu ziemnego i węgla w latach 1987—2001

Coal is relatively cheap source of energy. The most expensive is oil. In last few years the changes of gas price were very rapid. It should be noted that the prices of all fossil fuels were in 2001 above the long-term averages.

The yearly changes of prices are very high. Year to previous year change of prices in case of oil varies from -32.1% in 1998 to $+58.8\%$ in 2000. The deepest drop of gas prices occurred in 1999 (-20.4%) followed by the highest price increase in 2000 (80.6%). In case of coal the prices changes are not so rapid. The highest price increase was observed in 1988 (27.6%) and in 2000 (25%). The deepest prices fall was observed in 1998 (-17.8%).

5. Coal prices projections

In the view of constant short-term changes of fossil fuels prices, the long-term forecasts are very difficult. They are constantly worked out by many institutions but they hardly ever occur to become true. In the forecast the price level for future periods are the result of assumed direction of price change.

Table 1 summarises of the forecasts prepared by the European Commission (EC) in 1999, by the International Energy Agency (IEA) in 2000 and by the World Bank in 2000. To facilitate inter-fuel comparisons the original numbers have been transformed into US\$ per tonne of oil equivalent (toe).

With exception of the World Bank projections where an evident price decrease of all fuels is assumed, the other sources show very moderate changes in fuel prices in the perspective of 2010. The forecasted stabilisation of price level is the result of the facts that the depletion of fossil fuels reserves will not influence the supply and prices during the period under consideration. It is assumed that the actual prices for coal and gas correspond with the market equilibrium prices on

one side and with the costs of production on the other. It is also believed that the production quotas that oil cartels are going to set in future will keep the oil prices at the comparable level to the present ones.

TABLE 1

Summary of fossil fuel prices forecasts, in US\$/toe. Constant 1990 US\$

TABELA 1

Zestawienie prognoz paliw w USD/toe w cenach stałych USD z roku 1990

Forecast source	Specification	Actual		Forecast		Change [%] 2010/1997
		1990	1997	2005	2010	
Coal						
IEA, 2000	Imports to IEA, cif	76	55	56	56	1.8
EC, 1999	Imports to EU, cif	71	66		63	-4.5
World Bank, 2000	US exports, fob	62	50	44	42	-16.0
Oil						
IEA, 2000	Imports to IEA, cif	157	117	121	121	3.4
EC, 1999	Brent	175	136		124	-8.8
World Bank, 2000	Average Brent, Dubai, WTI	168	130	111	103	-20.8
EIA, 2000	Imports to US, cif	155	129	144	148	14.7
Natural gas						
IEA, 2000	European borders, cif	109	88	78	78	-11.4
EC, 1999	European market	111	109		111	1.8
World Bank, 2000	European borders, cif	100	99	86	80	-19.2

Source: Radetzki 2002

The newest projections of the World Bank (2002) assume the decrease of coal prices in U.S from US\$/t 44.86 in 2001 to US\$/t 34.0 in 2005 and then a slow rise to US\$35 in 2010 and US\$36 in 2015. The similar tendencies i.e. decrease of prices till 2005 and a slow increase afterwards are foreseen for crude oil and natural gas. Fig. 10 shows the projections. The data have been recalculated into prices per tonnes of coal equivalent to make the comparisons easier.

Slow increase of prices in current US dollars projected for the years 2010—2015 means in fact stabilisation of prices in long term.

Prepared recently by Energy Information Administration (EIA, 2002) and DRI-WEFA forecasts of minemouth coal prices in US assume price decrease in the 2020 perspective.

The details of the reference case forecast are shown in Table 2.

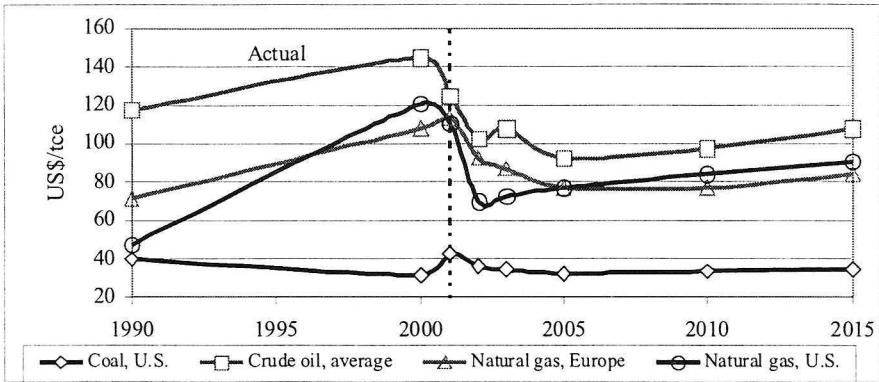


Fig. 10. Prices of fossil fuels and price projections in current dollars, according to the World Bank, 2002
 Coal, U.S. — less than 1.0% sulphur, 14% ash, fob piers, Newcastle/Port Kembla
 Crude oil, average — average spot price of Brent, Dubai and West Texas Intermediate, equally weighted
 Natural gas, Europe — average import border price
 Natural gas, U.S. — spot price at Henry Hub, Louisiana
 Series recalculated to tce (tonnes of coal equivalent); 1 tce = 7000 kcal/kg
 Source: World Bank, 2002

Rys. 10. Ceny surowców energetycznych i prognozy cen w bieżącej wartości dolara według World Bank 2002

TABLE 2

Projections of coal prices on the US market according to the Annual Energy Outlook 2002

TABELA 2

Prognozy cen węgla na rynku amerykańskim według Annual Energy Outlook 2002

Type of coal	Price (2000 US\$ per Short ton)		Change of the price	
	Actual 2000	Projection 2020	total [%]	per year [%]
Premium metallurgical	32.34	27.47	-15.1	-0.75
Bituminous	22.99	21.24	-7.6	-0.38
Sub-bituminous	7.24	5.71	-21.1	-1.06
Lignite	10.67	10.09	-5.4	-0.27
Low sulphur	11.23	7.94	-29.3	-1.46
Medium sulphur	21.53	20.06	-6.8	-0.34
High sulphur	19.75	19.26	-2.5	-0.12
US average	16.45	12.79	-22.2	-1.11

The forecast assumes that the production will increase and productivity will improve through 2020 leading to substantial minemouth coal prices drop. During next 20 years the average price of minemouth coal in US is projected to fall down by 22.2% i.e. about 1.1% per year.

The reference case assumes the decrease the prices of oil (by about 11% till 2020) and gas (by 9.5%).

Having in mind competition between coal and other fuels as well as competition among main coal producers, the further cutting in cost of coal production and also the facts that additional production capacities can easily be open in many exporting countries, coal prices will rather maintain their decreasing trend in long-term. On the other side the prices drop should be slow down by expected growth of demand for coal.

Conclusions

1. International market for coal can be subdivided into separate markets on the geographical basis. Spot prices of coal reflect the current market conditions and depend on relative supply — demand equilibrium. Yearly averaged coal prices achieved in Europe and Asia show the similar tendencies on both markets.

2. Coking coal is usually treated as a different commodity, but coking coal prices are strongly related to steam coal prices.

3. Changes of coal prices are to some extent correlated with changes of other fossil fuels prices like natural gas and, especially — oil.

4. Analyses of the series historical data allow to conclude that the current fossil fuels prices are higher than the long-term average prices.

5. Existing projections of coal prices indicate that in the next years decrease of coal prices is expected.

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LIDIA GAWLIK

OBECNE I PRZYSZŁE CENY WĘGLA NA RYNKACH MIĘDZYNARODOWYCH

Słowa kluczowe

Węgiel, ceny węgla, porównanie cen paliw, prognozy

Streszczenie

W artykule przedstawiono analizę cen węgla na rynkach międzynarodowych. Przedstawiono porównanie kształtowania się cen w Azji i Europie, jak również porównanie cen węgla z cenami ropy i gazu ziemnego. Zaprezentowano kilka prognoz rozwoju cen węgla kamiennego w przyszłości.