ANNUAL REPORT

2016

FACTS AND TRENDS 2015/16

VEREIN DER KOHLENIMPORTEURE

Import Coal Market at a Glance

		2013	2014	2015[1)]
World				
Hard Coal Production	Mn t	7,195	7,219	7,009
Hard Coal World Trade	Mn t	1,304	1,306	1,195
thereof Hard Coal Seaborne Trade	Mn t	1,209	1,221	1,104
Hard Coal Cross-Border Trade	Mn t	95	85	91
Hard Coal Coke Production	Mn t	681	685	652
Hard Coal Coke World Trade	Mn t	17	19	23
European Union (28)				
Hard Coal Production	Mn TCE	113	108	101
Hard Coal Imports/Cross-Border Trade	Mn t	216	205	192
Hard Coal Coke Imports	Mn t	6	6	7
Germany				
Hard Coal Consumption	Mn t	61.0	58.1	57.7
Hard Coal Production (Usable Production)	Mn t	7.5	7.6	6.2
Total Imports	Mn t	52.9	56.2	57.5
thereof Hard Coal Imports	Mn t	50.1	53.7	55.5
thereof Power Plants	Mn t	39.9	41.9	43.2
Iron and Steel Industry	Mn t	10.2	11.8	12.3
Hard Coal Coke Imports	Mn t	2.7	2.5	2.0
Import Coal Use [2)]	Mn TCE	52.4	50.2	49.7
Prices				
Steam Coal Marker Price CIF NWE	US$/TCE	96	88	67
Cross-Border Price Steam Coal	€/TCE	79	73	68
CO_2 Certificates Forward Prices (Mean Value)	€/CO_2	5	6	8
Exchange Rate	€/US$	0.75	0.75	0.90

[1)] Some figures provisional

[2)] Total import, including changes in stockpiles

AN INTRODUCTORY WORD – HARD-COAL FIRED POWER PLANTS ARE AN ECONOMICAL AND CLIMATE-FRIENDLY PILLAR OF THE CLIMATE PROTECTION PLAN 2050

The German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety presented its draft for the Climate Protection Plan 2050 on 21 June 2016. "Vision and yardstick" for the plan is the Paris Agreement signed on 22 April of this year. The International Energy Agency has analysed the effects of national plans that had been made available by the member states for the climate summit. The sobering results: These measures will not limit the temperature increase to 2° C.

Nevertheless, the German government remain committed to their "pioneering role": "Energy generation must become almost completely CO_2 neutral by no later than 2050." The goal is not limited to the generation of electricity. As of 2030, for instance, cars should operate without petrol or diesel as fuel and gas and oil heating will be prohibited in new buildings.

The Climate Protection Plan 2050 contains not only a vision, but also a path of transformation: "An important function on this path will be played by gas-fired power plants as transition technology with low CO_2 emissions and the existing state-of-the-art coal-fired power plants, especially in cogeneration of heat and power operated in orientation to the power market ..." The Coal Importers Association (VDKi) welcomes the status of coal-fired power plants in a transition function, but the fundamental assumption that "low CO_2 emission gas-fired power plants" are climate friendlier than hard coal-fired power plants is false. It overlooks the emissions of methane from the production of oil and natural gas, a gas that is far more harmful to the climate.

The International Energy Agency defines the avoidance of these emissions as one of the five primary measures in its "bridge" scenario for the implementation of the Paris Agreement. At their recent climate summit meeting, Canada, the USA and Mexico determined that the methane emissions from oil and gas production, which are harmful to the climate, should be significantly reduced. The VDKi commissioned the consulting company Pöyry to conduct a literature study that determined the emissions from hard coal and natural gas over the full length of the added-value chain and calculated for the first time also the values for the partial-load case that is important for the energy turnaround. The study concludes that open-cycle gas turbines emit up to 76 % more greenhouse gases than modern hard coal-fired power plants. The latter are consequently an important pillar for system stabilisation until low-cost storage facilities are available.

Prerequisite is a free-market framework for power generation. The proposals from the German government are inadequate in this respect, and the calls for a capacity market have therefore not been quieted. In its sector analysis on capacity markets, the European Commission recommended a review of whether subsidy mechanisms for renewable energy sources that are not in conformity with a free market are responsible for the unnaturally low electricity prices in Europe before any further steps are taken to intervene in the market. The Commission is right: the feed-in priority for renewable energies is the primary culprit here. If power from renewable energy sources were subject to the forces of a free market, the operation of hard coal-fired power plants would be sustainably profitable, and they could assume their bridge function for the Climate Protection Plan 2050.

Hamburg, July 2016

Dr Wolfgang Cieslik
– Chairman of the Management –

Dr Franz-Josef Wodopia
– Managing Director –

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* We have decided to save space and reduce expenses by not printing the glossary and the list of institutions. However, they are still available for viewing on the Coal Importers Association’s website.

GLOBAL ECONOMIC CONDITIONS

World Production and World Trade

Real gross domestic product worldwide grew by 3 % in 2015. Two countries caused this average to climb significantly. Real growth in China was 6.9 %, and in India it was even higher (7.4 %). Development in these two countries is to a high degree the driving force behind the development of the world economy. According to the OECD Interim Outlook from February 2016, only India will continue to grow at the same speed while growth in China will slow down; nevertheless, it will remain over 6 %. Last place in economic development is held by Brazil; its economy contracted by 3.8 % and will presumably continue to contract at approximately the same rate in 2016.

Real Growth in Gross Domestic Product

	2015 [1]	2016 [2]	2017 [2]
	Change from Previous Year in %		
World	3.0	3.0	3.0
USA	2.4	2.0	2.2
Euro Zone	1.5	1.4	1.7
Germany	1.4	1.3	1.7
France	1.1	1.2	1.5
Italy	0.6	1.0	1.4
Japan	0.4	0.8	0.6
Canada	1.2	1.4	2.2
Great Britain	2.2	2.1	2.0
China	6.9	6.5	6.2
India [3]	7.4	7.4	7.3
Brazil	-3.8	-4.0	0.0

1) Provisional 2) Forecast 3) Fiscal year begins in April

Source: IMF, International Financial Statistics, OECD Interim Economic Outlook, 2016

HT-W1

Development in the Western world is led by the United States (2.4 % growth) and the United Kingdom (2.2 % growth). Growth in the euro zone at 1.5 % is almost 1 percentage point lower than in the United States. Growth in Japan is a mere 0.4 %, but a certain level of recovery to between 0.6 % and 0.8 % is expected in the next two years. The background to the disparity in this development is that the individual countries emerged from the financial crisis with varying levels of recovery; in some cases, it was followed by a national debt crisis. While the United States took decisive steps to place its financial sector on a new regulatory footing and, in comparison with Europe, quickly overcame the crisis, the parties in the Old World are still discussing a solution to the financial problems of countries that are ultimately secondary in magnitude for European development. Moreover, the money policy of the European Central Bank is following a course that is equally problematic for business and private consumers because the low interest rates encourage investments that would otherwise not be made in this scope, especially in the construction industry.

World trade and growth of the worldwide gross domestic product have not always stayed in step with each other. The development in the crisis years 2001 and 2009 is striking. The impact on world trade was especially extreme in 2009, when trade uncoupled from economic development completely. World trade remained behind economic development in 2015 as well, although not as

Significant slowdown in global trade growth

Source: OECD Economic Outlook database
Note: World trade is goods plus services trade volumes. World GDP growth is measured at purchasing power parties.

Figure 1

severely as in the crisis years. In the short to middle term, one can only wait and see if worldwide economic growth will increase once again and have a positive effect on trade. In the middle to long term, the decisive point for the development of trade will be the reorientation of the Chinese economy and the development in India, which is even more difficult to assess.

According to the report Global Economic Outlook 2nd Quarter 2016 from Deloitte, the People's Republic of China is faced with more than just the restructuring of an export-oriented economy to an economy aimed at domestic consumption; it must deal with a completely different "trilemma". China must simultaneously achieve three highly critical goals: an independent central bank policy, a controlled currency exchange rate policy and the liberalisation of controls on capital. The problem is that these three target variables affect one another. An independent central bank policy will lead either to a greater devaluation of the Chinese currency or there will be stricter controls on the flow of capital.

Viewed against the background of global challenges, India is in a kind of "oasis". Indian policy oriented to growth is reinforced by the relatively low oil price and the low interest rates. On the other hand, the Indian economy faces a battle because its currency has in the meantime become very strong. Moreover, there is still relatively little interest in direct investments in India.

The economy in the United States is still on a stable upward curve despite the strength of the US dollar and the low oil prices. This has given the American Federal Reserve the opportunity to initiate the first steps in the direction of a normalisation of money policy. Globally, however, this has effects on those countries that are still lagging behind economically and have not yet normalised their money policies.

The economies in Russia and Brazil are in enormous difficulties. The falling oil prices have recently exacerbated the recession in Russia. Unless there is a stabilisation, the financial reserves of this country will be exhausted in only a few years, and the government would be forced to make even more drastic cuts in the Russian budget. Brazil, also one of the BRIC countries, is mired in a dramatic economic crisis. The currency has lost more than 40 % of its value over the last two years. Brazil's exports in the raw materials sector has taken a hard hit because of the decline in worldwide economic growth. Brazil is one of the countries that has suffered most from the sharp fall in trade volume. The high devaluation of the Brazilian currency alone, however, will not help the country out of the crisis unless there are structural reforms.

Future global economic development will depend above all on what answers the People's Republic of China finds to the decline in economic growth, how the oil prices and the financial situation of energy companies change, whether the US economy continues its positive development and whether Europe can find its way out of a deflation situation.

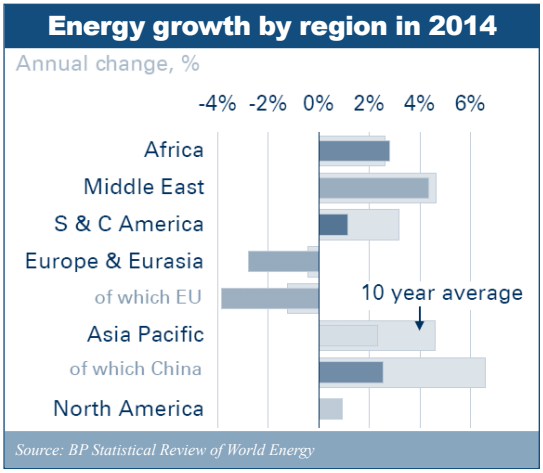


Figure 2

World Energy Consumption

According to the BP Statistical Review 2015, world energy consumption in 2014 rose by 0.9 % to 18.5 bn TCE. The situation in North, South and Central America was in step with this trend. The growth of 2.3 % to 7.6 bn TCE in the Asian-Pacific Region was more than twice as great. Even stronger – although at a lower level – was the development in energy consumption in Africa and the Middle East by 2.8 % and 4.4 %, respectively. Development among energy sources reveals that oil has not only remained energy source Number 1, but that its growth of 0.8 % was stronger than that of natural gas and coal. Renewable energy sources had the strongest growth (12 %), but they started at a very low level. Their share in coverage of consumption worldwide is only 2.5 %. The top spot is held by oil at 33 %, followed by coal at 30 % and natural gas at 24 %.

Primary Energy Consumption in bn TCE – Most Important Energy Sources –

	2011	2012	2013	2014	2014 / 2013 Change in %
Coal*	5.189	5.320	5.467	5.545	0.4
Natural Gas	4.167	4.266	4.319	4.379	0.4
Mineral Oil	5.836	5.912	5.985	6.016	0.8
Nuclear Energy	0.859	0.800	0.805	0.82	1.9
Hydroelectric Power	1.136	1.191	1.224	1.256	2.0
Renewables	0.278	0.344	0.399	0.453	12.1
Total	**17.465**	**17.833**	**18.199**	**18.469**	**1.0**

** Hard coal and lignite*

Source: BP, Statistical Review 2015

HT-W2

There are clear indications that the strong growth in consumption in the Asian-Pacific region will not continue. Growth in energy consumption in 2015 was significantly below the 10-year average. One reason was that the growth rates in gross domestic product in China are gradually weakening, but the shift in production to consumer goods that require less energy for their manufacture and to a services economy also makes a contribution.

The decline in the construction industry is an especially important factor behind the significantly lower growth rates posted for steel, iron and cement in comparison

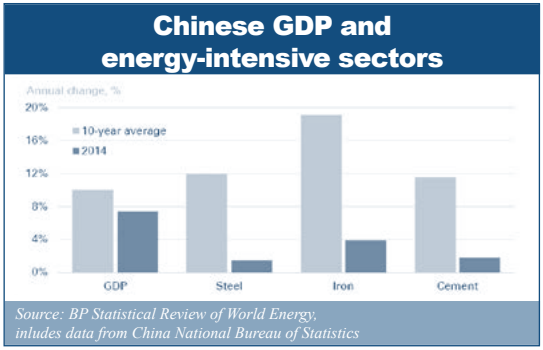


Figure 3

with the last ten years. As a consequence of this development, the rate of increase in CO_2 emissions also slowed.

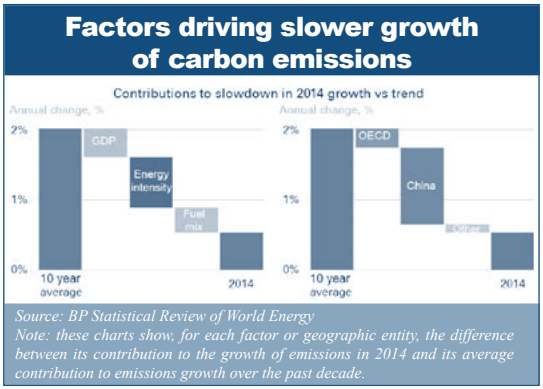


Figure 4

If CO_2 emissions in 2014 are compared with the average of the previous ten years, the greatest part of the decline in annual growth from 2 % to about 0.25 % is explained by the increase in energy intensity. If the slowdown in growth rate of CO_2 emissions is analysed according to region, the lion's share is attributable to the People's Republic of China.

World Climate Policy

The 21st UN Climate Change Conference (COP21) was held in Paris from 30/11/2015 to 12/12/2015. The negotiations focused above all on a common goal for stabilisation of the rise in temperature, financing mechanisms, technology transfer and other subjects. Since recent years had shown with increasing clarity that there would not be any successor regulation of climate policy if the previous line in the negotiations was continued, France had taken on an extremely difficult task. In view of the unanimous adoption of a resolution by 195 countries for a new climate convention – a success that was uncertain until the last minute – the contents were initially a positive surprise. For the first time, comprehensive and concrete climate protection targets were agreed. Despite the delight expressed by the negotiating parties at the conclusion of the COP21, however, it must not be overlooked that a closer examination of the results reveals that much has remained vague. It will not be possible to determine with certainty whether a fair distribution of the burdens of climate protection can be achieved until concrete implementation regulations are in place several years from now. An important point is to keep in mind that the targets proposed by the member states for Paris were designated as Intended National Determined Contributions (INDC). They were simply declarations of intent that had been determined by each country and had by no means been supported by concrete action plans. Even though the word "intended" was later deleted, it did not in any way change the concrete status of the action plans. The major success is derived from the achieved consensus that efforts will be made to limit the rise in temperatures to substantially below 2° C and to strive to keep it to no more than 1.5° C.

There was a deviation from the previous massive two-part differentiation between industrialised and developing countries. The phrase now reads, “in the light of different national circumstances.” The parties to the agreement are expected to make contributions to national climate protection in the future, now known as NDCs, and these contributions are to become more ambitious as time passes. This sounds well and good, but in actual practice the rule is far from having binding force.

The significance of market mechanisms for climate change is recognised as a fundamental principle, but they have not been employed as primary instruments of global climate policy. It is basically positive that developing countries are supposed to receive continuous and greater aid, but the provisions for the realisation of the aid have not yet been set. The same is true of the action introduced in Warsaw in 2013, a “loss and damage” mechanism that is intended to help countries that are affected by disasters caused by climate change. One element that made the compromise in Paris possible was the commitment of the industrialised countries to provide US$100 mn annually for developing countries from 2020 on. Emerging economies are “encouraged” to pay financial contributions voluntarily. To this extent, there was a failure from the German perspective to achieve the goal of reasonably involving the emerging economic powers in the support of developing countries.

The entry into force of the agreement required the signatures of 55 countries. This figure was recently reached. The bottom line for Germany is that not enough concrete action was agreed and there is a risk that attempts will be made in both the European Union and in Germany to implement even stricter measures. The Paris Agreement, however, does not contain anything that would provide for comparable general conditions for companies that are subject to international competition. Germany and the European Union are therefore called upon to protect their industries from unequal conditions of competition. The European climate protection targets, especially those in Germany, are already highly ambitious and go beyond what has been agreed by competitors in other countries. Global climate protection means that now the other countries must catch up and not that the European Union must push even further ahead of these countries. Cost-effective climate protection cannot be achieved unless free market climate protection instruments are put into place around the world and genuine worldwide trade becomes possible.

The reduction measures of the Asian-Pacific industrialised countries must be considered against the background that, according to the BP Statistical Review 2015, coal in this region still held a share of 52 % of the primary energy consumption in 2014 in comparison with 30 % worldwide. Seen in this setting, clean coal technologies are of the greatest importance. Practical policies in the OECD countries, however, are contrary to this. An answer from the German government on 29/03/2016 in response to a brief parliamentary query from the BÜNDNIS 90/DIE GRÜNEN parliamentary group revealed that “between 2013 and 2015, exports related to seven coal-fired power plant projects or deliveries to such plants” were secured by guarantees. In 2015, no exports related to coal-fired power plant projects were guaranteed. In other words, Germany is waiving the opportunity to give countries whose development model is based on coal access to the high standard of power plant technology. On 18 November 2015, the OECD adopted regulations for the granting of export loan guarantees for supplies and

services related to coal-fired power plants. They provide a clear set of rules and, for pragmatic reasons, a transition period. This regulation makes it impossible for European plant builders to compete with support in project financing against Asian providers, who always bring project financing with them. There are plenty of concrete examples of this, especially for the activities of Chinese companies and the Chinese Import-Export Bank. This attitude of refusal by the OECD and World Bank ultimately spurred Asian countries to develop their own project financing mechanisms. The Asian Infrastructure Investment Bank (AIIB) began official operations in Beijing on 16 January 2016. This step created an alternative to the World Bank, which is dominated by the USA and where the Western world calls the shots when it comes to the financing of major projects. The Chinese leadership will be the leading force at the AIIB. Jin Likun, the founding president of the bank, stated: “We will initially concentrate on projects in Asia that are related to electric power generation and transmission. We will also include transport infrastructure projects: roads, railway lines and urban construction projects.” One noteworthy aspect is that Germany and the Netherlands are also working in the AIIB. The Bundestag adopted the resolution for Germany’s participation at the beginning of November. The German participation, however, will not change the fact that Asia has now set up a genuine alternative to the World Bank.

World Energy Outlook 2015 and Trends Until 2040

The International Energy Agency (IEA) points out right at the beginning of its World Energy Outlook that there were a lot of changes in 2014 and not only in the conventional energy system; renewable energy sources also gained in importance around the world. Almost half of all new-build power plants use renewable energy sources. Contrary to all of the announcements made in advance of COP21, the focus on energy conservation is not yet as sharp as might be expected from all the promises. Quite the opposite: the IEA assumes that energy consumption will increase by one-third by the year 2040. According to the IEA’s primary scenario, this increase will be driven above all by India, China, Africa, the Middle East and South-east Asia. A decline of 15 % is expected for Europe, of 12 % for Japan and of 3 % for the United States. All of the INDCs submitted in advance of the COP21 have been considered in the IEA’s primary scenario. The primary scenario consequently reflects everything that can realistically be expected if and when the COP21 contract parties fulfil their promises.

China plays a significant role in this scenario. China will remain by far the world’s largest producer and consumer of coal. Similarly, however, China will also utilise renewable energy sources more than any other country. In 2030, China will finally overtake the United States as the largest consumer of oil and gas. China’s energy consumption will then be twice as high as that of the United States. This project takes into account, as described above, that steel and cement production has already declined substantially and that the specific energy consumption for an additional unit of Chinese economic performance amounts to only 85 % of what has been required in the past 25 years. Despite the tremendous progress that China has made, this country will consequently continue to be far and away the greatest consumer of energy.

In the World Energy Outlook 2015, special emphasis is given to the role that India might play in the future. In relative terms, India’s growth in energy consumption is even greater than China’s; it will increase by one-fourth

as of 2040, but in absolute figures India will nevertheless continue to trail China. At this time, one-sixth of the world's population lives in India, but this share of the world's population is responsible for only 6 % of world energy consumption. These dimensions clearly demonstrate how difficult it is to project the development of the Indian energy system over a period of decades. The IEA assumes that India will develop into the second-largest coal producer worldwide and that as early as 2020 India will become the largest coal importer, overtaking Japan, the European Union and China. In actual fact, India became the largest importer of coal in 2015!

The IEA emphasises that natural gas consumption up to 2040 will grow by 50 % and this energy source could therefore display the highest growth rate. In the IEA's view, natural gas is highly suitable for replacing carbon-intensive fuels or to support the integration of renewable energy sources into the energy system. Natural gas is said to be "a good fit" for the decarbonisation of the energy system. Despite this clear commitment to the role of natural gas, the IEA points out that methane is a greenhouse gas with "enormous" impact. Unless there are concerted efforts to stop methane leakage along the entire chain of effects, natural gas's reputation as a climate-friendly energy source will suffer "a blow".

In its remarks on coal, the IEA noted that its fate is turning since it has been able to increase its share of energy supplies from 23 % in 2000 to 29 % today. While coal covered 45 % of the growth in energy consumption over the last 10 years, it will cover only 10 % of the growth in consumption up to 2040. In this sense, coal will certainly contribute to growth, particularly because of the trebling of the demand for coal in India and South-east Asia. Owing to the political headwind, the IEA expects consumption to decline by 40 % over the same period in the OECD countries. Coal consumption is expected to decline to as little as one-third in the European Union by 2040. This would mean that by 2040 four-fifths of coal consumption would be in Asia. In the IEA's primary scenario, coal remains the backbone for energy supply in many countries.

In conclusion, the bottom line of the IEA's primary scenario is that the promises of the member states regarding COP21 will lead to a deceleration in the growth (!) of CO_2 emissions, but that there will not be any decoupling of economic growth and emissions and that the 2° C target cannot be achieved. For this reason, the IEA has presented a climate scenario that calls for greater efforts in energy efficiency, higher investments in renewable energies and the discontinuation of subsidies for fossil energy sources that encourage consumption; finally, and a fundamental element, it requires the reduction of methane emissions during oil and natural gas production. The IEA has demonstrated that the measures announced within the framework of the COP21 are inadequate to achieve the 2° C target. In view of the negligible magnitude of German CO_2 emissions, a global solution utilising free market instruments is urgently needed, not unilateral action.

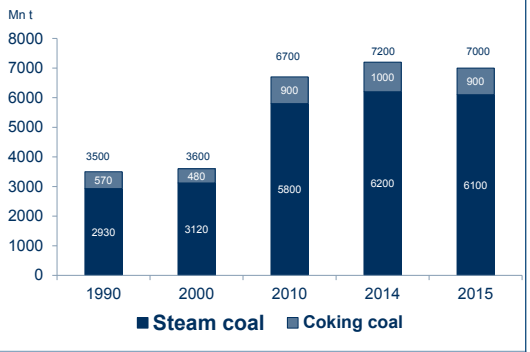
World Hard Coal Production

While world hard coal production of 7.2 bn t in 2014 was practically unchanged in comparison with the previous year, it declined by almost 3 % to 7.0 bn t in 2015. The decline for coking coal of 10 % was significantly greater than the 1.6 % for steam coal.

This decrease was especially dramatic in Asia. The critical reason for the clear decline in the reporting period 2015 over

2014 is the slowdown in the rate of growth in China and the slump in the construction industry there; this has impacted above all the raw material industry. China's production decreased by 1.5 %. The collapse from 228 mn t to 156 mn t in China's imports pulled production in Indonesia and Australia down as well. The decline was especially extreme for Indonesia (-18 %) because the Chinese regulation affected lower-grade coal more strongly. Australia was able to jump in here – otherwise, the decrease for Australia, above all because of the slumping steel industry, would have been even greater than the -4.5 % that was actually posted.

World Hard Coal Production



Source: VDKi own analyses

Figure 5

The strong downward spiral in price development accelerated even more in 2015. Despite continuous cost reductions, some providers have managed to achieve even substantially greater cost savings during the crisis, and this has increased the pressure on other providers to exit the market – especially in countries with a strong currency such as the USA. The US dollar continued to gain in value over the euro and other currencies in 2015, although the gains were in part not as great as in 2014. In comparison with the euro, the dollar rose from € 0.86 per $1 in January 2015 to € 0.92 per $ 1 in December 2015, an increase of 7 %. At the same time, rising production costs have resulted in high losses for some mining companies. Although there have been extensive closures, the market consolidation is only just now beginning. The major part of worldwide production growth comes from the large consumers in Asia.

Hard Coal Production of Important Countries in the Pacific Region in mn t

				Change in %
Producing Countries	2013	2014	2015	2015 / 2014
China	3,671	3,598	3,545	-1.5
India [1)]	518	612	675	10.3
Australia	410	441	421	-4.5
Indonesia	474	458	376	-17.9
Total	**5,073**	**5,109**	**5,017**	**-1.8**

[1)] In part, own estimates; reporting period in India is not equivalent to calendar year
Source: Various analyses excluding BGR (see HT-W4)

HT-W3

It is becoming increasingly clear that India will have a key role to play in future market development. Production in 2015 rose by 10 % over the previous year. If the country is able to cast off its bureaucratic fetters and solve its logistic problems, it will further raise its level of self-sufficiency. Otherwise, the growth in demand will create even more room for coal imports.

World Hard Coal Market

The world hard coal market fell by 111 mn t (8.5 %) in 2015. While domestic trade rose slightly, seaborne trade fell by 117 mn t (9.6 %), a rather higher decrease than the overall market. World trade in coal developed as shown below in 2015:

World Hard Coal Trade

	2013	2014	2015	Change 2015 / 2014	
	mn t	mn t	mn t	mn t	%
Seaborne Trade	1,209	1,221	1,104	-117	-9.6
Cross-Border Trade	95	85	91	6	7.1
Total	**1,304**	**1,306**	**1,195**	**-111**	**-8.5**

Source: VDKi own analyses

HT-W4

Owing to the steep decline in the steel market (especially in China), there was a relatively strong decrease in coking coal exports by 38 mn t (-12 %) in seaborne trade. The steam coal market declined as well, but the decrease of 79 mn t (-9 %) was not as drastic as in coking coal exports.

The global economic weakening, the competition from shale gas in the USA, the diminishing importance of coal in OECD countries and the situation in China led to the first decline in the world hard coal market in comparison with past years.

Seaborne Hard Coal World Trade

	2013	2014	2015	Change 2015 / 2014	
	mn t	mn t	mn t	mn t	%
Steam Coal	930	912	833	-79	-8.7
Coking Coal	279	309	271	-38	-12.3
Total	**1,209**	**1,221**	**1,104**	**-117**	**-9.6**

Source: VDKi own analyses

HT-W5

Since world trade declined more sharply than world production, the share of world trade in production declined by 1.1 % and came to 17 % in 2015.

World Production/World Trade

Hard Coal	2014	2015	Change 2015 / 2014	
	mn t	mn t	mn t	%
World Production	7,219	7,009	-210	-2.9
World Trade	1,306	1,195	-111	-8.5
Share of World Trade in Production	**18.1 %**	**17.0 %**		

Source: VDKi own analyses

HT-W6

Figure 6 shows the primary trade flows in seaborne trade. Seaborne trade of 1,104 mn t breaks down into 833 mn t of steam coal and 271 mn t of coking coal. Indonesia supplies almost its complete production (79 %) to Asia. Australia's seaborne trade is also aimed by and large at Asia (87 %). Thanks to their geographic locations, Russia, Canada and the USA can supply coal to both markets, and trade is shifting more and more toward Asia. Colombia (still) delivers primarily to Europe.

The largest import countries are without exception found in the South-east Asia region. However, a significant reversal of roles occurred there in 2015. China, which in 2014 was still the largest coal importer, has now fallen to fourth place. The top position is held by India (216 mn t) ahead of Japan (191 mn t). The EU-28 (147 mn t) is slightly ahead of South Korea (135 mn t). Taiwan (66 mn t) follows, although there is a substantial gap. Within the EU, Germany, the largest member state and largest industrialised country, imports the most coal.

Australia reclaimed from Indonesia (where imports suffered a particularly strong collapse) the position of the largest coal exporter (including lignite) in 2015 by posting

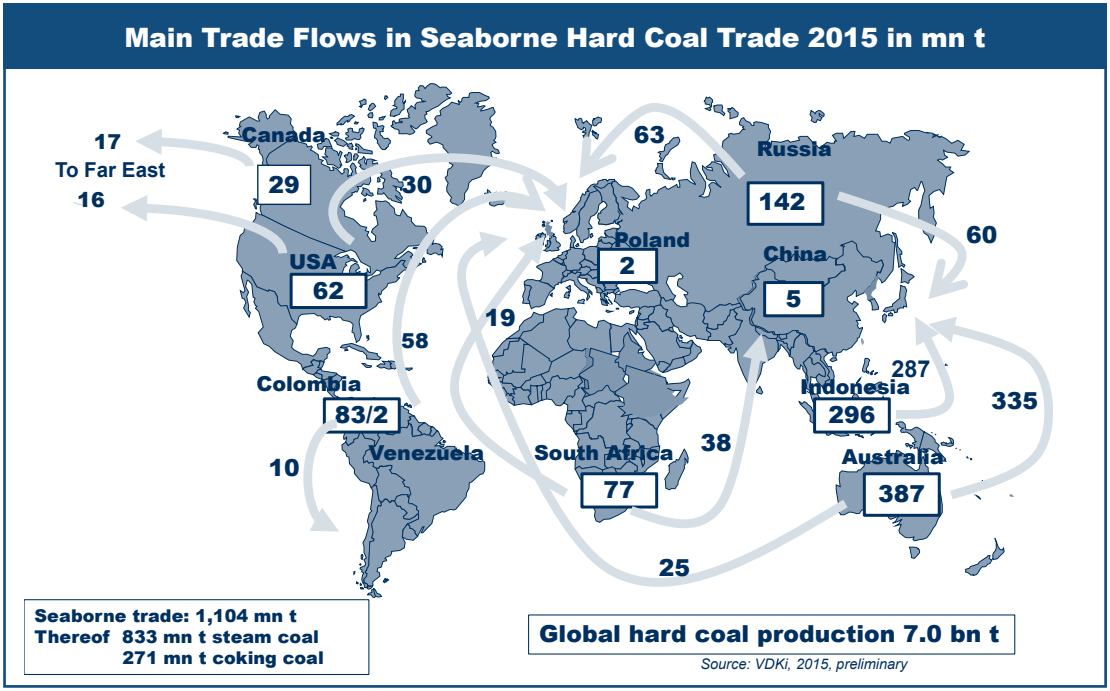


Figure 6

The Largest Hard Coal Importing Countries in 2015 in mn t [1)]

	Total	Steam Coal	Coking Coal
India	216	169	47
Japan	191	150	41
EU-28	147	114	33
PR China[2)]	141	106	35
South Korea	135	110	25
Taiwan	66	66	0
Germany	55	43	12

[1)] incl. anthracite [2)] excl. lignite
Source: Own calculations; seaborne traffic only

HT-W7

387 mn t (202 mn t of steam coal and 185 mn t of coking coal). Russia was able to maintain its position while Colombia and South Africa overtook the USA in 2015.

World Market for Steam Coal

The demand for steam coal on the Atlantic market – which encompasses the east coasts of North, Central and South America, Europe (including the countries bordering the Mediterranean) and the north and west coasts of Africa – rose slightly from 216 mn t to 217 mn t in 2015. Demand on the Pacific market, on the other hand, fell by

46 mn t (7 %) from 662 mn t to 616 mn t. The share of the Atlantic market in the total market now amounts to 26 %, an increase of 25 % over the previous year.

The trend of declining imports, especially of lower-grade coal, continued in the Pacific region in 2015. China in particular reduced its purchases of low-calorific coal. Total imports declined by 228 mn t (32 %) to 156 mn t. India increased its imports very slightly by 1 mn t to 216 mn t. Japan also increased its imports slightly from 188 mn t to 191 mn t.

The Largest Hard Coal Exporting Countries in 2015 in mn t [1)]

	Total	Steam Coal	Coking Coal
Australia	387	202	185
Indonesia	296	296	0
Russia	142	125	17
Colombia	83	80	3
South Africa	77	77	0
USA	62	24	38
Canada	29	2	27

[1)] Seaborne only
Source: VDKi own analyses

HT-W8

Seaborne trade volume breaks down into the two sectors of the coking coal market and steam coal market. The latter includes the two partial markets of the Atlantic and Pacific regions. These two partial markets are marked by differences in the provider structures. The volume exchange between the two partial markets for steam coal changed in comparison with the previous year by 7 mn t from 76 mn t to 69 mn t. But since the market as a whole declined, the volume exchange in 2015 came to 8 % of the total steam coal market (previous year: 6 %).

About 17 % of the global coal production (steam coal and coking coal) was transported to the consumers via seaborne trade in comparison with 18 % in the previous year.

Steam Coal Prices

The deterioration of steam coal prices continued in 2015. The decline stopped initially in spring 2016, but it would be premature to speak of a bottoming out at this point. It is not possible at this time to determine whether the market shake-down that has taken place will be adequate to stabilise prices. There are still overcapacities for American, Australian and Indonesian producers, and worldwide demand is weak. FOB prices from the East Coast of the USA declined by US$ 14/t to US$ 43/t in January 2016 in the year-on-year comparison; the price continued to fall until April (US$ 42/t).

The Pacific steam coal market shrank as well and prices (FOB from Richards Bay) also declined as of January 2016 from about US$61/t in the same month of the previous year to US$51/t. Prices had stabilised at US$53/t as of April.

January prices FOB Newcastle fell by US$ 12/t to US$ 49/t while FOB Qinhuangdao prices fell from US$ 93/t in January 2015 to US$ 62/t in January 2016. Prices from Richards Bay were higher than on the Atlantic market because South Africa was able to sell a large part of its production to the region, especially to India. This led to an implied freight rate from Richards Bay to the ARA ports that remains negative down to the present day.

On the other hand, the prices of the competitor Colombia of US$ 55/t in January 2015 were US$ 6/t lower than the price of South Africa, and an arbitrage window for Colom-

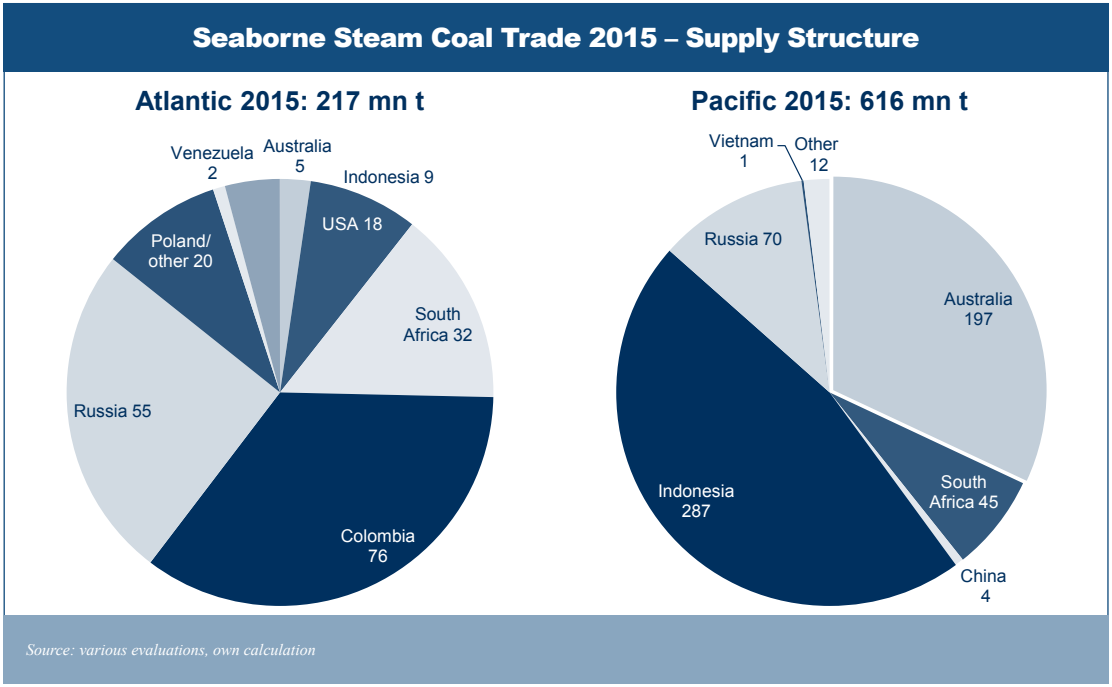
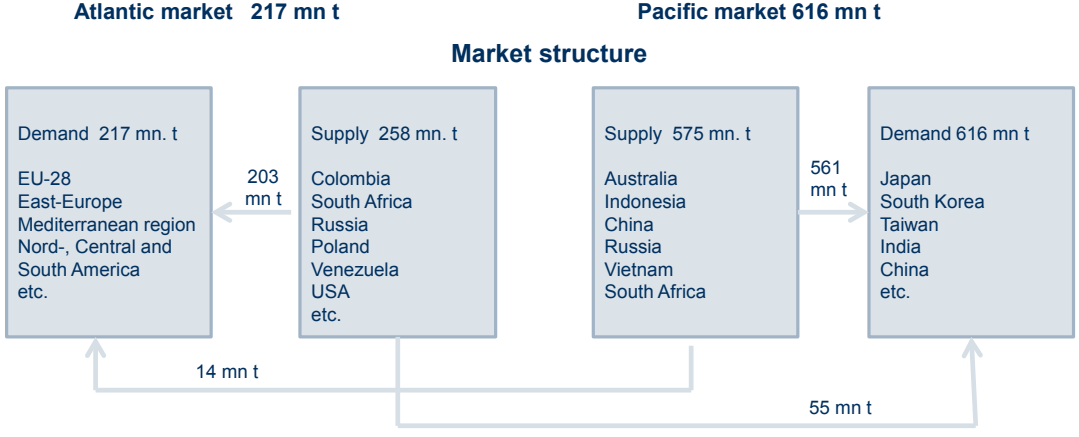


Figure 7

bian deliveries to India opened. In January 2016, the FOB price Puerto Bolivar was about US$ 43/t, US$ 8/t below the South African price. By April 2016 the difference had increased even further to US$ 10/t.

The Russian prices FOB Baltic Sea Coast declined in the January comparison by US$ 13/t; for exports to Asia prices declined even more strongly, by US$ 17/t. Translated into rubles, however, revenues increased slightly (see Country Report) – a special situation because of the especially weak currency. From the customer perspective, however, a weak currency is a disadvantage. Since the euro counts as such, prices in the euro zone did not fall as drastically as in US dollars.

Exchange Volume Between Antlantic and Pacific Steam Coal Markets



Source: VDKi

Figure 8

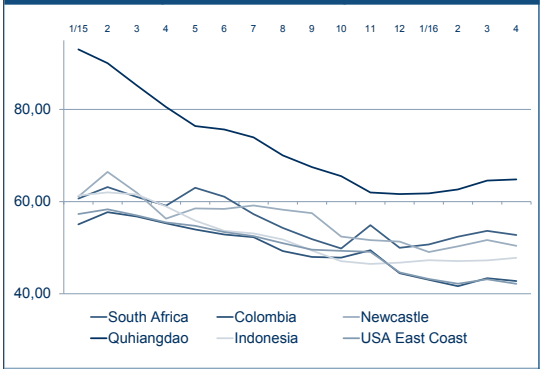
Development of FOB Prices (Monthly Average) in US$/t

Region	January 2015	July 2015	January 2016	April 2016
Atlantic Suppliers:				
Richards Bay	61	57	51	53
Puerto Bolivar	55	52	43	43
US East Coast	57	53	43	42
Russia (Baltic)	56	52	43	43
Pacific Suppliers:				
Newcastle	61	59	49	50
Qinhuangdao	93	74	62	65
Indonesia (Kalimantan)	61	53	47	48
Russia (Vostochny)	68	62	51	52

Source: Own analysis, basis: 6,000 kcal/kg, prices rounded off

HT-W9

Development of FOB Coal Prices in US$/t



Sources: several

Figure 9

World Crude Steel and Pig Iron Production

The pig iron production decisive for the consumption of coking coal, PCI coal and coke declined by 33 mn t from 1,186 mn t in 2014 to 1,153 mn t in 2015 (-2.8 %). Crude steel production fell by 2.9 %.

Crude Steel and Pig Iron Production in the World

	2013	2014	2015	Change 2015 / 2014
	mn t	mn t	mn t	%
Crude Steel	1,618	1,647	1,599	-2.9
Pig Iron	1,165	1,186	1,153	-2.8
Share of Pig Iron in Crude Steel	72.0 %	72.0 %	72.1 %	0.1

Source: World Steel Association

HT-W10

As a consequence of the strong decline in demand, especially in the construction industry, China's production of crude steel and pig iron fell significantly – crude steel production by 2.3 %, pig iron production even more strongly (3.5 %). Nevertheless, China was able to marginally increase its world market share in steel production in 2015 while its share in world pig iron production dipped slightly.

The share of pig iron production in overall steel production decreased slightly to 86 %.

Production from the world's largest steel producers developed as shown below in 2015.

All of the major steel-producing countries (with the exception of India (+2.6 %) experienced a slump of more or less substantial magnitude in 2015. Ukraine was hit the hardest, suffering a decline of 15.6 %, whereby the de facto

Crude Steel and Pig Iron Production in China

	2013	2014	2015	Change 2015 / 2014
	mn t	mn t	mn t	%
Crude Steel	815	823	804	-2.3
Pig Iron	708	716	691	-3.5
Share of Pig Iron in Crude Steel	86.9 %	87.0 %	85.9 %	-1.2
Share of Crude Steel Production in World Production	50.4 %	50.0 %	50.3 %	0.6
Share of Pig Iron Production in World Production	60.8 %	60.4 %	59.9 %	-0.7

Source: World Steel Association

HT-W11

The 10 Largest Steel Producing Countries in the World

Country	2013 mn t	2014 mn t	2015[1)] mn t	Change 2015 / 2014
China	815	823	804	-2.3 %
Japan	111	111	105	-5.0 %
India	81	87	90	2.6 %
USA	87	88	79	-10.5 %
Russia	69	71	71	-0.5 %
South Korea	66	71	70	-1.9 %
Germany	43	43	43	-0.6 %
Brazil	34	34	33	-1.9 %
Turkey	35	34	32	-7.4 %
Ukraine	33	27	23	-15.6 %
Total of the 10 Largest	**1,373**	**1,389**	**1,349**	**-2.9 %**
Total World	**1,618**	**1,647**	**1,599**	**-2.9 %**

[1)] Provisional figures
Source: World Steel Association

HT-W12

separation of the country into controlled and uncontrolled sectors must be taken into account (see Country Report). Aside from this, the decline of 10.5 % in the USA was the most severe decrease for the major steel-producing countries. Turkey (-7.4 %), Japan (-5.0 %) and China (-2.3 %) followed. Germany was just able to maintain its production level.

Market Share of Seaborne World Coking Coal Market

	2013		2014		2015	
	mn t	% Share	mn t	% Share	mn t	% Share
Australia	171	61	186	60	185	68
USA [1)]	56	20	53	17	38	14
Canada [2)]	35	13	31	10	27	10
Russia	15	5	33	11	17	6
Miscellaneous	2	0.7	6	1.9	4	1.5
Total	**279**	**100**	**309**	**100**	**271**	**100**

[1)] Excluding trade with Canada 2)Excluding trade with USA
Source: VDKi own analyses

HT-W13

Coking Coal Market

Although world steel production declined by 2.9 %, trade on the seaborne world coking coal market decreased even more significantly – by 12.3 %. At the same time, there has been a substantial shift in the market shares of the various countries in the seaborne world coking coal market. While Australia's seaborne coking coal exports fell slightly in absolute figures, the market share rose relatively by 8 % to 68 %. The USA (-15 mn t) and Canada (-4 mn t) lost absolute market shares to Australia; the USA share declined by 3 % and Canada maintained its position. While Russia was able to double its market share in the previous year, it was cut almost in half, from 11 % to 6 %, in 2015.

World Coke Market

Coke production declined worldwide from 685 mn t to 652 mn t. Of this amount, 3.5 % was traded; the world coke market is relatively small. Chinese coke exports in the past year came to 9.8 mn t in comparison with 8.6 mn t in the previous year.

China is not only far and away the largest exporter of coke; it is also the largest coke producer. China produced 69 % of the world production (448 mn t) and decreased coke production by 29 mn t in 2015. Europe produced 39.3 mn t of coke, less than in 2014 (49.2 mn t).

The European coke market in 2015 had a volume of 6.7 mn t, 10 % less than in the previous year. Primary exporters of coke besides China are Poland (2.3 mn t after 5.9 mn t in the previous year) and Russia (2.52 mn t after 2.50 mn t in the previous year).

World Coke Market

	2013	2014	2015 [1)]
	mn t	mn t	mn t
Total World Market	22	24	23
World Coke Production	681	685	652
% of World Coke Production	3.2	3.5	3.5

[1] Provisional
Source: Own calculations

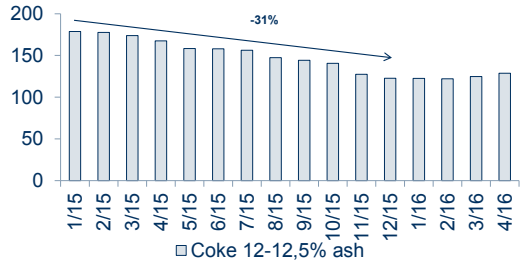
HT-W14

Coking Coal and Coke Prices

The downward slide in coking coal prices continued in 2015 and even accelerated. The price for Australian prime hard coking coal declined by 14 % even in the previous year. It then collapsed from US$114/t in January

2015 to US$77/t in January 2016, i.e. by 32 %. The price recovered to US$94/t by May 2015. It moved along the same lines as ore prices and became decoupled from the development of the steam coal price.

Coke Export Prices FOB China (12 %–12.5 % Ash) in US$/t



Source: McCloskey

Figure 10

The coke prices FOB China described a similar trend to the prices for coking coal. They fell steadily from US$179/t in January 2015 to US$123/t in January 2016, corresponding to a decline of 31 %. The price recovered to US$133/t by May 2016. The CIF ARA prices in 2015 were as much as US$38/t higher than the Chinese prices. The gap narrowed toward the end of the year and as of May 2016 had closed to US$22/t.

Bulk Goods Transports and Bulk Carrier Fleet

Iron ore, steam coal and coking coal are the most important dry bulk goods in the world. The dynamic development of bulk goods transports in recent years has mirrored worldwide economic development, above all in Asia and the USA. General economic development in China, especially the boom in construction, and India's upswing drove dry bulk transport upwards. The general picture is marked above all by the imports of coal and iron ore by China and India. While iron ore transports in 2015 increased over 2014, the transport of steam and coking coal fell by almost 5 %. A decrease in iron ore transports is also expected for 2016 while the transports of steam and coking coal will presumably stabilise.

Most Important Bulk Goods

	2014	2015[1)]	2016[2)]	Change 2015 / 2014
	mn t	mn t	mn t	%
Iron Ore	1,338	1,365	1,344	-9.6
Steam and Coking Coal	1,205	1,149	1,157	7.1

[1)] Provisional [2)] Forecast, own calculations
Source: Frachtcontor Junge & Co. GmbH, various analyses

HT-W15

The development in bulk goods transports had a decisive impact on fleet development. The growth in ships for dry bulk goods continues to fall. In 2015, 88 Capesize ships were delivered. Twice as many were expected at the beginning of the year. The situation for the Panamax ships is similar.

Capacities of the Bulk Carrier Fleet Forecast Based on Order Books and Delivery Dates

	2013	2014	2015	2016 Net Growth Q1
	mn Dwt	mn Dwt	mn Dwt	m Dwt
Capesize	296	310	310	0.5
Panamax	186	193	196	-0.1
Total	**482**	**503**	**506**	**0.4**

Source: Frachtcontor Junge & Co. GmbH, own analyses

HT-W16

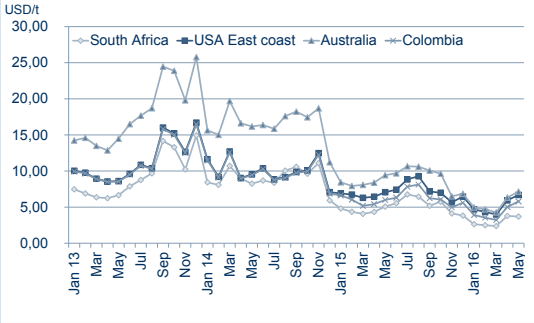
Some of the deliveries were only postponed until the new year, however, so that a newer ship would be registered at this time. Nevertheless, the growth in capacity of the bulk carrier fleet at the beginning of 2016 was virtually imperceptible (Capesize) or even slightly negative (Panamax). The reason for this is the rise in the number of ships sold for scrapping. The consequence was a fall in scrap prices to about half of the value in the past year. Because of the poor market environment, Frachtcontor Junge nevertheless assumes that scrapping will continue to increase and that the age of the ships marked for scrapping will decline further. New construction activities have dropped drastically, and at the beginning of the year, there were fewer than half a dozen orders for new Capesize and Panamax ships.

Freight Rates

The Baltic Dry Index (BDI) is calculated from the indices of the four ship groups Capesize, Panamax, Supramax and Handysize. The average value for last year of 718 points represented the lowest value of the Baltic Dry Index since 1986. According to Frachtcontor Junge, the resurgence in the freight market for dry bulk goods at the end of the year that had frequently been observed in previous years did not occur in 2016. A record low point of 290 points was reached in February before the index recovered.

Capesize ships were hit especially hard in 2015. Frachtcontor Junge noted that the average revenues at the end of March came to no more than between US$485 (!) and US$1,985 a day. Development for Panamax ships was better because they are less dependent on iron ore and coal transport than Capesize ships.

Sea Freight Rates (Capesize) for Hard Coal to the ARA Ports



Source: Frachtcontor Junge

Figure 11

Freight rates for Capesize ships with a capacity of 150,000 DWT headed for Rotterdam came to US$7.60/t from Queensland, US$5.90/t from Puerto Bolivar and US$4.45/t from Richards Bay at the beginning of January 2015. As of the middle of the year, the freight rates from these ports rose by 36 %, 21 % and 55 %, respectively. By the end of the year, freight rates collapsed again, and at the beginning of 2016 came to US$5.90/t, US$5.20/t and US$3.40/t, respectively, i.e. even below the low level of January 2015. At the moment, the freight rates from Colombia are hovering at the level of the beginning of the year while the rates from South Africa have risen by 15 %. These differences in development have made it possible for Colombian suppliers to take advantage of arbitrage opportunities (see Country Report).

Bunker prices collapsed parallel to crude oil prices in the past year. This, along with the market situation, made a substantial contribution to the decline in freight rates.

PROSPECTS

The development of real growth in gross domestic product both worldwide and in the separate countries is presented in the chapter “General World Economic Conditions”. The forecasts for the most important economic regions are summarised once again below.

According to a press release from the World Bank, these forecasts will have to revised to slightly lower levels because growing protectionism and the drying up of cross-border capital flows must be expected in the future. In the opinion of the World Bank, the development of the households in emerging and developing countries will be especially critical. The low interest rates have driven debt upward, and now the risk that a new financial crisis will be triggered by these countries is rising. The possibility of such a development can certainly not be excluded, but the OECD forecast is still being used as a working hypothesis. The Medium-Term Coal Market Report 2015 from the International Energy Agency is oriented along the lines of this framework. It presumes that the pressure on coal prices will remain high until 2020. This is not a consequence of energy and climate policies, however, but results from overcapacities and weakening demand.

The relationship between climate protection negotiations and the development of world coal production frequently claimed in the media is an artificial construction. According to analyses from the International Energy Agency, there is a strong correlation between the demand for all raw materials used in industry and for energy – and this is determined by the broad macro-economic developments. The opportunity for many companies to reduce their costs even further is evidence that the global mining sector does not have to be written off just because some important major companies are having financial difficulties. The Medium-Term Market Report from the IEA, for example, shows that the cost curves for Australian providers have fallen in a magnitude of double-digit US-dollar amounts within two years – both for opencast pit mines and underground mines. So the industry continues to be competitive.

Real Growth in Gross Domestic Product

	2014	2015 [1]	2016 [2]	2017 [2]
	Change from Previous Year in %			
World	3.0	3.0	3.0	3.0
USA	2.4	2.4	2.0	2.2
Euro Zone	1.0	1.5	1.4	1.7
Japan	-0.1	0.4	0.8	0.6
China	7.8	6.9	6.5	6.2

[1] Provisional [2] Forecast

Source: IMF, International Financial Statistics, OECD Interim Economic Outlook, 2016

HT-P1

Market consolidation on the world coal market has certainly not been concluded, but the first signs have become apparent. Conversely, however, demand must start to increase again if stabilisation is to become possible in the coming years. A look at the major consumption regions is especially important in this respect. The section “General Global Economic Conditions” describes that China is currently displaying a slower rate of growth in energy consumption and why this is happening, but there are other up and coming regions in South-east Asia. There is no “second China”, of course, but taken together India and many South-east Asian countries will provide

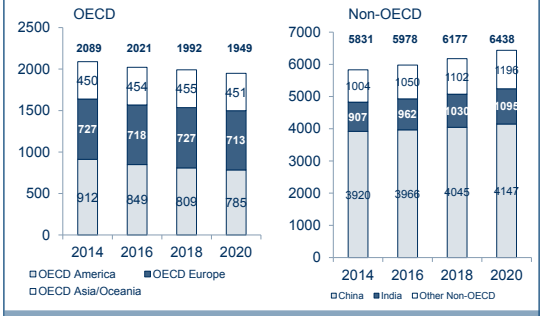
further positive stimulus to the market. The IEA speaks in this context of a “long sunset for coal”. This is meant to indicate that there will not be an abrupt turnaround in the trend. On the contrary, specific developments such as the high competitive pressure from shale gas in the USA will play a role alongside the general macro-economic conditions and their impact on the steel industry. The current market development is by no means the result of a global rethinking of energy policies. The decisive point will be the way the COP21 countries realise their Nationally Determined Contributions (NDCs). Even if they should realise their intentions completely, the IEA primary scenario does not project the complete disappearance of hard coal from the picture.

For the people in China, decisive steps for eliminating air pollution are much more important than climate change. In this respect, the Medium-Term Market Report from the IEA shows that even in China the power plants are no longer the primary emitters of air pollutants, but rather (depending on the specific pollutant) industry and the transport sector as well as private consumers.

Further development in future will be moulded above all by India and South-east Asia. The first sustainability report from Glencore describes how coal, despite the growing contribution from renewable energy sources, will remain the primary pillar of energy supply. Glencore projects growth in the demand for coal of 7 % until 2030. The most important driver is the construction of new coal-fired power plants in national economies that are still lagging economically. If this demand is to be satisfied, believes Glencore, additional export capacities of a magnitude between 500 mn t and 1 bn t must be made available in future. This forecast is in sharp contrast to the general perception of the hard coal sector. According to the Glencore study, non-fossil energy sources will grow by 53 % by 2030. Nevertheless, they will still trail coal.

In its Medium-Term Outlook, the IEA assumes that the demand for coal (including lignite) in the OECD countries will decline until 2020 – and this will be the case in all of the OECD countries. The non-OECD countries, on the other hand, will all grow, although at different rates. This is true of China, India and all other non-OECD countries (Figure 12).

Forecast of Global Coal Demand (Hard Coal/Lignite) Until 2020 in mn t



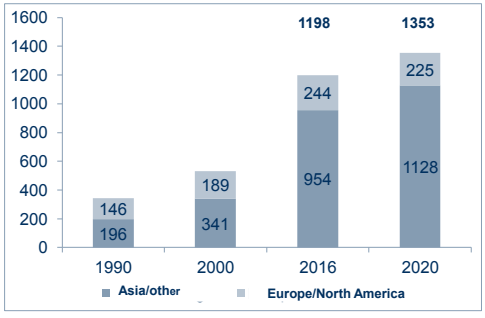
Source: IEA Medium-Term Coal Market Report 2015

Figure 12

So this outlook is similar to that found in the previously mentioned Glencore report. However, the IEA estimation for overseas trade (Figure 13) is not quite as optimistic. The OECD assumes that seaborne trade in Asia will increase substantially once again from 954 mn t in 2016 to 1,128 mn t in 2020 while it will decline in Europe and North America. All in all, there will be a development from 1.2 bn t in 2016 to 1.35 bn t in 2020.

The forecasts are not directly comparable with each other because of the differences in the underlying forecast periods, but growth of up to 1.5 bn t in 2030 would definitely be in line with the forecast made within the scope of the Medium-Term Outlook. If this market development is to become possible, however, mining companies would have to make massive investments and must not allow themselves to be influenced by the general atmosphere.

Development of Seaborne Hard Coal by Import Region Until 2020 in mn t



Source: IEA Medium-Term Coal Market Report 2015 – own analysis

Figure 13

Stable general conditions and long-term prospects are required for the stabilisation of the general conditions for investors in hard coal mining. It is of major importance for the acceptance of steam coal that no more subcritical power plants are built in developing countries. The OECD countries have blocked themselves in this respect, however, because their financial support of the construction of new power plants is tied to such restrictive terms and conditions that it is a simple matter for Asian investors to submit significantly more favourable offers. While it is much easier for developing countries to finance these power plants, the plants do not utilise the latest technology. The OECD countries would be well-advised to rethink their position so that they would have a greater climate policy impact than what comes from vague promises to support developing countries during the establishment of an economy based on renewable energies.

The development of the coking coal market is marked by the current crisis that has been triggered by overcapacities, especially in China. An initial increase in the prices for ores as well as coking coal at the beginning of 2016 is not yet an indication that the crisis is over. On the contrary, the prices have fallen again since then. The structural adjustment in China is just now beginning, and it is still too early to judge what effects the protective measures now taken by the European Union will have. The decline in bulk freight has led to a scrapping of ships in such a scope that the scrap price fell to half of its previous level last year. The industry will not be able to free itself from this vicious circle for a number of years.

According to current figures from the World Steel Association, crude steel production recovered significantly in March and April over the low point in February 2016 and has again reached the level of spring 2015. These figures are evidence that there are still no signs of a market consolidation on the Chinese side. In the year-on-year comparison, Chinese production developed exactly in line with the world average. The fact that the utilisation of capacities in world steel production rose from 65 % in December of last year, which marked the low point, to 71.5 % in April can be viewed as a sign that the indus-

try is beginning to recover. We must wait and see if this is the hoped-for light at the end of the tunnel, and it will depend on the general conditions of worldwide economic developments.

Additional background information on the development in the large hard coal producing countries is provided in the Country Reports at the conclusion of this Annual Report.

EUROPEAN UNION

Economic Growth in Europe

The recovery of European economies following the financial crisis and the national debt crises in some of the member states is continuing. For the EU (= EU-28), the more or less zero growth in 2013 was followed by growth in the real gross domestic product (GDP) of 1.4 % in 2014 and of 2.0 % in 2015. The development in the euro zone was rather more reserved; unfortunately, this is not an indication of the stabilising effect of a single currency. Of the medium-size and large EU countries, the following posted the highest growth rates: Ireland (+7.8 %), Sweden (+4.2 %), the Czech Republic (+4.2 %), Romania (+3.8 %), Poland (+3.6 %), Slovakia (+3.6 %), Spain (+3.2 %) and Bulgaria (+3.0 %). All of the EU coal countries except Germany can be found in this list. (Underground hard coal mining in Great Britain ceased in 2015.)

Germany's growth of 1.7 % corresponded precisely to the level of the euro zone, but was slightly below average in comparison with the EU. Countries with weaker growth included France (+1.3 %), Denmark (+1.2 %), Austria (+0.9 %), Italy (+0.8 %) and Finland (+0.5 %). Greece's economy was the only one in the Union to shrink (-0.2 %), continuing a series of years of negative growth after the one-time reversal of the trend in 2014.

Economic Growth EU-28 in Per Cent [1)]

Member States	2013	2014	2015
Countries of the Euro Zone (EU 18)[2)]	*-0.3*	*0.9*	*1.7*
EU-28	*0.2*	*1.4*	*2.0*

[1)] Until 31/12/2012 EU 27 [2)] Until 31/12/2012 EU 17
Source: Eurostat, per 07/06/2016

HT-EU1

The heading over the Spring Forecast 2016 from the European Commission reads: "Despite High Risks, Continuation of Modest Growth". In view of the slowing economic performance of the most important trade partners, economic growth is expected to remain at approximately the same level as in 2015. Growth in the euro zone is expected to amount to 1.6 % in 2016 and to 1.8 % in 2017. GDP growth in the EU is projected at 1.8 % and 1.9 % for 2017. The "extremely relaxed money policy" of the ECB and fiscal policies are mentioned as the cause of the modestly positive expectations for development. On the other hand, a recovery in oil prices is expected so that the positive effects on available income will presumably be consumed. Finally, EU exports are benefiting from the weakness of the Euro. That is quite a fragile support for some of the member states.

The EU Commission assumes that domestic demand will become the decisive factor for growth. Investments in the coming year in both the euro zone and the EU will presumably grow by 3.8 %. This is countered by the possibility of private consumption becoming weaker because

of the lower growth in real income, assuming that inflation begins to rise again as expected.

The prospects for growth on the "emerging markets" and the established economies "remain weak" in the view of the EU Commission. This wording may seem surprising because although growth has slowed on the emerging markets, it is anything but weak in comparison with the EU. And forecasts project world economic growth of 3.1 % in 2016 and 3.4 % in 2017. These figures are also higher than the corresponding estimates for the EU. The warning that slower growth, especially in China, could have a dampening effect on growth in the EU is correct, however. The positive outlook for India is the other side of the coin.

The decisive issue is whether the EU will resolve its internal problems before the support from the weak euro vanishes. These issues include long-overdue structural reform, the EU climate policy that unilaterally burdens European, especially German, companies and the exit negotiations after the (in the eyes of the Brexit advocates) positive outcome of the EU referendum in the United Kingdom.

Energy Consumption

Economic growth in the European Union recovered substantially in 2014 in comparison with 2013, although recovery in the euro zone was not as strong. This did not result in an increase in the primary energy consumption, for which data are always available only for the previous year. On the contrary, primary energy consumption in the European Union fell from 2.4 bn TCE to 2.3 bn TCE. In this sense, the process of the decoupling of primary energy consumption and economic growth continued. The shares held by the different energy sources remained almost unchanged in comparison with the previous year. Renewable energies (7 %) and hydroelectric power (5 %) have a combined share of 12 %, which is exactly as high as the share of nuclear energy. The share of coal has remained unchanged at 17 %. Natural gas has lost 1 %, and crude oil increased by the same percentage. So the statement that fossil energy sources, including nuclear energy, that are together designated as conventional energy sources have a share of 88 % in the energy supply to the European Union remains true for this year as well. In view of the higher growth rate of 2 % in the European Union and of 1.7 % in the euro zone in 2015, a rise in primary energy consumption may possibly be expected for 2015.

A shift in the shares of the various energy sources may become evident if the ongoing expansion of renewable energy sources, especially in Germany, continues. Presumably, however, renewable energy sources in the European Union will not continue to expand at the same speed as in past years. This is because the budgets for the expansion programmes for renewable energy sources have experienced cutbacks in many countries of the European Union, in no small part a consequence of the financial crisis. In some countries such as Denmark, there is resistance to the amount of financial support because of the burdens on the economy from the escalating additional costs; this has led to a change of course, and Germany and its energy turnaround will soon be left all alone in Europe. A leading newspaper in one of our neighbouring countries, the Neue Züricher Zeitung, described the situation with the following words on 15/06/2016: "Energy turnaround is losing its magic. Germany sees itself as a leader in climate protection policy – but support is crumbling."

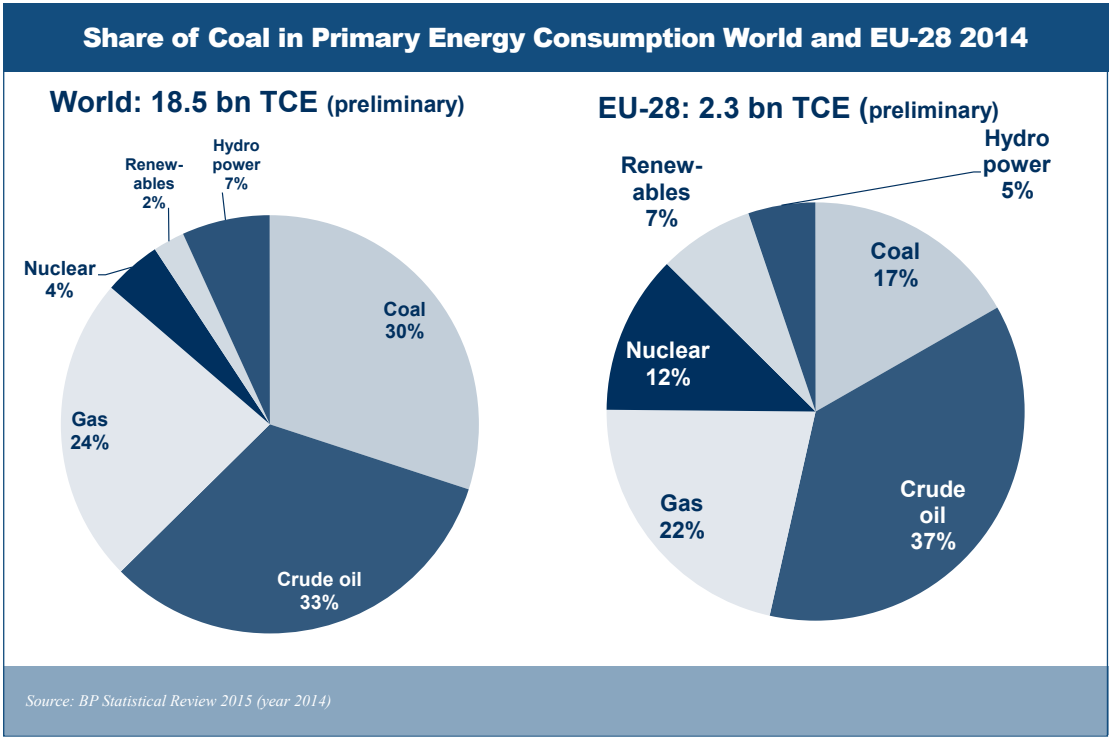


Figure 14

Hard Coal Market

European hard coal production continued to decline in 2015 as well. It fell from 8 mn t to 7 mn t in Germany. The Auguste Victoria Mine in Marl (once owned by BASF) of long-standing tradition was shut down per 01/01/2016; there are now only two mines remaining, Prosper-Haniel in Bottrop and the anthracite mine in Ibbenbüren. Production in Spain declined from 4 mn t to 3 mn t. Spain long battled the European Union's subsidisation rules that allowed subsidisation solely in conjunction with a plan for closing the mines, requiring the reimbursement of any paid subsidies if a mine was reopened at the conclusion of the closure schedule. In the meantime, however, the Spanish government have come to an agreement with the European Commission, submitted a closure schedule and adapted to the end of subsidised hard coal mining with an eye on 2018. The Commission approved the closure schedule on 27 May 2016. The hard coal mining industry in Poland is caught up in an extremely difficult adjustment situation. The Country Report for Poland de-

scribes the position in detail. Most recently, a compromise was found that prevented the bankruptcy of Kompania Weglowa. This regulation still awaits the agreement of the European Commission, however. Production in the Czech Republic declined from 9 mn t to 8 mn t. OKD, the Czech Republic's largest hard coal producer, has filed for bankruptcy this year. The Country Report contains more detailed information. These developments will presumably mean that hard coal production in the European Union in 2016 will be substantially below 100 mn t.

Hard Coal Production in the EU

	2013 mn t (t=t)	2014 mn t (t=t)	2015 mn t (t=t)
Germany	8	8	7
Spain	4	4	3
Great Britain	13	12	9
Poland	77	73	72
Czech Republic	9	9	8
Romania	2	2	2
Bulgaria	2	0	n/a
Total	**113**	**108**	**101**

Source: EURACOAL

HT-EU2

The development in Great Britain has been especially dramatic. Production fell from 12 mn t to 9 mn t in 2015, and a further decline to 3 to 4 mn t is expected for 2016. Kellingley, the last underground mine, shut down at the end of 2015. This has happened above all because of Great Britain's climate policies; they are hostile to coal and include a minimum price for CO_2. At this time, public consultations about the exit from coal in 2015 are under way.

A major increase in hard coal imports in the European Union was recorded in Germany and Spain, just as in the year before. Domestic mining of hard coal has declined significantly in both of these countries. For the first time, there was also a slight rise in Portugal's imports. Imports to all of the other countries were more or less falling rapidly. The decline from 4.5 mn t to 2.8 mn t in Denmark was especially pronounced because renewable energy sources have been advancing rapidly in this country. Polish imports declined from 10.3 mn t to 8.2 mn t, about 2 mn t. The decline in Slovakia was also sharp, from 6.7 mn t to 3.6 mn t.

Hard Coal and Lignite Volume in the EU

	2013 mn t (t=t)	2014 mn t (t=t)	2015 mn t (t=t)
EU 27 Hard Coal Production	115	106	100
EU 27 Coal Imports/ Domestic Trade	214	205	192
EU 27 Coke Imports/ Domestic Trade	7	5	7
Hard Coal Volume	**336**	**316**	**299**
EU-28 Lignite	407	401	398
Total Coal Volume	**743**	**717**	**697**

Source: EURACOAL, Coke Market Report, Issue 05/15

HT-EU3

Total coal volume, including lignite, is also declining in the European Union. The drops in production and imports have made themselves felt in equal degree. Lignite production is also on a slight decline.

Germany is far and away the largest importing nation for hard coal in Europe. Imports rose by 1.3 mn t to 43.2 mn t for steam coal and by 0.6 mn t to 12.3 mn t for coking coal. In Great Britain, which is still Number 2 in Europe, steam coal imports dropped sharply from 32 mn t to 22.4 mn t, by exactly 30 %. The decline in coking coal imports for the British steel industry from 6.3 mn t to 4.7 mn t translates as a drop of 25 %. It is evidence of Great Britain's continuing trend to deindustrialisation. Steam coal imports to Italy, the previous Number 3 country, remained stable at 16 mn t. Spain is now the new Number 3, increasing its imports by 34 % to 17.4 mn t in comparison with 13 mn t in the previous year.

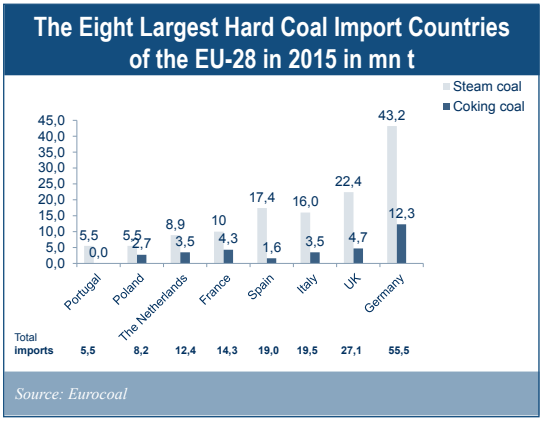


Figure 15

EU Energy Policy/Energy Union

The Commission presented its "Energy Security Package" on 16 February 2016. The security of energy supplies is one of the key pillars of the strategy for the Energy Union. The package contains a broad range of measures that are intended to heighten the stability of the EU during a crisis from interruptions in the supply of natural gas. These measures include the "throttling of energy demand", increase in energy production (including renewable energy sources), the continued development of a single energy market that functions smoothly and is completely integrated and the diversification of energy sources, suppliers and supply channels. Moreover, the proposals are supposed to enhance transparency on the European energy market and generate greater solidarity among the member states. Greater transparency is aimed at the better exploitation of the advantages resulting from a liquid market governed by competition. This alone, however, will not result in greater supply security.

Still, the EU Commission is aware of the great dependency on suppliers from regions that are potentially vulnerable to interruptions in gas supply. It proposes a transition from a national to a regional approach. In addition, a solidarity principle among the member states would be implemented so that in the event of a crisis the supply to private households and, in particular, to health care services would be assured. Bilateral treaties of member states with third-party states must become more transparent and compliant with EU law in all points. This is understandable from the Commission's viewpoint, but it also does not per se increase supply security.

One important element of the package adopted by the Commission is a regulation to secure gas supply. As is well known, the EU Commission attributes an important role in the reduction of CO_2 emissions to natural gas while its treatment of coal isstepmotherly. Besides the general dislike of coal, this is also because the emissions from

natural gas along the full length of the added-value chain are not taken into consideration (cf. in this context the results of the Pöyry study in the chapter on Germany). Moreover, the Commission appears to have the wrong idea regarding the flexibility of hard coal-fired power plants. Hard coal-fired power plants are a flexible and climate-friendly alternative to gas turbines.

Finally, the EU Commission proposes a strategy for liquefied natural gas (LNG) and the storage of gas. In 2015, Europe had capacities for the import of LNG that are sufficient to cover 43 % of current demand for natural gas. The Commission would like to improve the access of all member states to LNG as an alternative source of gas supply. This is why it is important to present to the EU Commission the disadvantages for climate policy of energy supply based on LNG – especially with respect to fracking.

Emissions Trading

The European Emissions Trading System (ETS) is the primary instrument for the European Union's climate protection. Introduced in 2005, the ETS is a "cap and trade system"; this means that upper limits (caps) have been set and that the participating parties engage in trade with one another to sell excess emission quantities or to buy quantities to make up shortfalls. The amount of CO_2 that may be emitted has been set for about 12,000 plants in the energy business and the energy-intensive industry in all of Europe. About 42 % of all greenhouse gas emissions are currently covered. Since special attention has been paid to include all coal-fired power plants in the system, the compatibility of power generation using hard coal and lignite with the targets set for European climate protection is assured.

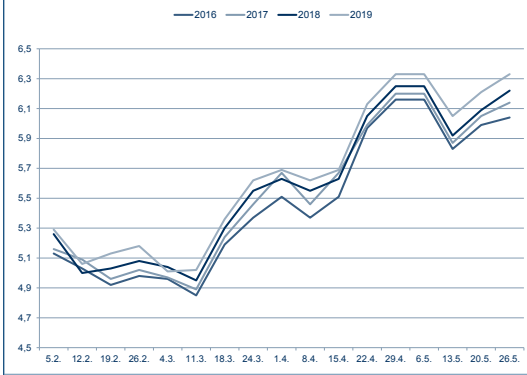
The ETS and its effects are frequently misunderstood. It functions on the basis of the volume cap – completely independently of whether the certificate price is high or low. Objections that the price signals are inadequate are often heard. In actual fact, however, the price says only whether climate protection costs a lot or only a little. The first section of the ETS Directive (2003/87/EC) emphasises that the system has been designed "to promote reductions of greenhouse gas emissions in a cost-effective and economically efficient manner." In other words, the directive seeks to make climate protection possible at a low CO_2 price. Price manipulations are unnecessary and ultimately serve only to benefit competing energy sources that are too expensive.

If the desire had been to steer the system by prices rather than quantities, it would have been necessary to introduce a CO_2 tax system in 2005. This step would have required a unanimous vote of the European Council, however. The ETS should not now be treated as a substitute instrument. But this is exactly what was attempted (again) last year. Capping the number of certificates was aimed at achieving a "politically desirable" price. Whether this instrument is now called "backloading" (introduced in 2014 to take 900 mn certificates off of the market) or "market stability reserves" (introduced in 2015) – it is already the third time there has been an intervention in the ETS.

The EU Commission has now provided more concrete details for its proposal of a market stability reserve (MSR) from 2018 on in its currently announced suggestions for a reform of the ETS. Even more "surplus" emission certificates are now to be taken out of circulation as a means of stabilising prices and will be returned to the EU ETS at a later point in time. These plans are pursuing other

objectives as well, however. For instance, 250 mn certificates have been earmarked for a market entry reserve ("New Entrants Reserve") and an innovation fund (50 mn certificates) even before the MSR enters into force. This approach is at least consistent with the system, unlike a minimum price. Care must be taken, however, to ensure that the integrity of the ETS is maintained despite the constant interventions. EURACOAL and EURELECTRIC point this out with a single voice.

European Carbon Permit Prices 2016-2019 Forward Market 2016 in €/t CO_2



Source: McCloskey, Spectron based

Figure 16

The reduction in emissions in comparison with 1990 indicates that emission trading works. According to a report from the European Environmental Agency EEA (EEA Report No. 4/2015), a reduction of 19.8 % had been achieved in 2013, very close to the target of 20 % that had been set for 2020. The EEA is projecting target achievement of 24 % in comparison with 1990 for 2020.

Germany, by heavily subsidising renewable energy sources, is following a separate course in its national climate policies. No one should be surprised when conflicts between the two systems arise. When renewable energy sources are funded outside of the ETS (as is the case in Germany), they lead to a reduction of the emission quantities in Germany. These quantities then become available for purchase by emitters in other countries in European trading. The result is that the German EEG does not produce any reduction in CO_2 across all of Europe, and the costs of preventing CO_2 emissions are not determined by the market, but are far above that level.

It is not necessary to achieve a greater reduction of emissions within the framework of the ETS by introducing minimum prices (as is often proposed); this is already inherent in the design of the system. During the trading period 2013 to 2020, the caps are reduced by 1.74 % annually. During the 4th trading period between 2021 and 2030, the annual reduction will be increased to 2.2 %. If the rate of reduction scheduled for the period from 2021 is continued, the emissions permitted within the framework of the EU ETS will fall to zero in 2058. Other forms of "decarbonisation measures" are consequently superfluous and inconsistent with the system. This is especially true for the German project of a Climate Protection Plan 2050 (see the chapter "Germany"). Moreover, the ETS does not have "decarbonisation" as its goal, but instead the reduction of emissions, and that includes CCS (carbon capture and storage) or the utilisation of CO_2.

The degree of freedom in the utilisation of coal-fired power plants is also determined by the extent to which there are special regulations protecting certain sectors or member states of the EU. The relevant regulations for the time

after 2021 have already become the subject of discussion. The German steel industry claims – and rightly so – that the overcapacities of Chinese and other producers who are pushing their way onto the German market must be judged in particular according to the criterion of whether comparable emission reduction measures have been prescribed in these countries. The threat to the existence of German coking plants and the steel industry calls for more effective protective measures than those now in place. Only sufficiently high import duties that include a CO_2 price component offer reliable protection from environmental dumping.

The distribution of the emission certificates within the EU would not be overshadowed by competition-policy issues and would also provide to coal-fired power generation the necessary manoeuvring room that it requires in its role as a stabilising element for the energy turnaround.

Sector Inquiry on Capacity Markets in Power Generation

The European Commission began a study on the financial support mechanisms for capacity markets in the European member states in April 2015. The Commission's legitimate concern is that uncoordinated capacity mechanisms could interfere in the competitive pricing on the power market. These fears are justified in no small degree because the member states have chosen mechanisms that differ enormously from one another. Some take approaches that apply to the entire power market while other countries have moved in the direction of target-oriented support. Moreover, the mechanisms also differ in that some are price-based, others quantity-based. The approaches range from a tender procedure for new power plant capacities to the creation of reserves comprising existing power plants to a locally organized capacity market. The EU Commission has drawn cautious conclusions indicating only certain tendencies from the report that has now been submitted, but these conclusions will aid the Commission in its assessment of the results related to subsidies. At least the Commission has come to the conclusion that not all of the capacity mechanisms in place at this time are even suitable for addressing the objective ideally. The Commission fears there is an overcompensation of the services provided by the companies participating in the capacity market when price-based mechanisms are employed, especially when they are organized market-wide. In the Commission's opinion, the call for a tender for new capacities and a strategic reserve (as is preferred by Germany) do better service in solving the transition issues on power markets.

The Commission points out in particular that none of the concepts for capacity markets are suitable for solving the fundamental problem that leads to market failure and the necessity for capacity markets in the first place. The fundamental problem as determined by the Commission – quite surprisingly – is to be found in the mechanisms for the subsidisation of renewable energies. Power prices must be scarcity prices, and the subsidisation systems must be designed accordingly. The European Commission has thus confirmed, although without saying so, that the feed-in priority and the financial subsidisation of renewable energy sources without regard of market prices is the root cause that has driven the establishment of capacity markets all across Europe.

GERMANY

General Conditions of the Overall Economy

According to the joint diagnosis of the economic research institutes issued in spring of 2016, the German economy continues to display a "moderate upswing." In view of the economic cooling-off of the global economy, it is unlikely that the growth of German export business will continue without a hitch. Moreover, the demand from some parts of Europe continues to suffer from the impact of the financial crisis, which has still not been overcome. Although there are not any risks of recession at this time, growth forecasts have been slightly reduced by almost all institutes. Growth in real gross domestic product is expected to be 1.6 % in 2016 and 1.5 % in 2017. This is not a striking drop from the growth of 1.7 % in 2015. The domestic economy, shored up by stable consumption and increased construction investments, is the main pillar of the upswing. Low oil and raw material prices as well as low core inflation will presumably lead to an increase in consumer prices of 0.5 % in 2016. Rising wages will not yet cause inflation to heat up, but will, in combination with the good employment figures and increased government expenditures, lead to an increase in domestic demand.

The institutes do not foresee any decrease in the current account balance, which remains at its accustomed high level, thanks to the good competitive position of German industry.

At almost € 260 bn, this made up 8.5 % of nominal gross domestic product in 2015. The low exchange rate of the euro is helpful, but should not be counted on as a permanent support of German exports because the economic cycles in America and the EU are not synchronous and the tide can turn again.

Selected Key Data for Overall Economic Development in Germany [1)]

	2014	2015	2016 Forecast
	Change from Previous Year in %		
Gross Domestic Product (Price-adjusted)	**1.6**	**1.7**	**1.6**
Labour Force (Domestic) (mn)	42.7	43.0	43.3
Unemployment in % [2)]	6.7	6.4	6.6
Usage of GDP (Price-adjusted)			
Expenditures for Private Consumption	0.9	1.9	1.8
Equipment Investments	4.5	4.5	3.4
Construction Investments	2.9	1.0	2.0
Domestic Utilisation	1.3	1.4	1.9
Exports	4.0	6.2	4.5
Imports	3.7	6.3	5.7
Trade Balance (GDP Growth Contribution) [3)]	0.4	0.4	-0.1

[1)] Results for 2014 and 2015 updated, forecast 2016 from SVR

[2)] Registered unemployed persons in relation to complete civil labour force

[3)] Contribution to growth rate of GDP in per cent

Source: Annual Assessment 2015/2016 of the Council of Economic Experts for Appraisal of Overall Economic Development Nov. 2015; focus on future capability

HT-D1

The Achilles' heel of the German economy is the development of net investments and productivity. The net investment rate in 2015 was only 1.3 %, a contrast to 7.2 % in 2000. The decline in equipment investments in private business in particular is a cause for serious concern because the lack of investments means that no increases in productivity are possible. Annual change in this area will be close to zero in 2016. To put it another way: Germany is liv-

ing on its principal. The only positive development is found in construction investments. But this is a consequence of special effects such as the management of the refugee crisis and the unnaturally low rate of interest. Quite correctly, the economic research institutes warn of a further decay in public infrastructure and appeal for an improvement in the general conditions for private investments.

The economic growth of recent years and the low level of unemployment on the labour market in Germany have glossed over the cutbacks in investments in the future that have been made for some time. A ranking of the 60 most competitive nations published recently by the Swiss IMD Competitiveness Center in Lausanne shows Germany falling out of the Top Ten and sliding back to twelfth place. The condition of roads, bridges and other infrastructure elements, for instance, was assessed no better than 25th place. The educational system was ranked at a worrying 23rd place. The international comparison makes it clear, however, that it will become increasingly difficult in the future for Germany to defend its ranking. The Asian countries are not the only ones on the advance. Eastern European countries are also generating dynamic progress.

The strengths of the German economy could quickly turn into weaknesses if it misses out on megatrends or if unilateral climate protection measures put an excessive burden on Germany as an economic site. The automotive industry is a key industry on which many other sectors depend. If it were to suffer harm, this would affect the steel industry in particular – which is already battling the Chinese overcapacities – and, with it, the coal imports as well.

It can only be hoped that German Economics Minister Gabriel is working on the realisation of his statement made at the conference “Future Prospects Industry 2030” in February 2016: “The target of increasing the share of industry in Europe to 20 % by 2020 is for me still one of the points of the European agenda and must be accorded the same importance as the 20 % climate target.”

Energy Industry Situation

Anyone listening to political discussions could have the impression that power generation was the top energy consumer in the country. In actual fact, however, only one-third of the primary energy consumption (PEC) can be attributed to power generation. The lion’s share of about half goes to energy consumption for the generation of heating and refrigeration. Just as in the past, oil is the Number 1 primary energy source, having a share of 34 %, while the share of natural gas is 21 %. Hard coal at 12.7 % is still in third place. Right behind it come the renewable energies at 12.5 %; they have already passed lignite (11.8 %) and will most likely overtake hard coal in 2016. Nuclear energy (7.5 %) has fallen far behind – the exit from its utilisation by the year 2022 is already clearly noticeable.

The share of renewable energies in primary energy consumption would have to be more than trebled for these sources to replace hard coal, lignite and nuclear energy. It is still unclear how the supply fluctuations in renewable energies can be balanced, however. During simulations of this type, it is easy to overlook the fact that energy consumption for the generation of heating and refrigeration makes up half of the PEC and is based on oil and natural gas – in other words, decarbonisation would have to place a high priority on addressing this sector and stop its one-sided focus on power generation.

Primary Energy Consumption in Germany 2014 and 2015

Energy Source	2014	2015	2014	2015	Change 2015 over 2014			Share in %	
	Petajoules (PJ)		mn TCE		PJ	mn TCE	%	2014	2015
Petroleum	4,516	4,511	154.1	153.9	-5	-0.2	-0.1	34.3	33.9
Natural Gas	2,679	2,812	91.4	95.9	133	4.5	5.0	20.4	21.1
Hard Coal	1,703	1,691	58.1	57.7	-12	-0.4	-0.7	12.9	12.7
Lignite	1,572	1,567	53.6	53.5	-5	-0.1	-0.3	11.9	11.8
Nuclear Energy	1,060	1,001	36.2	34.2	-58	-2.0	-5.5	8.1	7.5
Renewable Energies	1,519	1,669	51.8	56.9	150	5.1	9.9	11.5	12.5
Electricity Exchange Balance	-128	-186	-4.4	-6.4	-58	-2.0	-	-1.0	-1.4
Miscellaneous	237	242	8.1	8.3	5	0.2	2.1	1.8	1.8
Total	**13,157**	**13,306**	**448.9**	**454**	**149**	**5.1**	**1.1**	**100.0**	**100.0**

Source: AGEB, Energy Consumption in Germany in 2015 – Annual Report

HT-D2

Energy Productivity

	2014	2015	Difference in %
Gross Domestic Product (€bn)	2,736	2,783	1.7
Primary Energy Consumption in Petajoules (Adjusted for Temperature and Inventories)	13,487	13,542	0.4
Energy Productivity (€GJ) (Adjusted for Temperature)	203	205	1.3

Source: AGEB, provisional information, data for 2013 updated

HT-D3

Power Generation

While the energy turnaround has left only faint traces on the heating market and in the transport sector, it is having a massive impact on the energy mix for power generation. Renewable energy sources took over top place for power generation in 2014, and their share is now 30 %. Lignite follows with a share of 24 %, hard coal has a share of 18 %, nuclear energy posts 14 % and natural gas contributes 9 %. Among the other sources with a total share of 4 %, power generation using mine gas that is subsidised by the EEG is particularly strong.

The development of future power consumption will be characterised in part by an observed decrease on the utilisation side caused by increased energy efficiency, but otherwise by the appearance of new power-based applications – the rising equipping of the German vehicle fleet with electric motors comes to mind here in particular. The growth in gross power generation by 4 % to 652 TWh observed in 2015 had other causes, however. To start with, it is true that domestic power consumption increased, but the export of power at 52 TWh was substantially higher than in the previous year. This development can be explained by the energy policy situation in our neighbouring countries, especially Great Britain, as well as by the high surpluses of power generated in Germa-

The Energy Mix of Gross Power Generation

Energy Source	2013	2014	2015	Difference 2014/2015
	TWh	TWh	TWh	%
Lignite	160.9	155.8	155	-0.5
Nuclear Energy	97.3	97.1	91.8	-5.5
Hard Coal	121.7	118.6	118.0	-0.5
Natural Gas	67.5	61.1	59.6	-2.5
Petroleum	7.2	5.7	5.4	-4.6
Renewable Energies	152.4	162.5	195.9	20.5
Miscellaneous	26.2	27	26.1	-3.2
Total	**633.2**	**627.8**	**651.8**	**3.8**

Source: AGEB

HT-D4

Power Generation from Renewable Energy Sources

	2013	2014	2015
	TWh	TWh	TWh
Hydroelectric Power	23	19.6	19.3
Wind Power	51.7	57.3	88.0
Biomass*	41.2	43.3	44.2
Waste**	5.9	6.5	6.2
Photovoltaics	31	36.1	38.4
Geothermal Energy	9.6	9.8	13.0
Total	**162.4**	**172.6**	**209.1**

** Updated for 2013 and 2014*
*** Renewable share, incl. landfill gas*

Source: AGEB, BDEW

HT-D5

ny using renewable energy sources. It is becoming increasingly clear that the feed-in priority created by the Renewable Energies Act is not in line with the deregulated electricity business. As a consequence of the feed-in priority that contravenes the market, adjustments become inevitable in our neighbouring countries, changes that would not otherwise have taken this form. Another point is that the price on the spot market is being pushed further and further downward, and it is no longer unusual to see negative prices being realised on the market. At times, irrelevant arguments that this problem is a consequence of a lack of flexibility in the power plants could be read in the media. This is incorrect, however. Instead, the low prices result from the dumping of a product on the market without any economic rationality whatsoever and this product must be purchased because of its special physical features.

The special situation of renewable energy sources for the power generation facilities can also be seen in the fact that power plant capacity amounting to 60 % of the power plant facilities is required for a power generation share of 30 %. The consequence is that in Germany power plant facilities are being built with substantially greater volume than in the past and tying up correspondingly high amounts of capital. Moreover, the higher the share of fluctuating feed-in of power from renewable energy sources, the greater the efforts of the grid operators to stabilise the power grid. The situation is made even worse by the additional construction of renewable sources for solely politically rather than economically motivated reasons in regions where power demand is significantly lower. This system cannot function unless grid expansion as a minimum keeps pace with the expansion of renewable energy sources. But since the grid expansion continues to lag behind, the stabilising interventions in the grids (redispatch) are increasing. They amounted to €1 bn in the past year, and the Federal Network Agency assumes that they will soon increase to €4 bn. Until now, there has been a willingness to accept subsidies for renewable energy sources that are signifi-

cantly higher than the market value of the generated power, but now, where the costs for inclusion of the renewable energy sources in the grid are higher than their market value, the position will be reconsidered. This has already been indicated during discussions between the German government and the German states.

Electricity Market for the Energy Turnaround

In 2016, the German government passed a new power market act aimed at creating a "power market for the energy turnaround". The legislative process was preceded by an extensive consultation process and the publication of a green and a white book. The VDKi issued a statement to this. The VDKi fundamentally welcomed the objective of creating a future power market design that would ensure supply security, limit costs and make sustainability and innovation possible – criteria that hard coal-fired generation of electric power fulfilled yesterday, fulfils today and will fulfil tomorrow. However, it also expressed its reservations as to whether the proposed measures and the assumptions on which they are based are accurate and suitable for assuring long-term the goal (which is also important for the international competitiveness of German industry) of supply security and simultaneous limitation of costs. The idea of establishing capacity markets such as those found in other EU member states played an important role in this discussion process. The arguments favouring capacity markets noted that in the current situation virtually no power plants can be operated profitably and that, as a minimum, the provision of power plant production tacitly accepted by the system as unpaid service must be honoured. The German government are pursuing a different approach, however. Providers could post adequate contribution margins from price peaks that can be expected in the middle term after a curtailing of the power supply. The prerequisite here is that consumer protection must not be allowed to cap the price peaks. If, however, the market players do not trust this system, further shutdowns of power plants must be expected in the near future. Doubts about the viability of the system must be allowed above all because the feed-in priority for renewable energy sources is not in conformity with the market and it consequently makes little sense to determine an approach in conformity with the market solely for the power plants maintained in reserve. Market-oriented pricing will not become possible until the feed-in priority is eliminated so that capacity markets are not required. This is the conclusion of the EU Commission within the scope of the above-mentioned sector study on capacity markets, even though this is expressed in convoluted form.

The power market the German government want to see for the energy turnaround will not make any sense until renewable energy sources are integrated into a market-oriented power generation system, or – to put it another way – the same market rules apply to both conventional and renewable energies. Then it will be possible for balancing group managers to decide the degree to which they want to use renewable energies and initiate precautionary measures for stabilisation of the power system. Heightened incentives to maintain balancing group loyalty will ensure that a market-oriented system of this type functions reliably as well.

Combined Heat and Power Act

The new regulations of the Combined Heat and Power Act (KWKG 2016) entered into force at the beginning of the year. It first appeared as if the subsidisation for the additional construction would not be increased, but ultimately the subsidisation was doubled to €1.5 bn. The

target for additional construction was adjusted, however. The original target of an increase in the CHP share from 16 % to 20 % in 2020 was dropped in view of the growing share of renewable energy. The new target is for an expansion of absolute power generation from combined heat and power from the current 96 TWh to 110 TWh in 2020 and 125 TWh in 2025. However, only combined-cycle gas turbine plants will benefit from the subsidisation, and they will for the most part be plants that would otherwise have become stranded investments because the current gas price does not permit profitable operation of these CHP plants. The KWKG 2016 is therefore discriminatory toward coal as an energy source. The efficiency technology of combined heat and power, which is extremely advantageous from a climate and economic policy viewpoint, is divided into "good" CHP (natural gas) and "bad" CHP (coal) for no discernible reasons.

EEG Amendment – Energy Turnaround

The Renewable Energies Act (EEG), last revised in 2014, was once again revised in 2016. One special point was the introduction into the Act of the tender for power from renewable sources. After a pilot phase determined that the tender by no means favoured only large companies and, in particular, led to substantially lower subsidies than the feed-in compensation that has been paid so far, the entire subsidisation system will be converted to a tender procedure in a three-stage process starting in 2017.

The German cabinet approved the green power reform on 08/06/2016. Green power projects on a larger scale must in future win contracts during tender proceedings if they want to benefit from subsidisation. The contracts will be awarded to the wind, solar or biomass projects that can be carried out with the lowest subsidisation. The previously applicable feed-in rates that were fixed will apply only to small plants. Federal Economics Minister Gabriel spoke of a "paradigm change". Chancellor Merkel called it a "step in the direction of subsidisation rates generated by competition".

The statements made it obvious that there had been windfall gains related to subsidisation of renewable energy sources for many years – effects that could have been avoided if a market-oriented system had been in place. We should recall that the EU Commission at one time favoured a quota model for renewable energies, but Germany did not support this approach.

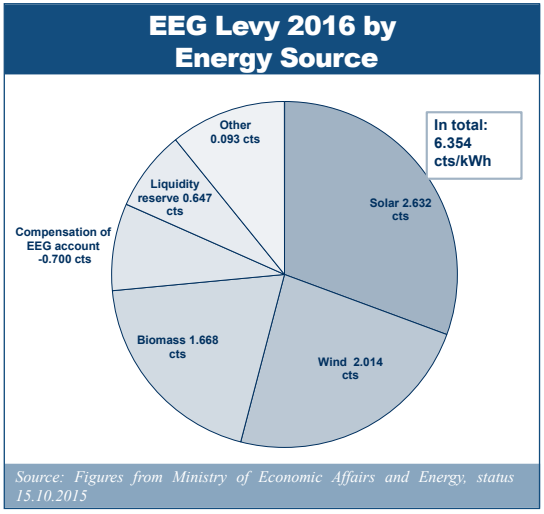


Figure 17

Reports regarding the tender procedure declaring that the EEG is now in conformity with the market regrettably have nothing to do with reality. The "subsidisation rates generated by competition" will continue to be substantial-

ly (i.e. many times) higher than the market price of the EEX power exchange for which conventional power generation must compete. Moreover, the grid feed-in, as already mentioned above, is still by no means in conformity with the market; feed-in is still compulsory.

The EEG levy had to be raised from 6.17 ct/kWh to 6.35 ct/kWh in 2016. The promise of a stabilisation of the levy at 3.5 ct/kWh declared by the grand coalition in the past could not kept, and it is only a question of time until the levy rate will have doubled to 7 ct/kWh. Many other different subsidy elements have led to the so-called power additional costs comprising 54 % of the power price in 2016. In other words: a second power price of the same and growing amount is added to the actual price of the power. The change in attitude in recent years related to the appraisal of subsidies in some industrial associations is surprising. They have mutated from guardians of the free market economy to proponents of a culture of subsidisation and bewail the agreement for stabilisation of the EEG concluded between the German government and the German states in June. The Gesamtverband Steinkohle has calculated that, within the framework of the EEG, approximately the same amount of subsidisation was paid for the EEG between 2000 and 2015 as for the German hard coal mining industry since 1960.

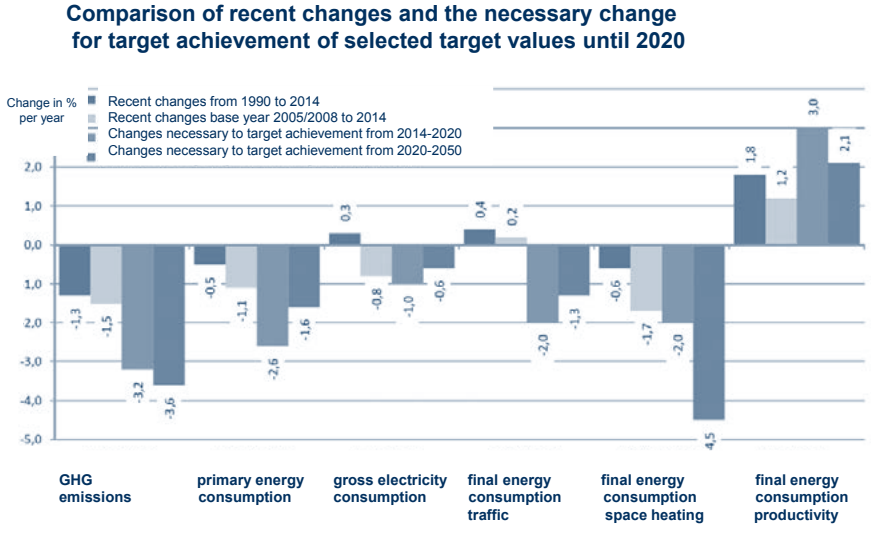
Fundamentally, the objectives of the energy concept from 2010 remain in effect as the energy policy objectives of the energy turnaround. These targets have even survived the doubled and accelerated exit from nuclear energy. Doubts as to how realistic this is are justified. The progress report on the energy turnaround issued in 2014 presented a so-called new “target architecture”. In addition to the exit from nuclear energy, the guiding objectives up to the year 2022 are climate protection targets, competitiveness and supply security. In addition, there are core targets related to implementation such as the expansion of renewable energies and an increase in energy efficiency. With an eye on the following chapter on the “Climate Protection Plan 2050”, if is de facto not possible so speak of a harmony of the goals according to the energy policy triangle.

The German government’s energy concept of September 2010 contains a monitoring process “energy of the future” as one of the instruments. This monitoring process is intended to provide a fact-based overview of the progress in the realisation of the energy turnaround. The German government appointed for this purpose an independent expert commission with four energy specialists as its members. They evaluate the monitoring report once a year. In the estimation of the German government, some of the subsidiary goals during the realisation of the energy turnaround lag significantly behind, some are on schedule. The expert commission is basically of the same opinion, but sees pronounced risks for achieving the targets. In the commission’s view, this is especially the case for the German government’s goal of reducing greenhouse gas emissions by 40 % in comparison with 1990 as of 2020. A positive conclusion, on the other hand, is that the target of expanding renewable energies in the power sector to achieve a minimum share of 35 % in power consumption by 2020 is possible. The German government’s targets for primary energy consumption and for the closely related increase in energy productivity cannot be achieved. This is not because of a lack of sufficient effort, however, but because targets that could not be reached were formulated right from the beginning against the advice of experts. For instance, a target for the in-

crease in energy productivity of 2.1 % annually, starting in 2008, was set. The rate of increase between 2008 and 2014 came only to 1.2 %. If the target for 2020 is to be achieved nevertheless, the end energy productivity of 2015 must increase by about 3 % every year, and this is completely unrealistic.

gy turnaround has not yet made any impact in the transport sector. Figure 18 contrasts this change and the other most important changes in selected target values up to 2020 against the previous changes and the changes necessary to achieve targets. This image confirms the overall impression that achieving the targets will be extremely difficult.

Comparison of Recent Changes and the Necessary Change for Target Achievement of Selected Target Values until 2020



Source: Expert Commission to Monitoring Process "Energy of the Future", Statement on the Fourth Monitoring report of the German Government for the Reporting period; November 2015

Figure 18

In the opinion of the commission, the rise in final energy consumption in transport in 2014 represents yet another step backward with respect to the target architecture of the energy concept. Or to put it even more drastically: the ener-

The fact that the German government on the one hand have achieved the target in the expansion of renewable energies in the power sector, but that there has even been growth in the transport sector, makes it clear, to

start with, that the German government's priorities are concentrating too much on the power sector. The failure to bring about the desired scale of reductions in greenhouse gas emissions despite the expansion of renewable energies is an indication that the German government's instruments are not in harmony with one another and that this is especially not the case in the European context.

The chapter on "Europe" previously described that the primary instrument used by the European Union for the reduction of greenhouse gases is emission trading. Since the German government employ an isolated national instrument, the result is the trade-off between expansion of renewables and the reduction in CO_2 described previously. The CO_2 reductions achieved in Germany become available to other European member states within the framework of emission trading. Instead of relying on solutions of a free market nature, the German government are increasing the trade-off between national planned economy single measures and European market-oriented emission reduction even more: the Climate Protection Plan 2050 aims to establish the next expansion stage of planned economy structures in the energy economy.

Climate Protection Plan 2050

After the conclusion of the climate convention in Paris, one would have thought that climate policies in future would be implemented, even by Germany, as part of an internationally coordinated process and that European integration would be considered in other aspects as well. In truth, yet another separate national road is being taken with the Climate Protection Plan 2050. It is correct that the source is found in a passage of text in the coalition agreement of 2013 calling for a further reduction of greenhouse gases and a climate protection plan in conjunction with a dialogue process. In the meantime, the work has progressed to the point that the adoption of the plan by the German cabinet by summer 2016 can be assumed. During the first stage of the drafting of the plan, ideas that were later to be incorporated into the legislative process were collected. During this dialogue process with the stakeholders, however, there was never an opportunity to develop ideas together; instead, so-called "paths" for the discussion were prescribed. There were also attempts to back up results scientifically in a fast-track process. The science community voiced extensive criticism of this process. The lack of an impact assessment for a broad range of measures with major implications was a particular source of criticism. Targets such as a climate protection act, intervention in emission trading, an obligation for feed-in of renewable energies in existing buildings, the closure of all regional airports, the coupling of energy efficiency with land tax and a speed limit of 130 km/h were all given equal importance, noted the BDI in a communication entitled "Climate Protection Plan 2050 – More Thoroughness, Less Haste".

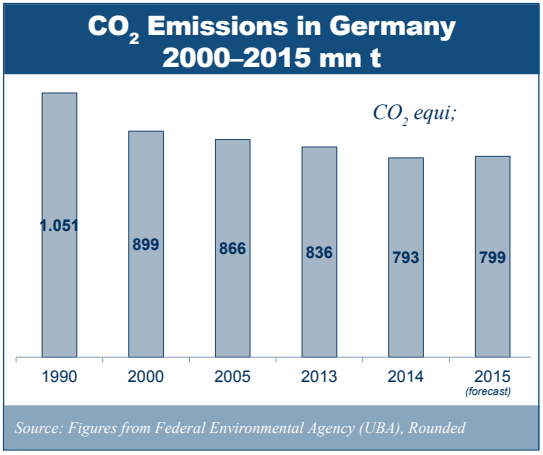


Figure 19

After the first step, the second step is the coordination among the departments of a draft of a climate protection plan that had already been prepared by the BMUB [Federal Ministry for the Environment, Nature Conservation, Construction and Nuclear Safety]. Integration into existing European legislation does not appear to have played any role here. Clearly defined sector targets for specific industries have been added to the German government's target architecture. This approach heightens further the already existing incompatibility of the individual targets, and it is becoming increasingly clear that the Climate Protection Act is leaving behind the principles of a free market economy. The energy sector, which had reduced its greenhouse gas emissions by one-fourth in comparison with 1990 to 358 mn t, is supposed to reduce emissions to a "corridor of residual emissions" of 170 mn t to 180 mn t as early as 2030. This is nothing less than cutting them in half. Overall, a reduction of 40 % to 50 % is to be achieved across all industries, whereby in agriculture, for example, a reduction of only one-fourth as a maximum has been set.

The 350 pages of the measures catalogue contain for the energy industry in particular the goals "exit from power generation by coal-fired power plants" in conjunction at one point with the clause "reduction of subsidies" and at one point with the clause "limitation of term". In addition, there is a proposal for the "levy of a CO_2 tax and realisation of the costs by cause principle". Another remarkable point is the proposal for a "democratisation by decentralisation of the energy industry". Amazingly, the German government appear willing to take initial steps precisely in this direction. Even before the next general election, they intend to prepare a concept that, from an industrial perspective, is highly critical and to appoint a commission of pluralistic membership for the energy sector for "climate protection and completion of the energy turnaround"; it is expected to function as a central implementation office and present results by the middle of 2017. The exclusion of the German Bundestag in this way, however, can hardly be called a democratisation process. The legislative authority of parliament is de facto usurped by an over-proportional participation of so-called non-government organisations from the environmental protection sector.

These organisations are intervening more and more forcefully in political decision-making processes. Right at the forefront is the so-called think tank Agora Energiewende, in actual fact a foundation financed by wealthy philanthropists. Agora Energiewende, which has close personnel ties with the decision-making level in ministries, proposes an accelerated exit from coal-fired power generation in Germany. Since the emission trading system ETS is also in force in Germany, the measures would not result in any changes at all for Europe as a whole unless emissions certificates were annulled. But this approach is not reconcilable with the ETS. The German government at least should feel bound by this.

The German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety presented its draft for the Climate Protection Plan 2050 shortly before the issue of this report. It describes not only a vision, but also a path of transformation: "An important function on this path will be played by transition technology of gas-fired power plants with low CO_2 emissions and the existing state-of-the-art coal-fired power plants, especially in cogeneration of heat and power operated in orientation to the power market ..." The Coal Importer Association (VDKi) welcomes the status of coal-fired power plants in

a transition function, but the fundamental assumption that "low CO_2 emission gas-fired power plants" are climate friendlier than hard coal-fired power plants is false (cf. Pöyry study). A date for the exit from coal has not been mentioned.

Coal: Bridge for the Energy Turnaround

While the climate protection act – initially only an in-house draft from the Ministry for Environmental Protection – looks at cutting emissions from the energy industry in half by 2030, the scenario framework for the power grid development plans for 2030 displays for capacities a less drastic picture at least; however, this is also a consequence of the fact that the load on these capacities will decline. Depending on the scenario, the scenario framework shows conventional generation capability declining from 106 GW in 2014 to between 65 GW and 79 GW by 2030. In its place, renewable power generation capability will increase from 89 GW to between 147 GW and 172 GW. In all of the scenarios, this capability would be at least twice as high as the capacity of conventional power plants. Capacity based on hard coal would be reduced especially sharply – from 26 GW in 2014 to between only 11 GW and 23 GW in 2030. This corresponds to a decline of 12 % to 52 %, depending on the scenario.

The role of hard coal is not given appropriate consideration in any of the scenarios. Technical reasons are not decisive for this because coal-fired power plants can in the meantime be adapted to load demand at a load adjustment speed similar to that of gas turbines. In their part-load behaviour, coal-fired power plants are even superior to gas-fired power plants; they can provide a significantly greater reduction of load and, in contrast to the gas turbines, suffer substantially lower losses of efficiency. From a strictly technical perspective, coal-fired power plants can be used as a bridge for the energy turnaround just as effectively as gas-fired power plants. If pricing is also considered, it becomes clear that natural gas cannot (in Germany, at least) play a role in the electricity industry like that in the United States of America. Natural gas is too expensive to assume a bridge function in this country. The natural gas industry has definite reasons for its repeated efforts to bring about the changes in the European emission trading system described in the chapter Emission Trading that would drive up the CO_2 price. From today's perspective, coal – not natural gas – is the bridge for the energy turnaround. The coming decades will show whether the storage of electricity, whether in the form of power or chemical energy, makes technical and commercial progress. In a free market system, the various methods for cushioning production fluctuations must compete with one another. This development will determine the scope of the bridge for the energy turnaround.

Pöyry Study: Coal-fired power plants are climate-friendlier as backup for the energy turnaround than open-cycle gas turbines

The flexibility of thermal power plants, especially during part-load operation, will gain enormously in importance in future so that the security of the power supply in Germany can be assured over the course of the energy turnaround and the fluctuation in generation rates of renewables can be compensated. Even today, hard coal-fired power plants, thanks to their high flexibility, provide the major share of the load balance for fluctuating renewable energies.

A recent study by the highly respected consulting company Pöyry Management Consulting commissioned by the VDKi took a close look at the direct and indirect green-

house gas emissions caused by power generation from hard coal-fired and gas-fired power plants. The observations included the part-load operation that is especially important for compensating the feed-in fluctuations from renewable energies. Within the scope of the analysis, comprehensive international studies on the emissions in production and transport of hard coal and natural gas were compared and assessed. When these indirect greenhouse gas emissions are added to those from power generation in the power plants, it turns out (taking into account the mix of coal and gas for Germany in 2014) that the direct greenhouse gas emissions of power generation from open-cycle gas turbines are up to 76 % higher than for modern coal-fired power plants during part-load operation. The difference in greenhouse gas emissions between modern hard coal-fired power plants and combined-cycle gas turbine plants without heat extraction declined from 36 % during full-load operation to 30 % in part-load operation.

So if the greenhouse gas emissions that result during the production and transport of the two energy sources are included, part-load power generation in modern coal-fired power plants for compensation of the variances in the feed-in volume of renewable energies and the fluctuating demand for power for the present German power plants is the significantly climate-friendlier alternative to open-cycle gas turbines. The latter can also go online on short notice for load balance, but in part-load operation they suffer substantial losses of efficiency that result in disadvantages for the climate balance. Even if only the direct emissions, excluding production and transport of the fuel, are taken into account, an open-cycle gas turbine plant in part-load operation emits up to 29 % more greenhouse gases than a hard coal-fired power plant.

In the current discussions about the best bridge technology on the road to the energy turnaround, natural gas is presently the energy source of choice among politicians and society because of the presumably better CO_2 balance. The results of the Pöyry study impressively illustrate, however, that the assumptions previously made are wrong. The indirect emissions that are created during production and transport of the various energy sources must also be taken into account, especially if the worldwide climate targets are to be achieved. In this holistic assessment, and especially during part-load operation, hard coal performs significantly better than the presumably climate-friendlier natural gas.

Methane – the primary component of natural gas – is even more harmful than the "climate killer" CO_2

In addition to the CO_2 emissions, the Pöyry analysis also considers the emission of the greenhouse gas methane that is emitted during the production, transport and processing of both shale gas and the conventionally produced natural gas. Observed over a period of 100 years, methane's greenhouse potential is 28 times greater than that of CO_2. Since the need for action has been regarded as very high and urgent since the world climate conference in Paris, Pöyry used an observation period of 20 years as the basis for the calculation of the CO_2 equivalent. According to the Intergovernmental Panel on Climate Change (IPCC), the greenhouse potential for methane then soars to 84 times that of CO_2.

The primary components for the emission balance of power generation are therefore the direct combustion process (CO_2), the expenditure of energy for the transport (CO_2) and the release of methane during production

and from leakage. The concentration in the atmosphere of the powerful greenhouse gas methane has risen sharply since 2006. The respected Karlsruhe Institute of Technology (KIT) was recently able to prove that the production of oil and natural gas, especially in the USA, is responsible for this rise. Leakage from a large gas storage facility in Aliso Canyon, California, when 77,000 metric t of methane escaped into the atmosphere, called public attention to the relevance of this greenhouse gas and its greater impact by far than CO_2 at the beginning of this year.

Because of the feed-in priority of renewable energy sources, the fossil fuel-fired power plants will more and more be given the task of compensating the generation fluctuations and grid stabilisation, so they will be increasingly used in part-load operation. According to the results of the Pöyry study, hard coal-fired power plants are the climate-friendlier alternative to open-cycle gas turbines in this load range. The efficient combined-cycle gas turbine plants produce power in immediate relationship to the production of heat (e.g. for district heating grids) and are consequently unable to respond to feed-in fluctuations as flexibly as required for the energy turnaround. On the current energy market, they are built almost exclusively in response to heat demand, not for compensation of load peaks. Only open gas turbines without an associated steam process can be used fully flexibly for a transition phase until the expansion targets for wind farms and photovoltaic parks have been reached and a solution to the storage problem has been found, but in terms of efficiency and consequently of greenhouse gas emissions, they are worse than modern hard coal-fired power plants. If hard coal-fired power plants really should be shouldered out of the market in favour of natural gas for political reasons, the energy suppliers will have to make massive investments in the expansion of gas turbines to create a flexible power plant reserve. In view of the significantly worse emission values documented in the Pöyry study, this would amount to a royal bungling of energy and climate policies.

In addition, because of current market conditions and regulatory requirements – in the unanimous opinion of experts – no modern combined-cycle gas turbine plants will be built or go online for the first time in the foreseeable future.

The origin of the fossil energy sources is crucial for the amount of the indirect emissions because the transport route plays a decisive role. In Germany, the German natural gas and gas from the next-door Netherlands have lower indirect emissions than natural gas from more distant regions such as Russia or liquefied gas from the USA or Middle East. However, natural gas reserves in this country are dwindling fast. This means that a growing use of natural gas in the future will depend more and more on supply areas and production methods that have a substantially worse climate balance. They include liquefied natural gas (LNG) or natural gas produced by fracking as well. All of these factors must be taken into consideration for future concepts of energy policies.

VDKi calls for an objective appraisal of the energy source hard coal during the assessment of the most appropriate bridge technology for the transition to the post-fossil fuel age

The study results underscore the political pressure for action in this sector. Power generation using hard coal is at least as suitable as power generation using natural gas to function as an especially flexible bridge technology until the expansion targets for wind farms and photovoltaic parks are reached and the storage problem has been solved. New construction of open-cycle gas turbines as replacements for existing hard coal-fired power plants would be a gigantic annihilation of capital without the least benefit for climate protection.

All existing energy sources should be utilised economically so that the power supply in Germany (without rising emission values) and the required flexibility in the mode of operation of the thermal power plants can be secured in the middle term. Moreover, fair competition among the fossil energy sources must be guaranteed so that consumers are protected from any further price increases. The declining natural gas reserves in Germany and the Netherlands play a decisive role here. Total emissions in the natural gas chain will therefore rise in the future – substantially, in fact, if LNG and fracking gas play a greater role.

In summary, this must be noted:

In principle, natural gas is less carbon-intensive than hard coal. If, however, the direct and indirect emissions (including production and transport) of power generation using natural gas and hard coal are considered from a holistic viewpoint, there is a significant change favouring hard coal of the total emissions of these two fossil energy sources.

When running at full capacity, power plants using open-cycle gas turbines and hard coal prove to be almost identical. Fluctuations in renewable energies more and more frequently restrict these power plants to part-load operation. Pöyry has calculated the indirect emissions in this case for the first time. The results show that the total greenhouse gas emissions from open-cycle gas turbine power plants are as much as 76 % higher than those from hard coal-fired power plants. Efficient combined-cycle gas turbine plants are built in the current market conditions – if at all – in connection with the need for heating.

Hard Coal Market

Hard coal consumption continued the decline that began in 2014. Primary energy consumption of hard coal fell by 1.9 mn TCE (3.3 %) from 58 mn TCE to 56.1 mn TCE in 2015. Since the consumption of power plants that had recently gone online was not fully accounted for in the official statistics in the past year, the values for 2014 were corrected and reduced. Hard coal consumption in mn TCE was covered in 2015 as shown below:

Cover of Hard Coal Consumption in Germany

	2013	2014	2015	2014/2015 Change
	mn TCE	mn TCE	mn TCE	mn TCE
Import Coal	52.4	50.2	49.7	-0.5
Domestic Production	7.8	7.8	6.4	-1.4
Total	**60.2**	**58**	**56.1**	**-1.9**

Source: AGEB, updated data 2014

HT-D6

The share of inland production in coal utilisation fell from 7.8 mn TCE to 6.4 mn TCE. The scheduled adaptation and exit process in socially acceptable boundaries will continue its orderly progress until the end of 2018. The Auguste Victoria Mine in Marl was shut down per 01/01/2016. The share of import volumes in coal utilisation fell from 50.2 mn TCE to 49.7 mn TCE (-1 %) according to statistics from the Arbeitsgemeinschaft Energiebilanzen (AGEB). As noted by AGEB, in 2015 imports contributed 89 % to the secure and high-grade supplies for the German market.

The sale of hard coal in t=t developed as shown here:

Total Hard Coal Sales in Germany

Utilisation	2013	2014	2015
	mn t	mn t	mn t
Power Plants	48.8	39.2	38.9
Steel Industry	17.6	17.5	17.5
Heating Market	1.9	1.4	1.3
Total	**68.3**	**58.1**	**57.7**

Source: AGEB, updated data 2014

HT-D7

The difference in volumes shown in Tables D6 and D7 is explained in part because some figures are consumption, some are sales (discrepancies are possible because of inventory movements) and in part because the consumption is calculated in “TCE” and sales in “t=t”. Since steam coal is primarily measured with calorific values below 7,000 kcal/kg, the “t=t” figures are higher than the “TCE” figures.

Imports break down according to grades as shown here:

Imports According to Grades in mn t (t = t)

	2013	2014	2015
	mn t	mn t	mn t
Steam Coal [1)]	39.9	41.9	43.2
Anthracite	---	---	---
Coking Coal	10.2	11.8	12.3
Coke	2.7	2.5	2.0
Total	**52.8**	**56.2**	**57.5**

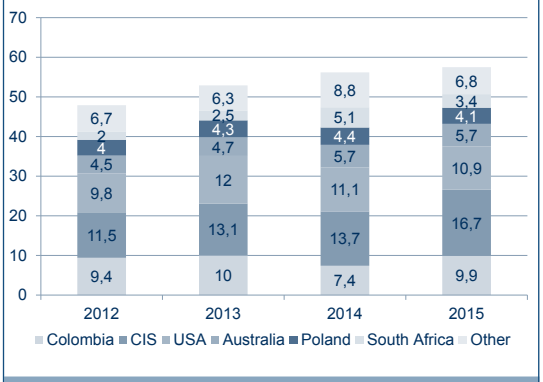
[1)] Including anthracite as of 2012
Source: VDKi own calulations

HT-D8

Exactly three-fourths of the imports were steam coal, 21.4 % coking coal and 3.5 % coke. The origins of the import volumes can be seen in Figure 20. Russia leads the list, providing 16.7 mn t (29 %). Russia was able to increase its supply by 3 mn t (4 %) over the previous year. It is followed by the USA (19.0 %) and Poland (7.1 %), each of them with decreasing shares of the supplies to the German market. The contribution from Australia of 5.7 mn t remained at the same level in absolute figures while declining slightly in relative terms to 9.9 %. Colombia, on the other hand, was able to increase its supplies by 34 % from 7.4 mn t (2014) to 9.9 mn t, providing a share of 17 % to the market supply.

Russia remains the largest provider of steam coal (34.5 %). Colombia (22.8 %) overtook the USA (17.9 %). South Africa (7.5 %) and Poland (7.2 %) follow. Russia and Colombia were able to increase their deliveries significantly while the steam coal supplies from South Africa declined by 36 % from 5.1 mn t to 3.4 mn t.

German Hard Coal Imports Including Coke by Origin in mn t



Source: VDKi, several evaluations

Figure 20

The most important suppliers of coking coal were Australia (5.6 mn t; 45.5 % market share), the USA (3.2 mn t; about 25.7 % market share), Russia (1.6 mn t; about 13.3 % market share) and Canada (1.3 mn t; 10.7 % market share). While coking coal supplies from Australia increased slightly (+5.6 %), supplies from Russia rose substantially (+39 %). The supplies from the USA declined by 5.8 % and from Canada by even 10 %.

The coal imports to Germany according to country of origin are broadly distributed for all grades. Virtually all of the countries are politically stable.

Logistics in Germany's seaports and in the ARA ports important for German imports were not disrupted by any interruptions and were reliable.

Development of Energy Prices

Crude oil prices fell precipitously last year, and the prices for heavy fuel oil declined along with them (-42 %). The average price for the year was €180/TCE. The natural gas price for power plants (-7 %) in 2015 followed approximately the trend for the cross-border price of import coal (-6 %), but at €228/TCE was significantly higher than the cross-border price for import coal (€73/TCE). Figure 21 shows that the direction over the course of the year was almost consistently down with a slight interim recovery for heavy fuel oil.

Energy Price Development as a Yearly Average

	2013	2014	2015	2013/2014 Change
	€/TCE			%
Heavy Fuel Oil (HS)	349	309	180	-42
Natural Gas/Power Plants [1]	265	244	228	-7
Cross-border Price/Imported Coal [2]	84	78	73	-6

[1] Average mean value BAFA price [2] 2013 and 2014, corrected

Source: Statistics of Kohlenwirtschaft e.V

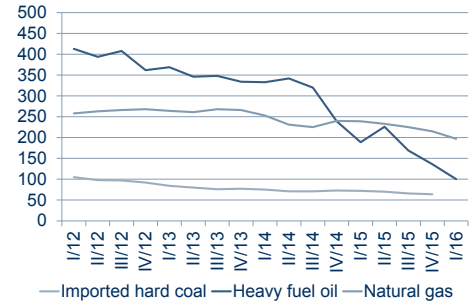
HT-D9

The coal price CIF ARA came to US$48.15/t in May following a price of US$43.89/t in February 2016. The price came to US$58.20/t in June 2015. In the year-on-year comparison, the price declined by 17 %.

Import coal enjoyed a major competitive advantage over natural gas throughout 2015. However, the energy price alone is not decisive for the use of hard coal in power plants; a number of influencing factors combine as summarised in the clean dark spread and clean spark spread,

the gross margins of hard coal-fired and gas-fired power plants that depend on the CO_2 price and power price. The margin for hard coal in both peak load and base load price was most recently higher than that of natural gas (which was largely negative), but it was nevertheless far too low for profitable operation of power plants.

Prices of Selected Energy Sources Free Power Station in €/TCE



Source: Statistics of Kohlenwirtschaft e.V./BAFA

Figure 21

As in past years, Table D10 shows only the cross-border prices for all types of coking coal from third countries that are decisively determined by the spot prices on a monthly basis.

So the prices for hard coking coal, semi-soft coking coal and PCI qualities are included; the price range among them is only about US$10/t.

In 2015, the price for metallurgical coal fell from €105/t to €101/t – about 4 % in comparison with the previous year. The global demand for steel continued to be weak; the decline in crude steel production in Germany, however, was relatively slight (-0.6 %).

Cross-border Price Third Countries Coking Coal in €/t [1)]

2011	185.30
2012	188.42
2013	127.19
2014	104.67
2015	100.52

[1)] Rounded-off average values for all metallurgical coal types

Source:VDKi own analysis

HT-D10

The price for HCC FOB Australia came to US$93.88/t in May 2016, an increase of 6 % over the value of US$88.58/t of the previous year. Initially, however, the price fell to US$76.85/t in February 2016, but recovered substantially afterwards.

The coke price fell by an average for the year of €6.62/t for third country imports (3.4 %) – about the same as coking coal. As was the case for coking coal, however, the decline was not as strong as in the previous years.

Coke Price Development (Cross-border Prices)

	Third-country Imports €/t
2011	319.78
2012	258.72
2013	204.88
2014	193.66
2015	187.04
Year-on-year	-6.62

Source: VDKi own calculations

HT-D11

Steel Production

Crude steel and pig iron production was in a slight decline in 2015, falling by 0.6 % to 42.7 mn t. Utilisation of capacity in Germany in 2016 reached the previous year's value of 86 % after climbing as high as 90 % in Q1 2015, and again fell short of the long-term average of 89 %. Globally, however, utilisation of capacity came to only 71.3 % in May 2016.

Pig Iron Production

	2013	2014	2015	Year-on-year change
	mn t	mn t	mn t	%
Crude Steel	42.6	42.95	42.7	-0.6
Pig Iron	27.2	27.95	27.84	-0.4

Source: Stahl-online

HT-D12

Pig iron production declined by 0.4 % from 27.95 mn t in 2014 to 27.84 mn t in 2015. Steel production is facing cut-throat competition originating in China. Chinese exports averaged about 50 mn t a year in the period from 2010 to 2013. They more than doubled to 111 mn t in 2015. Imports to Europe increased by about 50 %. Since China obviously does not conduct itself like a free-market economy, the German government should not allow themselves to be persuaded by other viewpoints and should not make any unacceptable compromises. Temporary import duties on unfair cold-rolled sheet imports from China and Russia were levied in February. In the estimation of the Steel Federation, however, the duties are not anywhere nearly high enough. Although dumping ranges for Chinese imports of almost 60 % were proved, the duties were assessed at only between 14 % and 16 %. This would not stop the unfair practices of Chinese suppliers on the European market.

Steel production in Germany increased in May by 4 % in the year-on-year comparison after declining for six months in succession. As noted by the Steel Federation, these were the first signs for stabilisation that had previously become apparent from the development in incoming orders of recent months. The major cause of the increase is to be found in the stock cycles. Sustained recovery will continue to depend on whether it is possible to establish fair competition conditions on international markets.

Consumption by the Steel Industry

Energy Source	2013	2014	2015
Coke (dry kg per t/pig iron)	331.6	334.1	329.5
Blasting Coal (kg per t/pig iron)	158.9	158.2	164.1
Sintering Fuels (kg per t/pig iron)	47.8	46.0	43.9
Oil (kg per t/pig iron)	8.7	7.8	5.0

Source: VDKi own calculations

HT-D13

The average specific consumption of coke, sintering fuels and oil in the German steel industry declined while the average specific consumption of blasting coal rose.

CORPORATE SOCIAL RESPONSIBILITY –

Statement of Principles of the VDKi

As far as is possible for the Association, the VDKi assumes responsibility for social, ecological and ethical principles. The Association supports its members in their efforts to achieve a high level of corporate social responsibility (CSR) in all of their business activities. The VDKi and its members expect all of the parties participating in the hard coal supply chain (hereinafter known as the suppliers) to regard and support the following basic principles as the fundamental ground rules for a business relationship based on trust. The VDKi therefore adopted a resolution recognising the following basic principles for responsible, social, ethical and environmentally sound actions in the hard coal supply chain during its Members' Assembly on 25 June 2015.

Basic Principles

We expect the compliance of all suppliers with any and all relevant laws and regulations of the country in which they operate. Moreover, we expect suppliers to orient their business to at least one of the following three international standards and guidelines:

- The Ten Principles of the United Nations Global Compact
- The OECD Guidelines for Multinational Enterprises
- The IFC Performance Standards on Environmental and Social Sustainability

We monitor the further development of standards specific to mining and coal and maintain an ongoing dialogue with our suppliers so that we can support them in the fulfilment of their social responsibility.

We expect our suppliers to advocate sustainable business activities within the full scope of their responsibilities and interests and not to limit their efforts to establishing sustainable business models for themselves alone. In this sense, we expect our suppliers to communicate the basic principles declared here as their expectation of their own suppliers and market partners.

We are open for dialogue with all of the relevant stakeholders who wish to contribute to responsible corporate action in the hard coal supply chain in the sense of a continuous improvement process.

We expect our suppliers to commit to the basic values of the following four areas set forth in the UN Global Compact and to strive to implement these principles in practice.

1. Human Rights

We expect all suppliers to support and respect the United Nations Universal Declaration of Human Rights and to ensure that they themselves are not party to any violations of human rights. The reference framework for responsible handling of human rights is established by the "UN Guiding Principles on Business and Human Rights" and any national action plans based on these principles for the relevant region.

2. Labour Standards

We expect the compliance of all of our suppliers with the laws and regulations of their countries, including those related to occupational safety and health protection on the job.

Moreover, we expect compliance with the following basic principles and related core labour standards of the International Labour Organisation (ILO):

- Freedom of association and the right to collective bargaining
- Abolition of forced labour
- Elimination of child labour
- Prohibition of discrimination in employment and profession

3. Environmental Protection

We expect all of our suppliers to ensure their responsible treatment of the environment and to work continuously on reducing the environmental impact of their activities on water, land, air and biodiversity. Moreover, we expect them to encourage the development and distribution of technologies to protect the environment and to use natural resources efficiently.

4. Ethical Business Standards

We expect all of our suppliers to comply with a high level of business ethics and to combat every form or corruption or bribery, including fraud and extortion.

The reference frame for ethical business standards is found in the UN Convention Against Corruption.

The VDKi has set up a working group for the purpose of incorporating the subject of CSR as a fixed element of the Association's policies. CSR is now a regular point on the agenda of the Management Board's meetings as well. The VDKi is open to the sharing of experience with all groups and associations interested in CSR.

COUNTRY REPORTS

AUSTRALIA

General

The Australian economy is stagnating at a high level. According to the International Monetary Fund (IMF), real growth in gross domestic product amounted to 2.3 %, similar to that of the previous year, and unemployment was at almost exactly the same level as the previous year (6.1 %). These conditions for the Australian economy are a consequence of the falling demand for raw materials, and this affects the mining sector especially. There are also positive tendencies, however, especially a positive atmosphere in the business world after a change in the government leadership.

The Australian Central Bank has lowered the basic interest rate a number of times and thus contributed to a further devaluation in the exchange rate to the US dollar. The declines in wage agreements are also supportive of Australia's economic development. In the previous year, the agreements were still providing for an increase of 3.6 %; they now amount to 2.7 %. In the mining sector, they went from 4 % to 2.1 %.

The new Australian government published an energy white book in 2015; it sets general conditions for energy policies and intends to ensure competitive prices and reliable energy supplies for households, companies and international markets. The high increases in electricity prices of the past have been stabilised in particular by the revocation of the CO_2 tax imposed by the previous government.

Australia became the world's largest coal exporter in 2015, dethroning Indonesia, which had held this position (including lignite) for three years. Although Australia's exports remained more or less constant, Indonesian exports fell by about 11 %. This was caused above all by the weaker demand from India and China while the Australian demand profited from relatively stable general conditions on important export markets such as Japan and South Korea (among other factors, because of long-term contracts and mine ownership of companies from these countries). South Korea currently has 12 coal-fired power plants in the planning stage that are scheduled for construction by 2021. The conditions for the construction of new coal-fired power plants in Japan have also become more favourable. High-grade import coal from Australia is the fuel of choice for these new plants.

Nonetheless, the low world market prices for hard coal have prevented the mining sector from being able to join the generally positive trend. As of February 2016, the Australian currency lost 6.9 % in comparison with the US dollar, but at the same time the price for prime coking coal declined by 29 %. In terms of domestic currency, the decline in earnings was still 24.1 % and had a drastic impact on export business. Despite these difficult general conditions, the Australian mining industry is still in a relatively good position. Nevertheless, there have been setbacks here as well.

The publication "Resources and Energy Quarterly" issued by Australia's Bureau of Resources and Energy Economics (BREE) in March 2016 notes that China bears

the primary responsibility for the declining demand for coking coal. The strong decline in the construction sector had a corresponding effect on Chinese steel production. This in turn affected the contract price for low-volatile coking coal. According to BREE, the contract prices FOB Australia declined by 19 % to an average of US$102/t in 2015. The spot prices for low-volatile coking coal declined by 23 % to US$88/t in 2015. The sharp fall in global market prices had a major impact on the economic position of the producers, especially in the United States. The impact was weakened to some degree in countries such as Australia, where the currency lost value in comparison with the dollar.

Resources and Energy Quarterly assumes that a major part of world production is not profitable at prices of US$80/t. It must therefore be assumed that even more producers who face high costs will be exiting the market. In the middle term, this will most likely result in a stabilisation that could benefit the Australian producers in particular. This estimation is also based on the fact that Australia's share in coking coal exports of 56 % in 2014 rose to 62 % in 2015. Attempts to lower production costs have impacted exploration in particular. In 2015, expenditures for exploration declined by 37 % in comparison with the previous year. But it was possible to avoid mine closures for the most part in Australia. The Collinsville Mine, the oldest mine in Queensland, had been operating for almost 100 years, but was one of the mines closed in 2015.

Production

New South Wales (NSW) and Queensland (QLD) are the sources of virtually all of Australia's hard coal. Most of the coking coal comes from QLD while steam coal comes primarily from NSW. Seventy-eight percent of the production comes from opencast pits, 22 % from underground mines. According to BREE, coal production decreased to 421 mn t, corresponding to a decrease of 20 mn t (4.5 %).

Smaller quantities of hard coal were mined in Western Australia (6.6 mn t), South Australia (2.5 mn t) and Tasmania (0.4 mn t) in 2015 in addition to the production from Queensland and New South Wales, but this production was consumed exclusively on the domestic market. Of the total hard coal production (421 mn t), 237 mn t were steam coal (-12 mn t) and 184 mn t were coking coal (-8 mn t).

Smaller quantities of lignite as well as hard coal are mined in Victoria.

Usable Production of the Major Production States of Australia

	2013	2014	2015
	mn t	mn t	mn t
New South Wales (NSW)	190	198	191
Queensland (QLD)	212	234	221
Total NSW QLD	**402**	**432**	**412**
Western Australia/Tasmania	10	9	9
Total	**412**	**441**	**421**

Source: Resources and Energy Quarterly, Austr. Government, Dpt. Of Industry.

LB-T1

BREE regularly publishes reports on the status of projects in coal mining in the Resources and Energy Major Projects. A distinction was made between announced projects, feasibility studies, started projects and completed projects in the October 2015 issue.

– Ten coal projects have been announced. The investment volume amounts to AUS$14 bn.
– The largest number of projects for the expansion or new development of mines is found in the section of the feasibility studies. There are 39 coal projects in this stage; the total value is AUS$57 bn.
– Six coal projects with a value of AUS$4.7 bn are currently under development. Three of these active projects are in New South Wales, three are in Queensland. The projects in New South Wales are expansion investments while the projects in Queensland are greenfield projects, and the greater part of the funds are therefore flowing into the Queensland projects. The Grosvenor Project for an underground mine in Queensland alone has an investment volume of about AUS$2 bn, and it is presumed that it will be concluded in 2016.
– One project was concluded in 2015. The Maules Creek Project with a value of AUS$767 mn is in New South Wales; both steam coal and coking coal are produced in this mine.

The Carmichael Mine belonging to the Indian Adani Group could create 6,400 new jobs and become Australia's largest mine, producing 60 mn t annually. This project met with major resistance from environmental protection organisations as well as from representatives of the indigenous groups of the Wangan and the Jagalingou. After a long and difficult approval process and legal disputes, the project appeared to be well on its way last October. Greg Hunt, Minister of the Environment, described the environmental protection conditions as "the strictest conditions in Australian history". The expansion of the Abbot Point Coal Terminal in Queensland was approved two months later. Three partial permits with a deposit volume of 11 bn t of steam coal were issued on 3 April 2016. At this time, however, two court proceedings have cast doubt on the project.

Infrastructure

The new transport routes that are planned from the Galilee Basin to the Abbot Point Coal Terminal are related to the development of the Carmichael Mine, the above-mentioned project of the Indian company Adani Mining.

Export

Despite declining coal prices, Australia was able to maintain its exports and the previous year's level of 387 mn t in 2015.

Exports of the Largest Coal Loading Ports

Coal Loading Ports	2014	2015
	mn t	mn t
Abbot Point	26.5	27.2
Dalrymple Bay	69.6	69.3
Hay Point	43.0	44.4
Gladstone	68.4	71.7
Brisbane	7.1	7.0
Total Queensland	**214.6**	**219.6**
PWCS	112.4	109.3
Port Kembla	13.7	11.4
NCIG	46.3	48.7
Total New South Wales	**172.4**	**169.4**
Total	**387.0**	**389.0**

Source: Australian Coal Report

LB-T1

Hard Coal Exports According to Quality		
Coal Grade	2014	2015
	mn t	mn t
Coking Coal (HCC)	122	121
Semi-soft Coking Coal	64	64
Steam Coal	201	202
Total	**387**	**387**
Source: McCloskey		

LB-T2

Development of Australia's Exports to China		
	2014	2015
	mn t	mn t
Hard Coking Coal	32.0	26.2
Semi-soft Coking Coal/PCI	14.2	10.0
Steam Coal	47.1	34.6
Total	**93.3**	**70.8**
Source: McCloskey		

LB-T3

A summary of Australia's key figures is shown here:

Key Figures Australia			
	2013	2014	2015
	mn t	mn t	mn t
Hard Coal Production	410	441	421
Hard Coal Exports	**358**	**387**	**387**
• Steam Coal	188	201	202
• Coking Coal	170	186	185
Imports Germany	**4.7**	**5.7**	**5.7**
• Steam Coal (incl. Anthracite)	0.1	0.4	0.1
• Coking Coal	4.6	5.3	5.6
Export Rate in %	**87**	**88**	**92**
Source: Own calculations			

LB-T4

INDONESIA

General

Indonesia is suffering from an obsolete infrastructure of insufficient capacities. The government agencies are regarded as inefficient and vulnerable to corruption. President Joko Widodo, who was elected in October 2014, wanted to solve these problems quickly, but little has happened in the meantime. Since spring 2015 and according to GTAI, the dominant atmosphere is now one of disappointment because the government are seeking their salvation in protectionism and nationalism. At the end of last year, Adhi Wibowo, the head of the Directorate General for Coal and Minerals, declared: "We are energising other countries with our coal – India, China and others – but what about us? Indonesia needs to protect its reserves." And he added that the goal was to end coal exports by the end of 2025.

In the "Ease of Doing Business" from the World Bank in 2015, Indonesia landed in 114th place out of 189 assessed countries, lower than Zambia and Nepal, for instance. But Indonesia has been able to improve recently and is significantly ahead of India. Such results, however, are also dependent on the chosen criteria. In the "Global Competitiveness Report" from the Global Economic Forum, Indonesia was able to place 34th out of 144 because of its high domestic consumption and financial stability.
According to the National Statistics Office, economic growth fell to 4.7 % in 2015, but the economy is expected to pick up again in 2016 and grow by 5.2 %. While private consumption has become decoupled from the general economy and grew by a real 5 %, exports and imports shrank by double-digit percentages in 2015, caused in part by low prices for raw materials and energy. There are

reports in the industry of significant reluctance to make any investments.

A report from GTAI called “Mining in Indonesia” characterises the situation in the following way. Mining in Indonesia has the advantage that the population density on the mining islands Kalimantan and Papua is very low and most of the cities and villages are located on the coast while the deposits are in the interior. This advantage is offset by the poor infrastructure in the country, however. As a result, mining companies are frequently forced to build the infrastructure, including power plants, themselves. Coal, produced as a rule in opencast pits, has developed into the country’s most important energy source.

The country’s power generation relies above all on modern coal- and gas-fired power plants to cover the fast-growing electricity consumption; projections from the state-owned power group PLN indicate annual growth of 8.4 % until 2022. The government are striving to increase the share of private investors in electric power generation significantly, but the country’s largely inefficient bureaucracy mentioned above is a hindrance. The mining company PT Bukit Asam (PTBA) is one of the investors in the electricity market and is planning the construction of two power plant blocks of 620 MW each, utilising project financing from the China Export-Import Bank (CEXIM) and a Chinese partner.

According to the Ministry of Energy, 50 % of power generation comes from coal-fired power plants, gas-fired power plants have a share of one-quarter, and hydroelectric power and geothermal energy have a share of 13 %. Diesel-fuelled power plants are supposed to be either taken offline or converted in future to biofuels – palm oil above all. The state-owned energy utility PLN wants to increase its consumption in 2016 by 6 to 10 mn t (8 % to 14 %) over the previous year’s value of 71 mn t, which would provide a certain amount of relief to the mining companies and their situation.

According to the state-owned energy utility PLN, the available generation capacities at the end of 2014 totalled 53,000 MW. Calculations from the Ministry of Energy show that a value of almost 200,000 MW must be achieved by 2030 to cover the load, and capacities in 2050 are supposed to amount to about 400,000 MW. There is certainly adequate potential for growing domestic demand for coal.

Production

Hard coal production in 2015 declined from 458 mn t (2014) to 376 mn t – a consequence of the sharp decline in exports, although domestic consumption rose from 76 mn t to 80 mn t.

Indonesian mining companies took capacities off the market in 2015, whereby the larger producers were in a better position to survive the slump and wait for an increase in prices than the smaller companies, some of which were unable to continue operations because the margins were too low.

The large companies, however, are at a disadvantage competitively because they are subject to higher production royalties. In accordance with the Mining Act of 2009, the rates were actually supposed to be adjusted, but this is not supposed to happen now. This means that large companies pay royalties of 13.5 % while smaller companies must pay between 3 % and 7 %, staggered according to the calorific value of the coal. This disparity leads to price disadvantages of as much as US$4/t FOB. Additional pressure is created by the preference of South Korean buyers

for coal from South Korean investors. Royalties of 2 % below the rates for small companies were under discussion for underground mining, which is still in its infancy in Indonesia. The benchmark price on which the calculation of the royalties is based is important. There were plans by the Directorate General for Coal and Minerals to increase the share of the Indonesian coal index from 25 % to 50 %, but this measure has been put back on the shelf. Instead, the assessment basis for the property tax has been expanded from the mine areas to the value of the coal reserves. This quadruples the tax payment for a midsize company.

Despite the reduction in capacities, a growing number of investors are seeking to obtain licences. The assessment of the reserves is very low at the moment – an opportunity for investors with strong financial backing.

Infrastructure

Indonesia's transport infrastructure has major shortcomings and hinders the country's economic development. The expansion of the seaports and other measures are intended to connect remote parts of the country more closely. The Tanjung Enim-Tanjung Apiapi Railway for coal transport in South Sumatra with a length of 375 kilometres and an investment volume of US$2,975 mn and the Pulau Baai-Muara Enim Coal Railway, a 230-kilometre long rail connection for coal transport in Sumatra costing US$2,300 mn are among the largest public-private partnership projects in Indonesia.

Export

2015 saw the end of Indonesia's three-year reign as the world's largest coal exporter (including lignite). The decline in Indonesian hard coal exports by 23 % from 382 mn t to 296 mn t allowed Australia to claim the top spot. Above all, the weaker demand from India and China impacted Indonesia's situation in the past year.

India, Indonesia's largest coal export market, raised the level of its own production, imported substantially more South African coal and reduced its imports from Indonesia. Indonesian steam coal deliveries to India (excluding lignite) fell from 105 mn t in the previous year to 90 mn t, including above all sub-bituminous coal.

The slowdown in China's economic growth led to a significant reduction in coal imports, and Indonesia was the big loser of this development – exports to China fell from 88 mn t to 64 mn t. Quality also played an important role in this development. Indonesian coal generally has a relatively low energy content, although it also has very low sulphur content. Initially, this was a major advantage for buyers from the People's Republic of China because of the high level of air pollution. When the regulation of the calorific value also went into effect in China, the Indonesian suppliers found themselves in even stiffer competition with other suppliers, especially from Australia. Despite the downward development in exports, Indonesia remained the largest exporter of steam coal, nearly all of which went to the Asian-Pacific region.

Coal Exports According to Markets

	2013	2014	2015 [1)]
	mn t	mn t	mn t
Pacific	393.0	372.0	284.1
Europe	8.4	8.6	11.3
USA	0.6	1.4	0.6
Total	**402,0**	**382,0**	**296,0**

[1)] Estimated
Source: Prepared McCloskey figures

LB-T6

The largest single buyers are India, China, South Korea, Japan and Taiwan.

The Largest Buyers of Indonesian Coal

	2013	2014	2015 [1)]
	mn t	mn t	mn t
India	82.7	104.7	90.0
China	106.9	88.2	63.9
Japan	26.0	32.0	25.9
South Korea	36.1	35.3	26.9
Taiwan	22.1	22.0	19.4

[1)] Provisional, in part estimates, excluding lignite
Source: McCloskey

LB-T7

Key Figures Indonesia

	2014	2015
	mn t	mn t
Exports	382	296
Domestic Consumption	76	80
Total Coal Production	458	376
Imports Germany	0	0
Export Rate in %	83	79

Source: IHS and own calculations

LB-T8

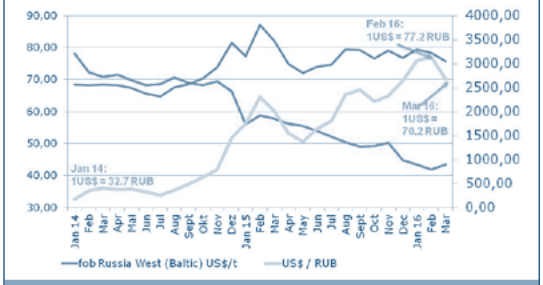
RUSSIA

General

Russia is not only one of the world's largest energy producers, but is "the" energy supplier for Germany – for oil, natural gas and coal in equal measure. In the years after the turn of the millennium, Russia gained strength from annual economic growth of close to 7 % while reducing national debt and significantly improving its credit rating. This positive development was strongly disrupted by the international financial crisis in 2008, however. Russia managed to stabilise, but no longer at the previous level. Structural deficits in the country were not addressed with determination during the years of the upswing. Following the crisis in Ukraine and the sanctions imposed by the Western world, the Russian ruble (RUB) lost one-third of its value. The national economy, which had grown by only 0.6 % in 2014, collapsed in 2015 and shrank by 3.7 %. The Russian Central Bank expects a further decline in economic performance of 1 % for 2016. According to the GTAI, positive stimuli came only from agriculture, which profited from the stop to imports of Western foods, and from mining, which became more competitive because of the devaluation of the ruble. The chart below shows that a massive decay in the prices FOB Baltic Sea coast and the simultaneous devaluation of the ruble, which was even greater, led to an increase in revenues in rubles.

Whenever Russian producers were able to fall back on domestic mining supply products, they were in an outstanding competitive position. The other side of the coin was the corresponding competitive disadvantage for German mining suppliers. How long this currency situation

Steam coal prices fob Russia West (Baltic), 6,000 kc NAR
in US$/t and RUB/t Rubel Exchanges rate US$ / RUB



Source: Mc Closkey

will last depends on the development of the oil price as well as on the economic sanctions. To be sure, few experts expect a significant increase in the price of oil at this time that would lead to a higher valuation of the ruble, but this could have a negative effect on the competitive situation of Russian hard coal mining.

Production

According to the Russian Ministry of Energy, the share of opencast pit production in total Russian coal production is 73 %. In 2015, an estimated 177 mn t were consumed in Russia in approximately equal shares in the steel industry and as fuel. Productivity of Russian mining has systematically risen in recent years. On average, annual growth since 2008 has been almost 6 %. Growth in productivity in 2014 over the previous year was 8 %. In this sense, Russian hard coal mining has a certain potential for the goal of stabilising the ruble or possibly even initiating an increase in its value as a means of compensating the negative effect.

The most important Russian mining region is the Siberian Kuznetsk Basin. The share of Russian production in this region has risen steadily from 56 % in 2008 to 59 % in 2014. SUEK, the largest Russian mining company with production of almost 100 mn t, is located in this region.

The SUEK company profited last year from a 9 % increase in domestic consumption to 54 mn t, but on the other hand had to deal with significant revenue losses in its export business to Asia of 10 % and to Europe of 6 %. The company intends to concentrate increasingly on production in Kuzbass (Kuznetsk Basin) and is investing US$149 mn there in comparison with US$134 mn in the previous year. Moreover, the company plans to invest more heavily in coal processing. Similar approaches to investment planning are heard from other companies.

Hard Coal Production Russia

	2014	2015
	mn t	mn t
Coking Coal	92	95
Steam coal [1)]	265	278
Total	**357**	**373**

1) Incl. anthracite
Source: McCloskey

LB-T9

Coal production in Russia rose only slightly by 9 mn t over the previous year to about 356 mn t. Domestic demand for coal increased from 169 mn t to 177 mn t (+4.7 %). After collapsing in 2014, the consumption of coking coal stabilised again and increased by 6.5 %, according to information from the Russian Ministry of Energy.

Coal Export Ports in Russia

	2013	2014 [1]
	mn t	mn t
Baltic Sea Ports and North Russia		
Murmansk	14.8	15.5
Vysotsk	5.3	5.9
Riga	16.5	16.6
Ventspils	6.6	5.7
Tallinn (Muga)	0	0
St. Petersburg	0	0
Ust-Luga	16.2	17.6
Miscellaneous	2.3	2.0
Total	**61.7**	**63.3**
South Russia and Ukraine		
Mariupol (Ukraine)	0.9	0.4
Tuapse (Russia)	3.0	3.2
Yuzhny (Ukraine)	0.4	0.4
Miscellaneous	7.6	7.9
Total	**11.9**	**11.9**
Russia Far East		
Vostochny	22.6	27.7
Vanino	19.6	24.7
Miscellaneous	13.3	15.8
Total	**55.5**	**68.2**
Total	**129.1**	**143.4**

[1] In part estimates
Source: Argus Media

LB-T10

Export

Owing to the rise in demand abroad on the one hand and the decline in domestic demand on the other, Russia exported about 142 mn t in seaborne trade, almost the same as the previous year. In addition, another approximately 23 mn t were traded in domestic traffic with former CIS states and China. Total exports came to just under 166 mn t in 2015 as well.

Key Figures Russia

	2013	2014	2015
	mn t	mn t	mn t
Coal Production	347	357	373
Hard Coal Exports1) Seaborne	130.8	143.0	142
• Steam Coal	116	110	125
• Coking Coal	14.8	33	17
Imports Germany	13.1	13.7	16.7
• Steam Coal	12	12.3	14.9
• Coking Coal	0.9	1.2	1.6
• Coke	0.2	0.2	0.2
Export Rate in %	37	40	38

[1] Seaborne only; breakdown into coking and steam coal not possible for 2014 and 2015

Source: Own calculations

LB-T11

In Germany, total imports from Russia increased by 3.0 mn t to 16.7 mn t, making Russia the most important coal supplier for Germany once again.

COLOMBIA

General

Estimates indicate that Colombia's gross domestic product in 2015 increased by 3.0 %, substantially less than in the previous year (4.6 %). The third-largest national economy in South America is no longer growing as fast as in the past because of the lower prices for raw materials, but it is still above the average for Latin America. The raw materials sector is suffering from the low prices on the global market. The economic turbulences in the neighbouring countries Brazil and Venezuela have also had a negative impact.

The outlook for 2016 is more reserved and economic growth of 2.7 % is predicted, lower than any time since 2009. Inflation in 2015 was 6.8 %, caused especially by the rise in prices for food and energy, and was last this high in 2008.

In its Global Competitiveness Report 2015-2016, the World Economic Forum issued a country rating that put Colombia economically in 61st place out of a total of 140 countries. Positive elements for the ranking were the stable macro-economic environment and the size of the market. Increasing Colombia's competitiveness will require battling corruption and improving the education system, public institutions, transport infrastructure, competition on the domestic market and the security situation.

A successful conclusion to the peace talks now being conducted with the guerrilla FARC will have a positive effect on the investment climate. The Colombian government and the FARC rebels sought a truce supervised by the United Nations in their peace negotiations. Both sides announced that they wanted to ask the UN Security Council to set up an observer mission. The aim is to have observers from the UN and the Community of Latin American and Caribbean States monitor the truce and the disarming of the rebels for a period of twelve months after the peace treaty is signed. After almost four years of negotiations, the parties to the conflict agreed on a truce on 22 June 2016. This is the decisive prerequisite for the signing of a peace treaty. During the final phase, however, the talks bogged down. Secretary of State Kerry from the US supported the negotiations by making concrete aid commitments for the time after the end of the conflict, which has been going on for decades. The details that are still open include the surrender of their arms by the rebels, the integration of the FARC fighters into civil life and a referendum on the peace treaty. The Colombian Interior Minister wants to hold such a referendum in September.

President Juan Manuel Santos, the guerrilla leader Rodrigo Londoño Echeverry and five representatives of the victims of the conflict in Colombia have been nominated for the Nobel Peace Prize 2016 for their engagement in the current peace process.

Production

At the beginning of 2016, wage negotiations with the trade union Sintracarbon were on the agenda at Cerrejón. The conclusion of the agreement three years ago was preceded by a 32-day strike and production losses of about 2.5 mn t. At that time, the agreements also included improvements in education and health care, and rumours indicated that the negotiations this year would also include these topics because of the decline in coal prices. A second 20-day round of negotiations with the

trade union ended on 20 February 2016, and a strike appeared almost inevitable. Sintracarbon had reduced its demands for a wage increase from 12 % to 10.1 %. The company initially remained firm on its offer of an increase corresponding to the consumer price index of 6.77 %. The negotiations were brought to a conclusion on 15 March 2016, however, without a strike. The agreement, which has a term of two years, provides for an increase in wages of 7 %. In addition, health care benefits were agreed and 150 temporary employment relationships were changed to regular positions.

On 13 February 2015, the Colombian Supreme Court responded to a suit filed by 139 people who were disturbed by night-time rail transports and ordered restrictions in the form of a prohibition of night-time transport for the state-owned railway company Fenoco (10.30 p.m. – 4.00 a.m.). The court declared the restrictions would remain in place until suitable protective measures had been taken. The government feared a loss of royalties in the amount of US$78 mn and a loss of US$148 mn in taxes from the reduction in transport capacity of 35,000 to 36,000 t/day. A certain level of compensation for the loss of capacity was achieved by using longer trains, a different management system and the shifting of maintenance work into the night-time hours, but the curtailment remained substantial.

The “solution” to the problem came indirectly from abroad. On 20 August 2015, Venezuela declared a state of emergency because of major conflicts between smugglers and security forces in the border area, and the border to Colombia was consequently closed. As this led to even further restrictions in freight capacities, President Santos issued a decree permitting the resumption of 24-hour operation. At the same time, the government announced their determination to carry out infrastructure projects in the railway sector.

Colombia’s hard coal output declined by 3.5 % to 85.5 mn t in 2015 (source: National Mining Agency). The Cesar Departement, where the companies Drummond, Glencore and Colombia Natural Resources operate, produced 53,1 %, more than half of the Colombian production, while 39.4 % came from La Guajira (Cerrejón and Caypa). Cerrejón, the largest producer, alone produced 33 mn t (previous year 33.4 mn t) – about the same as in the previous year. Drummond’s production rose by 2.2 % to 27.4 mn t despite the restrictions resulting from the night-time travel prohibition for Fenoco. Glencore’s production, on the other hand, fell from 19.5 mn t in 2014 to 16.9 mn t in 2015. The company Colombia Natural Resources (Murray Energy) produced 1.05 mn t in comparison with 0.87 mn t in the previous year (+21 %).

Production in Norte de Santander fell by almost 15 % to 1.87 mn t because the closing of the border between Venezuela and Colombia hindered export through Venezuelan ports. In Boyacá, production from smaller companies operating on the edge of profitability fell to almost 2 mn t as an indirect consequence of the weather phenomenon El Niño, which restricted opportunities to generate hydroelectric power. Production in Cundinamarca declined to 2.25.

Current predictions from the government indicate production of up to 100 mn t in this year. This will depend, however, on whether the drought – a consequence of the weather phenomenon El Niño – continues (it led to increased dust levels in some mines) and whether the border to Venezuela remains closed or is opened again.

Reficar, a newly opened refinery, began petroleum coke production in February 2016. Monthly capacity is given at 75,000 t. The port of Mamonal is just 4.5 kilometres away.

Steam Coal Exports by Company

Exporteur	2013	2014	2015
	mn t	mn t	mn t
Cerrejón	33.7	34.2	33.4
Drummond	20.0	23.2	27.9
Glencore/Prodeco	16.4	18.3	16.9
Goldman Sachs (CNR)	2.8	0.033	2.6
Others (incl. Central Colombia)	0.7	1.4	0.8
Total	**73.6**	**77.1**	**81.6**

Source: Company information

LB-T10

Infrastructure

Infrastructure investments at a historically high level are planned in Colombia and are necessary to make up the big deficits in this area. The projects to make the Magdalena River navigable and to rehabilitate various railway lines are supposed to put an end to the transport of freight on roads in future. Coal from the country's interior must still be transported by lorry to the ports. The railway project Central Railway System (CRS) is aimed at improving connections among several regions in Colombia. During the first half of 2016, 873 kilometres of railway lines are scheduled to begin operation. The project Bogotá-Belencito-Rail with a length of 228 kilometres and a transport capacity of 5 mn t a year involves US$3 mn in maintenance expenditures. The transport costs for coking coal from Boyacá and Cundinamarca could be reduced by 25 % upon its completion. There are still bottlenecks in the railway system, however.

Cerrejón has built a new loading terminal at the port of Puerto Bolivar with improved rail connections from the mine to the port.

Export

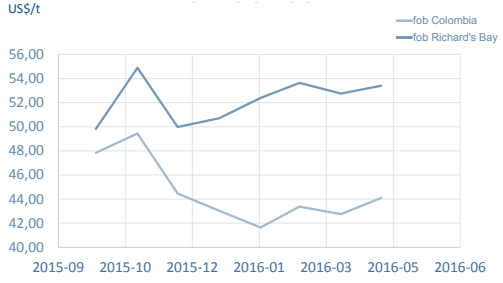
Steam coal exports rose in comparison with 2014 by 7.3 % to 80.5 mn t. At the beginning of 2015, expectations were still for 84 to 88 mn t. This was prevented by the night-time travel prohibition for the railway company Fenoco. According to agency information, Cerrejón exported 33.4 mn t, Drummond 27.9 mn t, Glencore 16.4 mn t and Colombia Natural Resources 2.4 mn t. Exports to the euro zone rose by 8.8 % to 57.6 mn t, to America by 3.5 % to 22.9 mn t and to Asia from 0 to 19.6 mn t. The industry is expecting 84 to 90 mn t for 2016.

The border closing between Venezuela and Colombia has caused a loss of at least 0.5 mn t in export capacity through Venezuelan ports since August 2015. Before the border was closed, Colombia exported about 1.5 mn t through Venezuela. Average annual production in Norte de Santander previously came to about 2.5 mn t. Since the closing in the middle of August 2015, monthly production has fallen by more than 35 %, and monthly exports barely reach 40,000 t because the company must attempt to export its production via Colombian ports.

Colombia is one of the five largest exporters of hard coal in the world. The hope is to develop new sales markets in Asia in the middle term to compensate for the declining demand from the USA and Europe. India, for instance, has become an export target for Colombia thanks to the low freight rates. There were reports of

a number of contract conclusions for steam coal at the beginning of the year. In the meantime, the expectations for 2016 are for average monthly deliveries of about 1 mn t. Presumably 2 mn t to 3 mn t will go to South Korea this year, and occasional deliveries have even gone to China. The growing price advantage over South Africa is the reason why Colombian ships, although they must pass South Africa on their way to Asia, can still be competitive. Lower freight costs are opening up arbitrage opportunities for Colombia.

Arbitrage Opportunities for Colombia



Source: McCloskey

Colombia was able to increase its exports of steam coal once again in 2015. They amounted to 80.5 mn t in 2015 over 75.0 mn t in the previous year. In view of the aforementioned restrictions, an increase of 5.5 mn t is definitely significant. Colombian coal went primarily (57.6 mn t; 72 %) to Europe (including Turkey, Israel and Morocco), 28 % went to North and South America and 19,557 t went to Japan.

Structure of Colombian Steam Coal Export [1)]

	2013	2014	2015
	mn t	mn t	mn t
America	**20.0**	**21.9**	**22.9**
North America (USA + Canada)	6.1	7.1	8.0
South and Central America	13.9	14.8	14.9
Asia	**1.0**	**0.0**	**19.6**
Europe	**52.6**	**53.0**	**57.6**
Mediterranean Region	20.7	14.6	17.3
North-west Europe	31.9	38.4	40.3
Total	**73.6**	**75.0**	**80.5**

[1)] Coking coal and coke are not included in the export figures.
Source: MCR, own calculations

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Key Figures Colombia

	2013	2014	2015
	in mn t	in mn t	in mn t
Hard Coal Production	85.5	88.6	85.5
Hard Coal Exports	**74.7**	**77.1**	**83.2**
• **Steam Coal**	73.6	74.9	80.5
• **Coking Coal**	1.1	2.2	2.7
Imports Germany	**9.8**	**7.4**	**9.9**
Export Rate in %	87	87	97

Source: Various analyses

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REPUBLIC OF SOUTH AFRICA

General

South Africa's export volume of 76.5 mn t in 2015 means that it continues to be one of the major coal exporting countries. 39.75 mn t were exported to India alone. South Africa's structural economic problems, however, appear to be worsening rather than improving. While economic growth of 3.1 % was posted in 2014, it declined to 2.0 % in 2015. The International Monetary Fund (IMF) has reduced its forecast for South Africa's economic development this year from 1.3 % to 0.7 % – the lowest forecast ever made by the IMF.

Unemployment remains at the previous year's level of 25 %. As if the known structural problems were not enough, a drought disaster is now apparently on the way. The positive side is that there have been very few strikes, and the electric power supply has also stabilised. This is not only a result of better management at Eskom (Africa's largest power generator on the basis of installed output), however, but also comes from the lower demand for power because of economic conditions.

The regulatory environment is as uncertain as before. The expected reform of the Mineral and Petroleum Resources Development Act that was mentioned in last year's annual report is still hanging over the industry as a source of uncertainty. Only vague statements on the subject are to be heard from President Zuma and the Ministry of Economics. This raises significant doubts about whether this project will be realised with determination. There is a conflict about the Mining Charter between the Ministry for Minerals and Raw Materials (DMR) and the Chamber of Mines. In the opinion of observers, mediation would be the most successful way to resolve the conflict. The current disputes could lead to a phase of uncertainty lasting for years. The Chamber of Mines regards the Mining Charter to be unconstitutional, however.

South Africa's position in the Survey of Mining Companies 2015 from the Fraser Institute has worsened even further. According to the Fraser report, the assessments for areas important above all to investors such as legal system, tax system, socio-economic factors and political stability have produced very low ratings. These ratings are used in calculating the parameter "Current Mineral Potential" and have caused it to worsen from 55th out of a total of 112 countries in 2013 to 85th out of a total of 109 countries in 2015.

The "Frankfurter Allgemeine Zeitung" of 25 March 2016 reported in the meantime of a "political power struggle" that is frightening off investors in South Africa. In fact, it even spoke of a "political thriller". Over the course of 2015, the rand lost 29 % with respect to the US dollar. The growing influence of an Indian family of investors, not just the replacement of the finance minister, is a source of growing concern for investors. Among other incidents, even the Swiss corporate Glencore had to accept interventions by the Gupta family during the sale of a coal mine.

The strict South African money policy fostered the rise in the consumer price index of 4.6 % in 2015. The weak

South African rand does have advantages as well for the export of raw materials, however. The price for steam coal FOB Richards Bay declined by 17.6 % in 2015. But since the US dollar rose against the rand by 29.3 % during the same period, the revenues in rand in 2015 rose by 6.5 %.

Production

Climate protection looms over the general conditions for the construction of power plants in South Africa as well.

The Thabametsi power plant project of Exxaro Resources is facing a climate change impact assessment that has been ordered by the Ministry of the Environment in response to a demand by the NGO Earthlife Africa. A tender procedure for a gas-fired power plant (3126 MW) by an independent power producer is expected at the beginning of 2016.

South African coal production declined from 261 mn t to about 252 mn t (3.5 %).

The attempts by the power utility Eskom to secure coal supplies at low cost in an inflationary environment escalated at times as in the case of the Arnot mine of Exxaro Resources. Since no agreement about the coal supply contract was reached, 1,800 mine employees were suspended and Eskom is currently procuring its coal from a different company. The cost increases led to Eskom applying for a raise in the electricity rates of 16.6 % this year.

The domestic market in South Africa consumed the following quantities in 2015.

Consumption of the Domestic Markets

	2013	2014	2015
	mn t	mn t	mn t
Power Generation	120	117	115
Synthetic Fuels (Sasol)	39	40	40
Industry/Metallurgical Industry	18	12	12
Total	**177**	**169**	**167**

Source: IHS Energy SAR

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Infrastructure

The state-owned railway and logistics company Transnet has undertaken to conclude the first large greenfield railway infrastructure project in the country since 1986, presumably in Q4 2017. The project (value: US$378 mn) is part of the supply system for the Majuba power plant, and it is planned to be able to deliver 21 mn t of coal annually.

No capacity expansions are planned at the moment for the Richards Bay Coal Terminal because of the current price situation. The planned figure of 110 mn t per year would supposed to be realised jointly with Transnet. Transnet now intends to pursue its own strategy for coal export facilities. The Richards Bay Coal Terminal has even reduced its capacity to 85 mn t per year at the mo-

Exports Through South African Ports

	2013	2014	2015
	mn t	mn t	mn t
RBCT	70.9	71.9	73.5
Durban	0.8	0.8	0.8
Maputo/Mozambique	1.2	1.2	1.2
Total	**72.9**	**73.9**	**75.5**

Source: IHS South African Coal Report No 2265

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ment, but could raise capacity to 91 mn t per year if this becomes necessary.

Export

Exports in 2015 fell by 0.3 mn t to just under 76.5 mn t.

Structure of the Exports in 2015

	Gesamt	Europa [1)]	Asien	Sonstige
	mn t	mn t	mn t	mn t
Steam Coal	74.8	27.2	42.7	4.9
Anthracite	1.7	0.5	0.3	0.9
Total	**76.5**	**27.7**	**43.0**	**5.8**

[1)] Incl. neighbouring Mediterranean countries

Source: IHS South African Coal Report No 2265

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India has now become far and away the most important export country for South Africa. Exports (excluding anthracite) rose from 30 mn t to 40 mn t in 2015, corresponding to an increase of 30 %. This country's share in total exports has risen to 52 %. Second place is held by supplies to Turkey, Morocco, Italy and Pakistan, each of which receives exports in a magnitude of 5 – 9 %. The increase in supplies to Morocco and Italy are especially noteworthy because in both cases the supplies have doubled to quintupled. Exports to Germany, on the other hand, declined by one-third. 7.5 % of the steam coal imports to Germany still come from South Africa. Exports to the EU declined sharply (-28 %). Exports to the People's Republic of China declined to about 3 mn t in 2014; in 2015, they were discontinued completely.

Key Figures Republic of South Africa

	2013	2014	2015
	mn t	mn t	mn t
Hard Coal Production	256.3	261.3	252.1
Hard Coal Exports1)	**72.8**	**76.8**	**76.5**
• Steam Coal	72.2	74.8	74.8
• Anthracite	0.6	2.0	1.7
Imports Germany	2.5	5.1	3.4
• Steam Coal	2.5	5.1	3.4
• Anthracite	0	0	0
Export Rate in %	**28.4**	**29.5**	**30.4**

[1)] Seaborne only

Source:VDKi

LB-T18

USA

General

The year 2014 was in itself a very difficult year for the American coal industry. Unfortunately, the critical escalation in 2015 exceeded even the negative development of the previous year. The consolidation and shrinking process among the companies that produce coking coal continued as did the adjustment process among the companies producing steam coal. According to a report published by the consulting company CRU at the end of 2015, the greatest problem facing the American mining companies is that even prior to the crisis they were counted among the companies with comparatively high costs. For instance, the distances to the export ports (from the Powder River Basin and others) are comparatively high, the geological conditions tend to be difficult and labour costs are comparatively high as well.

In comparison with its competitors, the American mining industry was especially hard hit by the rise in value of the US dollar in comparison with most of the world's currencies. Since all hard coal producing mining companies around the world were seeking to reduce their costs, the American mining companies inevitably found themselves in the role of losers because of this disadvantage from the strong exchange rate. According to CRU, 30 % of worldwide seaborne trade in 2015 involved losses for the producers. Hardest hit were the countries with hard currencies such as the US dollar and the Australian dollar. While some competitors did not suffer as much, the weak ruble even turned into an advantage for Russian exporters.

The American providers had to struggle with another problem (besides the strength of the US dollar) that no other mining country was facing (although it may become a threat in Australia as well in future): the shale gas boom. Even if most recently the low oil price generated high pressure on the American oil and natural gas industry, it was able to put high pressure to adapt on hard coal production in 2015. The share of power generation from natural gas has been higher than power generation from hard coal since April 2015. Calculated on a yearly basis, the share of natural gas, according to the Energy Information Administration (EIA), came to 33 % while the share of coal fell to 32 % – a decline from 50 % in the period from 1950 to 2000 to one-third today.

If all power generation in the United States and not just public generation is considered, coal and natural gas are still equal at 33 % share of generation; nuclear energy is at 20 % and conventional hydroelectric power is at 6 %. Of the non-conventional, renewable energy sources, photovoltaics has a share of 1 % and wind power generation supplies 5 %.

Coal was hit by 80 % of the shutdowns in power plant production in 2015. Last year, 18 GW of electric power generation were shut down – a relatively high decline in capacity in comparison with previous years. This decline in capacity reflects the falling importance of hard coal for power generation. In addition to competition with natural gas, environmental policy regulations played a role. More than 30 % of the coal-fired power plant capacities that were shut down were shut down in April at the time of the entry into force of the Mercury and Air Toxics Standards of the US Environmental Protection Agency (EPA). Some power plants that were of significance for regional pow-

er supply security were able to apply for an extension of one year so that there will presumably be additional shutdowns in April 2016 that have not yet been reported statistically. The closed power plants were power plants with an average production of 133 MW in comparison with the hard coal-fired power capacity averaging production of 278 MW that remains.

The Clean Power Act has the goal of achieving a significant reduction in emissions from 2022; at this time, however, the American Supreme Court has called a halt to the project. It will also be necessary to wait and see what effect the results of the American elections will have on future environmental policies. According to the EIA, a basic scenario of the Clean Power Plan would cause coal to fall after 2024 to a level that it last had at the end of the 1970s. Since the basic scenario is based on the assumption of rising natural gas prices, hard coal-fired power generation would later recover, but reach no more than the level of the 1980s. The effects viewed regionally would vary significantly. In the West (especially Wyoming, Powder River Basin), production of steam coal would decline by 24 % after 2024. In the Middle West (Illinois and lignite fields), production after 2024 would decline by 45 % while the decrease in the Appalachians would be only 19 %.

Production Breakdown USA

	2013	2014	2015
	mn t	mn t	mn t
Appalachians	246	242	201
Middle West	166	172	152
West	480	493	460
Total	**892**	**907**	**813**

Source: EIA

LB-T19

On 13 April 2016, the largest American hard coal mining company, Peabody Energy Corporation, applied for Chapter 11 creditor protection. Consol Energy is now the only remaining American hard coal mining company listed on the stock exchange (the Dow Jones US Coal Index). Large American mining companies have applied for creditor protection one after another. Patriot Coal submitted its application in May 2015, Walter Energy followed in July and Alpha Natural Resources in August. In January of this year, Arch Coal, the second-largest American hard coal mining operation, also had to request protection under Chapter 11. While for some companies the situation in the United States and the sale of coking coal was the final straw, the fact that there is no corresponding rule for creditor protection in Australia also had a role to play for Peabody. In 2011, Peabody invested in the large Australian company McArthur Coal. This acquisition was a further burden on Peabody, even though the Australian activities are not a part of the Chapter 11 proceedings, because the price for coking coal has fallen by 75 % since its peak in 2011.

Export / Import

Steam coal exports from the United States to the European Union fell to a good half (52 %) of the previous volume last year. A good third (37 %) went to North America and 5 % to South America. The European Union (35 %) was also the primary delivery region for coking coal, followed by South America (14 %), rest of Europe (11 %) and North America (10 %). Exports to Germany did not move parallel to the general trend. They remained at almost the same magnitude as in 2014, whereby 7.7 mn t of steam coal and 3.2 mn t of coking coal were imported. A massive drop was seen in exports to Great Britain, on the other hand, falling from 8.9 mn t to 3.8 mn t. The reduction of exports to Turkey were also very remarkable, dropping

by half from 4.0 mn t to 1.9 mn t. The decline in imports by South Korea from 7.3 mn t to 5.5 mn t made itself felt especially strongly in the exports to Asia.

The exports of American coal via Canada, the Great Lakes and the terminals on the West Coast fell by 23 % to 12.4 mn short tons in 2015. This was reported by the International Trade Commission of the United States. Exports via Hampton Roads fell even more last year, by 35 %. Exports via the American East Coast were even more strongly affected and declined from 37 mn t to 24 mn t in 2015.

Export USA 2015

	Coking Coal	Steam Coal	Total
	mn t	mn t	mn t
Seaborne	37.8	23.7	61.5
Overland (Canada)	3.9	1.3	5.2
Total	**41.7**	**25.0**	**66.7**

Source: McCloskey

LB-T20

Import-Export Balance USA (Seaborne)

	2010	2011	2012	2013	2014	2015
	mn t	mn t	mn t	mn t	mn t	mn t
Export (Seaborne)	64	91	107	100	82	62
Import (Seaborne)	16	11	7	7	9	9
Balance	**48**	**80**	**100**	**93**	**73**	**53**

Source: McCloskey

LB-T21

Key Figures USA

	2013	2014	2015
	mn t	mn t	mn t
Hard Coal Production	**892**	**907**	**813**
Hard Coal Exports (Seaborne)	**106**	**82**	**62**
• **Steam Coal**	58	29	24
• Coking Coal	56	53	38
Hard Coal Imports	8	10	10
Imports Germany	12	11	11
• **Steam Coal**	9	8	8
• Coking Coal	3	3	3
Export Rate in %	**12**	**10**	**8**

Source: Various and own calculations

LB-T22

CANADA

General

Canada is a midsize mining country, but it is the third-largest exporter of coking coal via seaborne trade following Australia and the United States of America. The lion's share of production and export mines is located in British Columbia and Alberta. The rail transport to the West Coast for exports to Asia is an average of 1,100 kilometres.

Owing to its wealth of oil and natural gas, 59 % of Canada's primary energy consumption is covered by these two energy sources. Coal contributes no more than 6 %. At 10 %, the share of coal in power generation is relatively low as well. However, this is because of the high share of hydroelectric power (60 %). More than half of the coal-fired power generation is in Alberta.

There are 20 producing mines in Canada, 18 of them opencast pits and 2 of them underground operations. In addition, there is production of 36 mn t of lignite.

Canada has used the Sask Power Boundary Dam Project to demonstrate that it is the leader in the field of carbon capture and storage. The country is pursuing ambitious climate protection targets, but respects the earlier investments in the existing hard coal-fired power plants. The Canadian Climate Protection Act provides that 50-year-old coal-fired power plants must either meet a highly ambitious emission limit value of 420 g CO_2/kWh (which de facto means a conversion to natural gas) or must separate and store the CO_2. Otherwise, these hard coal-fired power plants must be shut down. There are even discussions in Alberta about reducing the lifetime of hard coal-fired power plants to 40 years. A cap that is 12 % below an historical reference value has been introduced for existing power plants with high emissions. If the value is exceeded, penalties must be paid, but it is also possible to trade with companies that have exceeded their reduction obligations – for all practical purposes, an emission trading system.

Production

In June 2015, the People's Republic of China concluded a free trade agreement with Australia, granting the producers in this country a competitive advantage of 3 % in the amount of the eliminated customs duties. This put even more cost pressure on Canadian suppliers. In comparison with the US suppliers, the weaker Canadian dollar provided a certain degree of relief. Lower diesel prices were also a source of relief because of the high level of opencast pits in Canada. Nevertheless, the cost pressure is so high that Teck, the leading company, introduced revolving closures for its 6 mines for three weeks over the summer. The Quinsam Mine was closed for several weeks during the summer. There have been no changes for the mines mothballed in British Columbia back in 2013. In February 2016, plans of the British Columbian government aimed at helping the mine operators (or, more precisely, the employees) by postponing payment of the electricity bills of the mining companies became public. A figure of C$300 mn that would not have to be paid immediately was mentioned.

A number of mine projects that were initiated when prices were high have been postponed. In the middle term, however, it must be assumed that these capacities will be put on the market. There has also been a postponement of the restart of the Teck Quintette Mine. This has a capacity in

the vicinity of 3-4 mn t of export coking coal. Still, one project that will be finished before much longer is remarkably an underground project of HD Mining with a capacity of 6 mn t. Exploration is also overshadowed by cost pressures. In 2015, C$69 mn was invested in exploration in British Columbia. This compares with C$105 mn in 2014 and C$150 mn in 2012.

The production of steam and coking coal in Canada was lower in 2015 than in 2014. Production of 61.7 mn t was 7.3 mn t below the level of the previous year.

Infrastructure

In 2013, a programme with a value of C$1 bn was scheduled for the terminals on the West Coast. This project means that in the next few years additional handling capacity of 30 mn t will become available. These capacities will be completed in a time when only about half of the Canadian export terminals are operating at full capacity.

Handling Capacities 2014

Terminal	Capacities 2015	Exports 2015	Capacities 2016
	mn t/a	mn t/a	mn t/a
Neptune Bulk Terminal	12.5	6.3	18.0
Westshore Terminal	33.0	30,628.8	36.0
Ridley Terminal	18.0	7.24.4	24.0
Total	**63.5**	**39.5**	**78.0**

Source: Company reports, own estimate

LB-T23

Export

The seaborne exports of 29.2 mn t break down into 2.3 mn t of steam coal and 26.9 mn t of coking coal. Only 0.9 mn t of coking coal went overland to the USA. In total, exports declined by about 4 mn t in comparison with 2014.

Key Figures Canada

	2013	2014	2015
	mn t	mn t	mn t
Hard Coal Production [1]	69	69	61.7
Hard Coal Exports	38	34	30.1
• **Steam Coal**	3	3	2.3
• **Coking Coal**	35	31	27.8
Imports Germany	1.2	1.5	1.3
• Coking Coal	1.2	1.5	1.3
Export Rate in %	55	49	49

[1] *Incl. hard lignite*
Source: Various and own calculations

LB-T24

MONGOLIA

General

Mongolia is one of the countries in possession of enormous deposits of raw materials – they are estimated to be 6.4 bn t of coal, about 40 % of it coking coal – but relatively little reliable information about production data is available. The close proximity to the People's Republic of China was a great advantage for Mongolia during the time of enormous growth in the Chinese steel industry. Conversely, Mongolia is now the first victim of this development. For instance, the pressure to adjust has led to reports of major financial problems for the company South Gobi, a coking coal producer.

Despite the economic difficulties, a large number of projects are in the pipeline, especially the Rio Tinto project Tavan Tolgoi. According to BMI Research, hard coal production in 2015 came to 36.6 mn t and could rise to 56 mn t by 2020. This contrasts, however, with the major sales problems faced by the Chinese steel industry. While Chinese steel production in the last 5 years has grown by an annual average of almost 5 %, it will presumably decline in the coming years, especially if international pressure forces China to reduce its capacities even further. Owing to its immediate proximity to the People's Republic of China and the high quality of the coal, Mongolia is in the best position to deal with the pressure to adjust. Despite everything, coking coal exports fell from 14.7 mn t in 2014 to 12.7 mn t in 2015. An optional sales strategy (although one that is available to all competitors) is to build on the development of steel production in India. Growth in steel production in that country, as in China in the past, is about 5 %, but an increase in the rate of growth is expected for India. The decisive point for sales opportunities will be the degree to which India is capable of making better use of its coking coal deposits and lowering the costs to world market level.

Infrastructure

In 2015, a memorandum of understanding related to the Tavan Tolgoi project was signed with a Japanese company for the development of the Tavan Tolgoi Eastern Railway. A railway line with a length of 1,300 kilometres is to be built to the east and will provide a connection to Japan and the United States. A railway project with a length of 267 kilometres leads to the Chinese border. This project is intended to make it possible to replace lorry transports with rail transports, which would substantially reduce costs. Finally, the Erdenet Ovoot Arts Suuri project must be mentioned. This project opens the route to the north and is expected to provide capacity of 100 mn t for transport to Russia, China and via sea routes as well.

POLAND

Production

The Polish hard coal mining industry is undergoing a massive restructuring process. The number of workers has declined from 155,000 in 2000 to 92,000 at the end of 2015. This corresponds to a reduction in the workforce of about one-third, and the decline since the previous year alone came to almost 10,000 workers. Production has also dropped massively from a little over 100 mn t in 2000 to a good 70 mn t. The original plans of the Polish government either to close four mines belonging to Kompania Weglowa or to incorporate them into a new

company were subject to the agreement of the European Commission with respect to the related subsidisation factors. This course of action has not proved to be promising, however.

Following the election victory of the party Law and Justice on 25 October 2015, the Polish hard coal mining received strong support politically, at least. Beata Syzdlo, the new prime minister, declared that Polish coal must provide the foundation for Polish power generation. She announced a revitalisation programme for Silesian hard coal mining and took a rather protectionist-critical attitude to import coal.

The high price pressure to which Polish hard coal mining was exposed in 2015 led to a surplus in Poland and an aggressive price policy of Kompania Weglowa. The company Bogdanka submitted a complaint to the Polish competition supervision authorities. This internal Polish problem was later "solved" by the acquisition of LW Bogdanka, which was listed on the stock exchange, by companies of the Polish electricity industry. The "solution" – to reorganise the Polish hard coal mining industry by increasing the responsibility of state-owned electricity supply companies – also became an approach to save Kompania Weglowa. The primary element is the conversion of loans into stocks; another is the waiving of compensation demands by the trade unions. On 11 April 2016, a compromise was worked out with the trade unions waiving the payment of bonuses in the form of a 14th annual salary for three years. This agreement with the trade unions was signed on 19 April 2016. The agreement warded off the bankruptcy of Kompania Weglowa. It begins on 1 May 2016 with eleven mines and about 30,000 workers. The merger of mines is aimed at realising gains in efficiency. The energy companies PGE, Energa and PGNIG Termika played a major role in bringing about this solution. Since this solution could also include factors relevant for government aid, this model to save Polish hard coal mining is also subject to review by the EU Commission. A decision is expected in July 2016.

But production is declining steadily. 72.2 mn t of hard coal were produced in 2015, a decline of 0.4 % over 2014. The 72.2 mn t break down into 59.2 mn t of steam coal and 13.0 mn t of coking coal. While lignite is mined in opencast pits, all of the hard coal comes from underground mines of great depth, a feature which causes high production costs. The currently low levels of world market prices led to the financial problems described at the beginning. The state-owned company Kompania Weglowa still operated 11 production sites at the end of 2015, i.e. before the restructuring, and produced 27 mn t in 2015, 13 % less than in the year before.

The Largest Hard Coal Producers in Poland

Company	Production		Exports [1]	
	2014	2015	2014	2015
	mn t	mn t	mn t	mn t
Kompania Weglowa S. A.	31.0	27.2	5.0	4.7
Katowicka Holding Weglowy	10.7	10.6	0.9	1.3
Jastrzebska Spólka Weglowa S. A.	13.9	16.3	1.8	2.6
LW Bogdanka	9.2	8.5	0.0	0.0
Other Mines	7.7	9.6	0.7	0.4
Total	**72.5**	**72.2**	**8.4**	**9.0**

Source: Agencjy Rozwoju Przemyslu (ARP)

LB-T25

Polish production of coking coal of 13.0 mn t p.a. and coke production of 9.5 mn t represented a slight increase.

The Australian company Prairie Down Mining Ltd, which is listed on the ASX, presented its plans for a mine project in Lublin in March; it is in the immediate vicinity of the Bogdanka Mine. Planned production is over 6 mn t, and according to current planning, both coking coal and steam coal can be produced under competitive conditions. At the moment, costs of US$25/t have been mentioned. Startup is expected in 2018, and production is supposed to have reached the planned capacity in 2023. This project has been hindered by court proceedings initiated by the neighbouring company Bogdanka. It questioned the legality of the exploration rights of the company Prairie Down. A Polish court rejected the claims of the company Bogdanka and determined that the company Prairie Down held the rights for the Lublin Coal Project, securing its access to 170 mn t of reserves. At this time, about 130 mn t can be mined profitably. However, the company Bogdanka has also filed suit against this decision.

Infrastructure

The export logistics in Poland are well developed. Weglokoks exported about 2.33 mn t of the 4.7 mn t by rail.

Owing to the difficult situation in the Polish hard coal mining industry, there were no new infrastructure projects in 2015. However, last year a plan became known that, under the name Slask 2.0, is intended to help Silesia with its restructuring and also improve export opportunities to neighbouring Ukraine. A support programme of $100 mn for Ukraine was under discussion; the objective is the modernisation of the coal-fired power plants in that country and to make the use of Polish coal possible. Ukrainian power plants, however, operate on the basis of anthracite, and the first step on the Ukrainian side was the creation of a working group to review the offer.

Export

Poland became a net importer in 2014. The situation turned around again in 2015: imports of 8.3 mn t compared to 9.2 mn t in exports. The imports consist essentially of 6.9 mn t of steam coal, but there are also smaller quantities of coking coal (2.3 mn t).

According to Polish information, Weglokoks' export of hard coal declined in 2015 by significant 0.9 mn t to 4.7 mn t. The volumes marketed by Weglokoks were exported by sea (51 %) and by land transport (49 %). Coke exports also increased, Exports in 2015 break down as shown below (Weglokoks only):

Export 2015

	Coking Coal	Steam Coal	Total
	mn t	mn t	mn t
Seaborne	0	2.4	2.4
Overland	0.7	1.6	2.3
Total	**0.7**	**4.0**	**4.7**

Source: Weglokoks

LB-T26

Key Figures Poland	2013	2014	2015[1)]
	mn t	mn t	mn t
Hard Coal Production	76.5	72.5	72.2
Hard Coal Exports	10.8	8.8	8.8
• Steam Coal	8.5	6.8	6.8
• Coking Coal	2.3	2.0	2.0
Coke Exports	5.9	5.9	5.9
Hard Coal Imports	10.9	10.3	10.3
Imports Germany	4.3	4.4	4.4
• Steam Coal	2.9	2.9	2.9
• Coking Coal	0.1	0.0	0.0
• Coke	1.3	1.5	1.5
Export Rate in % (coke converted into coal terms)	24	23	23

[1)] Provisional
Source: Various analyses

LB-T27

The largest purchasers of steam coal were Germany (about 3.1 mn t) and the Czech Republic (1.3 mn t). A large part of the coking coal went to the Czech Republic (1.4 mn t); smaller quantities went to Slovakia, Austria and Ukraine.

UKRAINE

General

Ukraine had to deal with a decline in real economic performance (GDP) of 15 % in 2009. In the following years, the country posted growth of 4 % to 5 %, but then the growth rates once again collapsed drastically because of the political situation. In 2012, growth was still 0.3 %, but in 2013 it was virtually 0 %. According to the Statistics Service of Ukraine, GDP in 2015 fell by 11 %, the power consumption of the industry by even more (15 %). The rise in the consumer price index from 121.46 in 2014 to 180.63 in 2015 (according to IMF), i.e. by 49 %, indicates the state of affairs in the country in 2015. In its autumn forecast, the IWF projected growth of 2 % for 2016, presuming that general conditions are stable.

Production

The conflicts bordering on civil war in Ukraine meant that the mining regions in the south-east, especially the region around Donetsk, suffered greatly. It was possible to increase production there again at times – especially after the cease-fire – but in the view of Ukraine, these were illegal activities in a part of the country that was not under control. Reliable figures for the year are available to us only in part. The coal production fell from 65 mn t to 39.8 mn t (39 %) in 2015. Coke production declined by 13.1 mn t to 11.1 mn t. No figures for exports are known. A report is possible only for Germany, which imported 51,000 t of anthracite and 29,000 t of coking coal from Ukraine. Imports to Ukraine increased from 12.2 mn t to 14.8 mn t in 2015, about 10 mn t of this volume coking coal.

The largest private mining company, DTEK, reported a decline in exports of two-thirds to 1.4 mn t in 2015. Production fell by 23 % to 28.7 mn t. The company has been operating in the red since 2014.

In view of the stabilisation of the political situation, the data for Q1 could give some indications. Production in the western part of the country rose in Q1 by 6 % to 10 mn t; coking coal production was about 2 mn t, steam coal production about 8 mn t. Ukraine imports fell by one-third to 1.2 mn t in Q1 because supplies from the uncontrolled areas were again recorded. In the Donetsk region, 4 mn t of hard coal, one-fourth more than in the same quarter of the previous year, were produced in Q1. Coal production in in the neighbouring region Luhansk came to 1 mn t. In contrast, the regions in the western part of the country experienced backward development. This was the case in Dnepropetrovsk, where production declined by 5 % to 4.4 mn t; in Lviv, where production fell by 20 % to 0.4 mn t; and in Volyn, where a decrease by one-third to a mere 0.05 mn t was recorded. According to government information, 65 mines are located in controlled areas, 85 mines in uncontrolled areas.

The development in the uncontrolled part of the country was obviously more dynamic than in the west. It is not a simple matter to explain how the aforementioned deliveries were made from the uncontrolled areas into the controlled areas. According to information from the company DTEK, coal from the separatist areas is frequently exported to Russia and from there exported further, either without any certificates of origin or with forged Russian certificates. In this way, it comes back to the western part of the country in a magnitude of 80,000 t to 100,000 t a month, but it also finds a path to the world market. According to DTEK, Turkey is the key country in the chain. Customers there take advantage of the weak negotiating position of the suppliers and demand large price discounts. Russia is the second-largest buyer, and supplies here go to the Crimean region in particular. A number of countries from the EU-28 are also buyers of coal production from the separatist area, however.

PEOPLE'S REPUBLIC OF CHINA

General

From the perspective of the industrialised countries, the economy of the People's Republic of China continues to grow at high speed, but in the Chinese comparison, it is slower than it has been for many years. The target mark of 7 % for 2015 was almost achieved at 6.9 % according to official sources. Growth of about 6.5 % is expected for the next few years. In an historical comparison, economic growth in 2015 was the lowest in 25 years, according to the reports from the National Bureau for Statistics (NBS). According to a KPMG study, China is already in a phase of a two-track economy. While the steel industry, mining, shipbuilding, housing and commercial business would be able to post only declining growth rates, the sectors of the economy focusing on consumption and services and on innovation and technology will grow even more strongly in the coming years. The tertiary economy already holds a share of 50.5 % in economic performance, and its contribution has risen by 9 % in the ten-year comparison. The secondary sector (industrial production etc.) at 40.5 % has now been relegated to second place. The industrial transformation has already

become clearly recognisable. According to the NBS, growth in industrial production in 2015 amounted to only 6.1 % after 8.3 % in the previous year and 9.7 % in 2013.

Within the framework of this restructuring process, environmental policy considerations are becoming increasingly weighty in China. Concerns are related to climate protection and not only to improvement of air quality. During the COP21 negotiations, the People's Republic of China presented a plan (Intended Nationally Determined Contributions) proposing an increase in the share of non-fossil energy sources in primary energy consumption to about 20 % in 2030. If it is to achieve this target, China must build between 800 and 1,000 GW in low-emission or emission-free power generation capacity by 2030. This will lead to substantial investments in nuclear energy and renewable sources. There have also been announcements concerning coal that the emissions from coal-fired power plants should decline by 60 % per 2020.

The restructuring of the Chinese economy is already influencing power consumption. 94 % of the growth in power consumption in China is now attributable to the service industry and household sector while the industrial sector contributes only 3 % to growth in consumption. The four energy-intensive sectors chemicals, construction, steel and metal production even have a 6 % decline in power consumption.

Power generation from non-fossil energy sources is already growing significantly. Power generation from hydroelectric plants increased by 18 %, from nuclear power plants by 33 % and from wind energy by 21 % while power generation from thermal power plants decreased by 2 % in the past year.

The Chinese government's plan for clean air and emission reduction was announced publicly on 3 December 2015, one day after especially intensive smog in Beijing and the temporary closing of 2,000 factories. An announcement regarding the process of establishing a national CO_2 market has been scheduled for 2016. It is expected to involve power generation, the metal industry, the non-ferrous metal industry, the construction industry, the chemical industry, trades and aviation.

Measures for improvement of air quality are being conducted at many different levels. The Chinese National Development and Reform Commission (NDRC) prohibits the construction of new power plants, for instance, if either the air quality is too poor or there is already a power capacity surplus while in regions with a deficit initially non-fossil power generation projects are supposed to be favoured. A power plant closure programme for small and inefficient power plants has also been adopted, whereby fuel consumption of 320-330 g/kWh with a calorific value of 7,000 cal for 600 MW power plants and a consumption of 340 g/kWh for power plants up to 300 MW is required. Shanxi Province has even issued orders for newly constructed power plants requiring orientation to the emissions of gas-fired power plants. Shanxi also wants to limit the construction of coking plants. Before doing so, however, Shanxi intends to survey public opinion of these plans until November of this year.

Some of the environmental protection measures, however, definitely have a protectionist background. For instance, petroleum coke with a sulphur content greater than 3 % has been prohibited. It is assumed, however, that this measure also serves to protect domestic petroleum coke production.

A protective measure of completely different dimensions, the devaluation of the Chinese currency renminbi on Tuesday, 11 August 2015, shook the entire world. After a devaluation of the official rate by 1.9 %, the aggregate exchange rate on the market slid down faster than it had since 1994. It cannot be denied that this liberalisation step also served the domestic economy.

Infrastructure projects are especially important among the measures intended to stabilise the Chinese economy. It became known this year that the Chinese Ministry of Transport will invest €632 bn in more than 300 transport projects.

Power/Crude Steel/Pig Iron Production

		2013	2014	2015
Power Generation	TWh	5,245	5,629	5,618
Crude Steel Production	mn t	815.0	822.7	803.8
Pig Iron Production	mn t	708.0	711.6	691.4

Source: world-steel, NBS

LB-T28

Production

In the middle of April, the Chinese government released a plan for the reduction of capacities in hard coal mining in response to the high market pressure. Officially, however, the plan serves occupational safety. It provides for a reduction in the maximum number of working days from 330 to 276 days, corresponding to a capacity reduction of 16 %. Additional safety checks will be required in the mines to ensure compliance with this measure. In Shanxi, the effect is expected to cause a reduction in production from 80 mn t to 50–60 mn t in the months April to June. Only 50 % of the mines in Shanxi were producing coal in April, and they were not even operating at full capacity. Still, the measure led to a relief on prices in the range of US$1.50/t to US$2.30/t. Moreover, the government's plan (which encompasses a total of eight points) for reduction of capacities also provides concrete closure measures for mines that are generating losses or are no longer using the latest technology, and the construction of any new hard coal-fired power plants has been prohibited for three years. The consolidated plan from nine provinces would result in a reduction of capacities of almost half a bn t. Shanxi is at the top of the list with a reduction of 100–150 mn t (sources vary in their figures), Guizhou with 70 mn t, Shandong with 50 mn t and Hebei with 40 mn t.

Sixteen mine projects that are already in the construction phase and that together would add capacities of 80 mn t to the market have been stopped by the refusal to issue a production licence to them. This measure can also contribute to price stabilisation. On the other hand, there are the aforementioned measures for the reduction of emissions, especially in large cities. A number of large cities intend to prohibit the use of coal for heating purposes in the next few years. The subsidisation of district heating as well as the use of imported high-grade coal from other provinces are planned. Hebei Province is under especially high pressure because it has been made responsible for the extremely poor air quality in Northern China in past years.

Infrastructure

New coal railway lines connecting Inner Mongolia with Hebei were opened in 2006. The railway line is 1,000 kilometres long and has an annual capacity of 200 mn t.

Coal Production in the Largest Mining Provinces and Companies in China		
	2014	2015
	mn t	mn t
Inner Mongolia	908	901
Shanxi	977	962
Shaanxi	511	502
Shenhua Energy	306	281
China Coal	114	No data available at this time

Source: Various analyses

LB-T29

Higher-grade coal can be transported to Hebei over this line. It is the third-largest railway line for the transport of coal anywhere. The Caofeidian Terminal in Hebei currently has two terminals with a capacity of 50 mn t each and is to be expanded to 350 mn t.

Investment activities in mining itself, on the other hand, are on the decline. Investments by mining companies have dropped by 14 % in the past year. A decrease of 10 % was noted in the previous year. There has been a shift to reverse gear in the coking industry as well. Capacities are supposed to be reduced by 10 %. Capacities of 687 mn t per year are projected to decline by 70 mn t by 2020, according to the China Coking Industry Association (CCIA). This measure will at the same time increase the share of coking plants that can comply with China's emissions standards from 50 % to 70 %.

Import / Export

In comparison with the previous month of February, Chinese coal exports in March rose by 40 %. They reached a value of 1.3 mn t in the month of March. In the same month, however, imports of hard coal rose by 45 % to 20 mn t. It is certainly not possible to recognise a clear tendency that would indicate whether China might be able to develop into an exporting country again. In fact, coal imports in the previous month, in February 2016, were at their lowest point in five years. Chinese coke exports in the past year came to 9.7 mn t, whereby India and Japan were the largest buyers. Over the course of the entire year, Chinese imports of hard coal and lignite also declined substantially. In total, the decline was 33 % and was even higher for hard coal alone (38 %) in comparison with 2014. Chinese imports of high-grade coking coal from Australia declined from 32.0 mn t to 26.2 mn t, a drop of 18 %. The decline for semi-soft coal was even greater (29.4 %). Imports of steam coal from Australia fell from 47.1 mn t to 34.5 mn t, a drop of 26.7 %. Imports of steam coal from Indonesia declined from 49.8 mn t to 33.2 mn t.

Import/Export Development			
	2014	2015	Deviation 2014 / 2015
	in mn t	in mn t	in mn t
Imports Steam Coal	165.5*	107.9	-57.6
Imports Coking Coal	62.4	48.0	-14.4
Total Imports	**227.9**	**155.9**	**-72.0**
Exports Steam Coal	4.5*	4.0	-0.5
Exports Coking Coal	0.7	1.0	+0.3
Export Coke	8.6	9.8	+1.2
Total Exports	**13.8**	**14.8**	**+1.0**

** Incl. anthracite, excl. lignite*
Source: McCloskey CCR

LB-T30

Key Data People's Republic of China [1)]	2013[2)]	2014	2015
	mn t	mn t	mn t
Hard Coal Production	3,671	3,598	3,545
Hard Coal Exports	**7.1**	**5.2**	**5.0**
• Steam Coal	6.0	4.5	4.0
thereof anthracite	2.6	2.1	1.1
• Coking Coal	1.1	0.7	1.0
Coke Exports	4.7	8.6	9.8
Hard Coal Imports	**267.3**	**228.0**	**155.9**
• Steam Coal	152.3	135.2	83.1
• Coking Coal	75.4	62.4	48.0
• Anthracite	39.6	30.4	24.8
Imports Germany	**0.01**	**0.12**	**0.12**
Steam Coal	0.008	0.02	0.02
Coke	0.002	0.1	0.1
Export Rate in %	**0.2**	**0.4**	**0.14**

[1)]Excluding lignite
Source: Various analyses

LB-T31

CZECH REPUBLIC

Production

OKD is the Czech Republic's largest hard coal producer. Hard coal is mined in underground operations in the south of the Upper Silesia Coal Basin. The largest buyers include US Steel Kosice, Arselor Mittal Ostrava, Dalkia, Novacim and CEZ. At the beginning of the year, the company OKD had four mines and employed 12,000 workers. The company has been striving to reduce its costs for the past three years in response to the high competitive pressure. In the past three years, operating and administrative costs have been reduced by 42 %. Nevertheless, it became apparent at the beginning of the year that two mines would have to be closed unless additional capital was provided by the parent company New World Resources.

In the meantime, the situation has escalated further, and OKD has become insolvent. The company filed for bankruptcy at the beginning of May. While the payment of an invoice from a key account is expected in the middle of May, dismissals would be inevitable even then. The company owes €630 mn to 650 creditors. According to New World Resources, average revenues for fiscal year 2015 came to €90/t for coking coal and to €50/t for steam coal. Costs could obviously not be covered at these prices.

ODK is the largest employer in the Moravian-Silesian industrial area. In view of the consequences of the dismissals, the Czech government will not grant any direct support to OKD. They will, however, initiate measures to mitigate the dismissal process and are obtaining

information about such a process from countries that have already had similar experience in adaptation processes.

The company New World Resources Plc is listed on the stock exchange. Owing to the insolvency of ODK, trading of the stock on the London Stock Exchange and on the stock exchanges in Prague and Warsaw was suspended.

In 2015, production of hard coal in the Czech Republic came to 8.2 mn t, 0.5 mn t less than in 2014 (8.7 mn t). Of the total production, 4.4 mn t were in coking coal and 3.8 mn t in steam coal.

Coke production in 2015 came to 2.2 mn t and was slightly lower than the previous year (2.53 mn t). Lignite production came to 38.1 mn t, a decrease of 0.1 mn t from 2014.

Infrastructure

Czech coal and coke exports were transported overland by rail and on the Danube (Bratislava).

Export / Import

Exports of hard coal and coke amounted to about 3.6 mn t, thereof 1.8 mn t of coking coal. The Czech Republic imported about 2.9 mn t of coal (thereof 1.1 mn t of coking coal).

Key Figures Czech Republic

	2013	2014	2015
	mn t	mn t	mn t
Hard Coal Production	8.6	8.7	8.2
Hard Coal Exports	4.8	4.1	3.6
Coke Exports	0.4	0.5	0.5
Imports Germany	0.7	0.7	0.9
• Steam Coal	0.4	0.4	0.6
• Coke	0.3	0.3	0.3
Export Rate in % (coke converted into coal terms)	62	58	52

Source: Euracoal/VDKi

LB-T32

VENEZUELA

General

There was a dramatic escalation in the domestic political and economic situation in Venezuela in May of this year. The country with the world's largest crude oil reserves is on the brink of ruin. Mismanagement has taken Venezuela into an extreme recession and given the country the world's highest inflation rate. Currencies as well as imported economic goods are in short supply. Even domestic energy supply was caught in a bottleneck when the country's largest water works, the most important energy supplier (60 % share), had to shut down because of an extreme water shortage. The economic state of emergency that entered into force in January was extended into a general state of emergency by a decree that granted significant special powers to State President Nicolás Maduro and the military. The government blame above all the international community for the misery in the country and issued "special measures" to reduce the influence of other countries on "domestic matters". The socialist government (in power for 16 years) are attempting to hold onto power despite their catastrophic results in the parliamentary elections in December 2015, which were won by an alliance of conservatives, liberals and social democrats.

At the most recent summit meeting of the South American economic association Mercosur (Argentina, Brazil, Paraguay, Uruguay and Venezuela), the heads of state adopted resolutions to reduce trade barriers in intraregional trade of goods and to lower barriers to countries outside of the association. It will be necessary to wait and see how helpful this development will be for the coal industry. In view of the state of emergency that is still in force, however, the impact on Venezuela will probably be no more than moderate, to put it mildly.

Production

Venezuela's importance as a coal exporting country continues to dwindle. Germany Trade & Invest, the business development company of the FRG, no longer lists coal among the mineral raw materials of the country. Hard coal production in 2015 came to just 1.6 mn t, a decline of 20 % over the previous year. A lack of maintenance and investments in mining equipment along with payroll conflicts are the reasons for the decline in production.

Production/Exports by Company [1)]

	2013	2014	2015
	mn t	mn t	mn t
Carbones del Guasare	0.93	0.6	-
Interamerican Coal	0.54	0.6	0.5
Carbones De La Guajira2)	0.17	0.4	0.8
Miscellaneous	0.4	0.41	0.3
Total	2.04	2.01	1.6

[1)] Estimate; [2)] Including production of Carbones del Guasare
Source: Own calculations

LB-T33

Export

All of the hard coal production went to export, which at 1.6 mn t in 2015 was 20 % below the level of the previous year. The most important buyers were Brazil and Peru with 0.58 mn t and 0.3 mn t, respectively. Europe procured 0.23 mn t.

Key Figures Venezuela	2013	2014	2015
	mn t	mn t	mn t
Hard Coal Production	2.04	2.0	1.6
Hard Coal Exports	2.04	2.0	1.6
Imports Germany	0.06	0.0	0.0
• Steam Coal	0.06	0.0	0.0
Export Rate in %	**100.0**	**100.0**	**100.0**

Source: IHS

LB-T34

VIETNAM

General

According to the IMF, the Vietnamese economy has developed steadily over recent years with growth rates throughout of at least 5 % and a peak of over 7 %. Growth of 5.4 % over 2013 meant that Vietnam again posted growth of 6 % (real) in 2014. According to the country information portal of the German Society for International Cooperation (GIZ), Vietnam's growth of 6.7 % in 2015 was the highest growth rate of the past five years. The outsourcing of production from China to Vietnam has increased investments from abroad, and Vietnam is well on its way to becoming a new "tiger economy".

Export

Vietnam is already a net importer. Owing to its strong economic growth, Vietnam's exports in recent years have continued to decline while imports have risen. In 2010, the share of coal in power generation was 19 %; it rose to 36 % in 2015, and according to the EIA, could reach 46 % in 2020. Imports in 2015 rose by 125 % from 3.09 mn t in 2014 to 6.97 mn t. The Vietnamese customs statistics are unfortunately not broken down according to grade, but presumably there are substantial shares of steam coal because 3.4 GW in new hard coal-fired power plant capacities went online in the past year. There are almost certainly coking coal imports in the figures as well, however. The primary supplier of import coal is Indonesia. Imports from Indonesia rose by 20 % to 1.9 mn t, 1.7 mn t came from China and 1.6 mn t from Australia, whereby the imports from each of these two countries more than doubled.

Imports of about 7 mn t are contrasted by exports of only 1.5 mn t. In the previous year, Vietnam exported about 7 mn t, so there was a decline by almost 80 %.

Developments on a monthly basis confirm that Vietnam will not be a coal exporting country in the future, either. In March 2016 alone, Vietnam imported 1.2 mn t of hard coal. This is an all-time high that was achieved for two successive months. This can be compared to steam coal exports that came to 31,000 t in January, to 4,000 t in February and to 300,000 t in March.

Key Figures Vietnam	2013	2014	2015
	mn t	mn t	mn t
Production	42.6	40.8	41.5
Export	12.8	7.2	1.5
thereof China	13.1 [1)]	4.1	0.7
Export Rate in %	30	18	3.6
Imports	–	3.1	7.0

Source: Various analyses

LB-T35

Report in Figures (Provisional for 2015)

World-Energy Consumption by Source of Energy and Regions MTCE

Source of Energy	2009	2010	2011	2012	2013	2014
Mineral Oil	5,400	5,754	5,836	5,913	5,970	6,016
Natural Gas	3,700	4,083	4,167	4,266	4,361	4,379
Nuclear Energy	900	900	859	800	805	820
Hydro Power	1,000	1,100	1,136	1,191	1,231	1,256
Hard Coal and Lignite	4,900	5,080	5,189	5,320	5,524	5,545
Other and Renewables	280	162	286	342	404	453
Total	**16,180**	**17,079**	**17,473**	**17,832**	**18,295**	**18,469**
						Shares in %
Region of Consumption	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
North America	23.8	23.1	22.7	21.8	21.8	21.8
Asia/Australia	37.1	38.1	39.1	40.3	40.7	41.3
since 2013 EU-28	14.4	14.5	13.9	13.0	13.1	12.5
CIS	7.4	8.3	8.3	8.5	7.9	7.7
Other regions	17.3	16.0	16.0	16.4	16.5	16.7
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
						MTCE
Coal Consumption (Hard Coal and Lignite)	**4,688**	**5,080**	**5,189**	**5,320**	**5,545**	**5,524**
						Shares in %
Region of Consumption	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
North America	16.2	15.6	14.5	12.6	12.6	12.6
Asia/Australia	65.7	67.1	67.9	69.7	70.6	71.5
since 2013 EU-28	7.9	7.9	8.3	7.9	7.5	7.0
CIS	4.6	4.8	4.7	4.9	4.6	4.2
Other regions	5.6	4.6	4.6	4.9	4.7	4.7
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Considered were only commercial traded sources of energy.
Source: BP Statistical Review of World Energy until 2014

Table 1

World Hard Coal Production / Foreign Trade [1)]

M t (t=t)

	2010			2011			2012		
	Production	Export	Import	Production	Export	Import	Production	Export	Import
Germany	14	0	41	14	0	41	11	0	45
France	0	0	19	0	0	19	0	0	18
Great Britain	18	1	27	18	1	27	17	0	45
Spain [2)]	9	0	13	9	0	13	6	0	21
Poland	77	14	10	77	14	10	79	7	10
Czech Republic	12	7	2	12	7	2	11	5	2
Romania	4	0	4	4	0	4	4	0	4
since 2013 EU-28	134	22	182	134	22	182	129	12	214
Russia	321	97	10	321	97	10	353	127	30
Kazakhstan	106	29	1	106	29	1	121	30	0
Ukraine	76	6	10	76	6	10	85	0	10
Countries Total	503	132	21	503	132	21	559	157	40
Canada	33	33	9	33	33	9	67	35	10
USA	984	74	15	984	74	15	922	114	8
Colombia	75	72	0	75	72	0	89	81	0
Venezuela	4	4	0	4	4	0	3	3	0
Countries Total	1,096	183	24	1,096	183	24	1,081	233	18
South Africa	250	68	0	250	68	0	260	76	0
Australia	355	300	0	355	300	0	366	316	0
India	537	0	86	537	0	86	580	0	129
China [3)]	3,410	19	166	3,410	19	166	3,660	9	235
Japan	0	0	184	0	0	184	0	0	185
Indonesia	295	240	0	295	240	0	386	304	0
Countries Total	4,242	259	436	4,242	259	436	4,626	313	549
Other Countries	141	89	390	141	89	390	145	57	343
World	6,720	1,053	1,053	6,720	1,053	1,053	7,166	1,164	1,164

1) internal trade and seaborne trade, 2) Production incl."Lignito Negro"
3) Production incl. lignite (about 50 mill. t estimated), since 2013 without lignite

Table 2

World Hard Coal Production / Foreign Trade [1)]

M t (t=t)

2013 Production	2013 Export	2013 Import	2014 Production	2014 Export	2014 Import	2015 Production	2015 Export	2015 Import	
8	0	50	8	0	54	8	0	56	Germany
0	0	19	0	0	14	0	0	14	France
13	0	49	12	0	38	9	0	27	Great Britain
4	0	13	4	0	15	3	0	19	Spain [2)]
77	11	11	73	9	10	72	9	8	Poland
9	5	2	9	4	3	8	4	2	Czech Republic
4	0	3	2	0	2	2	0	2	Romania
114	16	216	106	13	205	100	4	192	**since 2013 EU-28**
347	143	22	357	166	30	373	166	22	Russia
120	30	0	120	30	0	107	30	0	Kazakhstan
84	8	11	65	5	17	40	8	15	Ukraine
551	181	33	542	201	47	520	204	37	**Countries Total**
69	39	9	69	34	8	62	30	8	Canada
905	106	8	907	88	10	813	67	10	USA
86	75	0	89	77	0	86	83	0	Colombia
2	2	0	2	2	0	2	2	0	Venezuela
1,062	222	17	1,067	201	18	963	182	18	**Countries Total**
256	73	0	261	77	0	252	77	0	**South Africa**
410	358	0	441	387	0	421	387	0	**Australia**
518	0	161	612	0	215	675	0	216	India
3,671	7	288	3,598	5	228	3,545	5	156	China [3)]
0	0	191	0	0	188	0	0	191	Japan
474	402	0	458	382	0	376	296	0	Indonesia
4,663	409	640	4,668	387	631	4,596	301	563	**Countries Total**
139	45	398	134	40	405	157	40	385	Other Countries
7,195	1,304	1,304	7,219	1,306	1,306	7,009	1,195	1,195	**World**

Sources: statistics of import and export countries, own calculations

Table 2

Seaborne Hard Coal Trade

M t (t=t)

Exporting Countries	2010 Coking Coal	2010 Steam Coal	2010 Total	2011 Coking Coal	2011 Steam Coal	2011 Total	2012 Coking Coal	2012 Steam Coal	2012 Total
Australia	159	141	300	133	148	281	145	171	316
USA	48	16	64	60	31	91	59	48	107
South Africa	1	67	68	1	66	67	1	75	76
Canada	27	6	33	26	6	32	30	4	34
China	2	17	19	5	10	15	1	8	9
Colombia	4	69	73	3	78	81	1	80	81
Indonesia	0	277	277	0	270	270	0	304	304
Poland	0	6	6	0	3	3	0	3	3
Russia	7	80	87	8	93	101	8	109	117
Venezuela	0	4	4	0	4	4	0	3	3
Other	2	30	32	3	30	33	11	21	32
Total	**250**	**713**	**963**	**239**	**739**	**978**	**256**	**826**	**1,082**

Importing Countries/ Regions	2010 Coking Coal	2010 Steam Coal	2010 Total	2011 Coking Coal	2011 Steam Coal	2011 Total	2012 Coking Coal	2012 Steam Coal	2012 Total
Europe [1)]	51	125	176	48	148	196	42	193	235
since 2013 EU-28	51	125	176	39	116	155	37	149	186
Asia	149	511	660	140	531	671	139	601	740
Japan	52	132	184	55	120	175	52	133	185
South Korea	19	92	111	22	107	129	21	105	126
Taiwan	5	59	64	0	66	66	0	66	66
Hongkong	32	117	149	21	109	130	34	145	179
China	0	10	10	0	13	13	0	12	12
India	26	60	86	33	81	114	31	98	129
Latin America	3	19	22	4	31	35	20	17	37
Other (incl. USA)	47	58	105	47	29	76	55	15	70
Total	**250**	**713**	**963**	**239**	**739**	**978**	**256**	**826**	**1,082**

Figures excl. land transport
1) incl. bordering Mediterranian countries

Sources: evaluation of several sources

Table 3

Seaborne Hard Coal Trade

M t (t=t)

2013 Coking Coal	2013 Steam Coal	2013 Total	2014 Coking Coal	2014 Steam Coal	2014 Total	2015 Coking Coal	2015 Steam Coal	2015 Total	Exporting Countries
171	188	359	186	201	387	185	202	387	Australia
56	44	100	53	29	82	38	24	62	USA
0	73	73	0	77	77	0	77	77	South Africa
35	3	38	31	3	34	27	2	29	Canada
1	6	7	1	5	6	1	4	5	China
1	74	75	1	75	76	3	80	83	Colombia
0	402	402	0	382	382	0	296	296	Indonesia
0	6	6	0	3	3	0	2	2	Poland
15	116	131	33	110	143	17	125	142	Russia
0	2	2	0	2	2	0	2	2	Venezuela
0	16	16	4	25	29	0	19	19	Other
279	**930**	**1,209**	**309**	**912**	**1,221**	**271**	**833**	**1,104**	**Total**
2013 Coking Coal	**2013 Steam Coal**	**2013 Total**	**2014 Coking Coal**	**2014 Steam Coal**	**2014 Total**	**2015 Coking Coal**	**2015 Steam Coal**	**2015 Total**	**Importing Countries/ Regions**
43	190	233	70	140	210	38	154	192	Europe [1]
38	156	194	64	104	168	33	114	147	since 2013 EU-28
194	658	852	199	694	893	148	640	788	Asia
48	143	191	43	145	188	41	150	191	Japan
21	105	126	6	125	131	25	110	135	South Korea
0	67	67	0	67	67	0	66	66	Taiwan
51	158	209	62	166	228	35	106	141	Hongkong
0	13	13	0	14	14	0	11	11	China
54	107	161	37	178	215	47	169	216	India
19	12	31	17	16	33	1	32	33	Latin America
23	70	93	23	62	85	84	7	91	Other (incl. USA)
279	**930**	**1,209**	**309**	**912**	**1,221**	**271**	**833**	**1,104**	**Total**

Table 3

World Coke Production

(000 Metric Tonnes)

Country/Region	2009	2010	2011	2012	2013	2014	2015
Europe							
Austria	1,290	1,400	1,350	1,310	1,350	1,330	1,300
Belgium	1,570	1,880	1,867	1,788	1,654	1,260	1,250
Bosnia-Herzegovina	714	920	891	694	703	766	696
Bulgaria	0	0	0	0	0	0	0
Czech Republic	2,172	2,396	2,436	2,317	2,348	2,395	2,200
Finland	740	828	852	881	878	783	773
France	3,170	3,110	2,841	3,186	3,331	3,231	3,150
Germany	6,770	8,150	7,990	8,050	8,379	8,740	8,800
Hungary	746	1,018	1,049	1,026	924	923	960
Italy	2,724	3,708	4,154	3,607	2,080	1,930	1,778
Netherlands	1,700	1,882	1,998	1,860	1,967	2,000	2,000
Poland	6,947	9,546	9,134	8,637	9,104	9,357	9,150
Romania	237	0	0	0	0	0	0
Slowakia	1,575	1,550	1,555	1,583	1,425	1,458	1,676
Spain	1,691	2,021	2,045	1,761	1,610	1,483	1,606
Sweden	980	1,118	1,151	1,048	1,009	1,037	1,129
Great Britain	3,600	3,774	3,717	3,487	3,616	3,500	2,878
Europe in total	**36,626**	**43,301**	**43,030**	**41,235**	**40,378**	**40,193**	**39,346**
CIS	**45,379**	**48,220**	**49,673**	**48,135**	**46,657**	**44,197**	**41,805**
North America	**14,550**	**19,624**	**19,632**	**19,230**	**19,214**	**18,235**	**17,021**
Latin America	**9,754**	**12,350**	**13,018**	**13,593**	**12,802**	**13,229**	**13,191**
Africa	**1,970**	**2,691**	**2,618**	**2,404**	**2,301**	**2,413**	**2,162**
Middle East	**5,125**	**5,320**	**5,135**	**5,459**	**5,186**	**5,388**	**5,685**
Asia							
China	355,100	384,060	427,790	441,620	473,050	476,910	447,780
India	19,211	19,756	20,389	20,699	21,466	22,753	23,780
Indonesia	0	0	0	0	112	991	1,130
Japan	37,500	37,500	35,400	34,700	35,200	34,200	33,000
South Korea	9,577	12,835	15,799	14,607	15,572	16,899	17,496
Pakistan	350	323	250	150	50	50	100
Taiwan	3,983	4,752	4,859	4,821	6,103	6,277	6,026
Vietnam	247	384	530	447	465	641	725
Total	**425,968**	**459,610**	**505,017**	**517,044**	**552,018**	**558,721**	**530,037**
Australia	**2,498**	**3,149**	**2,982**	**2,858**	**2,619**	**2,465**	**2,430**
WORLD in total	**541,870**	**594,265**	**641,105**	**649,958**	**681,175**	**684,841**	**651,677**

Sources: according to associations information

Table 4

Qualities of Steam Coal Traded on the World Market

Exporting Countries	Volatile %	Ash %	Moisture %	Sulphur %	F. Carbon %	Grinding Index HGI	Calorific Value kcal/kg
Atlantic Supplier							
USA (east coast)	17 - 39	5 - 15	5 - 12	0,5 - 3,0	39 - 70	31 - 96	6000 - 7200
South Africa	16 - 31	8 - 15	6 - 10	0,5 - 1,7	51 - 61	43 - 65	5400 - 6700
Colombia	30 - 39	4 - 15	7 - 16	0,5 - 1,0	36 - 55	43 - 60	5000 - 6500
Venezuela	34 - 40	6 - 8	5 - 8	0,6	47 - 58	45 - 50	6500 - 7200
Poland	25 - 31	8 - 16	7 - 11	0,6 - 1,0	44 - 56	45 - 50	5700 - 6900
Czech Republic	25 - 27	6 - 8	7 - 9	0,4 - 0,5	58 - 60	60 - 70	6700 - 7100
Russia	27 - 34	11 - 15	8 - 12	0,3 - 0,6	47 - 58	55 - 67	6000 - 6200
Pacific Supplier							
Australia	25 - 30	8 - 15	7 - 8	0,3 - 1,0	47 - 60	45 - 79	5900 - 6900
Indonesia	37 - 47	1 - 16	9 - 22	0,1 - 0,9	30 - 50	44 - 53	3700 - 6500
China	27 - 31	7 - 13	8 - 13	0,3 - 0,9	50 - 60	50 - 54	5900 - 6300
Russia (east coast)	17 - 33	11 - 20	8 - 10	0,3 - 0,5	47 - 64	70 - 80	5500 - 6800
Vietnam / Anthracite	5 - 6	15 - 33	9 - 11	0,85 - 095	58 - 83	35	5100 - 6800
Germany	**19 - 33**	**6 - 7**	**8 - 9**	**0,7 - 1,4**	**58 - 65**	**60 - 90**	**6600 - 7100**

Indication in gross bandwidths

Sources: see table 6

Table 5

Qualities of Coking Coal Traded on the World Market

Exporting Countries/ Qualities	Volatile %	Ash %	Latent Moisture %	Sulphur %	Phosphorus %	Swelling Index FSI
Low Volatile						
Australia/NSW	21-24	9.3-9.5	1.0	0.38-0.40	0.03-0.07	6-8
Australia/Qld.	17-25	7.0-9.8	1.0-1.5	0.52-0.70	0.007-0.06	7-9
Canada	21-24	9.5	0.6	0.30-0.60	0.04-0.06	6-8
USA	18-21	5.5-7.5	1.0	0.70-0.90	n/a	8-9
Middle Volatile						
Australia/NSW	27-28	7.9-8.3	1.5-1.8	0.38-0.39	0.04-0.06	5-7
Australia/Qld.	26-29	7.0-9.0	1.2-2.0	0.38-0.90	0.03-0.055	6-9
Canada	25-28	8.0	0.9	0.30-0.55	0.03-0.07	6-8
USA	26-27	6.8-9.0	1.0	0.95-1.10	n/a	7-9
Poland	23-28	7.0-8.9	0.7-1.5	0.60-0.80	n/a	6-9
China	25-30	9.5-10.0	1.3-1.5	0.35-0.85	0.015	
High Volatile						
Australia/NSW	34-40	5.5-9.5	2.4-3.0	0.35-1.30	0.002-0.05	4 - 7
Australia/Qld.	30-34	6.5-8.2	2.0	0.50-0.70	0.02-0.04	8 - 9
Canada	29-35	3.5-6.5	1.0	0.55-1.20	0.006-0.04	6 - 8
USA	30-34	6.8-7.3	1.9-2.5	0.80-0.85	n/a	8 - 9
Poland	29-33	6.9-8.9	0.8-1.5	0.60-1.00	n/a	5-8
Germany	26.6 [1]	7.4 [1]	1.5 [1]	1.1 [1]	0.01-0.04	7-8

Figures in bandwidths
1) Utilization mixture for coking plant
2) CSR-value (Coke Strength under Reduction) describing the heating strength of coke after heating up to 1,100° C and following CO_2 fumigation. The CSR-values classified to the coal are only standard values.

Sources: Australian Coal Report, Coal Americas, companies' information

Table 6

Qualities of Coking Coal Traded on the World Market

Coke strength CSR-value [2]	Fluidity max ddpm	Contraction max %	Dilatation max %	Reflection middle %	Macerale reactive %	Macerale inert %	Minerals %
50-65	500-2000	20-30	25-140	1.23-1.29	38-61	36-58	3-4
60-75	34-1400	24-34	35-140	1.12-1.65	61-75	20-34	3-5
65-72	10-150	20-26	7-27	1.22-1.35	70-75	20-35	5
60-70	30-100	25-28	30-60	1.30-1.40	65-75	20-30	3
40-60	200-2000+	25-35	0-65	1.01-1.05	50-53	43-44	4-6
50-70	150-7000	19-33	(-)5-240	1.00-1.10	58-77	20-38	3-4
50-70	150-600	21-28	50-100	1.04-1.14	70-76	20-24	5
60-70	500-7000	22-18	50-100	1.10-1.50	72-78	18-24	4
n/a	n/a	26-32	30-120	n/a	n/a	n/a	n/a
35-55	100-4000	27-45	(-)10-60	0.69-0.83	67-84	11-28	2-5
65-75	950-1000+	23-24	35-160	0.95-1.03	61-79	18-36	3-4
50-60	600-30000	22-31	50-148	1.00-0.95	76-81	17-19	2-4
60-70	18000-26847	26-33	150-217	1.00-1.10	75-78	18-21	4
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
50-65	30-3000	27-28	108-170	1.15-1.45	60-80	15-35	5

Table 6

Hard Coal Export of Australia

1,000 t

Importing Countries	2009	2010	2011	2012	2013	2014	2015
Germany	3,759	4,303	4,280	4,451	4,739	5,673	5,737
France	2,077	2,946	2,363	2,719	3,317	3,219	3,719
Belgium/Luxembourg	680	1,298	1,179	992	444	39	1,275
The Netherlands	500	1,217	1,470	1,202	2,651	2,785	2,432
Italy	1,122	1,741	1,557	1,519	821	657	832
Great Britain	2,746	3,612	3,585	2,357	2,458	1,803	1,726
Denmark	151	0	0	0	0	0	0
Spain	776	1,715	1,337	1,118	1,062	1,438	1,343
Portugal	0	0	0	0	0	0	0
Sweden	716	1,825	1,092	1,057	1,056	1,079	1,244
Other			364	379	695	1,360	1,692
since 2013: EU-28	12,904	18,657	17,227	15,794	17,243	18,053	20,000
Israel	672	592	498	678	496	174	172
Turkey	759	1,304	787	1,221	311	633	1,965
Romania	0	0	0	0	0	0	0
Other Europe [1)]	350	288	0	0	0	0	0
Europe	14,685	20,841	18,512	17,693	18,050	18,860	22,137
Japan	101,618	117,768	106,171	113,626	123,811	120,186	125,800
South Korea	41,662	43,629	46,037	46,201	49,819	55,052	59,509
Taiwan	22,517	28,706	26,878	24,378	27,128	29,869	29,940
Hongkong	1,175	440	895	679	446	518	488
India	27,092	32,862	30,224	32,071	34,813	46,826	47,865
China	46,546	37,069	34,000	62,894	87,923	93,351	70,800
Brazil	3,713	3,457	2,198	2,691	3,044	4,745	6,571
Chile	481	944	1,135	717	913	901	2,150
Other Countries	13,902	15,042	15,025	15,376	12,110	16,992	21,911
Export in Total	**273,391**	**300,758**	**281,075**	**316,326**	**358,057**	**387,300**	**387,171**

1) incl. bordering Mediterranean countries
Source: McCloskey

Table 7

Hard Coal Export of Indonesia

1,000 t

Importing Countries	2009	2010	2011	2012	2013	2014	2015
Germany	86	69	34	0	0	0	53
The Netherlands	239	0	927	71	15	0	379
Italy	5,427	7,094	4,882	3,692	3,365	3,516	3,368
Great Britain	786	162	390	0	0	0	0
Ireland	0	0	0	0	0	0	0
Denmark	0	0	0	0	0	0	0
Spain	4,361	2,115	1,877	5,634	3,392	4,071	3,851
Slovenia	840	840	559	332	n/a	n/a	n/a
Other	376	2,220	851	2,071	1,638	1,053	3,729
since 2013: EU-28	12,115	12,500	9,520	11,800	8,410	8,640	11,380
USA	2,025	1,240	1,180	469	650	1,390	616
Chile	437	980	483	160	0	0	0
Japan	32,109	26,040	24,950	31,800	26,010	32,050	25,880
South Korea	33,698	34,650	36,720	37,700	36,080	35,330	26,946
Hongkong	11,131	9,540	8,650	11,673	11,100	10,970	8,328
Taiwan	25,206	21,770	19,090	19,600	22,110	21,980	19,450
Malaysia	11,184	8,600	11,880	12,600	12,140	12,250	11,424
Philippines	7,066	5,160	6,050	9,300	10,140	9,680	9,192
Thailand	10,334	8,770	6,780	11,421	8,440	16,467	14,861
India	37,735	36,500	52,800	60,520	82,720	104,740	90,000
China	39,402	68,060	77,950	83,300	106,940	88,180	63,920
Other countries	7,844	6,164	13,836	13,657	59,491	40,323	14,003
Export in total [1)]	**230,286**	**239,974**	**269,889**	**304,000**	**402,000**	**382,000**	**296,000**

Sources: Own calculations, companies' information

Table 8

Hard Coal Export of Russia

1,000 t

Importing Countries	2009	2010	2011	2012	2013	2014	2015
Germany	9,449	10,308	10,731	11,227	12,841	13,494	16,528
Belgium/Luxembourg	0	0	0	0	2,620	2,304	1,694
Italy	1,017	862	2,346	2,600	4,406	4,341	4,023
Great Britain	15,501	7,332	11,592	14,600	17,748	16,200	7,374
Spain	1,439	768	1,917	2,300	2,196	2,157	5,012
Finland	4,770	2,900	5,111	2,700	3,586	3,784	2,063
Poland	1,766	1,402	1,389	1,700	1,300	1,303	607
Romania	222	308	438	450	460	460	489
Other	11,325	13,532	12,802	10,200	9,894	10,632	26,235
since 2013: EU-28	45,489	37,412	46,326	45,777	55,051	54,675	64,025
Turkey	8,672	9,139	8,180	9,785	8,580	8,460	11,091
Europe	54,161	46,551	54,506	55,562	63,631	63,135	75,116
Japan	8,718	10,575	11,608	15,292	8,422	14,519	16,824
South Korea	4,541	8,574	13,100	11,438	12,853	16,841	23,067
Taiwan	1,652	1,116	3,498	3,330	2,994	5,464	7,466
China	12,122	11,660	10,836	20,183	27,251	25,921	15,780
Other countries [1]	8,409	9,056	7,434	11,195	15,649	17,520	5,147
Export in Total [2]	**89,603**	**87,532**	**100,982**	**117,000**	**130,800**	**143,400**	**143,400**

1) 2009-2015 exports via Cyprus/Libanon; the quantities were partially exported in unknown countries
2) only hard coal exports (seaborne trade)

Sources: 2009-2015: information from companies, own calculations

Table 9

Hard Coal Export of the United States

1,000 t

Importing Countries	2009	2010	2011	2012	2013	2014	2015
Germany	5,104	5,727	8,140	9,809	12,044	11,099	10,913
France	3,052	2,788	3,615	3,720	3,728	1,990	1,208
Belgium/Luxembourg	2,503	2,080	2,783	2,360	1,745	917	1,066
The Netherlands	2,458	3,314	5,908	7,178	4,352	4,571	4,441
Italy	2,125	3,000	5,070	7,747	5,981	5,331	3,112
Great Britain	4,052	3,980	6,283	10,856	11,986	8,898	3,811
Ireland	0	0	219	208	0	0	0
Denmark	291	73	146	0	0	0	40
Spain	1,581	1,837	1,551	1,975	1,430	1,357	1,151
Portugal	1,020	531	891	1,127	356	201	126
Finland	202	428	452	266	374	670	352
Sweden	434	676	633	613	438	651	585
Other	1,920	4,076	1,717	3,786	3,565	3,472	2,956
since 2013: EU-28	24,742	28,510	37,408	49,645	45,999	39,157	29,761
Israel	0	0	0	17	0	0	0
Turkey	1,295	2,296	2,670	4,871	4,521	4,045	1,863
Romania	0	0	937	607	819	0	0
Other Europe [1]	2,033	3,069	6,330	5,951	4,583	2,725	411
Europe	28,070	33,875	47,345	61,091	55,922	45,927	32,035
Canada	9,509	10,528	6,022	6,393	6,284	5,884	5,190
Mexico	1,161	1,682	2,526	3,126	5,102	4,267	3,410
Argentina	417	281	233	471	427	413	0
Brazil	6,720	7,177	7,867	7,206	7,742	7,233	5,737
Japan	822	2,869	6,209	5,169	4,783	4,475	4,224
South Korea	1,562	5,237	9,479	8,250	7,648	7,282	5,527
Taiwan	77	227	0	227	342	91	0
Other countries	4,891	11,787	17,033	21,615	17,689	12,424	10,644
Export in total	**53,229**	**73,663**	**96,714**	**113,548**	**105,939**	**87,996**	**66,767**

1) incl. bordering Mediterranean countries

Source: McCloskey

Table 10

Hard Coal Export (only Steam Coal) of Colombia

1,000 t

Importing Countries	2009	2010	2011	2012	2013	2014	2015
Germany	5,173	7,397	10,550	8,972	9,794	7,265	9,850
France	2,232	2,329	1,100	1,239	1,765	695	755
Belgium/Luxembourg	168	125	68	75	0	31	0
The Netherlands	10,726	9,061	7,412	13,053	10,305	8,502	8,462
Italy	2,080	1,715	1,593	1,916	1,264	1,205	2,661
Great Britain	4,471	4,417	4,198	6,365	6,195	6,867	4,100
Ireland	980	1,048	1,942	1,729	1,773	1,792	2,131
Denmark	1,973	1,092	4,998	3,153	1,927	1,248	574
Greece	0	76	480	0	0	0	0
Spain	2,441	2,272	2,125	4,340	2,981	6,067	5,869
Portugal	1,929	1,553	2,069	3,212	3,246	4,196	5,357
Finland	72	277	459	0	0	0	0
Sweden	0	0	1,169	0	0	0	0
Slovenia	341	0	1,031	214	222	238	165
Other			858	0	619	298	360
since 2013: EU-28	32,587	31,362	40,052	44,268	40,091	38,404	40,284
Israel	2,549	3,770	5,595	5,713	4,901	5,257	5,845
Other Europe [1)]	3,718	3,006	10,222	8,424	7,660	9,300	11,499
Europe	38,854	38,138	55,869	58,405	52,652	52,961	57,628
Japan	30	119	145	220	278	0	0
Hongkong	0	0	0	0	0	0	0
USA	14,191	11,301	6,928	5,029	4,511	5,565	6,341
Canada	1,794	1,843	1,488	1,125	1,593	1,516	1,711
Brazil	750	1,123	1,631	1,776	2,076	4,448	5,042
Other Countries	7,814	16,683	10,033	13,189	12,537	10,546	9,778
Export in total	**63,433**	**69,207**	**76,094**	**79,744**	**73,647**	**75,036**	**80,500**

[1)] incl. bordering Mediterranean countries, Turkey

Sources: McCloskey, companies´ information

Table 11

Hard Coal Export of Republic of South Africa

1,000 t

Importing Countries	2009	2010	2011	2012	2013	2014	2015
Germany	5,231	3,363	2,644	1,972	2,533	5,082	3,400
France	2,050	1,030	1,190	1,060	1,150	850	390
Belgium/Luxembourg	300	500	430	320	0	0	50
Netherlands [1)]	4,049	1,087	1,056	2,838	5,047	6,358	2,150
Italy	4,230	3,400	3,630	3,120	2,040	1,540	4,120
Great Britain	1,000	470	670	810	620	1,160	350
Ireand	460	220	50	90	140	140	98
Denmark	1,080	780	1,380	630	300	690	350
Greece	0	50	0	80	0	0	40
Spain	5,062	3,670	2,470	2,360	1,720	2,980	2,430
Portugal	1,240	320	0	0	360	160	390
Finland	0	0	0	0	0	0	0
Other	680	170	180	400	390	190	30
since 2013: EU-28	25,382	15,060	13,700	13,680	14,300	19,150	13,798
Israel	3,250	2,490	3,180	4,770	3,490	2,580	2,590
Morocco	300	810	70	140	250	860	4,360
Turkey	1,106	3,182	2,760	2,890	2,850	3,690	7,150
Other Europe [1)]	4,656	6,482	6,010	7,800	6,590	7,130	14,100
Europe	30,038	21,542	19,710	21,480	20,890	26,280	27,898
Japan	390	300	620	470	560	150	160
South Korea	525	2,260	3,520	1,550	150	310	330
Taiwan	2,220	2,990	3,490	4,500	5,815	1,400	1,400
Hongkong	340	160	0	0	0	0	0
India	18,690	22,397	17,071	23,170	21,030	30,600	39,750
China	790	6,960	10,460	12,950	13,703	3,370	0
USA	0	170	40	490	0	680	540
Brazil	296	1,099	1,030	1,130	320	935	910
Other countries	8,927	10,534	11,380	10,450	10,291	12,750	5,546
Export in total	**62,216**	**68,412**	**67,321**	**76,190**	**72,759**	**76,475**	**76,534**

1) incl.bordering Mediterranean countries

Sources: South African Coal Report, own calculations

Table 12

Hard Coal Export of Canada

1,000 t

Importing Countries	2009	2010	2011	2012	2013	2014	2015
Germany	1,070	1,203	1,736	1,516	1,214	1,462	1,317
France	117	166	104	55	0	31	0
Belgium/Luxembourg	0	48	55	0	0	0	0
The Netherlands	300	696	267	412	227	30	165
Italy	465	1,016	1,000	767	817	403	288
Great Britain	317	284	505	99	186	423	185
Denmark	0	0	0	0	0	0	0
Spain	1	64	120	1	58	1	2
Portugal	0	0	0	0	0	0	0
Finland	258	416	422	303	428	537	526
Sweden	0	0	0	60	0	0	22
Other		59	221	0	291	614	449
since 2013: EU-28	2,528	3,952	4,430	3,213	3,221	3,501	2,954
Other Europe [1)]	952	840	182	500	567	551	195
Europe	3,480	4,792	4,612	3,713	3,788	4,052	3,149
Japan	8,765	10,615	9,265	9,526	10,108	8,850	8,306
South Korea	7,381	6,553	8,611	6,360	7,594	0	5,680
Taiwan	795	638	1,070	1,005	1,151	1,509	1,252
Brazil	936	1,693	2,281	1,813	1,677	2,263	1,113
USA	1,045	1,470	1,330	898	911	834	980
Chile	214	259	216	253	327	274	366
Mexico	283	697	400	183	278	158	130
Other countries	4,931	5,944	5,602	10,761	12,712	16,320	9,144
Export in Total	**27,830**	**32,661**	**33,387**	**34,512**	**38,546**	**34,260**	**30,120**

1) incl. bordering Mediterranean countries

Sources: McCloskey, own evaluations

Table 13

Hard Coal Export of China

1,000 t

Importing Countries	2009	2010	2011	2012	2013	2014	2015
Germany	5	7	11	9	8	23	16
France	0	0	0	0	0	0	
Belgium/Luxembourg	0	14	0	0	0	0	0
The Netherlands	5	0	0	0	0	0	0
Italy	0	0	0	0	0	0	0
Great Britain	0	0	0	0	0	0	0
Spain	0	0	0	0	0	0	0
Greece	0	0	0	0	0	0	0
EU-15	10	21	11	9	8	23	16
Japan	6,391	6,436	6,222	3,989	3,020	2,070	1,503
South Korea	9,919	7,207	5,559	3,662	3,303	2,835	1,884
Taiwan	4,870	4,418	2,197	1,270	835	467	331
Hongkong	122	395	1	0	0	59	0
India	0	0	173	0	0	0	2
Malaysia	12	12	6	0	0	4	15
Thailand	0	0	0	1	0	0	22
North Korea	52	224	205	172	129	80	71
Philippines	839	2	0	0	0	0	22
Brazil	0	0	0	0	0	0	0
Other countries	133	225	127	24	18	59	1,109
Export in total	**22,348**	**18,940**	**14,501**	**9,127**	**7,313**	**5,597**	**4,975**

Source: several, i.a. MCR, CCR

Table 14

Hard Coal Export of Poland

1,000 t

Importing Countries	2009	2010	2011	2012	2013	2014	2015
Germany	2,649	3,659	2,659	2,406	3,007	2,931	3,098
France	358	597	10	212	534	0	228
Belgium	79	232	1	80	450	2	2
The Netherlands	165	81	0	0	147	54	51
Italy	0	0	0	0	0	1	65
Great Britain	565	598	634	89	665	230	123
Ireland	240	257	206	140	170	148	101
Denmark	82	455	60	60	553	365	150
Spain	0	23	20	20	19	26	25
Portugal	0	0	0	0	0	0	0
Finland	224	220	37	148	358	183	85
Austria	853	883	435	786	807	887	850
Sweden	59	134	84	105	184	117	100
Czech Republic	746	1,444	1,820	1,540	1,663	2,604	2,633
Slovakia	71	638	568	302	767	500	619
Hungary	58	118	133	98	93	58	163
Other	1,970	557	10	383	401	38	52
since 2013: EU-28	8,119	9,896	6,677	6,369	9,818	8,144	8,345
Other countries	581	480	101	667	1,018	699	874
Export in total	**8,700**	**10,376**	**6,778**	**7,036**	**10,836**	**8,843**	**9,219**

Sources: McCloskey, Federal Statistical Office and own calculations

Table 15

Hard Coal Imports of EU-Countries: Imports inclusive internal trade between Member States

1,000 t

	2009	2010	2011	2012	2013	2014	2015
Germany	36,800	41,000	44,200	44,900	50,100	53,600	55,500
France	16,200	18,900	15,300	17,000	18,300	14,300	14,300
Italy	22,000	22,700	24,000	25,000	20,800	20,000	19,500
Netherlands	10,800	11,800	11,700	12,400	12,400	12,400	12,400
Belgium	4,100	3,500	4,000	3,500	5,200	4,400	4,200
Luxembourg	200	200	200	n/a	n/a	n/a	n/a
Great Britain	38,100	26,500	31,700	44,800	44,800	38,300	27,100
Ireland	2,300	2,200	1,900	2,200	1,200	1,800	2,400
Denmark	4,400	4,100	6,100	3,900	5,000	4,500	2,800
Greece	400	600	600	200	200	200	200
Spain	17,100	12,800	15,300	22,300	13,500	14,700	19,000
Portugal	3,100	2,700	3,600	5,000	4,200	4,400	5,500
Finland	6,000	5,900	7,000	4,000	5,100	5,400	3,500
Austria	4,000	4,000	3,800	2,900	3,500	3,200	3,000
Sweden	2,400	3,000	2,700	2,200	2,500	2,500	2,400
Poland	10,000	10,000	15,500	10,100	10,800	10,300	8,200
Czech Republic	1,700	1,900	2,400	2,000	2,100	2,900	2,900
Hungary	1,400	1,800	1,500	1,500	1,300	1,300	1,300
Slovakia	3,200	3,500	3,400	3,400	7,100	6,700	3,600
Slovenia	600	600	500	600	500	400	400
Croatia	n/a	n/a	n/a	n/a	1,200	1,000	1,000
Latvia	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Lithuania	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Estonia	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Cyprus	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Malta	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Bulgaria	3,500	2,900	3,300	2,300	1,700	1,600	1,200
Romania	1,200	1,400	1,200	1,300	900	700	1,200
Other EU28 since 2013	**189,500**	**182,000**	**199,900**	**800 212,300**	**700 213,100**	**204,600**	**191,600**
	thereof coke:	coke:	coke:	coke:	coke:	coke:	coke:
Coke	11,000	8,000	8,000	8,000	6,000	6,000	6,000

Source: EURACOAL

Table 16

Primary Energy Consumption in Germany MTCE

Energy Sources	2009	2010	2011	2012	2013	2014	2015
Hard Coal	50.1	57.9	55.3	58.3	61.0	58.1	57.7
thereof Import Coal	(36.2)	(44.4)	(43.4)	(46.8)	(52.4)	(52.1)	(51.4)
Lignite	51.4	51.6	53.3	56.1	55.6	53.6	53.5
Mineral Oil	159.3	160.0	154.8	154.9	158.3	154.1	153.9
Natural Gas	100.3	107.1	99.3	99.6	104.4	91.4	95.9
Nuclear Energy	50.2	52.3	40.2	37.0	36.2	36.2	34.2
Hydro and Wind Power	7.1	7.2	8.1	8.9	9.2	9.4	13.2
Foreign Trade Balance Electricity	-1.8	-2.2	-0.8	-2.8	-4.2	-4.4	-6.4
Other Energy Sources	41.8	47.9	51.0	51.0	47.7	50.5	52.0
Total	**458.4**	**481.8**	**461.2**	**463.0**	**468.2**	**448.9**	**454.0**

Anteile in %

Energy Sources	2009	2010	2011	2012	2013	2014	2015
Hard Coal	10.9	12.0	12.0	12.6	13.0	12.9	12.7
thereof Import Coal	(7.9)	(9.2)	(9.4)	(10.1)	(11.0)	(11.6)	(11.3)
Lignite	11.2	10.7	11.6	12.1	11.9	11.9	11.8
Mineral Oil	34.8	33.2	33.6	33.5	33.8	34.3	33.9
Natural Gas	21.9	22.2	21.5	21.5	22.3	20.4	21.1
Nuclear Energy	11.0	10.9	8.7	8.0	7.8	8.1	7.5
Hydro and Wind Power	1.6	1.5	1.8	1.9	2.0	2.1	2.9
Foreign Trade Balance Electricity	-0.4	-0.5	-0.2	-0.6	-0.9	-0.9	-1.4
Other Energy Sources	9.0	10.0	11.0	11.0	10.1	11.2	11.5
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Sources: The Working Group on Energy Balances, The Federal Statistical Office of Germany, own calculations

Table 17

Coal Handling in German Ports

1,000 t

	2009	2010	2011	2012	2013	2014	2015
North Sea Ports							
Hamburg	5,189	5,276	5,805	5,111	5,629	5,924	7,672
Wedel - Schulau	0	0	530	239	42	-	-
Bützfleth	9	5	8	6	0	6	-
Wilhelmshaven	2,404	1,843	1,924	1,597	3,301	3,112	4,093
Bremen ports	1,410	1,796	1,599	1,783	1,270	1,636	1,710
Brunsbüttel	500	434	424	710	793	525	485
Emden	1	2	-	-	-	-	-
Nordenham	2,284	2,235	2,792	2,240	1,574	1,277	1,107
Papenburg	121	141	0	-	-	-	-
Other North Sea Ports S.H.	502	610	0	-	3	7	-
Other North Sea Ports N.S.	-	7	3	-	-	-	-
Total	**12,420**	**12,349**	**13,085**	**11,686**	**12,612**	**12,487**	**15,067**
Baltic Sea Ports							
Rostock	823	1,200	1,345	1,335	1,032	1,234	985
Wismar	26	34	0	-	-	-	
Stralsund	-	-	-	1	-	-	
Lübeck	-	-	-	-	2	-	
Flensburg	230	209	237	235	255	239	254
Kiel	453	479	271	503	178	325	231
Saßnitz	1	5	1	1	1	2	
Wolgast	-	-	-	-	-	-	
Other Baltic Sea Ports	-	-	-	-	-	-	
Total	**1,533**	**1,927**	**1,854**	**2,075**	**1,468**	**1,800**	**1,470**
Tonnage Total	**13,953**	**14,276**	**14,939**	**13,761**	**14,080**	**14,287**	**16,537**

Source: The Federal Statistical Office

Table 18

Consumption, Import/Export and Power Generation in Germany

	2009	2010	2011	2012	2013	2014	2015
Gross Electricity Consumption in TWh	581.3	615.4	606.8	607.1	599.4	592.2	600.0
Electricity Foreign Trade in TWh							
Exports	54.9	59.9	56.0	67.3	72.2	74.5	85.2
Imports	40.6	42.2	49.7	44.2	38.4	38.9	33.5
Balance (export surplus)	14.3	17.7	6.3	23.1	33.8	35.6	51.8
Gross Electricity Generation in TWh	595.6	633.1	613.1	630.1	633.2	627.8	651.8

Utilization of Energy Sources for Power Generation in TWh

	2009	2010	2011	2012	2013	2014	2015
Hard Coal	107.9	117.0	112.4	116.4	121.7	118.6	118.0
thereof Import Coal [1)]	(76.3)	(86.8)	(84.9)	(89.1)	(101.8)	(91.6)	(103.0)
Lignite	145.6	145.9	150.1	160.7	160.9	155.8	155.0
Natural Gas	80.9	89.3	86.1	76.4	67.5	61.1	59.6
Fuel Oil	10.1	8.7	7.2	7.6	7.2	5.7	5.4
Nuclear Energy	134.9	140.6	108.0	99.5	97.3	97.1	91.8
Hydro / Wind Power	57.6	58.8	66.6	72.8	74.7	76.5	107.3
Other	58.6	72.8	82.7	96.7	103.9	113.0	114.7
Total	**595.6**	**633.1**	**613.1**	**630.1**	**633.2**	**627.8**	**651.8**

1) Sales to power stations

Sources: BDEW, Statistik der Kohlenwirtschaft, BAFA, The working group on energy balances, DIW, own calculations

Table 19

European / International Price Quotations

	2009	2010	2011	2012	2013	2014	2015
Steam Coal Marker Prices 1 %S. CIF NW Europe							
USD/TCE	82.12	107.74	141.73	107.92	95.29	87.83	66.08
€/TCE	58.87	81.27	101.82	83.99	71.75	66.15	59.56
Source: McCloskey (from 6000 kcal/kg converted into 7000 kcal/kg)							
Sea Freight Rates Capesize Units - Port of Destination ARA (Amsterdam. Rotterdam. Antwerp)							
South Africa USD/t	13.66	12.41	10.74	8.13	9.38	9.07	5.01
USA/East Coast USD/t	16.68	15.06	12.01	9.62	11.44	10.00	7.14
Australia/NSW USD/t	22.46	22.15	19.43	15.05	18.03	16.54	8.93
Colombia USD/t	16.25	14.75	11.89	9.63	11.33	9.87	6.22
Sources: Frachtcontor Junge. own calculations							

Table 20

Imports of Hard Coal and Hard coal coke

1,000 t

Countries	2012 Steam Coal*	2012 Coking Coal	2012 Coke	2012 Total	2013 Steam Coal*	2013 Coking Coal	2013 Coke	2013 Total
Poland	2,397	9	1,565	3,971	2,938	70	1,317	4,325
Czech Republic	7	0	316	323	365	0	325	690
Spain			7	7	0	0	3	3
France			48	48	0	0	19	19
Other	1,638	38	679	2,355	2,485	33	809	3,327
since 2013 EU-28	4,042	47	2,615	6,704	5,788	103	2,473	8,364
CIS	10,474	753	319	11,546	11,975	867	249	13,091
Norway	395	0	0	395	680	0	0	680
USA	7,072	2,737	0	9,809	8,933	3,111	0	12,044
Canada	0	1,516	0	1,516	0	1,214	0	1,214
Colombia	8,972	347	33	9,352	9,794	180	25	9,999
South Africa	1,972	0	0	1,972	2,533	0	0	2,533
Australia	308	4,143	0	4,451	128	4,611	0	4,739
China	9	0	2	11	8	0	0	8
Indonesia	0	0	0	0	0	0	0	0
Venezuela	111	0	1	112	59	0	0	59
Other Third Countries	1,985	64	5	2,054	0	135		135
Third Countries	31,298	9,560	360	41,218	34,110	10,118	274	44,502
Total	**35,340**	**9,607**	**2,975**	**47,922**	**39,898**	**10,221**	**2,747**	**52,866**

Sources: Federal Statistical Office, BAFA, own calculations

**Steam coal including anthracite*

into Germany

1,000 t

2014				2015				
Steam Coal*	Coking Coal	Coke	Total	Steam Coal*	Coking Coal	Coke	Total	**Countries**
2,925	6	1,458	4,389	3,097	1	998	4,096	Poland
362	0	297	659	566	0	266	832	Czech Republic
0	0	1	1	0	0	0	0	Spain
0	0	1	1	0	0	15	15	France
5,489	35	450	5,974	2,951	36	318	3,305	Other
8,776	41	2,207	11,024	6,614	37	1,597	8,248	**since 2013 EU-28**
12,312	1,183	227	13,722	14,885	1,643	196	16,724	CIS
435	0	0	435	561	0	0	561	Norway
7,725	3,374		11,099	7,734	3,179	0	10,913	USA
0	1,462	0	1,462	0	1,316	0	1,316	Canada
7,265	116	0	7,381	9,850	98	0	9,948	Colombia
5,034	48		5,082	3,225	175	0	3,400	South Africa
350	5,323	0	5,673	118	5,619	0	5,737	Australia
14	9	101	124	16	0	75	91	China
0	0	0	0	4	49	0	53	Indonesia
0	0	0	0	0	0	0	0	Venezuela
0	204	0	204	188	234	97	519	Other Third Countries
33,135	11,719	328	45,182	36,581	12,313	368	49,262	**Third Countries**
41,911	**11,760**	**2,535**	**56,206**	**43,195**	**12,350**	**1,965**	**57,510**	**Total**

**Steam coal including anthracite*

Table 21

Germany – Energy Prices / Exchange Rates

	2009	2010	2011	2012	2013	2014	2015
Exchange Rates							
EUR / USD	0.7169	0.7543	0.7184	0.7783	0.7530	0.7527	0.9013
Source: Deutsche Bundesbank							
Cross Border Prices for Coking Coal and Coke – €/t							
Importierte Kokskohle	173.75	174.78	185.30	188.42	127.19	104.67	100.52
Importierter Steinkohlekoks	196.91	259.37	319.78	258.72	204.88	193.66	187.04
Source: Federal Statistical Office							

Cross Border Prices for Steam Coal in €/TCE: Utilization in Power Plants

	1. Q	2. Q	3. Q	4. Q	Annual value
2009	91.24	76.35	69.36	73.31	78.81
2010	75.06	86.34	87.97	92.89	85.33
2011	105.30	105.22	106.22	110.44	106.97
2012	100.21	93.09	92.01	86.62	93.02
2013	84.03	80.03	75.64	76.66	79.12
2014	75.16	71.18	71.21	73.41	72.94
2015	71.99	69.64	66.10	64.06	67.90

Source: BAFA (cross border price=cif price ARA + freight German border)

Energy Prices free power station €/TCE

Energy Source	2009	2010	2011	2012	2013	2014	2015
Natural Gas	239.00	222.00	241.00	264.00	265.00	244.00	228.00
Heavy Fuel Oil	208.00	270.00	355.00	394.00	349.00	309.00	180.00
Steam Coal	84.00	90.00	112.00	98.00	84.00	78.00	73.00

Sources: BAFA, Statistik der Kohlenwirtschaft, own calculations

Table 22

Hard Coal Market in Germany

Quantities and Prices 1957 - 2015

Quantities								Prices							
Imports of Hard Coal and Coke t=t				Domestic Mining of Hard Coal Mill. t usable output				Steam Coal from non-EEC Countries [1]				Domestic Industrial Coal [2]			
Year	M t	Year	M t	Year	M t	Year	M t	Year	€/TCE	Year	€/TCE	Year	€/TCE	Year	€/TCE
1957	18.9	1987	8.8	1957	149.4	1987	75.8	1957	40	1987	46	1957	29	1987	132
1958	13.9	1988	8.1	1958	148.8	1988	72.9	1958	37	1988	42	1958	29	1988	134
1959	7.5	1989	7.3	1959	141.7	1989	71.0	1959	34	1989	49	1959	29	1989	137
1960	7.3	1990	11.7	1960	142.3	1990	69.8	1960	33	1990	49	1960	29	1990	138
1961	7.3	1991	16.8	1961	142.7	1991	66.1	1961	31	1991	46	1961	29	1991	139
1962	8.0	1992	17.3	1962	141.1	1992	65.5	1962	30	1992	42	1962	30	1992	147
1963	8.7	1993	15.2	1963	142.1	1993	57.9	1963	30	1993	37	1963	30	1993	148
1964	7.7	1994	18.1	1964	142.2	1994	52.0	1964	30	1994	36	1964	31	1994	149
1965	8.0	1995	17.7	1965	135.1	1995	53.1	1965	29	1995	39	1965	32	1995	149
1966	7.5	1996	20.3	1966	126.0	1996	47.9	1966	29	1996	38	1966	32	1996	149
1967	7.4	1997	24.3	1967	112.0	1997	45.8	1967	29	1997	42	1967	32	1997	149
1968	6.2	1998	30.2	1968	112.0	1998	40.7	1968	28	1998	37	1968	30	1998	149
1969	7.5	1999	30.3	1969	111.6	1999	39.2	1969	27	1999	34	1969	31	1999	149
1970	9.7	2000	33.9	1970	111.3	2000	33.3	1970	31	2000	42	1970	37	2000	149
1971	7.8	2001	39.5	1971	110.8	2001	27.1	1971	32	2001	53	1971	41	2001	149
1972	7.9	2002	39.2	1972	102.5	2002	26.1	1972	31	2002	45	1972	43	2002	160
1973	8.4	2003	41.3	1973	97.3	2003	25.7	1973	31	2003	40	1973	46	2003	160
1974	7.1	2004	44.3	1974	94.9	2004	25.7	1974	42	2004	55	1974	56	2004	160
1975	7.5	2005	39.9	1975	92.4	2005	24.7	1975	42	2005	65	1975	67	2005	160
1976	7.2	2006	46.5	1976	89.3	2006	20.7	1976	46	2006	62	1976	76	2006	170
1977	7.3	2007	47.5	1977	84.5	2007	21.3	1977	43	2007	68	1977	76	2007	170
1978	7.5	2008	48.0	1978	83.5	2008	17.1	1978	43	2008	112	1978	84	2008	170
1979	8.9	2009	39.5	1979	85.8	2009	13.8	1979	46	2009	79	1979	87	2009	170
1980	10.2	2010	45.2	1980	86.6	2010	12.9	1980	56	2010	85	1980	100	2010	170
1981	11.3	2011	48.4	1981	87.9	2011	12.1	1981	84	2011	107	1981	113	2011	170
1982	11.5	2012	47.9	1982	88.4	2012	10.8	1982	86	2012	93	1982	121	2012	180
1983	9.8	2013	52.9	1983	81.7	2013	7.6	1983	75	2013	79	1983	125	2013	180
1984	9.6	2014	56.2	1984	78.9	2014	7.6	1984	72	2014	73	1984	130	2014	180
1985	10.7	2015	57.5	1985	81.8	2015	6.2	1985	81	2015	68	1985	130	2015	180
1986	10.9			1986	80.3			1986	60			1986	130		

since 1991 Eastern Germany included, EUR values are rounded

1) Price free German border

2) Estimated cost-covering price

Sources: Federal Statistical Office, Statistik der Kohlenwirtschaft, BAFA, own calculations

Table 23

Members of VDKI

Member Company	Area Code	Phone	Fax	Website
AG der Dillinger Hüttenwerke *Werkstrasse 1, 66763 Dillingen/Saar, Germany*	*+49 6831*	*47-2220*	*47-3227*	*www.dillinger.de*
Antwerp Port Authority *Entrepotkaai 1, 2000 Antwerp, Belgium*	*+32 3*	*205 22 46*	*205 22 69*	*www.portofantwerp.be*
AVALON Trading LP *Glasgow G2 4JR, 272 Bath Street*	*+7 459*	*2870095*	*0044 203 0041 664*	*www.avalon.ms*
BS/ENERGY Braunschweiger Versorgungs-Aktiengesellschaft & Co. KG *Taubenstrasse 7, 38106 Braunschweig, Germany*	*+49 531*	*383-0*	*383-2644*	*www.bvag.de*
Bulk Trading S.A. *Piazza Molino Nuovo 17, 6900 Lugano, Swizerland*	*+41*	*9161 15-130*	*9161 15-137*	*www.bulktrading.ch*
CMC Coal Marketing Company Ltd. *Fumbally Square, New Street, Dublin 8, Ireland*	*+353 1*	*708 2600*	*708 2699*	*www.cmc-coal.ie*
Currenta GmbH & Co. OHG *BIS-EN-BM, Geb. G11, 51068 Leverkusen, Germany*	*+49 214*	*3057885*	*30657885*	*www.currenta.de*
DAKO Coal GmbH *Kämpenstrasse 151, 58456 Witten, Germany*	*+49 2302*	*970 30 17*	*970 30 70*	*www.dako-coal.com*
DB Schenker Rail AG, MB Montan *Rheinstrasse 2, 55116 Mainz, Germany*	*+49 6131*	*15-61100*	*15-61199*	*www.dbschenker.com*
Douglas Services GmbH *Rohrbergstr. 23 b, 65343 Eltville, Germany*	*+49 6123*	*70390*	*703920*	
EDF Trading (Switzerland) AG *Kurfürstendamm 194, Haus Cumberland, 10707 Berlin, Germany*	*+49 30*	*700 140 460*	*700 159 510*	*www.edftrading.com*
EnBW AG *Durlacher Allee 93, 76131 Karlsruhe, Germany*	*+49 721*	*63-23314*	*914-20071*	*www.enbw.com*
Enerco bv *Keerweg 2, 6122 CL Buchten, Nethetlands*	*+31 46*	*48 19 900*	*48 59 211*	*www.enerco.nl*
Engie Energy Management Trading *Boulevard Simon Bolivar/Simon Bolivarlaan 34, 1000 Brüssel, Belgium*	*+32*	*2518 61 11*	*2501 59 06*	*www.engie.com*
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Evonik Industries AG *Paul-Baumann-Strasse 1, 45722 Marl, Germany*	*+49 2365*	*49-6084*	*49-806084*	*www.evonik.de*
Exxaro International Trading AG *Bahnhofstrasse 18, 6301 Zug, Switzerland*	*+41 41*	*727 0570*	*727 0579*	*www.exxaro.com*
Frachtcontor Junge & Co. GmbH *Ballindamm 17, 20095 Hamburg, Germany*	*+49 40*	*3000-0*	*3000-343*	*www.frachtcontor.com*
Freepoint Commodities Europe LLP *157-197 Buckingham Palace Road, London SW1W 9SP, UK*	*+44*	*203 262 6264*	*203 262 6900*	*www.freepoint.com*

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Goldman Sachs International *Peterborough Court, 133 Fleet Street, London EC4A 2BB, UK*	*+44 20*	*7051 9438*		*www.gs.com*
Grosskraftwerk Mannheim AG *Marguerrestr. 1, 68199 Mannheim, Germany*	*+49 621*	*8684310*	*8684319*	*www.gkm.de*
GUNVOR SA *Rue du Rhone 82-84, 1204 Genève, Switzerland*	*+41 22*	*718 79 00*	*718 79 29*	*www.gunvorgroup.com*
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ICT Coal GmbH *Katernberger Str. 107, 45327 Essen, Germany*	*+49 201*	*860 44 61*	*860 44 65*	*www.ict-coal.de*
IMPERIAL Shipping Holding GmbH *Dr.-Hammacher-Str. 49, 47119 Duisburg, Germany*	*+49 203*	*5794-0*	*5794-229*	*www.imperial-shipping.com*
Incolab Services B.V. *Röntgenstraat 3, 3261 LK Oud Beijerland, Netherlands*	*+31 186*	*610 355*	*610 552*	*www.incolab.com*
Inspectorate Germany GmbH *Daimlerstr. 4a, 47167 Duisburg, Germany*	*+49 203*	*860 967-13*	*860 967-20*	*www.inspectorate.com*
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Niederrheinische Verkehrsbetriebe Aktiengesellschaft (NIAG) *Rheinberger Str. 95 a, 47441 Moers, Germany*	*+49 2841*	*205 528*	*999 398 544*	*www.niag-online.de*
OBA Bulk Terminal Amsterdam *Westhavenweg 70, 1042 AL Amsterdam, Netherlands*	*+31 20*	*5873701*	*6116908*	*www.oba-bulk.nl*
OVET B.V. *Mr F.J. Haarmanweg 16 d, 4538 AR Terneuzen, Netherlands*	*+31 11*	*5676700*	*5620316*	*www.ovet.nl*
Oxbow Coal GmbH *Renteilichtung 44a, 45134 Essen, Germany*	*+49 201*	*439 529-0*	*439 529-50*	*www.oxbow.com*
Peabody COALTRADE GmbH *Ruhrallee 185, 45136 Essen, Germany*	*+49 201*	*89 45 135*	*89 45 45*	*www.peabodyenergy.com*
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RAG Verkauf GmbH *Shamrockring 1, 44623 Herne, Germany*	+49 2323	15-5410	15-5412	www.rag-verkauf.de
RC INSPECTION Coal B.V. *Gustoweg 66, 3029 AS Rotterdam, Netherlands*	+31 10	425 02 46	501 99 80	www.rc-inspection.com
Rheinbraun Brennstoff GmbH *Stüttgenweg 2, 50935 Köln, Germany*	+49 221	480-1364	480-1369	www.energieprofi.com
RheinCargo GmbH & Co. KG *Hammer Landstr. 3, 41460 Neuss, Germany*	+49 2131	53 23-0	53 23-100	www.rheincargo.com
Rhenus PartnerShip GmbH & Co. KG *August-Hirsch-Str. 3, 47119 Duisburg, Germany*	+49 203	8009-326	8009-221	www.rhenus.de
RWE Supply & Trading GmbH *Altenessener Str. 27, 45141 Essen, Germany*	+49 201	12-09	12-17900	www.rwetrading.com
SEA-Invest N.V. *Skaldenstraat 1, 9042 Gent, Belgium*	+32 9	255 02 51	259 08 93	www.sea-invest.be
Ssp Stockpile surveying and protection B.V. *Zuideinde 36, 2991 LK Barendrecht, Netherlands*	+31	180 55 65 61	180 55 62 89	www.ssp-rotterdam.nl
Stadtwerke Flensburg GmbH *Batteriestrasse 48, 24939 Flensburg, Germany*	+49 461	487-0	487-1880	www.stadtwerke-flensburg.de
Stadtwerke Hannover AG *Ihmeplatz 2, 30449 Hannover, Germany*	+49 511	430-0	430-2772	www.enercity.de
STEAG GmbH *Rüttenscheider Str. 1-3, 45128 Essen, Germany*	+49 201	801-3230	801-3232	www.steag.com
SUEK AG, Swiss Office *Vadianstrasse 59, 9000 St. Gallen, Switzerland*	+41 71	226 85 00	226 85 03	www.suekag.com
Südzucker AG *Maximilianstr.10, 68165 Mannheim, Germany*	+49 621	421-0	421-466	www.suedzucker.de
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THB Transport- und Handelsberatungsgesellschaft mbH *Auf dem Dreieck 5, 28197 Bremen, Germany*	+49 421	536 868	536 86-78	www.thb-bremen.de
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Vattenfall Energy Trading Netherlands N.V. *Hoekenrode 8, 1102 BR Amsterdam, Netherlands*	+31	888 380 037		www.vattenfall.com
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