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ANNUAL REPORT

# 2017

FACTS AND TRENDS 2016/17



## Import Coal Market at a Glance

		2014	2015	2016 <sup>1)</sup>
<b>World</b>				
Hard Coal Production	Mill. t	7,050	6,998	6,730
World Hard Coal Trade	Mill. t	1,272	1,226	1,216
thereof hard coal seaborne trade	Mill. t	1,187	1,135	1,115
Hard Coal Domestic Trade	Mill. t	85	91	101
Hard Coal Coke Production	Mill. t	685	650	652
Hard Coal Coke World Trade	Mill. t	24	23	25
<b>European Union (28)</b>				
Hard Coal Production	Mill. t TCE	108	101	87
Hard Coal Imports (incl. Domestic Trade)	Mill. t	205	191	167
Hard Coal Coke Imports	Mill. t	6	8	8
<b>Germany</b>				
Hard Coal Use	Mill. t TCE	58.1	58.6	55.6
Hard Coal Volume	Mill. t TCE	58.0	57.7	52.3
thereof import coal use <sup>2)</sup>	Mill. t TCE	50.2	51.3	48.4
thereof domestic hard coal production	Mill. t TCE	7.8	6.4	3.9
Imports of Hard Coal and Hard Coal Coke	Mill. t	56.2	57.5	55.2
thereof steam coal	Mill. t	41.9	43.2	41.0
thereof coking coal	Mill. t	11.8	12.3	12.2
thereof hard coal coke	Mill. t	2.5	2.0	2.1
<b>Prices</b>				
Steam Coal Marker Price CIF NWE	US-\$/t TCE	88	67	69
Cross-border Price Steam Coal	EUR/t TCE	73	68	67
CO2 Emission Certificates (European Carbon Futures)	EUR/t CO <sub>2</sub>	6.00	7.72	5.37
Exchange Rate (US\$1 = €....)	EUR/US-\$	0.75	0.90	0.90
<sup>1)</sup> Some figures provisional				
<sup>2)</sup> Total import, including changes in stockpiles				

## AN INTRODUCTORY WORD –

For decades, oil was the energy source at the centre of major crises. Now natural gas is well on its way to taking oil's place in this role. The European Union is divided on the issue of dependency on Russian gas and the lack of solidarity displayed in the circumvention of neighbouring countries by Nordstream 2. The USA, in the meantime a major natural gas producer, has intervened in this European dispute. Moreover, the US president, in coalition with Saudi Arabia, has evidently determined that Qatar, the world's most important source of liquefied natural gas (LNG), is an evil power that supports and encourages terrorism.

Import coal remains today, just as in the past, a secure and reliable energy source. World hard coal production has reached a high plateau, but has not yet come to a turning point. Demand in the USA and in China has declined recently, but there are already signs of a recovery, and in India and the ASEAN countries, demand is rising because of the new construction of modern coal-fired power plants.

In Germany, emphasis remains on renewable energy sources. These sources alone, however, cannot guarantee a secure supply. For a long time to come, thermal power plant production will continue to serve as a major pillar. Hard coal is an ideal partner here – producing countries are found all around the globe and are secure from crisis situations. As far as CO<sub>2</sub> emissions are concerned, Deutschlandfunk correctly pointed out not too long ago: "Zero emissions cannot be achieved with natural gas." So natural gas is not an alternative to renewable energy sources. If the German energy turnaround is to continue its successful path, it must be expanded to encompass other sectors as well. After all, less energy is consumed in the electric power sector than in road traffic or heating.

The need for backup capacities is accelerating so that the fluctuations in the supplies from renewable energy sources can be balanced. In economic terms, it is efficient to utilise existing power plant capacities, whether coal or natural gas, for this purpose. The Agora Energiewende recently determined that coal is much more flexible than previously recognised. And coal is less expensive than natural gas. A minimum CO<sub>2</sub> price would only distort competition, and it is moreover superfluous in European emission trading because the targets for the reduction of CO<sub>2</sub> can be reliably achieved through the annual lowering of the upper emission thresholds. A minimum CO<sub>2</sub> price helps only the natural gas industry and increases energy costs for German industry.

In short: hard coal will be needed much longer than many believe. Supplies are secure and it can be used flexibly and at low cost because it is constantly subject to competition – to the benefit of consumers.

Hamburg, July 2017



Dr Wolfgang Cieslik  
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### Report in figures (provisional for 2016)

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#### Disclaimer

#### Glossary/Institutions/Links\*

\* 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 German Coal Importer Association's website.

# WORLD ECONOMIC SITUATION

## World Production and World Trade

Real gross domestic product worldwide grew by 3 % in 2016. Two countries caused this average to climb significantly. Real growth in China was 6.7 % and in India 7.0 %. 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 March 2017, only India will continue to grow at the same speed while growth in China will tend to slow. The

banknote demonetisation carried out so surprisingly in India, however, might possibly have a disruptive impact. The Indian press reports that growth figures have not been influenced by the reform. At the same time, it is hinted that these figures will remain valid only until the next election. Brazil remains in last place in economic development; its economy shrank by 3.5 % in 2016. Still, the OECD expects economic recovery and zero growth for 2017.

The decline in growth in the USA from 2.6 % to 1.6 % in 2016 is striking, but the OECD forecast foresees a recovery to 2.4 % in 2017. While Japan and the eurozone have held their previous levels, a decline in growth is expected in Great Britain, caused undoubtedly in significant part by the Brexit debate.

The World Trade Organisation (WTO) has drastically lowered its projection for the development of world trade in 2016. The WTO now expects an increase of only 1.7 % in comparison with 2015. In April 2016, the organisation had forecast a plus of 2.8 %. This is a drying-up of a major source of global growth. The International Monetary Fund (IMF) also warned last year of a dramatic slowdown in world trade. In conjunction with low inflation, the world economy could become trapped in a downward spiral of higher debt, massive unemployment and stagnating growth. The implementation of trade barriers has been on the rise since 2008, making the exchange of goods more difficult. The IMF made a specific effort during the G20 summit in Hangzhou in September 2016 to express its great concerns about stagnating world trade. According to a report from the IMF, global trade volume has grown by merely 3 % annually since 2012. Before the financial crisis, growth was twice as high. The rule of thumb was

Real Growth in Gross Domestic Product			
	2015 <sup>1)</sup>	2016 <sup>2)</sup>	2017 <sup>2)</sup>
	Change from Previous Year in %		
World	3.0	3.0	3.3
USA	2.6	1.6	2.4
Eurozone	1.5	1.7	1.6
Germany	1.5	1.8	1.8
France	1.2	1.1	1.4
Italy	0.6	1.0	1.0
Japan	0.6	1.0	1.2
Canada	1.1	1.4	2.4
Great Britain	2.2	1.8	1.6
China	6.9	6.7	6.5
India <sup>3)</sup>	7.6	7.0	7.3
Brazil	-3.9	-3.5	0.0
1) Provisional 2) Forecast 3) Fiscal year begins in April			
Source: OECD Interim Economic Outlook 2017 and Annex Table I			

that annual trade volume grew twice as fast as the world economy. In the past four years, however, trade has barely kept pace with economic growth.

In the opinion of the IMF, weak investments and lower growth in many countries cannot alone explain the stagnation of world trade. The growth of protectionism and lack of progress in trade agreements are further causes of the stagnation. Finally, the World Bank also showed concern about weak global investments in a report published in January. It viewed the opportunities in a Trump economy and the announced infrastructure expenditures as greater than the risks; global growth could be 0.1 %-points higher in 2017 and 0.3 %-points higher in 2018. In the meantime, however, the chief economist for the new US president has been appointed: Peter Navarro. He enjoys the trust of President Donald Trump and shocked the world with his allegation that Germany is “manipulating” the euro to secure advantages in world trade so that it can “exploit” its business partners, the United States in particular. There are great concerns in China as well about the climate change in trade policy. China has just recently lost the title of “world champion in exports” to Germany, and foreign trade is weakening. Growth in exports to America has so far prevented China’s trade balance surplus for falling even further. Now a change in course by the largest trading partner appears imminent. Should this happen, the Chinese government has already threatened Trump with a “trade war”; Beijing would in this case surely place high taxes on American import products.

According to the report “Global Economic Outlook” for Q1 2017 from Deloitte, exports from the People’s Republic of China are on the decline because of the high value of the

currency, rising wages and weak demand from abroad. Efforts to cool down an overheated real estate market would bear fruit, but threatened to undermine growth. Our Annual Report last year pointed out China’s “trilemma”, the necessity to secure three conflicting goals at the same time: an independent central bank policy, a controlled currency exchange rate policy and liberalisation of controls on capital. The capital controls are aimed at stopping the fall of the Chinese currency. The value of the Chinese currency yuan (also known as renminbi) has lost 5.6 % in value against the US dollar since the beginning of 2017, with the result that China has experienced a high outflow of capital. The capital controls may affect German companies as well, possibly preventing them from transferring any funds to their German parent companies this year. A much greater problem, however, could cause the turnaround in world trade initiated by the USA to introduce or increase import duties. This would have a huge damage to the free flow of goods.

## World Energy Consumption

According to the BP Statistical Review 2016, world energy consumption rose by 1.0 % to 18.8 billion TCE in 2015. While primary energy consumption in North America fell by 1.1 %, the growth in South and Central America of 0.2 % was at a similarly low level as in Europe/Eurasia (0.1 %). In contrast, the growth of 2.1 % to 7.9 billion TCE in the Asian-Pacific Region was more than twice as great as the global average. Figure HT1 shows how strongly primary energy consumption has grown in this region since 1965. Its share in world energy consumption has now reached 42 %. This is as high as in North America and Europe/Eurasia combined. Even stronger – although starting at a lower level – was the rise in energy consumption of 4.2 % to 1.3 billion TCE in the Middle East.

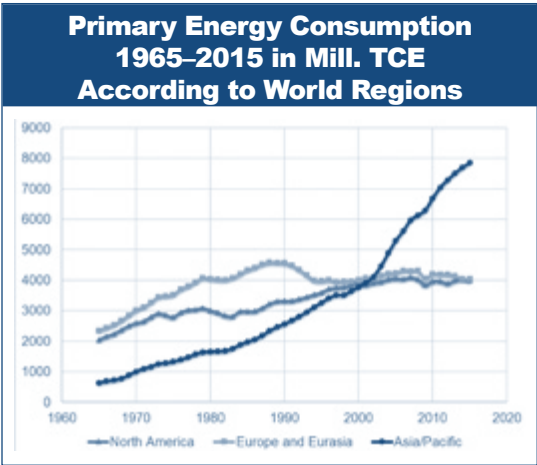


Figure HT1

Development among energy sources (HT-W2) reveals that oil has not only remained energy source Number 1, but that its growth of 1.9 % in 2015 was stronger than that of all other conventional energy sources. Coal consumption, on the other hand, declined by 1.8 %. Renewable energy sources had the strongest growth (15.2 %), but they started at a very low level. Their share in coverage of consumption worldwide is only 2.8 %. The top spot is held by oil at 33 %, followed by coal at 29 % and natural gas at 24 %.

**World Climate Policy**

Despite economic growth of about 3 % in recent years, worldwide CO<sub>2</sub> emissions from fossil fuels hardly rose at all in 2016, the third year in succession this has happened, according to the Global Carbon Project. This is viewed as signs of a turnaround because the CO<sub>2</sub> emissions in previous years had risen by more than 2 % annually. The scientists expect a rise of 0.2 % for 2017. A major role here is played by the strong global growth

**Primary Energy Consumption  
in Billion TCE  
– Major Energy Sources –**

	2012	2013	2014	2015	2015 / 2014 Change	Share in Total 2015
Coal *	5.320	5.524	5.587	5.485	-1.8 %	29.2 %
Natural Gas	4.266	4.361	4.402	4.479	1.7 %	23.8 %
Oil	5.913	5.970	6.074	6.188	1.9 %	32.9 %
Nuclear Energy	0.800	0.805	0.822	0.833	1.3 %	4.4 %
Hydroelectric Power	1.191	1.231	1.263	1.276	1.0 %	6.8 %
Renewable Energies and Others	0.342	0.404	0.452	0.521	15.2 %	2.8 %
<b>Total</b>	<b>17.832</b>	<b>18.3</b>	<b>18.601</b>	<b>18.782</b>	<b>1.0 %</b>	<b>100.0 %</b>

\* Hard coal and lignite  
Source: BP, Statistical Review 2015

HT-W2

in renewable energy sources. The International Energy Agency (IEA) reported in 2016 that in China alone two wind turbines were installed every hour in 2015, and half a million solar collectors were set up in the world every day. According to the IEA, 40 % of the renewable energy capacities were constructed in China. The motivating factor in Asia is not climate change only, however, but also the desire for improved air quality.

These developments have recently become the subject of discussion on capital markets under the general heading of “climate protection and sustainability.” “Investors can no longer ignore climate change,” reads the introduction to a study by the world’s largest assets manager, the American company Blackrock, published in 2016. Large insurance companies are investing billions in infrastructure projects or in renewable energies. What no one is saying so clearly: the historically low interest rates are forcing the finance world to look around for new invest-



ment opportunities. The willingness to invest in renewable energy sources is consequently high and can also be sold well under the heading “climate protection.” The coal opponents are using this to mobilise a “divestment” campaign. “Because of the anti-coal war, investors want to diversify away,” said Guillaume Perret, Director of Perret Associates in London. He added immediately: “But the demand is still there.” Consequence: Coal stocks rose by one-third in 2016 and were the industrial group with the best performance on the European Stoxx 600 index, reported the Washington Post on 14 October 2016.

The question of whether the capital markets are about to see a new major trend pursuant to this development was also the subject of discussion at the G20 meeting in Hangzhou in China from 4 to 5 September 2016. The passage on the climate effects of the oil and natural gas industry in the communiqué attracted less attention: “Given that natural gas is a less emission-intensive fossil fuel, we will enhance collaboration on solutions that promote natural gas extraction, transportation, and processing in a manner that minimizes environmental impacts.” The most important news item was that the United States of America (USA) and the People’s Republic of China declared there the ratification of the Paris Climate Agreement. This brought the total of countries ratifying the agreement to 62, who are responsible for 52 % of emissions. The requirement, however, was for the signature of 55 countries who make up at least 55 % of global CO<sub>2</sub> emissions. Following the vote by a large majority of the European Parliament in favour of ratification of the agreement on 4 October 2016, the road had been cleared for the approval of the EU and the agreement could enter into effect.

The procedure selected for the Paris Climate Agreement paved the way for fast agreement, but it had the disadvantage that the agreement is not legally binding. It is based on voluntary implementation in the individual countries. Each country makes its own decision about its contribution. In the estimate of the Intergovernmental Panel on Climate Change, the national climate protection schedules that have been submitted are not adequate to limit global warming to 1.5° C. The discrepancy between vision and reality is huge. Hans-Werner Sinn, at that time president of the ifo Institute, had this comment to make: “The agreement contains above all moral appeals and lip service, but it does not provide any instruments of any kind that could be used to persuade unwilling countries to join in.”

On 4 November 2016, the new international climate treaty entered into force punctually for the start of the 22nd Conference of the Parties to the United Nations (UN) Framework Convention on Climate Change (COP 22) held in Marrakesh from 7 to 18 November 2016. No fundamental resolutions concerning climate policy were adopted. In the Marrakesh “Action Proclamation,” the 196 participating countries appealed to themselves to submit action plans that would ensure that the global temperature in this century would not rise by more than 1.5° or 2° C in comparison with the pre-industrial age. These plans are supposed to be tightened every five years, beginning in 2023. The announcements made so far are not sufficient to achieve the goal.

The conference in Marrakesh was overshadowed by the election results in the USA. The newly elected president, Donald Trump, had previously made it clear that he had a low opinion of the climate policy supported by his pre-

decessor, Barack Obama, and that he intended to back out of the Climate Agreement of Paris. There are many indications that Trump could reverse a major part of Obama's environmental protection policies. During the election campaign, Trump had described climate change as an invention harming US industry and called for the USA to exit the World Climate Agreement of Paris. The new director of the American Environmental Protection Agency EPA does not believe that the mainstream position of climate change caused primarily by human activity holds up to scrutiny. As the general attorney of Oklahoma, he had stood out above all for the many suits he filed against the US Environmental Protection Agency (EPA) which he is now leading. Speaking on the television channel CNBC on 10 March 2017, Scott Pruitt said: "I think that measuring with precision human activity on the climate is something very challenging to do and there's tremendous disagreement about the degree of impact. So no, I would not agree that it's a primary contributor to the global warming that we see." (FAZ, 11 March 2017).

The position taken by the USA will become evident by the next UN World Climate Conference, which will presumably be held in Bonn at the end of 2017. The (at least) formal presidency will be assumed by the government of the Fiji Islands. As the South Sea region is too small to organise a conference attended by about 20,000, it is scheduled to take place at the headquarters of the UN Climate Change Secretariat in Bonn.

In the opinion of the BDI, national climate protection efforts cannot be successful unless the entire community of nations undertakes comparable climate change efforts because Germany's share of worldwide CO<sub>2</sub> emissions from energy production amounts to a mere 2.25 %. A

decisive contribution could be made by an intelligently designed environmental policy, the export of environmental technologies and innovative solutions for increasing efficiency. But such contributions can come only from high-performing companies in Germany!

## **World Energy Outlook 2016 and Trends Until 2040**

The International Energy Agency (IEA) published the World Energy Outlook (WEO) 2016 on 16 November 2016. Just like the Global Carbon Project, the IEA concludes that growth in world economy is no longer paralleled by higher CO<sub>2</sub> emissions. In 2015, 90 % of the rise in energy generation was covered by renewable energies. Over half of this energy came from wind power. The two countries with the highest CO<sub>2</sub> emissions, China and the USA, were both able to report a decline in their CO<sub>2</sub> emissions related to energy. In China, the share of wind and hydroelectric power in energy generation rose from 19 % to 28 % in the period between 2011 and 2015. Coal share, in contrast, decreased by 10 %-points to under 70 %.

The New Policies Scenario (NPS) is the guiding scenario of the IEA. It takes into consideration the policies and actions that have been initiated or announced as of the middle of 2016. The climate commitments submitted before the Paris Climate Agreement are considered in particular in this scenario. The IEA assumes that worldwide gross domestic product will rise by an average of 3.4 % annually between 2014 and 2040. That is more than the 3 % currently being reported. Until 2040, growth in the developing and emerging countries will rise significantly more strongly than in the OECD countries. One important cause: the NPS sees world population increasing from

7.3 billion today to 9.2 billion in 2040. While the IEA projects an oil price of over US\$100/b in 2040, prices for steam coal will not rise as quickly and will be substantially lower than natural gas prices. Finally, it is assumed that only a few countries outside of the European Union (EU) will tax CO<sub>2</sub> or introduce emission trading before 2040. An increase in CO<sub>2</sub> price to US\$50/tonne is assumed for the EU.

Based on these assumptions, worldwide primary energy consumption will rise from 13.7 billion tonnes crude oil equivalent (TOE) (19.6 billion TCE) in 2014 to 17.9 billion TOE (25.6 billion TCE) in 2040, corresponding to annual average growth of 1.0 %. While in the period from 1990 to 2015 coal had the largest share in covering growth in demand, this role will in future – i.e. until 2040 – be taken

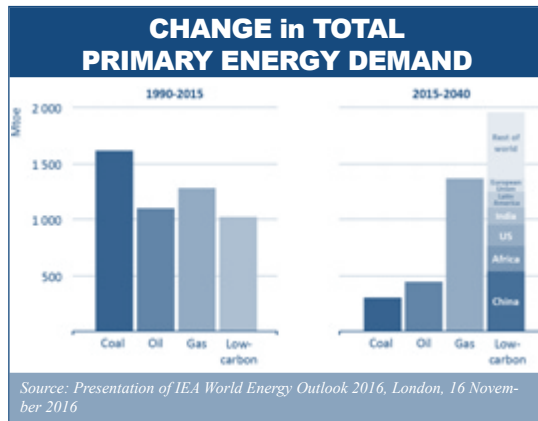


Figure HT2

over by renewable energy sources and natural gas, according to the IEA's guiding scenario. Even though coal's contribution to growth will decline and even stagnate in comparison with the strong growth of past years, consumption will nevertheless rise slightly by 5 % up to 2040.

Worldwide growth in primary energy consumption from 19.6 billion TCE in 2014 to 25.6 billion TCE in 2040 will be composed of two movements that are contrary to each other. In the European Union (-63 %) and the USA (-40 %), but even in China (-13 %), the demand for coal in absolute figures will decline. China will make a significant contribution to expansion of renewable energy sources. Despite this, China will still consume about 2.5 billion TOE, about 3.5 billion TCE. According to the IEA, gigantic growth – in both relative and absolute terms – will be observed in India and in South-East Asia. The demand for

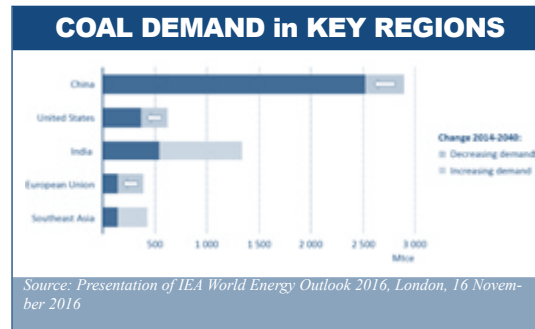


Figure HT3

energy in India is expected to more than double between 2014 and 2040. Coal will consequently have a major role to play as well in the first half of this century.

Global CO<sub>2</sub> emissions related to energy will rise by 13 % from 32 billion tonnes in 2014 to 36 billion tonnes in 2040, according to the guiding scenario NPS. This growth is attributable to the non-OECD countries and will balance out the declines in other regions. For instance, the European Union's share of worldwide CO<sub>2</sub> emissions is forecast to decline by half from 10 % in 2014 to 5 % in 2040.

World Hard Coal Production

While world hard coal production of 7.1 billion tonnes in 2014 was practically unchanged in comparison with the previous year, it declined by 0.7 % to 7.0 billion tonnes in 2015. Production in 2016 came to 6.7 billion tonnes, corresponding to a decline of 3.8 %.

The major causes of this significant drop in the reporting period were the developments in China (-185 million tonnes) and the USA (-147 million tonnes). If these two countries are excluded, world hard coal production did not decline by 268 million tonnes (Figure HT4), but instead increased by 64 million tonnes. In other words, the development of global hard coal production is decisively affected by the situation in two large producing countries, as is described in the pertinent chapters of the Country Report. Hard coal production rose in Colombia (+5.8 %), Russia (+2.9 %), Australia (+2.9 %), India (+2.1 %) and Indonesia (+1.2 %). Australia, Russia and Colombia are major pillars of world coal trade. The increase in production in these countries shows that there are still countries with rising need for coal. While India produces a substantial share

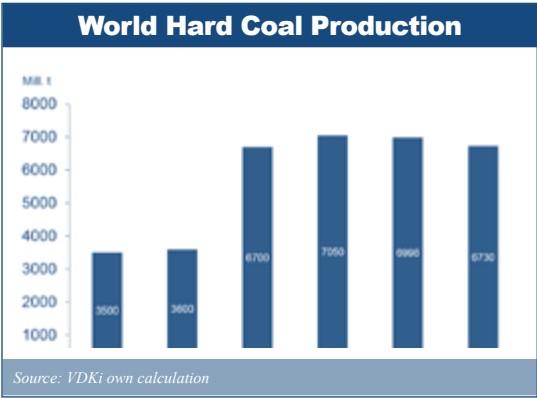


Figure HT4

itself (while nevertheless importing significant quantities from the world coal market as well), there are many ASEAN countries whose need to supply newly built hard coal-fired power plants has led to a corresponding demand on the world coal market. This explains why global production would have risen by 64 million tonnes if the decline in the USA and China were ignored.

Hard Coal Production of Important Countries in the Pacific Region in Million Tonnes				
Producing Countries	2014	2015	2016	Change in %
				2016 / 2015
China	3,598	3,545	3,360	-5.2
India <sup>1)</sup>	612	626	639	2.1
Australia	441	421	433	2.9
Indonesia	389	414	419	1.2

<sup>1)</sup> Partly own estimates  
Source: Various analyses

HT-W3

World Hard Coal Market

The world hard coal market fell by 10 million tonnes (0.8 %) in 2016. While domestic trade rose, seaborne trade fell by 20 million tonnes (1.8 %), a greater decrease than the overall market. World trade in coal developed as shown below in 2016:

World Hard Coal Trade				
	2014	2015	2016	Change
	Mill. t	Mill. t	Mill. t	2016 / 2015
Seabome Trade	1,187	1,135	1,115	-20
Inland Trade	85	91	101	10
Total	1,272	1,226	1,216	-10

Source: VDKi own analyses

HT-W4

There was a relatively strong decrease in coking coal exports by 14 million tonnes (-5.2 %) in seaborne trade because of the continuing decline in demand for coking coal. The steam coal market declined as well, but the decrease of 6 million tonnes (-0.7 %) was only marginal. Above all, the falling demand for coking coal (-5.2 %) led to a decline on the world hard coal market of 1.8 % in 2016 in comparison with the previous year.

### Seaborne Hard Coal World Trade

	2014	2015	2016	Change 2016/2015	
	Mill. t	Mill. t	Mill. t	Mill. t	%
Steam Coal	878	864	858	-6	-0,7
Coking Coal	309	271	257	-14	-5,2
<b>Total</b>	<b>1,187</b>	<b>1,135</b>	<b>1,115</b>	<b>-20</b>	<b>-1.8</b>

Source: VDKi own analyses

HT-W5

Since world production decreased more sharply than world trade, the share of world trade in production rose to 18.1 %.

### World Production/World Trade

	2014	2015	2016	Change 2016 / 2015	
Hard Coal	Mill. t	Mill. t	Mill. t	Mill. t	%
World Production	7,050	6,998	6,730	-268	-3.8
World Trade	1,272	1,226	1,216	-10	-0.8
<b>Share of World Trade in Production</b>	<b>18.0 %</b>	<b>17.5 %</b>	<b>18.1 %</b>		

Source: VDKi own analyses

HT-W6

Figure HT5 shows the primary trade flows in seaborne trade. Seaborne trade of 1,115 million tonnes breaks

down into 858 million tonnes of steam coal and 257 million tonnes of coking coal. Indonesia ships almost its complete production (97 %) to Asia. Australia's seaborne trade is also aimed by and large at Asia (85 %). 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 is now supplying more to Asia than to the USA, even though Europe (including Mediterranean countries) remains the primary sales market.

The largest import countries are without exception found in the South-East Asia region. This region accounts for 74 % of seaborne trade in hard coal. The top position is held by Japan (189 million tonnes). The EU 28 (149 million tonnes) is slightly ahead of South Korea (128 million tonnes). Within the EU, Germany, the largest member state and largest industrialised country, imports most of the coal.

Australia defended its position as the largest coal exporter against Indonesia (311 million tonnes) in 2016 by posting 391 million tonnes (200 million tonnes of steam coal and 191 million tonnes of coking coal). Russia, Colombia and South Africa maintained their positions.

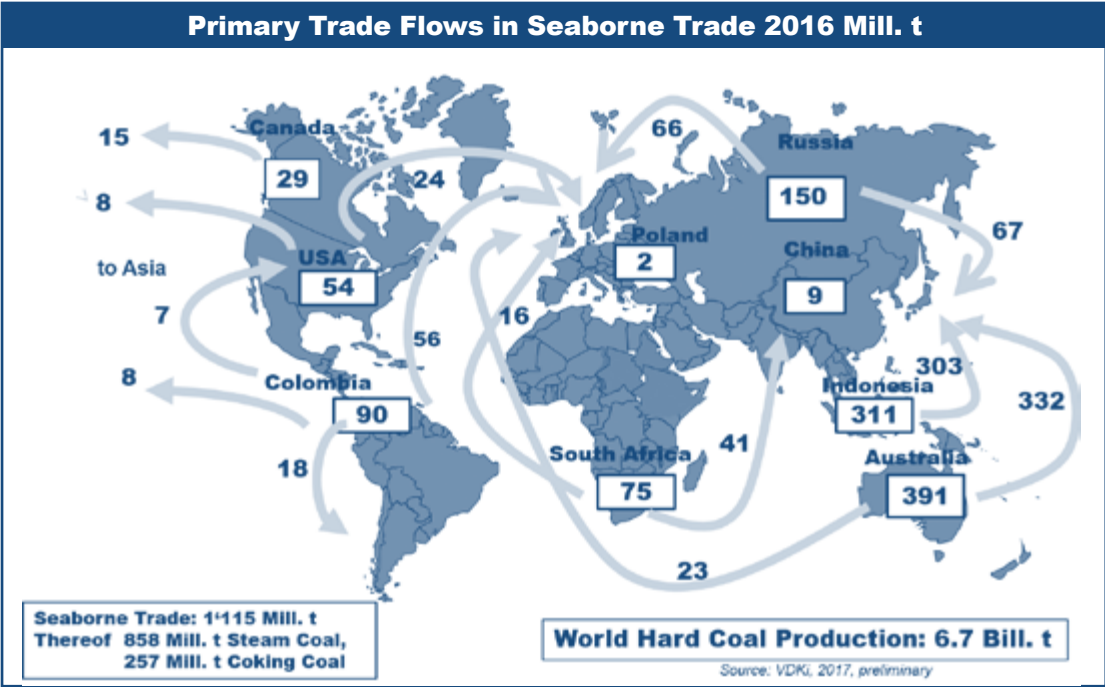


Figure HT5

Large Hard Coal Importing Countries/ Regions 2016 in Million Tonnes <sup>1)</sup>			
	Total	Steam Coal	Coking Coal
Asia, thereof	821	637	184
Japan	189	146	43
PR China <sup>2)</sup>	183	124	59
India	181	141	40
South Korea	128	103	25
EU 28, thereof	149	110	39
Germany	53	41	12

<sup>1)</sup> Incl. anthracite <sup>2)</sup> Excl. lignite  
Source: Own calculations; seaborne traffic only

HT-W7

### 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 in the Mediterranean region while declining in the EU in 2016.

Demand for steam coal on the Pacific market was dominated above all by China, India and some of the ASEAN countries. While demand from Japan, South Korea and

India decreased in 2016, China's imports rose from 108 to 124 million tonnes, caused in particular by the need to compensate production cutbacks caused by limitations on working hours.

The Largest Hard Coal Exporting Countries in 2016 in Million Tonnes <sup>1)</sup>			
	Total	Steam Coal	Coking Coal
Australia	391	200	191
Indonesia	311	311	0
Russia	150	131	19
Colombia	90	89	1
South Africa	75	75	0
USA	54	37	17
Canada	30	2	28

<sup>1)</sup> Seaborne only  
Source: VDKi own analyses

HT-W8

### Steam Coal Prices

The deterioration of steam coal prices initially continued at the beginning of 2016. The decline came to an end in spring of 2016, however. The market consolidation that had occurred in the meantime took hold while demand stabilised. The overcapacities of American, Australian and Indonesian producers were partially eliminated.

The price FOB Russian Baltic Seaboard increased from US\$41.80/tonne in February 2016 to US\$69.50/tonne in May 2017. During the same period, the price for Colombian coal (FOB) rose from US\$41.64/tonne to US\$69.06/tonne, and the price for Indonesian coal increased from US\$53.38/tonne to US\$77.12/tonne. As Figure HT6 shows, the Chinese price level was higher. As early as December 2015, prices there increased from US\$59.84/tonne to US\$92.04/tonne in May 2017. The regulation in

China has provided decisive support for the market revitalisation. It is described in detail in the Country Report, supplemented by a guest article.

The arbitrage window for Colombian deliveries to India closed in December 2016. Since that time, the prices for South Africa and Colombia have been at a similar level. The special situation for Russia resulting from the especially weak currency has also come to an end.

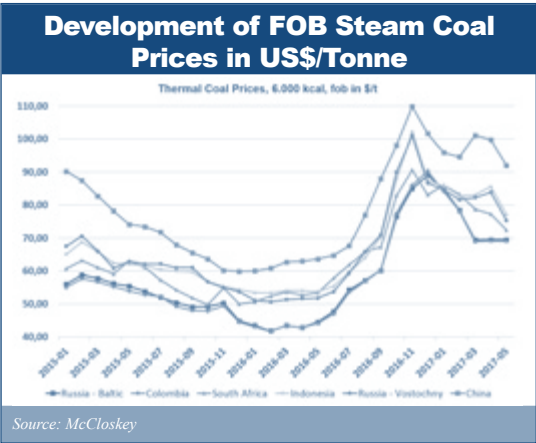


Figure HT6

### World Crude Steel and World Pig Iron Production

The pig iron production decisive for the consumption of coking coal, PCI coal and coke increased slightly by 8 million tonnes from 1,153 million tonnes in 2015 to 1,161 million tonnes (+0.7 %) in 2016. Crude steel production also rose by 0.7 %.

### Crude Steel and Pig Iron Production in the World

	2014	2015	2016	Change 2015 / 2014
	Mill. t	Mill. t	Mill. t	%
Crude Steel	1,647	1,599	1,610	0.7
Pig Iron	1,186	1,153	1,161	0.7
Share of Pig Iron in Crude Steel	72.0 %	72.1 %	72.1 %	0.0

Source: World Steel Association

HT-W9

The drastic decline of the previous year in China's crude steel and pig iron production was followed by a recovery. Crude steel production rose by 0.6 %, and pig iron production improved even more (by 1.4 %). China's world market share in crude steel production did not increase in 2016, but its share in world pig iron production again rose further by +0.8 %.

### Crude Steel and Pig Iron Production in China

	2014	2015	2016	Change 2016 / 2015
	Mill. t	Mill. t	Mill. t	in %
Crude Steel	823	804	808	0.6
Pig Iron	716	691	701	1.4
Share of Pig Iron in Crude Steel	87.0 %	85.9 %	86.7 %	0.9
Share of Crude Steel Production in World Production	50.0 %	50.3 %	50.2 %	-0.1
Share of Pig Iron Production in World Production	60.4 %	59.9 %	60.4 %	0.8

Source: World Steel Association

HT-W10

China's share of pig iron production in overall steel production again increased slightly from 85.9 % to 86.7 %.

Production from the world's largest steel-producing countries developed as shown below in 2016.

### The 10 Largest Steel-producing Countries in the World

Country	2014 Mill. t	2015 Mill. t	2016 <sup>1)</sup> Mill. t	Change 2015 / 2014
China	823	804	808	0.6 %
Japan	111	105	105	-0.4 %
India	87	90	96	6.7 %
USA	88	79	78	-0.6 %
Russia	71	71	71	-0.4 %
South Korea	71	70	69	-1.6 %
Germany	43	43	42	-1.4 %
Turkey	34	32	33	5.2 %
Brazil	34	33	31	-5.9 %
Ukraine	27	23	24	5.6 %
<b>Total of the 10 Largest</b>	<b>1,389</b>	<b>1,349</b>	<b>1,357</b>	<b>0.6 %</b>
<b>Total World</b>	<b>1,647</b>	<b>1,599</b>	<b>1,610</b>	<b>0.7 %</b>

<sup>1)</sup> Provisional figures

Source: World Steel Association

HT-W11

The collapse in production in 2015 continued for many of the steel-producing countries in 2016, although greatly alleviated. Japan, the USA and Russia recorded only slight decreases. The decline was rather stronger for Germany and South Korea. Brazil at -5.9 % brought up the rear owing to the ongoing poor state of its economic position. Crude steel production increased slightly in China.

India remains an exception to general development and its growth of +6.7 % was the highest. Turkey achieved a turnaround from -7.4 % in the previous year to +5.2 % in



2016. The trend reversal in Ukraine was even more dramatic: the fall of 15.6 % was followed by an increase of 5.6 %. Although the country is de facto still divided into a controlled area and an uncontrolled area, there are forms of exchange of goods that made this development possible.

### Market Share Seaborne World Coking Coal Market

	2014		2015		2016	
	Mill. t	Share %	Mill. t	Share %	Mill. t	Share %
Australia	186	61	185	69	191	75
USA <sup>1)</sup>	53	17	38	14	17	7
Canada <sup>2)</sup>	31	10	27	10	28	11
Russia	33	11	17	6	19	7
<b>Total</b>	<b>303</b>	<b>100</b>	<b>267</b>	<b>100</b>	<b>255</b>	<b>100</b>

<sup>1)</sup>Excluding trade with Canada <sup>2)</sup>Excluding trade with USA  
Source: VDKi own analyses

HT-W12

## Coking Coal Market

While world steel production rose by 0.7 %, trade on the seaborne world coking coal market declined further (-5.2 %). Except for Turkey, countries with growing steel production have their own coking coal deposits. There has been a further shift in the market shares of the various countries in the seaborne world coking coal market. Australia's seaborne coking coal exports rose slightly; the market share rose by 6 %-points to 75 %. The USA lost market shares to Australia while Canada maintained its position. Russia could increase its market share slightly.

## World Coke Market

DCoke production worldwide fell slightly from 650 million tonnes to 649 million tonnes; in contrast, world trade with coke rose substantially from 23 million tonnes to 25 million tonnes so that the share of world trade in world coke

production increased from 3.5 % to 3.9 %. Chinese coke exports in 2016 amounted to 10.1 million tonnes (+4 %).

China is not only by far the largest exporter of coke; it is also the largest coke producer. China produced 69 % of the world production (449 million tonnes) and increased its coke production by 4.1 million tonnes over 2015. In Europe, on the other hand, was a drop of 38.7 million tonnes (2.5 %) in coke production in 2016 from 2015.

### World Coke Market

	2014	2015	2016 <sup>1)</sup>
	Mill. t	Mill. t	Mill. t
Total World Market	24	23	25
World Coke Production	685	650	649
% of World Coke Production	3,5	3,5	3,9

<sup>1)</sup> Provisional  
Source: Own calculations

HT-W13

The European coke market in 2016 had a volume of 8.0 million tonnes compared with 7.6 million tonnes in the previous year. Primary exporters of coke besides China are in particular Poland (5.9 million tonnes over 5.5 million tonnes in the previous year) and Russia (2.25 million tonnes; -6 %).

## Coking Coal and Coke Prices

Coking coal prices finally bottomed out at the end of 2015. From September 2015, the price for Australian prime hard coking coal rose from US\$76.75/tonne to US\$294.69/tonne. As of May 2017, the price had declined again to US\$185.05/tonne. This was a consequence of the situation in China as well as of temporary effects that are described in the Country Report for Australia.

The coke prices FOB China described a similar trend to the prices for coking coal. They rose from US\$179/tonne in January 2015 to US\$280/tonne in May 2017. The CFR ARA prices were slightly below the Chinese prices at the beginning of 2016. In May 2017, they were again about US\$30/tonne higher than the Chinese prices.

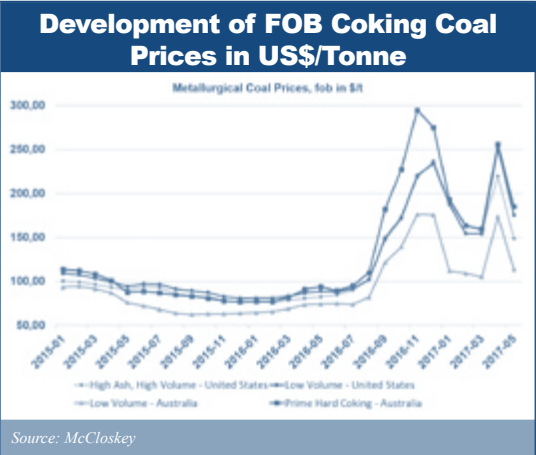


Figure HT7

### 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 of 718 points at the beginning of 2016 represented the lowest value of the Baltic Dry Index since 1986. Since then, the index has recovered. It is now back within the range of the past 5 years, but is still far away from the high marks since the turn of the millennium

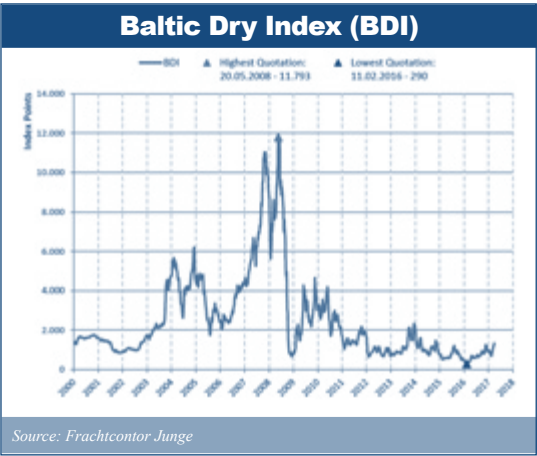


Figure HT8

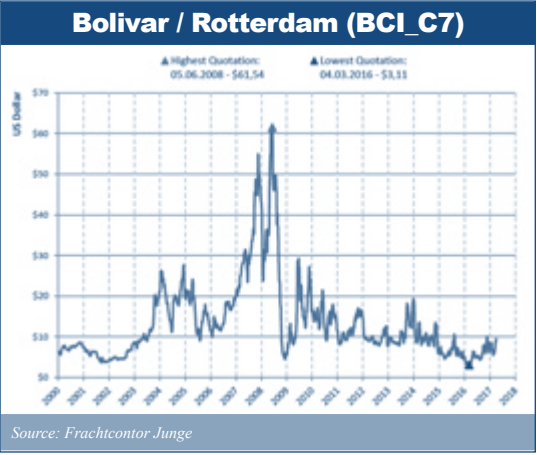


Figure HT9

# PROSPECTS

Real gross domestic product worldwide grew by 3 % in 2016. In its Interim Outlook of March 2017, the OECD predicted an increase in growth to 3.6 % up to 2018. Following the drop in the growth rate in the USA from 2.6 % to 1.6 % in 2016, it will, according to the OECD forecast, increase again to 2.8 % up to 2018, and the USA will remain in alignment with the global trend. The situation in Japan and the eurozone is different. Growth rates in these areas will remain at their current levels through 2018 – substantially below the global average. Growth in China, although at a very high level, continues to slow down. While as high as 7.8 % in 2015, China's real growth will still amount to 6.3 % in 2018, according to the OECD. Despite everything, China, along with India and some of the countries in the Asian-Pacific region, remains the driving force of global growth.

Real Growth in Gross Domestic Product				
	2015	2016 <sup>1)</sup>	2017 <sup>2)</sup>	2018 <sup>2)</sup>
	Change from Previous Year in %			
<b>World</b>	3.0	3.0	3.3	3.6
<b>USA</b>	2.4	1.6	2.4	2.8
<b>Eurozone</b>	1.0	1.7	1.6	1.6
<b>Japan</b>	-0.1	1.0	1.2	0.8
<b>China</b>	7.8	6.7	6.5	6.3

1) Provisional 2) Forecast  
Source: IWF International Financial Statistics, OECD Interim Economic Outlook, 2017

HT-P1

The Medium-Term Coal Market Report 2016 from the International Energy Agency (IEA) is oriented along the

lines of the OECD forecasts. The IEA looks ahead to the year 2021 in its Medium-Term Outlook. During this period, coal will remain the energy source of choice in electric power generation, but its share of 41 % in 2013 will fall to 36 % in 2021.

In the view of the IEA, total coal demand reached a “high plateau” in 2015 and will continue to grow by 0.6 % annually until 2021. Even though a slight decline is expected for China, China will remain the country accounting for about 50 % of global coal demand and for more than 45 % of coal production. In the period from 2015 to 2021, India will make the largest contribution to growth in global coal demand in absolute terms of +187 million TCE (Ø +5 %). In relative terms, demand in the South-East Asia countries (ASEAN) will grow the strongest at Ø +7.2 % (+85 million TCE). India's strong growth is closely tied to the country's development into the second-largest steel and pig iron producer during the forecast period.

India will for this reason take over the position as the second-largest consumer of metallurgic coal from Japan. The expectation is that coal production in India will grow at an average of 5.8 %.

The figure “Global Primary Energy Consumption 1965–2015 According to World Regions” (Figure HT1) in the section World very clearly shows that primary energy consumption in the Asian-Pacific region has been growing exponentially ever since the post-war period. This region overtook North America and Europe, including Eurasia, around 2000. In 2015, consumption in the Asian-Pacific region was as high as in the other large world regions combined. This has implications for world hard coal trade as well as for world climate policy.

The IEA speaks in this context of a “two-track coal world.” Figure HT10 clearly shows this divergence between the eastern and western parts of the world map in the middle term as well:

50 million tonnes. India’s share at that time was negligible, but began to grow steadily. Today, India is the primary buyer of South African coal and has been joined by other countries from the Asian-Pacific region.

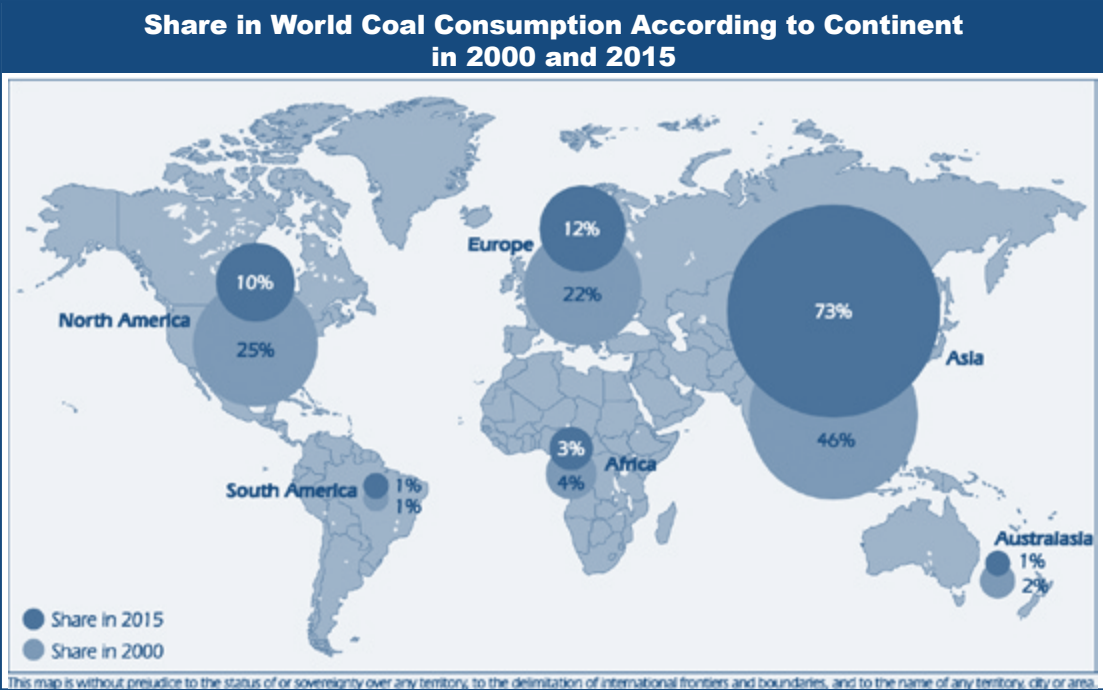


Figure HT10

The IEA predicts there will initially be a slight decline in overseas trade before it returns to the level of the year 2014. The VDKi’s own data confirm that seaborne trade decreased only slightly in 2016. In the view of the IEA, the shift in the direction of the Pacific region in overseas trade will continue. Quantitatively speaking, this shift will be significant above all for South Africa. In 2004, Europe was still the primary customer, procuring more than

While the expected fall in Chinese imports is subject to massive insecurity and is dependent on political decisions, India’s imports are above all dependent on the extent to which this country is able to increase its own production steadily. The IEA expects annual growth in imports of 3 % until 2021. Despite new coal-fired power plant capacities in Japan, growth in coal imports is not expected because of the growing contribution from re-

newable energy sources. The introduction of a CO<sub>2</sub> tax is making itself felt in South Korea. The smaller Asian countries such as Vietnam, the Philippines, Malaysia and Pakistan will be the ones that contribute to a stabilisation of overseas trade. Additional hard coal-fired electric power generation totalling 25 GW is expected in these countries by 2021. In the estimate of the IEA, the demand for coal in the USA – despite the positive signals from President Trump – will decline further by 100 million tonnes to 2021 following the decrease by 300 million tonnes in the period from 2007 to 2015.

Australia and Indonesia will remain the most important exporters, but the gap between the two countries is growing ever larger. This is in part because of the high competitiveness of the Australian suppliers, in part because of Indonesia's growing domestic demand, but the administrative and structural problems in the latter country also have an impact. Many coal producers have achieved major cost reductions during the time of price and cost pressures. Along with genuine cost reductions, some countries have benefited additionally from the low oil price and currency exchange rate advantages with respect to the US dollar. The latter currency reached a high point in relation to the Russian rouble, the South African rand and the Colombian peso in February of 2016 – and this was at the same time the high point of the American disadvantage with respect to these countries. The strength of the US dollar (along with other factors) caused financial distress for many American companies, in some cases even forcing them into Chapter 11 bankruptcy proceedings. Since the beginning of 2016, a significant decline in the currency advantage of Russian, South African and Colombian suppliers has been observed. The Country Report for Russia includes a description of how the currency

exchange rate advantage, still clearly visible in 2015, has flattened out again.

Future market development will depend above all on China and India and on the development of smaller countries with growing coal consumption. Besides the countries of South-East Asia previously mentioned, Turkey, Morocco, Egypt and the countries along the Persian Gulf will have a role to play. Because of the two-track development of global coal demand, new construction of power plants in the aforementioned countries will not be able to compensate fully for the decline in the Western world. Major additional investments in mining projects will most likely not be required. The price peaks that occurred recently are generally viewed by producers as the result of Chinese regulation policies and not of market strength. Even though a large number of mining projects are scheduled for the near future, it should not be forgotten that these are largely the consequence of postponements of previously planned projects and that only a few new projects have been planned.

The IEA makes a distinction between mining projects as “more advanced” and “less advanced” in its outlook. “More advanced” means that an investment decision has been made or that the project is in the realisation phase. If projects are still in the phase of feasibility or environmental compatibility studies or if a decision has not yet been made, they are classified as “less advanced.” The IEA reports on some projects that will increase capacities by 100 million tonnes annually by 2021. Most of these projects are located in Australia and Russia (each 30 %) and Colombia (20 %). Mozambique has a share of 11 %, but weaknesses in the infrastructure there make these projects highly uncertain.

About 370 million tonnes are planned in the “less advanced” projects. Australia has the highest share of these at 36 %. The decline in the less advanced projects is in particular a consequence of the reduction in the planned capacity of the Carmichael Mine in Australia by 40 million tonnes (see detailed presentation in the Country Report). A number of less advanced projects will most likely be maintained in the project status to avoid valuation allowances until market conditions have improved. Otherwise, the development costs will have to be written off.

Moreover, there are reports of projects for expansion of port transshipment capacities on a magnitude of more than 250 million tonnes annually, but the planned additions, especially in Russia and Mozambique, will not be realised in the near future. Plans in Russia and the USA are aimed at expanding export capacities for the Asian market, but it is uncertain now whether they will be carried out. This is especially the case for the USA's planning for the Pacific coast. The rise in price this year is viewed there, and properly so, as more the result of a change in Chinese policies than as a change in the fundamental data.

According to the IEA, the total capacity in bulk goods carriers will stagnate until 2018 and will be just below 800 million DWT. The growth rate, which reached its high point of a little more than 16 % in 2010, was just over 2 % in 2015 and will stabilise at a level well below 2 % until 2018.

Trade volume for derivatives based on coal was insignificant in 2000. The “paper trade” has grown strongly since then. It amounted to about 2 billion tonnes in 2007 and 2011, had doubled to over 4 billion tonnes in 2015, and

it will continue to grow. The vast majority of the products are offered on the API2. The IEA assumes that the trade with coking coal securities will also increase.

The prospects for the world coal market will, on the one hand, be marked by climate policy developments in the Western world and, on the other hand, by economic development in the Asian-Pacific region. The inauguration of the newly elected president of the USA, Trump, may have significant influence on both factors. Following a rocky start, he issued a decree at the end of March 2017 (i.e. after his first 100 days in office) intending to “reverse” the climate policies of his predecessor Obama. At first glance, these actions appear to be positive for hard coal mining. Nevertheless, the fate of American coal mining, whether good or bad, is inextricably linked with the price for natural gas. In contrast to Europe, natural gas is frequently competitive with hard coal there because of the low-cost production of shale gas from fracking. Just as Trump gives less thought to the environmental impact of mining than to American jobs, the environmental impact of shale gas production is unimportant to him. This was initially no different for Obama – after all, the replacement of coal with natural gas was long a core element of American climate policy. It was not until the end of his first term of office that it became clear to him that he was doing his country a disservice with fracking because of the immense methane emissions. In the meantime, at least the scientists in the USA know that natural gas is not suitable for use as a bridge into the future. The quite positive figures for natural gas from the Environmental Protection Agency EPA for American methane emissions obviously came from the emitters and were not correct. Slowly, but surely, measurement results are becoming known that paint a completely different picture: the emissions from

power plants and refineries using natural gas are five to seven times higher than reported. The advantage in the emission of greenhouse gases from natural gas-fired power plants has shrunk enormously. Toward the end of the Obama Administration, measures for the reduction of methane emissions were ordered. These are precisely the measures that Trump now wants to revoke. One thing is clear: Trump is ending the “War on Coal,” but whether this will truly help remains to be seen.

Shrinking sales to the American steel Industry is also a problem for US coal suppliers. Parts of the steel industry in the Rust Belt are not competitive and have suffered collapse. This is another area in which Trump is trying to help according to his motto, “America First.” He has set his sights on highly competitive German companies such as the Dillinger Hütte and Salzgitter. In his eyes, this competitive advantage is “unfair.” He equates “un-

fair” with “dumping” and intends to levy punitive duties on German suppliers. These steps clearly illustrate that Trump’s policies will benefit the US market above all, but will harm world trade.

During the most recent G7 summit in Taormina, Italy, in May 2017, it became clear that the USA for one does not want to see a continuation of the previous climate policies and for another that the usual declaration of commitment to world trade in the final communiqué was missing. Free trade, however, is a prerequisite for the development of countries whose economies are trailing far behind. China’s development model was based on coal, and it is foreseeable that the course of events in other regions will be similar. In particular, the regions mentioned by the IEA above will have a growing demand for coal and be dependent on free world trade.

# 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 still continues. For the EU (= EU 28), growth of the real gross domestic product (GDP) of 1.9 % in 2016 followed 2.3 % in the previous year (2015). Developments in the eurozone were slightly lower: 1.8 % growth following 2.0 % in 2015. Of the medium-size and large EU countries, the following posted the highest growth rates: Ireland (+5.2 %), Romania (+4.8 %), Bulgaria (+3.4 %), Slovakia (+3.3 %), Spain (+3.2 %) and Sweden (+3.2 %).

Germany posted growth of 1.9 %, precisely the same level as the EU. The countries with weaker growth include Italy (+0.9 %) and Greece (0 %). The economic recovery in Europe has in the meantime reached almost all of the EU member states.

Economic Growth EU 28 in Per Cent <sup>1)</sup>			
Member States	2014	2015	2016
Countries of the Eurozone (EU 18) <sup>2)</sup>	1.2	2.0	1.8
EU 28	1.7	2.2	1.9
Until 31/12/2012 EU 27 <sup>3)</sup> Until 31/12/2016 EU 18 Source: Eurostat, per 15/06/2017			

HT-EUI

In its spring forecast 2017, the European Commission assumes growth in gross domestic product in the eurozone of 1.7 % and 1.8 % for 2017 and 2018, respectively. It projects growth of 1.9 % in both years for the EU as a

whole. Growth in Germany in 2018 will presumably be 1.9 % as well.

Inflation has risen clearly in recent months, a consequence in particular of the rise in oil prices. The Commission expects inflation in the eurozone to increase from 0.2 % in 2016 to 1.6 % in 2017. It could shrink back to 1.3 % in 2018 should the price of oil decline again.

Private consumption rose more strongly in 2016 than in the last 10 years. The short inflation burst that caused private households to lose a part of their buying power will most likely have only a temporary negative effect. Investment activities will continue to be restrained by the dim outlook for growth in Europe.

In the Commission's view, the economic outlook continues "to be characterised by great uncertainty." All in all, the risks continue to point downward. The reasons given include the American trade policies and geo-political tensions. The upcoming negotiations with the United Kingdom for the country's exit from the EU could also trigger negative impact on growth.

## Energy Consumption

The data for primary energy consumption are always for the previous year only. As in the year before, the primary energy consumption of the European Union amounts to 2.3 billion TCE. The process of the decoupling of primary energy consumption and economic growth continued. There has been a shift in the shares represented by the various energy sources from the previous year for only two energy sources. Renewable energies gained 1 % and rose to 8 % while the share of coal declined from 17 % in 2015 to 16 %. Shares of nuclear energy (12 %),



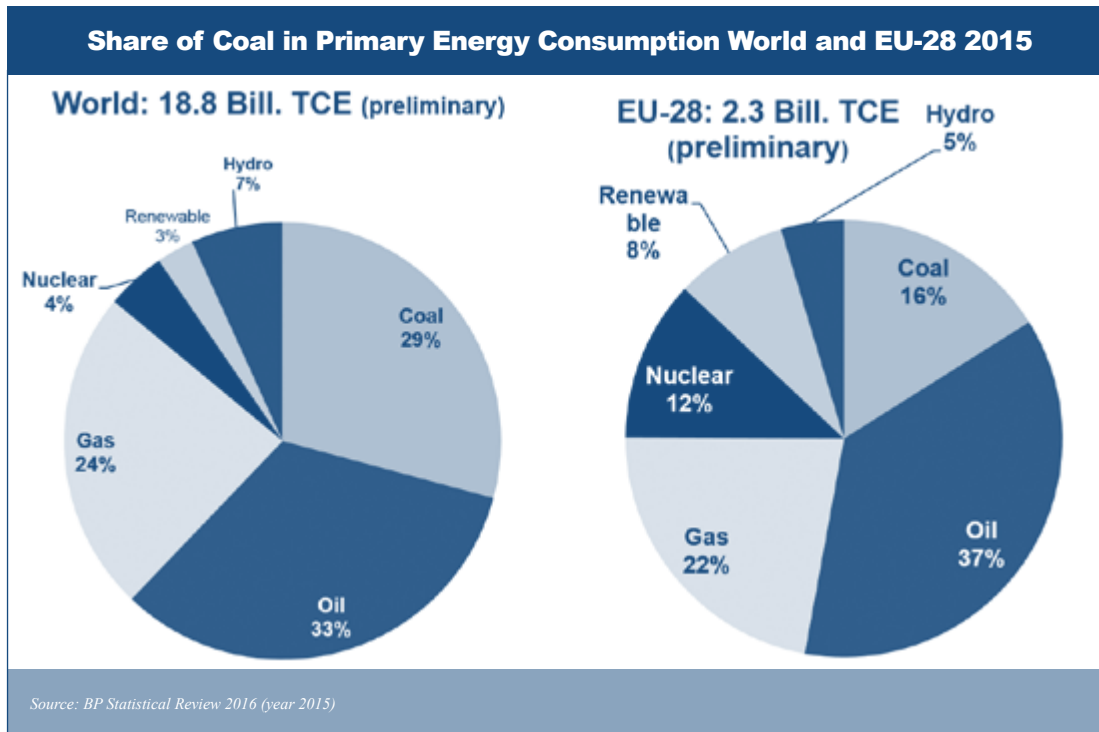


Figure HT11

natural gas (22 %) and oil (37 %) remained constant. Hydroelectric power and renewable energies together have a share of 13 %. So fossil energy sources, including nuclear energy, that are together designated as conventional energy sources have a share of 87 % in the energy supply to the European Union.

The further development of renewable energy sources in Europe remains to be seen. For one, some European countries have in the past cut back on their expansion programmes for renewable energy sources strictly

because of financial restraints. For another, resistance to wind power is growing in some regions of Europe. Finally, the German national government is giving greater emphasis to more competition by conducting tender proceedings. In the short term, however, the expansion of this instrument will initially lead to the investments being brought forward so that the previous laws apply, but ultimately the expansion of renewable energy sources at declining costs is to be expected. Some European neighbours have already demonstrated that this is possible.

Hard Coal Market

European hard coal production declined sharply in 2016. In Germany it fell from 7 million tonnes in 2015 to 4 million tonnes. The Auguste Victoria Mine in Marl was shut down per 01 January 2016; there are now only two mines remaining, Prosper-Haniel in Bottrop and the anthracite mine in Ibbenbüren. Production in Spain declined further from 3 million tonnes to 2 million tonnes. The Polish hard coal mining industry has completed an exceedingly difficult restructuring of mining companies and capacity adjustments. Production fell from 72 to 70 million tonnes. The Country Report for Poland describes the situation in detail. Production in the Czech Republic declined from 8 million tonnes to 7 million tonnes. These developments mean that hard coal production in the European Union in 2016 of 87 million tonnes will be 14 % below the value of the previous year.

Total coal volume, including lignite, is also in rapid decline in the European Union. The drops in production and im-

Hard Coal Production in the EU			
	2014	2015	2016
	Mill. t	Mill. t	Mill. t
	(t=t)	(t=t)	(t=t)
Germany	8	7	4
Spain	4	3	2
Great Britain	12	9	4
Poland	73	72	70
Czech Republic	9	8	7
Romania	2	2	0
Bulgaria	2	k. A.	k. A.
Total	108	101	87

Source: EURACOAL

HT-EU2

Hard Coal and Lignite Volume in the EU			
	2014	2015	2016
	Mill. t	Mill. t	Mill. t
	(t=t)	(t=t)	(t=t)
EU 27 Hard Coal Production	108	101	87.2
EU 27 Coal Imports/Domes- tic Trade	205	191	167
EU 27 Coke Imports/Domes- tic Trade	5	8	8
Hard Coal Volume	318	300	262
EU 28 Lignite	401	400	371
Total Coal Volume	719	700	634

Source: EURACOAL, Coke Market Report March 2017

HT-EU3

ports have made themselves felt in equal degree. Lignite production is also falling, but the decline at -7.2 % is not quite as extreme as that in hard coal volume (-12.6 %).

A major increase in hard coal imports in the European Union in 2016 was recorded only in the Netherlands. Imports to that country rose from 12.4 million tonnes in 2015 to 14.5 million tonnes in 2016. There was a rise from 2.7 to 3.1 million tonnes in Sweden. Imports to all the other countries were falling more or less rapidly. The decline from 19 million tonnes (2015) to 14.7 million tonnes was especially striking in Spain, although the figure for the previous year was also unusually high. Power production from renewable energies could not be utilised in equal measure in 2016. Polish imports remained almost constant at 8.3 million. There was a dramatic drop in the United Kingdom from 25.5 million tonnes to 8.2 million tonnes, a fall of 68 %. The British decarbonisation policy is proceeding unabated.

Germany is by far the largest importing nation for hard coal in Europe (Figure HT12). Imports of steam coal decreased from 43.2 million tonnes to 40.3 million tonnes while there was a slight rise from 12.3 million tonnes to 12.8 million tonnes for coking coal. Great Britain has relinquished its second place in the ranking of coal-importing countries to Italy. There was once again a decline in coking coal imports for the British steel industry from 4.7 million tonnes to 2.8 million tonnes, a drop of 40 %. The negative trend for industry in Great Britain continues. Italy's steam coal imports declined from 16 million tonnes to 14 million tonnes. Total imports to Spain – as mentioned above – fell sharply. This is above all a consequence of the decreasing imports of steam coal, which fell from 17.4 million tonnes to 14.0 million tonnes. There was a rise from 8.9 million tonnes in 2015 to 10.7 million tonnes in 2016 in the Netherlands. As in the previous year, this clear increase is a consequence of the construction of new power plants.

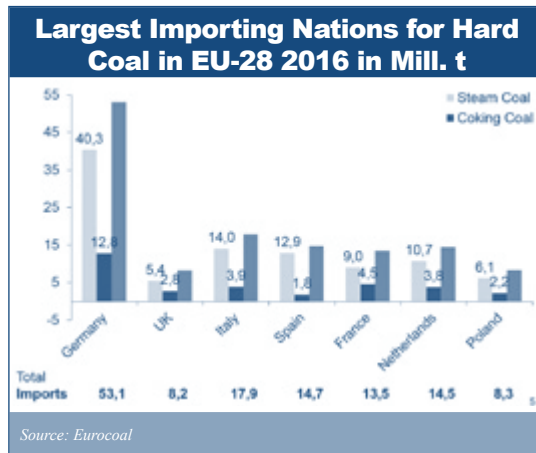


Figure HT12

## EU Energy Policy/Energy Union

According to the Statistical Office of the European Union (Eurostat), nuclear energy, coal and natural gas secured 70 % of electric power generation in the EU in 2015. The remainder came from renewable energies, whereby 12 % was produced by more conventional hydroelectric power plants. There was a noticeable change in the structure of electric power generation in the EU between 2011 and 2015: renewable energy sources grew strongly in the EU as well. A look back over the recent years reveals the striking fact that countries banking strongly on electric power generation fired by natural gas import more power than they export. They include the United Kingdom, Italy, Belgium or the Netherlands. According to information from EURELECTRIC, the industrial association of electric power providers, Luxembourg, the Netherlands and Belgian each use imported electricity to cover 2 % of their power demand. Even though natural gas was at times very inexpensive in 2016 and electric power generation shot up, there is a noticeable dependency in the long term of countries with a high share of natural gas on power supplies from countries with stable coal-fired electric power generation. This shows that the lobby work of the natural gas industry in Germany ultimately could lead not only to a decline in electric power generation using coal in Germany, but to an increase in the future of electricity imports from those countries that continue to rely on coal.

In its "Winter Package," the EU Commission presented a comprehensive set of rules on energy efficiency, renewable energy sources and the electricity market. While environmental protection associations believed the reforms did not go far enough, market-oriented academics as-

sessed the package as being hostile to the market. Maros Sefcovic, the vice-president of the European Commission in charge of energy, christened the package “Clean Energy for All Europeans.” Even environmental protection groups were heard describing it as a “monster file” of European legislation. That is why the following can be no more than a brief overview of the “Winter Package.”

The Commission emphasised that its energy and climate policies in their entirety would be aligned with the principle of “putting energy efficiency first.” At the heart of the Commission’s policies is the EU Energy Efficiency Directive. The problem here is that guidelines follow administrative rules and not market signals.

There are also plans to revise the Renewable Energy Directive. Between 2013 and 2015, according to information from the Commission, almost two-thirds of all investments in renewable energies were made in Germany and Great Britain. Since the other member states had not developed any comparable activities, the EU Commission proposed opening the national subsidisation systems to foreign assets and changing over more and more to a European subsidisation system. In the view of the Commission, the specification to replace dispatch compensation for renewable energy sources with a tender process serves this purpose.

It is also a thorn in the side of the European Commission in terms of competition law that the dispatch of green power at prices guaranteed by the government can lead to negative electricity prices on the stock exchanges and electricity customers receive compensation for purchasing the power.

That is why the European Commission wants to remove the dispatch priority for renewable energies for those installations that go into operation after 2020. After 2020, only small installations at the municipal level will then enjoy priority for the dispatch of their power. But this is scheduled to apply solely to installations in EU countries in which the share of green power is less than 15 %, so Germany would not be affected.

The Commission also wants to take on the market design for the electricity markets. In its proposals, however, it plans to deviate from fuel neutrality for the first time and set CO<sub>2</sub> thresholds that can be achieved only by combined cycle power plants. This proposal is unrealistic because combined cycle power plants cannot be built solely to compensating power fluctuations. Gas turbines as well as hard coal-fired power plants could also handle this task, but they would not achieve the CO<sub>2</sub> thresholds that are under consideration.

Finally, the so-called best-reference documents for large combustion plants (LCP BREF) have been revised in a procedure for the involvement of stakeholders. Environmentalist associations in particular proposed significantly stricter values than those set forth in the applicable legal framework of the Industrial Emissions Directive (IED). Although threshold values were also incorrectly calculated in this process, the Commission did not consider at all the facts presented by representatives from the mining and energy industries. Although many of the member states did not agree with this approach, agreement was reached in the responsible decision-making bodies by the thinnest of margins, whereby the United Kingdom tipped the scales. In view of Brexit, this result is not acceptable.

## 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<sub>2</sub> that may be emitted has been set for about 12,000 plants in the energy business and energy-intensive industry in all of Europe. About 42 % of all greenhouse gas emissions are currently covered. Since special attention has been directed at the inclusion of all coal-fired power plants in the system, the compatibility of electric 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 based on 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 fact, however, the price says only whether climate protection costs a lot or 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." So, it is desirable from the perspective of the directive's legislators that climate protection in conjunction with a low CO<sub>2</sub>-price is possible. Price manipulations are unnecessary and ultimately serve only to benefit competing energy sources that are too expensive.

Despite this, the ETS has been misused for years to steer prices instead of volumes. Capping the number of cer-

tificates was aimed at achieving a "politically desirable" price. Whether this instrument is now called "backloading" (introduced in 2014 to take 900 million certificates off the market) or "market stability reserves" (introduced in 2015) – it is already the third time there has been an intervention in the ETS.

After almost two years of negotiations, the members of the European Union agreed on a reform of emission trading in 2017. On 28 February 2017, the environmental ministers finished tough negotiations and accepted the proposal of the European Commission to reduce the number of emission rights issued to industry and electricity producers by 2.2 % annually, starting in 2021. Furthermore, the environmental ministers want to take emission rights off the market so that the price for the emission rights will be driven up. At the same time, industry is to be protected from disadvantages in international competition and will continue to receive a cost-free allocation of a large part of the rights. According to the resolution of the environmental ministers, the number of emission rights will be reduced by allocating twice as many certificates as originally agreed to the "market stability reserves" created in 2015. In addition, a part of the rights will be finally deleted annually, starting in 2024.

Figure HT13 depicts how the ETS will fulfil its purpose up to 2050. It is not necessary to introduce minimum prices (as is often proposed) to achieve a reduction of emissions within the framework of the ETS; 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 – as mentioned above – will

be increased to 2.2 %. If the rate of reduction scheduled for the period from 2021 on is continued after 2030 as well, 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.

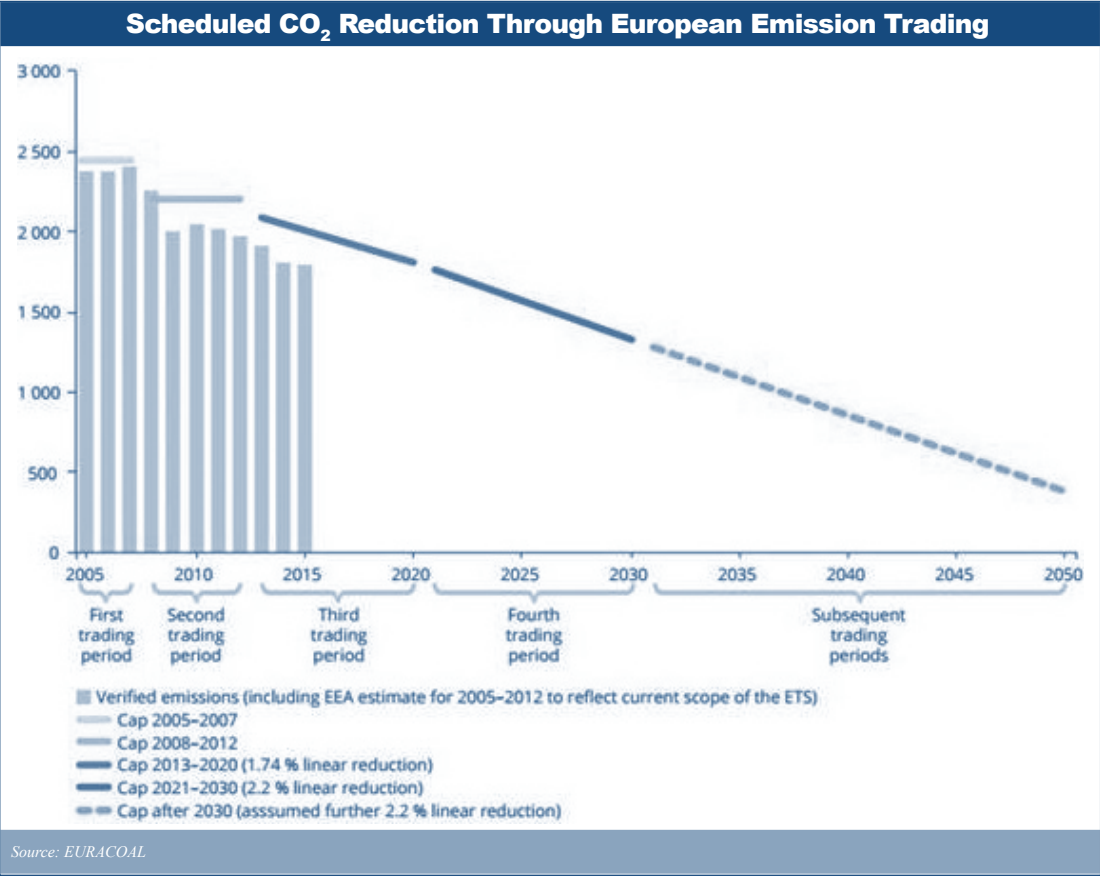


Figure HT13

# GERMANY

## General Conditions of the Overall Economy

In the estimation of the German Council of Economic Experts, the upswing in Germany and the eurozone will continue. The Council expects growth rates of the real gross domestic product of 1.9 % in 2016 and 1.3 % in 2017. The decline in the growth rate is almost completely a consequence of the leap year in 2016. The underlying growth dynamics essentially remain unchanged.

In the eurozone, the unusually expansive money policy of the ECB has made a fundamental contribution to the recovery. Since significant structural problems still remain unresolved, the recovery is not self-supporting. The ECB's money policy is masking the problems and represents an increasing risk to financial market stability.

The domestic economy, supported by consumption and investments in construction, was the pillar for the recovery in the past year 2016. Private expenditures for consumption will remain constant in 2017 within the scope of the leap year effect while public expenditures for consumption and investments in construction will fall significantly. Presumed rises in prices of oil and raw materials will lead to a rise in consumer prices from 0.5 % (2016) to 1.6 % in 2017. If this trend were to become constant, there would be serious concerns about a future deterioration of growth.

The surplus current account balance of the German economy has risen continuously over the past three years. A decline of 0.6 %-points to 8.2 % is expected for 2017. The high surpluses in the current account balance indicate that German industry is maintaining its good competitive position.

The name "Germany" does not appear in a press release from the Swiss IMD World Competitiveness Center in Lausanne on the competitiveness of 63 countries, however. The reason is that according to the ranking of this institute Germany does not hold an outstanding position. Germany fell out of the Top Ten in the previous year 2016 and fell from 12th to 13th place in 2017. Germany is even lower in the ranking for state of infrastructure and educational system. The IMD calculated a Digital Competitiveness Ranking as well for the first time in 2017, even though these figures had previously been collected. Germany fell from 15th to 17th place in this ranking.

The high current account balance surpluses, the economic growth of recent years and the low level of unemployment on the labour market in Germany obscure the cutbacks in future investments that have been made for some time. A strong world trade nation in particular requires an outstanding infrastructure and good conditions for imports, exports and logistics companies

Key Economic Data – German Council of Economic Experts					
	Unit	2014	2015	2016 <sup>1</sup>	2017 <sup>1</sup>
Gross Domestic Product <sup>2</sup>	%	1.6	1.7	1.9	1.3
Expenditures for Consumption	%	1.0	2.2	2.2	1.6
Expenditures for Private Consumption <sup>3</sup>	%	0.9	2.0	1.7	1.3
Expenditures for Public Consumption	%	1.2	2.7	3.8	2.4
Gross Installation Investments	%	3.4	1.7	2.5	2.0
Equipment Investments	%	5.5	3.7	1.6	1.8
Construction Investments	%	1.9	0.3	3.0	1.9
Other Investments	%	4.0	1.9	2.6	2.9
Domestic Utilisation	%	1.4	1.6	1.8	1.7
Trade Balance (Growth Contribution in Per Cent)		0.3	0.2	0.2	-0.2
Exports	%	4.1	5.2	3.3	3.9
Imports	%	4.0	5.5	3.4	5.4
Current Account Balance <sup>4</sup>	%	7.3	8.4	8.8	8.2
Workforce	Thousands	42,662	43,057	43,554	43,952
Employees Subject to Social Security Contributions <sup>5</sup>	Thousands	30,197	30,822	31,379	31,768
Persons Registered as Unemployed <sup>5</sup>	Thousands	2,898	2,795	2,701	2,713
Unemployment <sup>5, 6</sup>	%	6.7	6.4	6.1	6.1
Consumer Prices <sup>7</sup>	%	0.9	0.3	0.5	1.6
Public Fiscal Balance <sup>8</sup>	%	0.3	0.7	0.6	0.4
Per Capita Gross Domestic Product <sup>9</sup>	%	1.2	0.8	1.1	1.2
<i>1 – Projection of the Council of Economic Experts 2 – Adjusted for prices; change over previous year. Applies to all component elements of the GDP shown here. 3 – Including non-profit private organisations 4 – In relation to nominal GDP. 5 – Source for 2014 and 2015: BA. 6 – Registered unemployed persons in relation to complete civil workforce 7 – Change over previous year. 8 – Regional authorities and social security in delineation of national economic total account; calculations in relation to nominal GDP. 9 – Own change over previous year.</i>					
<i>Source: Council of Economic Experts, German Federal Statistical Office</i>					

HT-D1

Situation for Energy Business in Germany

The lion's share of primary energy consumption (PEC), about half, goes to energy consumption for heating and refrigeration. That is why oil, just as in the past, remains the primary energy source Number 1 with a share of 34 % while the share of natural gas is 22 %. For the first time, renewable energy sources at 12.6 % have moved into third place. Hard coal (12.2 %) and lignite (11.4 %) follow

close behind. Nuclear energy (6.9 %) has fallen far behind – the exit from its utilisation by the year 2022 is already clearly noticeable.

If renewable energy sources are to replace all other energy sources, their contribution to primary energy consumption must increase by a factor of seven. It is still unknown how the supply fluctuations in renewable energies can be



## Primary Energy Consumption in Germany 2015 and 2016 <sup>1)</sup>

Energy Source	2015	2016	Change 2016 over 2015		Share in %	
	Mill. t TCE	Mill. t TCE		%	2015	2016
Oil	153.2	155.3	2.2	1.5	33.9	34.0
Natural Gas	94.2	103.1	8.9	9.5	20.9	22.6
Hard Coal	58.6	55.6	-3.0	-5.1	13.0	12.2
Lignite	53.5	51.9	-1.6	-2.8	11.8	11.4
Nuclear Energy	34.2	31.5	-2.7	-7.8	7.6	6.9
Renewable Energies	56.1	57.6	1.5	2.8	12.4	12.6
Electricity Exchange Balance	-6.4	-6.6	-0.2	-	-1.4	-1.4
Miscellaneous	8.2	8.2	0.0	-0.5	1.8	1.8
<b>Total</b>	<b>451.5</b>	<b>456.7</b>	<b>5.2</b>	<b>1.1</b>	<b>100.0</b>	<b>100.0</b>

Source: AGEb, AGEb, Energy Consumption in Germany in 2016 – Annual Report

HT-D2

balanced, however. Moreover, energy consumption for heating and refrigeration makes up half of the PEC and is largely 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 electric power generation. The “sector coupling” is a step in this direction.

### Electric 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 electric power generation. Renewable energy sources took over top place for gross electricity generation in 2014, and their share is now 29 %. Lignite follows with a share of 23 %, hard coal has a share of 17 %, nuclear energy posts 13 % and natural gas contributes 12 %. Among the oth-

er sources with a total share of 4 %, electricity generation using mine gas that is subsidised by the EEG is particularly strong.

The development of future electricity consumption will be marked on the user side by increased energy efficiency and on the demand side by new, electricity-based applications (e.g. e-mobility). The growth in gross electric power generation by 0.1 % to 551 TWh observed in 2016 does not yet reflect this.

## Gross Electric Power Generation in Germany According to Energy Sources

Energy Source	2014	2015	2016	2016 Share	Change 2016/2015
	TWh	TWh	TWh	%	%
Lignite	155.8	154.5	150.0	23 %	-2.9
Nuclear Energy	97.1	91.8	84.6	13 %	-7.8
Hard Coal	118.6	117.7	111.5	17 %	-5.3
Natural Gas	61.1	62	80.5	12 %	29.8
Oil	5.7	6.2	5.9	1 %	-5.0
Renewable Energies	162.4	187.4	188.3	29 %	0.5
Miscellaneous	27	27.3	27.5	4 %	0.9
<b>Total</b>	<b>627.7</b>	<b>646.9</b>	<b>648.3</b>	<b>100 %</b>	<b>0.2</b>

Source: AGEb; updated data 2016

HT-D3

Power Generation from Renewable Energy Sources			
Energy Source*	2014	2015	2016
	TWh	TWh	TWh
Hydroelectric Power	19.6	19.0	20.8
Wind Onshore	57.3	70.9	65.0
Wind Offshore		8.3	12.4
Biomass	43.3	44.6	45.6
Municipal Wastes (50 %)	6.5	5.8	6.0
Photovoltaics	36.1	38.7	38.2
Geothermal Energy	0.1	0.1	0.2
<b>Total</b>	<b>162.9</b>	<b>187.4</b>	<b>188.2</b>
<b>Share of Renewable Energies in Gross Electricity Generation</b>	<b>26 %</b>	<b>29 %</b>	<b>29 %</b>

\* Corrected for 2014 and 2015  
Source: BDEW

HT-D4

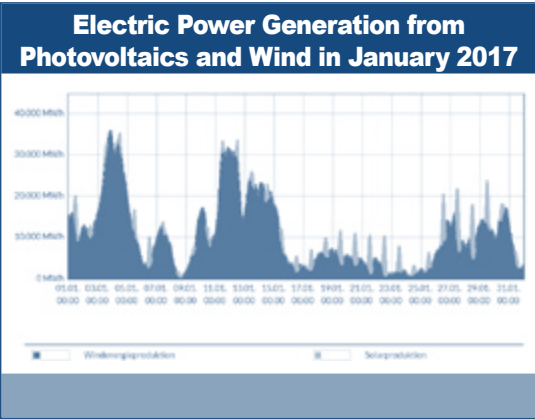


Figure HT14

Although renewable energies have a share of 29 % of gross electric power generation, power plant capacity making up about 60 % of the power plant fleet is required for this. The consequence is that in Germany a second power plant fleet is being built with substantially greater volume than in the past and tying up correspondingly high amounts of capital. Figure HT14 highlights the causes especially clearly. In January 2017, wind energy production was very low, and production from photovoltaics on some days was almost imperceptible. The result was that there were several days in January of this year on which renewable energy sources contributed almost nothing to gross electric power generation. If there are no large storage units that can buffer dark doldrums lasting two to three weeks, the first pillar of the electric power generation system will be required. Since a number of coal-fired power plants were decommissioned last year and capacities were reduced in previous years as well, the “power grid was close to collapse,” according to the FAZ of 9 June 2017. The Technical Managing Director of the grid operator Amprion, Klaus Kleinekorte, stated that “only a couple more straws, and the camel’s back would have broken, meaning a blackout.”

The higher the share of fluctuating dispatch 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. If the state Thuringia now blocks the planned new north-south power line Suedlink, the situation will become increasingly critical.

Electric Power Market  
for the Energy Turnaround

In the middle of 2016, a major electricity market reform was launched in Germany. Its important components were the “Act for Further Development of the Electricity Market and Digitalisation of the Energy Turnaround,” the introduction of the “Security Readiness” for older lignite-fired power plants as of 1 October 2016, the extension of the previous Grid Reserve Regulation and the preparation of the Capacity Reserve Regulation. Another important action in energy policies was the most recent EEG reform. Tender procedures for new wind power, photovoltaic and biogas installations were included in the EEG (“EEG 3.0”). The modification in the reformed Combined Heat and Power Plant Act was also significant for hard coal as it provides for a tender procedure for small installations of between 1 and 50 MW from 2017 on.

Climate Protection Plan 2050

The coalition agreement for the current electoral period includes the development of a “Climate Protection Plan 2050” for the sectors industry, energy, transport, buildings and agriculture. The German cabinet adopted the Climate Protection Plan 2050 on 14 November 2016 following a long and controversial process of creation. Despite repeated criticism from business, the energy policy goals of sustainability, economic efficiency and social dimension have been ignored. The result is a concept with a one-sided focus on sustainability bearing great potential for conflict. After some of the especially critical text passages had been deleted, sector targets were defined

in a chart for the first time. The target for 2030 set here was a reduction of CO<sub>2</sub>-equivalent emissions by a total of between 55 % and 56 % in comparison with 1990. The target for the energy industry was set even higher: a reduction of emissions by 61 % to 62 %. In contrast, below-average sector targets were set for transport and agriculture. The most serious complaint about these targets is that they have been defined arbitrarily and have been neither adequately analysed nor determined on a solid foundation.

A look at CO<sub>2</sub> emissions in Germany according to energy sources reveals, however, that in 2016 a reduction in CO<sub>2</sub> emissions in comparison with the previous year occurred only in the sector using solid fuels, i.e. hard coal and lignite – and that by 4 %. The emissions from the use of liquid fuels – i.e. oil products – on the other hand rose by 1.4 %. The highest growth came from the use of gaseous fuels, i.e. natural gas, at 9.5 %. This demonstrates that the German government, by focusing on the energy

CO <sub>2</sub> Emissions in Germany in 2015 and 2016 (Provisional) According to Energy Sources <sup>1)</sup>					
	CO <sub>2</sub> -Emissions		Change	Emission Shares	
	2015	2016	2016/2015	2015	2016
	Mill. t	Mill. t	%		
Liquid Fuels	245,6	248,9	1,4	31,0	31,3
Solid Fuels	321,1	308,1	-4,0	40,5	38,7
Gas Fuels	150,7	165,0	9,5	19,0	20,7
Miscellaneous	26,9	26,8	-0,4	3,4	3,4
<b>Total</b>	<b>744,3</b>	<b>748,8</b>	<b>0,5</b>		

1) Original values, i.e. not adjusted for temperature  
2) CO<sub>2</sub> emissions excluding “land use, changes in land use and forestry”, but including “Diffuse Emissions From Fuels”  
Source: Ziesing, H.-J., “Entwicklung der CO<sub>2</sub>-Emissionen in Deutschland im Jahr 2016”, et 2/2017

HT-D5

industry and more specifically on coal, is working with distorted standards.

## Sector Coupling

Daniel Wetzel put it succinctly in the Welt on 10 June 2016: “The new buzzword is ‘sector coupling’.” But what does it mean? The following definition is used in the white book entitled “A Power Market for the Energy Turnaround” issued by the Federal Ministry for Economics and Energy: “Sector coupling – also known as power-to-x – is the use of electricity from renewable sources in the heating sector (power-to-heat), the transport sector (power-to-mobility) and in industrial processes (power-to-industry).” Put simply, sector coupling is an instrument for the transfer of renewable energies to other sectors.

In reality, however, this fact-based part of the definition is accompanied by a political objective as well, one that is used implicitly with this term. Because of the lack of balance between subsidisation policies for renewable energies and grid expansion, renewable energy sources produce so-called “surplus electricity.” The aim is to make it possible to use other markets as “holding basins” for this power so that the necessity to throttle installations or slow down the expansion of renewable energies can be avoided.

A major sticking point in the energy turnaround becomes glaringly obvious here: research and expansion of storage technologies have not come even close to keeping pace with the subsidisation of renewable energy sources. Production from these sources is subject to tremendous natural fluctuations. There are days during the year when sunlight and wind are practically non-existent. Yet it must still be possible to meet peak loads on these days.

The use of load flexibilization (shutting down refrigerated warehouses or electrolysis processes) alone is not adequate. “Dark doldrums” lasting one to two weeks can be bridged reliably solely with storage units and power plants.

In 2015, renewable energy sources supplied 12.5 % of the primary energy consumption, half of it from biomass. Photovoltaics and wind energy, on the other hand, supplied only 2.4 % of the PEC (Figure HT15). In view of this low share and the share in PEC of over 50 % supplied by oil and natural gas, sector coupling is a huge challenge.

The study “Sector Coupling Through the Energy Turnaround” by Professor Quaschnig, which was published in June 2016 simultaneously with a press release from Greenpeace, describes how this could be achieved: “Prerequisite is the realisation of ambitious efficiency measures. Motorised road traffic must be almost completely electrified. As 2025 approaches, the production of vehicles with petrol and diesel engines must be stopped and roads important for freight traffic must be equipped with overhead lines. As of 2020, no new natural gas or oil heating units as well as CHP plants may be installed in the heating sector. In future, the major share of room heating will be covered by heat pumps for reasons of efficiency.” Only if these highly restrictive assumptions are met the electricity consumption will rise within the framework of sector coupling from the current 600 TWh to “merely” a good 1,300 TWh. If the proposed efficiency measures are not implemented, power demand will rise to as much as 3,000 TWh.

The inhibiting factors for sector coupling are the subject of discussion in the Impulspapier Strom 2030. Langfris-

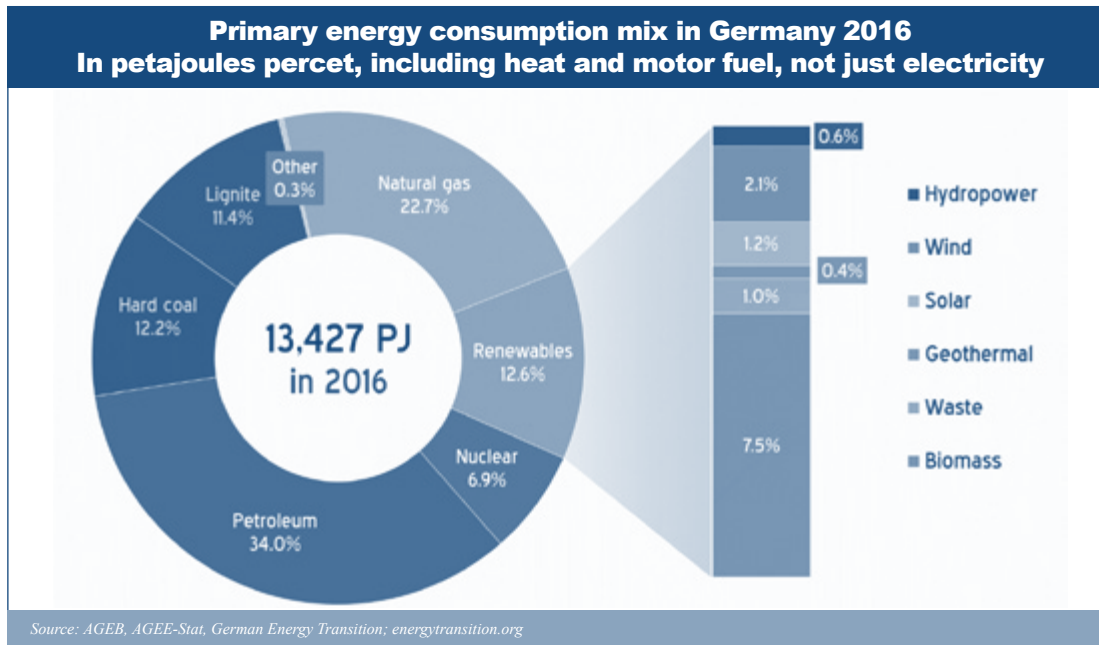


Figure HT15

tige Trends – Aufgaben für die kommenden Jahre issued by the Federal Ministry for Economics. One inhibiting factor is mentioned in particular: “Electricity is subject to more allocations, charges and levies for the financing of the energy turnaround than fuels, especially those used for heating.” The proposal for a solution option: “Those sectors that reduce their CO<sub>2</sub> emissions by using electric-

ity from renewable energy sources make an appropriate contribution to the financing of the energy system. This improves the competitive conditions for electric power from renewable sources and opens the door to a market-driven breakthrough in other sectors.”

## Sector Coupling Requires Flexible Hard Coal-fired Power Plants

Electric power generation from renewable energy sources must multiply many times over within the framework of sector coupling. Substantially larger backup capacities will be required to maintain electric power generation. In an interview with the Welt on 02/01/2017, the head of RWE, Rolf Martin Schmitz, quoted study results indicating that backup capacities of 60,000 MW would be required for sector coupling.

This is obviously possible solely if coal-fired and natural gas-fired power plants are used together. During the presentation of a study prepared jointly by Fichtner and Prognos, the Agora Energiewende stated in a press release of 6 June 2017: "Coal-fired power plants are not inevitably an obstacle to the expansion of renewable energies." The key results of the study "Agora Energiewende (2017): Flexibility in thermal power plants – With a focus on existing coal-fired power plants" from Prognos AG and Fichtner GmbH & Co. KG are described in the following.

- "1. Existing thermal power plants can provide much more flexibility than often assumed, as experience in Germany and Denmark shows. ...
- 2. Numerous technical possibilities exist to increase the flexibility of existing coal power plants. Improving the technical flexibility usually does not impair the efficiency of a plant, but it puts more strain on components, reducing their lifetime. ...
- 3. Flexible coal is not clean, but making existing coal plants more flexible enables the integration of more wind and solar power in the system. However, when gas is competing with coal, carbon pricing remains necessary to achieve a net reduction in CO<sub>2</sub>. ...

- 4. In order to fully tap the flexibility potential of coal and gas power plants, it is crucial to adapt power markets."

The study shows that coal-fired power plants could adapt their power generation much more flexibly to the fluctuating generation from wind and solar power plants than has previously been assumed by many. Only minor refitting would be required even for old coal-fired power plants. This paves the way for countries relying above all on coal to make their electric power generation more climate friendly at low cost while maintaining the security of electric power supply. Flexible coal-fired power plants could lead to higher greenhouse gas emissions in electricity systems in which a large number of natural gas-fired power plants are also online, however, and it is possible that "comparatively environmentally friendly, but more expensive natural gas-fired power plants" would be thrust aside. Referring to Germany, there is a call in the press release for a minimum price for CO<sub>2</sub>.

There was a clear explanation in the Europe section of this report why a minimum price for CO<sub>2</sub> is not necessary to achieve the reduction targets foreseen in the European Union's climate policies. The Prognos/Fichtner study on behalf of the Agora Energiewende showed, however, that it will not be possible to do without existing fossil fuel-fired power plants for an energy turnaround conforming to market principles.

Hard coal-fired power plants operated by VDKi member companies are now capable of cutting back to 20 % or less of the nominal load during partial load operation. This means that they are substantially better than even combined cycle power plants. Only the speed with which the load can be changed is not quite as fast. In comparison

with open-cycle gas turbines, power plants with a steam process – and combined cycle power plants belong to this group – inevitably display slower cold start times. This is compensated, however, by their degree of efficiency, which is significantly greater than for open-cycle gas turbines. Moreover, the wear on gas turbines during load cycling is enormous. So far, in any case, there have been no instances of large-scale investment in large and modern open-cycle gas turbines. On the contrary, the only known case is one in which a number of small gas motors have been installed in view of the enormous wear on the turbines. The investment costs in such a case, however, are substantially higher than for one turbine. This is an option that does not come into question until after the utilisation of existing power plants – in terms of an approach in conformity with market principles, anyway.

In principle, natural gas produces lower emissions than hard coal. If, however, the direct and indirect emissions (including production and transport of the energy sources) of electric power generation using natural gas and hard coal are considered from a holistic viewpoint, there is a significant change favouring hard coal in the difference between the emissions of these two fossil energy sources. A literature study conducted by the well-known consultancy Pöry Management Consulting on behalf of the German Coal Importer Association in 2016 considered the indirect as well as the direct greenhouse gas emissions from electricity generation from hard coal- and natural gas-fired power plants. The observations included the partial load operation that is especially important for compensating the dispatch 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 total greenhouse gas emissions of power generation from open-cycle gas turbines are up to 76 % higher than for modern coal-fired power plants during partial load operation.

So, if the greenhouse gas emissions that result during the production and transport of the two energy sources are included, partial load power generation in modern coal-fired power plants for compensation of the variances in the dispatch volume of renewable energies and the fluctuating demand for power is the significantly climate-friendlier alternative to open-cycle gas turbines within the scope of the current German power plant fleet. The latter can also go online on short notice for load balance, but in partial 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 considered, an open-cycle gas turbine plant in partial load operation emits up to 29 % more greenhouse gases than a hard coal-fired power plant.

Under current market conditions, the efficient combined cycle power plants are constructed only if there is financial subsidisation such as that provided by the Combined Heat and Power Plant Act of 2016 in conjunction with the generation of heat. From a holistic perspective existing hard coal-fired power plants will tend to grow in importance within the scope of sector coupling.

Hard Coal Market

Primary energy consumption of hard coal (HAT-D6) fell by 3 million TCE (5.1 %) from 58.6 million TCE to 55.6 million TCE in 2016. Hard coal consumption in million TCE was covered in 2016 as shown below:

Utilisation of Hard Coal in Germany				
	2014	2015	2016	2016/2015 Change
	Mill. TCE			%
Power Plants	39.2	38.8	36.8	-5.2
Steel Industry	17.5	18.5	17.6	-4.9
Heating Market	1.4	1.3	1.2	-7.7
<b>Total</b>	<b>58.1</b>	<b>58.6</b>	<b>55.6</b>	<b>-5.1</b>

Source: AGEb, updated data 2016

HT-D6

The share of inland production in coal utilisation (HT-D7) fell from 6.4 million TCE to 3.9 million TCE in 2016. 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 contribution of import volumes to coal utilisation fell from 51.3 million TCE to 48.4 million TCE (-5.7 %) according to statistics from the Arbeitsgemeinschaft Energiebilanzen (AGEB). As noted by AGEB, imports contributed 93 % to the secure and high-quality supplies for the German market.

The quantity difference between Tables D6 and D7 is explained by the fact that in the one case volumes, in the other utilisation are shown, and deviations are possible because of stockpile movements.

Volume of Hard Coal in Germany				
	2014	2015	2016	2016/2015 Change
	Mill. TCE			%
Import Coal	50.2	51.3	48.4	-5.7
Domestic Production	7.8	6.4	3.9	-39.1
<b>Total</b>	<b>58</b>	<b>57.7</b>	<b>52.3</b>	<b>-9.4</b>

Source: AGEb, updated data 2015

HT-D7

The quantity difference between the volume of import coal in Table D7 and the total imports in Table D8 is a consequence of the use of different measurement units. AGEB calculates volume in “TCE” while imports are calculated according to quality grades in “t = t”. Since steam coal is primarily utilised with calorific values below 7,000 kcal/kg, the “t=t” figures are higher than the “TCE” figures.

Imports (in t=t) break down according to grade as shown here.

Imports According to Grade in Mill. t (t = t)			
	2014	2015	2016
	Mill. t	Mill. t	Mill. t
Steam Coal <sup>1)</sup>	41.9	43.2	41.0
Coking Coal	11.8	12.3	12.2
Coke	2.5	2.0	2.1
<b>Total</b>	<b>56.2</b>	<b>57.5</b>	<b>55.2</b>

<sup>1)</sup> Including anthracite as of 2012  
Source: VDKi own calculations

HT-D8



74 % of imports were steam coal, 22 % coking coal and 3.8 % coke.

The origins of the import volumes can be seen in Figure HT16. Russia leads the list, providing 17.8 million tonnes (32 %). Russia increased exports to Germany by 1.1 million tonnes in comparison with the previous year. Colombia was able to increase its supplies from 9.9 million tonnes (2015) to 10.7 million tonnes, providing a share of 19 % to the market supply. The USA followed at 16.0 %. Australia's contribution rose from 5.7 million tonnes to 6.5 million tonnes, a share of 12 %. Poland contributed 4.5 % to the supply of the German market, whereby its share has steadily declined in recent years.

Russia strengthened its position as the largest provider of steam coal, increasing to 40 % in 2016 from 34 % in the previous year. Colombia at 26 % is now clearly ahead

of the USA (16 %). South Africa and Poland follow, each with a share of 4 %.

The most important suppliers of coking coal were Australia (6.1 million tonnes; 50% market share), the USA (2.7 million tonnes; 23% market share), Canada (1.5 million tonnes; 12 % market share) and Russia (1.3 million tonnes; 11% market share). While coking coal supplies from Canada rose by 13 % and supplies from Australia rose by 8%, supplies from Russia declined significantly by 22 %. Supplies from the USA were also on the decline (-14 %).

The coal imports to Germany according to country of origin are broadly distributed across 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 subject to any disruptions and were reliable.

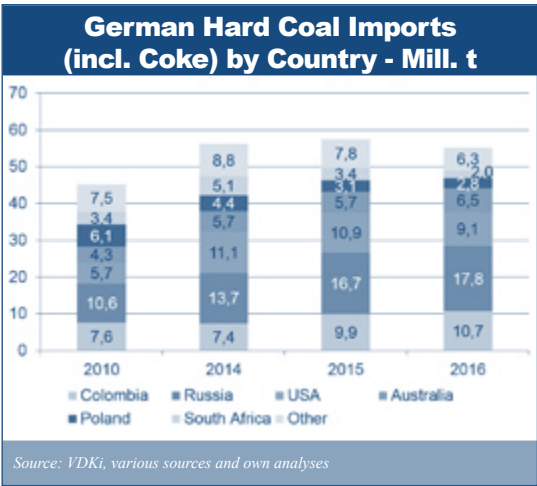


Figure HT16

Development of Energy Prices

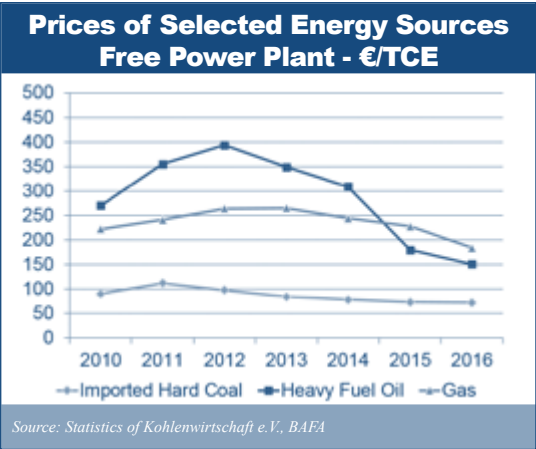


Figure HT17

Figure HT17 shows the price development of selected energy sources free power plant for the last seven years. The sharpest downward trend is found for heavy fuel oil. The natural gas price did not follow the fall in the oil price to the same degree. The price for import coal is still well below the level of the competing energy sources.

Energy Prices Free Power Plant as an Annual Average				
	2014	2015	2016	2016/2015 Change
	€/t TCE			%
Heavy Fuel Oil (HS)	309	180	151	-16
Natural Gas	244	228	184	-19
Steam Coal	78	73	72	-1

Source: Statistics of Kohlenwirtschaft e.V.

HT-D9

Following the precipitous fall of the crude oil price in 2015 compared to 2014 – and with it the price for heavy fuel oil – the latter fell by another 16% compared to the previous year in 2016 (HT-D9). The average price for the year was €151/TCE. The natural gas price for power plants declined by 19 % to 184 million TCE while the cross-border price for import coal fell by a mere 1% to €72/TCE. The competitiveness of natural gas in power plants consequently improved as an average for the year.

However, the energy price alone is not decisive for the use of hard coal in power plants; but a combined effect of several influencing factors, summarised in the clean dark spread and clean spark spread, the gross margins of hard coal-fired and gas-fired power plants that are dependent on the CO<sub>2</sub> price and electricity price. Irrespective of the competitive situation with natural gas, the gross profit margin for hard coal is far too low for profitable operation of power plants. At the end of 2016, the clean spark spread improved substantially and natural gas took market shares away from hard coal, but this evidently cannot be explained by price development alone. Instead, the favouring of natural gas through energy policies, especially the new Power-Heating Coupling Act, played a decisive role here.

The price for coal from third countries free German border in 2016 amounted to €67.07/tonne in comparison with €67.90/tonne in 2015. The market recovery noted on the international spot markets in the middle of 2016 showed up after a delay in the so-called BAFA price. Therefore, a clear increase to €95.75/tonne was not reported until the first quarter of 2017.

The cross-border prices for coking coal developed as shown below:

<b>Cross-border Prices for Coking Coal in €/t <sup>1)</sup></b>	
<b>2012</b>	188.42
<b>2013</b>	127.19
<b>2014</b>	104.67
<b>2015</b>	100.52
<b>2016</b>	86.35
<b>Change over Previous Year</b>	<b>-14.1 %</b>
<small>1) Rounded-off average values for all metallurgical coal types Source: VDKi own analysis</small>	

HT-D10

In 2016, the price for metallurgical coal fell from €101/tonne to €86/tonne – about 14 % in comparison with the previous year. While crude steel production worldwide increased by 0.7 %, crude steel production in Germany fell by 1.5 %.

The cross-border prices for hard coal coke developed along similar lines to the prices for coking coal.

<b>Cross-border Prices for Hard Coal Coke in €/t <sup>1)</sup></b>	
<b>2012</b>	258.72
<b>2013</b>	204.88
<b>2014</b>	193.66
<b>2015</b>	187.04
<b>2016</b>	159.87
<b>Change over Previous Year</b>	<b>-14.5 %</b>
<small>Source: VDKi own calculations</small>	

HT-D11

The coke price fell by an average for the year of €27/tonne (14.5 %) – about the same as coking coal.

## Steel Production

<b>Pig Iron Production</b>				
	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>Difference over Previous Year</b>
	<b>Mill. t</b>	<b>Mill. t</b>	<b>Mill. t</b>	<b>in %</b>
Crude Steel	42.95	42.7	42.08	-1.5%
Pig Iron	27.95	27.84	27.27	-2.0%
<small>Source: worldsteel.org</small>				

HT-D12

Crude steel production in Germany in 2016 declined by 1.5 % to 42.08 million tonnes; pig iron production fell by 2.0 % to 27.27 million tonnes in 2016. In contrast world steel and pig iron production each rose by 0.7 %. The corresponding values for China were +0.6 % and +1.4 %, respectively.

Worldwide crude steel production in May 2017 came to 143.3 million tonnes (+2.0 % over May 2016). China's crude steel production for May 2017 amounted to 72.3 million tonnes, 50.5 % of the world's crude steel production. The increase for May 2017 amounted to 1.8 % in comparison with the same month of the previous year. In May 2017, Germany produced 3.8 million tonnes of crude steel, a decline of 1.4 % in comparison with May 2016. Italy's production declined even further and was 4.1 % below the level of the same month of the previous year. Turkey's crude steel production, in contrast, rose by 9.7 %, and Brazil's production increased by an even larger figure (13.2 %).

The order entry in the German steel industry for rolled steel in Q1 2017 could not reach the level of the previous year. According to information from the industry association Stahl, however, order book levels at the end of the first quarter were higher than the value of the previous year. All in all, the data indicate a sold order position. The tensions between a superficially stable steel volume business and a structurally difficult environment in the global steel industry remain, however. The import situation on the European steel market continues to be strained and endangers a sustained recovery of the steel business.

Consumption by the Steel Industry			
Energy Source	2014	2015	2016
Coke (dry kg per t/ pig iron)	334.1	329.5	327.6
Blasting Coal (kg per t/pig iron)	158.2	164.1	171.0
Sintering Fuels (kg per t/pig iron)	46.0	43.9	42.4
Oil (kg per t/pig iron)	7.8	5.0	1.5
Source: VDKi own calculations			

HT-D13

The average specific consumption of coke and sintering fuels in the German steel industry declined; the decrease of 70 % for oil was especially sharp. On the other hand, the average specific consumption of blasting coal improved further (+4.2 %).



## CORPORATE SOCIAL RESPONSIBILITY –

### Statement of Principles of the VDKi

As far as 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 their business activities. The VDKi and its members expect all the parties participating in the hard coal supply chain (hereinafter known as the suppliers) to observe 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 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 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 of 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 of 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 our suppliers with the laws and regulations of their country, 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 of all 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, in the air and on 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 of all our suppliers to comply with a high level of business ethics and to combat every form of corruption or bribery, including fraud and extortion.

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

CSR has become a standard element of association policy.

The VDKi has created a work group on this subject, and CSR is a regular point on the agenda of the meetings of the Board of Directors. The VDKi is open to the sharing of experience with all groups and associations interested in CSR.

## COUNTRY REPORTS

### AUSTRALIA

#### General

The Australian economy has been growing continuously for 25 years. According to Germany Trade and Invest (GTAI), real growth in the gross domestic product will presumably come to 2.8 % (in comparison with 2.3 % of the previous year). A similarly high value is expected for 2017. According to the International Monetary Fund (IMF), unemployment of 5.7 % is substantially below the level of the previous year (6.1 %). Despite the falling demand for raw materials, economic growth is robust, to the surprise of some experts.

Increasing production of ores and coal was in contrast to the sharp fall in exploration investments in 2016. A major part of the investments in the Australian energy business has gone into liquefied natural gas (LNG) installations. A significant part of the liquefied natural gas is exported, a fact that is currently sparking heated domestic policy discussions because of the relatively high price level on the domestic gas market. The Australian government is also under competitive pressure from the party "One Nation" led by Pauline Hanson, which is emulating the American president Donald Trump. After the Australian government spoke back in March of an "energy crisis" in the land of raw materials (according to the Frankfurter Allgemeine Zeitung on 29 April 2017), it promised to regulate the natural gas market from 1 July 2017 so that the domestic natural gas price would be cut in half. "The government

remains committed to the export of liquefied natural gas, but not at the expense of Australian interests," was heard from government circles. The stricter regulations for the issue of visas can also be viewed in this political context. Although unemployment has declined in Australia, the demand for workers in mining is falling. This effect put the brakes on the average wage increases throughout the country in 2016. The rise of 2.1 % in 2016 was the lowest value since 1997.

In the estimation of the Chief Economist in the Australian "Department of Industry, Innovation and Science", the revenues from raw material exports in fiscal years 2016/17 and 2017/18 will presumably reach an all-time high of \$215 billion, corresponding to real growth of 32 % over fiscal year 2015/16. The higher prices for iron ore and coking coal were key factors here, while in the case of LNG the higher export volume made an impact. In the middle term, a slowdown in construction activities in China, especially in the residential sector, is expected, and this will lead to lower demand from China for raw materials. Nevertheless, a peak in Australian raw material production is not expected before 2019. On the contrary, growth is expected for ores and coal soon. The most important source of growth will presumably be LNG, however. Australia's LNG export grew by almost 50 % in fiscal year 2015/16 and will most likely double in the coming three years when new production capacities become fully available.

In the estimation of the Australian "Department of Industry, Innovation and Science", worldwide demand for raw materials will grow significantly more slowly over the next five years than in the previous five years. Australia has an advantage, however, in that it holds reserves of steam coal with high calorific values as well as high-grade cok-



ing coal and iron ore. Since the Chinese government is doing more and more to push back coal with low calorific values (e.g. from Indonesia) as a means of reducing air pollution in cities with especially high levels, the demand for Australia's resources will remain high.

### Production

The eastern parts of the country, 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. Smaller quantities of hard coal were produced in Western Australia (8 million tonnes) in 2016, but they remained exclusively on the domestic market. 80 % of the total usable production comes from opencast pits, 20 % from underground mines. Total coal production rose (after a decline in the previous year) from 421 million tonnes to 433 million tonnes, an increase of 2.9 %.

Usable Production of the Major Production States of Australia			
	2014	2015	2016
	Mill. t	Mill. t	Mill. t
New South Wales (NSW)	198	191	195
Queensland (QLD)	234	221	230
<b>Total NSW/QLD</b>	<b>432</b>	<b>412</b>	<b>425</b>
Western Australia	9	9	8
<b>Total</b>	<b>441</b>	<b>421</b>	<b>433</b>
<i>Source: Resources and Energy Quarterly, Austr. Government, Dpt. Of Industry.</i>			

LB-TI

Contract prices for coking coal were at their highest point in five years in Q1 2017. Cyclone Debbie caused significant damage in Queensland almost simultaneously with the end of the quarter (on 28 March 2017), disrupting

practically the full length of the coal delivery chain, with the greatest impact on coking coal. Mines that supply 15 % of global coking coal exports were affected. Ports and railway lines also suffered from the heavy rainfall. Originally, repairs of the damage to the railway system were not expected to be completed until the beginning of May. The railway operator Aurizon, however, succeeded in reopening the Goonyella line, although with certain restrictions, on 26 April. There is still a transport bottleneck, but the fast response by Aurizon has led to a significant improvement in the general mood. It cannot be ruled out that the problem was still taken too lightly as of May. Delays in the negotiation of the contract prices (quarterly benchmark price negotiations) were almost surely a result of the (in part extremely) different expectations about the duration of the supply disruptions found between providers and buyers.

The Australian Department of Industry, Innovation and Science regularly issues information about the status of the projects in coal mining in the publication Resources and Energy Major Projects and distinguishes here between announced projects, feasibility studies, projects in progress and completed projects. The following projects were listed in the publication of December 2016:

- 7 coal projects were announced: 2 in NSW, 5 in QLD. The estimated investment volume amounts to between AU\$8.5 billion and AU\$12 billion.
- The largest number of projects for the expansion or new development of mines are found in the phase of the feasibility studies. There are 37 coal projects in this stage with a total value AU\$55 billion: 11 in NSW, 25 in QLD and one in Victoria.
- 8 coal projects with a value of AU\$7.6 billion are currently under development: 2 in NSW and 6 in QLD.

Two large coking coal projects were added in 2016: the Grosvenor Project for an underground mine in Queensland and Byerwen. The Grosvenor Project of Anglo American in QLD has an estimated capacity of 5 million tonnes; investment volume is about AU\$1.95 billion. The Byerwen Project of Qcoal Group is also in QLD and has an estimated capacity of 10 million tonnes and an investment volume of about AU\$1.59 billion.

- Two projects with a value of AU\$837 million were completed in 2016, both of them in NSW. The Maules Creek Project of Whitehaven has estimated capacity of 12 million tonnes and a value of AU\$767 million. Both steam and coking coal are produced in this mine. The Metropolitan Coking Coal Project of South 32 in NSW is an expansion investment (1.5 million tonnes).

By far the largest projects are the following:

- Carmichael Coal Project (including rail connection) of Adani in QLD with a capacity of 60 million tonnes
- Project China Stone of MacMines Austasia in QLD with a capacity of 55 million tonnes
- China First Galilee Coal Project of Waratah Coal in QLD with a capacity of 40 million tonnes
- Alpha Coal Project of GVK-Hancock Coal in QLD with a capacity of 32 million tonnes
- Kevin's Corner of GVK in QLD with a capacity of 30 million tonnes

All mines will produce steam coal. The Project China Stone has been announced; all the other projects are in the feasibility study stage.

The Carmichael Mine of the Indian Adani Group could become a symbol of a new attitude toward mining in Australia. According to a report in the Frankfurter Allgemeine Zeitung of 10/12/2016, the Indian mining corporation

Adani is “causing stress for Australia.” While India needs more electricity, Australia wants to export more coal for the creation of new jobs. At the same time, however, Adani is under fire because of its disregard for the environment, especially because of a spoil heap near the Great Barrier Reef Marine Park. The project met with stiff opposition last year from both environmental organisations and representatives of indigenous groups who attempted to obtain protection for their interests in court. The project cleared this important hurdle in August 2016.

In December 2016, the Carmichael Mine overcame another obstacle: the most important final permit – approval of the 389-km-long rail connection from the Galilee Basin to the port of Abbot Point and of a building site – for the mining project and its six opencast pits and five underground mines was issued by the Mining Ministry of QLD. After it received this permit, Adani declared at the beginning of December 2016 that it would begin construction of the mine in the middle of 2017 and give local employees preference over workers from overseas. Since the project is expected to create 10,000 new jobs, the importance of this aspect for Australian politics cannot be underestimated.

At that time, however, the water law approval and the support of the financing by a loan from the Australian government had still not been secured. On 23 December 2016, the left-wing liberal newspaper “The Guardian” reported that an unnamed American human rights organisation had allegedly uncovered secret financing of the Carmichael Mine by a circuitous route via Indian banks through the World Bank. No confirming evidence of these allegations appeared. In view of the World Bank's official rejection of coal projects, the hopes in the region rest fully in the Asian Infrastructure and Investment Bank AIIB, which is under

Chinese management. Australia's four large banks dissociated themselves from the Carmichael Mine at the end of April 2017. They excluded any involvement on their part in the financing of the mine after the country's second-largest bank, Westpac, declared that it would no longer take part in the development of new mining regions. Australia's Finance Minister, Mathias Cormann, described this decision as "strange" and "disappointing." Banks are of course free to make their own investment decisions, but coal remains Australia's second-largest export sector. This decision would endanger another six projects in the Galilee Basin as well. All the large projects listed above are located in this area! This would make positive signals, such as those that could come from the Australian billionaire Gina Rinehart (Alpha Coal Project of GVK-Hancock Coal) or from Adani, more important.

On 7 June 2017, the FAZ reported that Adani Enterprises had given a green light for the mine. Preparations are scheduled to begin in September 2017. Financing to December 2017 has been secured. Adani is also expecting a compromise with the government of Queensland that would suspend royalty payments for the first few years. Nevertheless, PwC calculates that the mine would generate about \$22 billion in tax revenues by 2050.

Renewable energy sources are also on the advance in Australia, and they were identified in "Fortune" (9 March 2017) as the "final nail in the coffin" for the use of hard coal, of all places in the country that is also the world's largest coal exporter. South Australia is regarded as a pioneer for renewable energies. In combination with the decommissioning of older hard coal-fired power plants, the manageability of the electricity grid has reached its limits. A blackout after thunderstorms in South Australia

at the end of September 2016 left 1.7 million people in the dark. Traffic in the capital city Adelaide fell into chaos. The two telephone networks lost service as well. Minister for Energy and Environment, Josh Frydenberg, declared to Reuters that security and economic efficiency of the electricity grid had the highest priority.

In July 2016, electricity prices in Australia rose substantially because of the poor availability of renewable energies. This sparked a debate on whether an exit from reliable coal-fired power plants made good sense. In view of these difficult general conditions, the Australian mining business had previously launched a campaign entitled "Coal: Making the Future Possible."

## Infrastructure

Phase 3 of the Hay Point Coal Terminal Project of BHP Billiton Mitsubishi Alliance (BMA) in QLD was concluded in 2016. The estimated expansion in capacity is 11 million tonnes; investment volume comes to about AU\$3.5 billion. The Wiggins Island Railway Project of Aurizon in QLD with transport capacity of 27 million tonnes was also concluded. Investment volume is about AU\$900 million. The project augments the connections to the Wiggins Island Coal Terminal in the port at Gladstone.

## Export

90 % of Australia's hard coal production was exported. The following figure shows the loading ports used for export of the coal.

The handling figures of the coal loading ports do not always coincide exactly with the export figures. There may be customs-related reasons for this.

Exports of the Largest Coal Loading Ports		
Coal Loading Ports	2015	2016
	Mill. t	Mill. t
Abbot Point	27.2	26.7
Dalrymple Bay	69.3	68.4
Hay Point	44.4	49.0
Gladstone	72.0	70.1
Brisbane	7.0	6.6
<b>Total Queensland</b>	<b>219.9</b>	<b>220.8</b>
PWCS	109.3	109.6
Port Kembla	11.4	10.0
NCIG	49.2	53.3
<b>Total New South Wales</b>	<b>169.9</b>	<b>172.9</b>
<b>Total</b>	<b>389.8</b>	<b>393.7</b>
Source: Australian Coal Report		

LB-T2

Following a decline in the previous year, Australia could increase its exports by 0.8% to 390 million tonnes in 2016. 201 million tonnes were steam coal (-1 million tonnes) and 189 million tonnes were coking coal (+4 million tonnes). India is currently the largest importer of Australian coking coal, followed by Japan. Exports to India remained at the level of the previous year while shipments to Japan increased. A substantial rise is expected for India as well for 2017. The construction of state-of-the-art coal-fired power plants (super- or ultra-critical) in India will only increase the demand for Australian steam coal. Most of the current power plants can be operated only with the domestic steam coal with significantly lower calorific values.

Exports to China are subject to both macroeconomic fluctuations and influence by Chinese environmental policies. They increased by 5.0% to 75 million tonnes in 2016.

Hard Coal Exports According to Grade		
Coal Grade	2015	2016
	Mill. t	Mill. t
Coking Coal (HCC)	121	122
Semi-soft Coking Coal	64	67
Steam Coal	202	201
<b>Total</b>	<b>387</b>	<b>390</b>
Source: McCloskey		

LB-T3

Development of Australia's Exports to China		
	2015	2016
	Mill. t	Mill. t
Hard-coking-coal	26.2	28.1
Semi-soft-coking-coal / PCI	10.2	10.7
Steam Coal	35.0	36.2
<b>Total</b>	<b>71.4</b>	<b>75.0</b>
Source: McCloskey		

LB-T4

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

Key Figures Australia			
	2014	2015	2016
	Mill. t	Mill. t	Mill. t
Hard Coal Production	441	442	433
<b>Hard Coal Exports*</b>	<b>387</b>	<b>387</b>	<b>390</b>
• Steam Coal	201	202	201
• Coking Coal	186	185	189
<b>Imports Germany</b>	<b>5.7</b>	<b>5.7</b>	<b>6.5</b>
• Steam Coal (incl. Anthracite)	0.4	0.1	0.4
• Coking Coal	5.3	5.6	12.1
<b>Export Quota in %</b>	<b>88</b>	<b>88</b>	<b>90</b>
Source: Own calculations			

LB-T5

# INDONESIA

## General

In comparison with other countries rich in raw materials such as Brazil or Venezuela, Indonesia, with real economic growth of about 5%, is in an excellent position. Nevertheless, President Joko Widodo is not satisfied. According to sources at GTAI, there is potential for growth of up to 7%, but this would require above all the lowering of protectionist barriers.

Indonesia's coal production has been driven almost completely by export down to the present day. Domestic demand is rising steadily, however, and it is also prioritised within the framework of the national energy policy. According to a report from the Oxford Institute for Energy Studies of 2017, electrification of the country is scheduled to be complete as early as 2019. As of today, however, 40 million Indonesians still do not have access to electricity. The Indonesian government launched a programme in 2015 aimed at construction of an additional 35 GW in power plant production by 2019. 20 GW of this new power plant generation are planned for coal-fired power plants so that the dominant role of coal in Indonesian electric power generation will remain. Coal consumption is expected to double because of this measure. In response to the challenges of climate change, Indonesia will increase the share of renewable energy sources, but simultaneously make use of clean coal technologies, especially of ultra-supercritical power plants. A look at Table T8 shows that domestic consumption is rising sharply and causing the export quota to fall to 74% (if illegally produced coal is included, domestic consumption is undoubtedly significantly higher).

Competition between the use for domestic consumption and exports is to be expected in future.

## Production

2016 was initially a difficult year for Indonesian coal mining. Heavy rainfalls caused restrictions in production and exacerbated the situation that was already marked by overcapacities because of the low world market prices. The number of mining permits rose because of the Mining Act from 2009. Part of the new capacities on this basis are illegal, but their production nevertheless finds its way to the market and contributes to the overcapacities. 30% of the mining companies do not fall under government supervision because they are not subject to the Coal Contracts of Work.

The recovery in the second half of 2016 was caused especially by an increase in exports to China. This was preceded by attempts by the Chinese government in 2016 to eliminate overcapacities in hard coal mining. When it became clear that this process had been driven too fast, there was a return to larger purchases of Indonesian coal.

The Indonesian mining companies are planning production of 493 million tonnes (including lignite) in 2017. The government's production target is 466 million tonnes. Production of this volume would significantly exceed the 419 million tonnes of the previous year 2016. At the beginning of 2017, there was torrential rainfall like that of 2016, especially in the southern part of Kalimantan. Capacity for one of the large suppliers was reported to have been limited by 20%. Therefore, the shortfall from the first quarter must be compensated so that the target volume can be achieved.

In 2016, Indonesia's President Joko Widodo announced a moratorium for mining licences and the cultivation of palm oil. This measure is to be a continuation of the moratorium decided back in 2011 for the protection of forests and peat bogs.

In 2014, a law that gradually prohibits the export of processed ores went into effect; its objective is to encourage processing within the country. The Indonesian government and Freeport McMoran, the world's second-largest copper producer, found themselves embroiled in serious conflict in 2017, including the threat of expropriation. The American company ultimately withdrew from Indonesia. While efforts are being made to raise the value from the export of ores, coal is in competition with the growing domestic consumption by Indonesia itself.

### Infrastructure

The ambitious production targets of the country cannot be achieved unless the infrastructure, especially the rail connections, are developed further. The government-owned Bukit Asam, for instance, is planning a production target of 27.3 million tonnes in 2017, 31% higher than the 20.8 million tonnes of the previous year (2016) and 7 million tonnes over the government's plan. Achieving this target will be possible only if there is sufficient rail capacity to the port facilities in the southern part of Sumatra. The company could expand rail capacities of 15.8 million tonnes in 2015 to 17.6 million tonnes in 2016, but this was still substantially below the company's target of 22.7 million tonnes.

### Hard Coal Exports According to Markets

	2014	2015	2016 <sup>1)</sup>
	Mill. t	Mill. t	Mill. t
Pacific	372.0	318.0	303.4
Europe	8.6	8.3	7.2
USA	1.4	0.7	0.6
<b>Total</b>	<b>382.0</b>	<b>327.0</b>	<b>311.2</b>

<sup>1)</sup> Estimated  
Source: Prepared McCloskey figures

LB-T6

### The Largest Buyers of Indonesian Hard Coal

	2014	2015	2016 <sup>1)</sup>
	Mill. t	Mill. t	Mill. t
India	104.7	123.4	94.6
China	88.2	36.7	50.8
Japan	32.0	32.4	33.0
South Korea	35.3	32.7	35.0
Taiwan	22.0	24.0	20.3

<sup>1)</sup> Provisional, in part estimated  
Source: McCloskey

LB-T7

### Key Figures Indonesia

	2014	2015	2016
	Mill. t	Mill. t	Mill. t
Exports of Hard Coal	356	327	311
Exports of Lignite	52	39	58
Domestic Consumption of Hard Coal	76	87	107
Total Hard Coal Production	432	414	419
Imports Germany	0	0	0
Export Quota (Hard Coal)	82,4	79,0	74,4

Source: Statistics Indonesia, IHS and own calculations/estimates

LB-T8

## Export

Indonesia's coal exports rose slightly by 0.8 % in 2016. The increase came above all from exports of lignite, which rose by 49 % from 39 million tonnes to 58 million tonnes, while the export of hard coal fell by 4.9 % from 327 million tonnes to 311 million tonnes. Above all, the increased demand from India and China impacted Indonesia's situation in the past year. The imports of these two countries alone make up 47 % of the demand for Indonesian steam coal. This leads to a high level of dependency on political changes in China and India. While lignite supplies to China in 2015 were still under pressure, they rose in the second half of 2016, according to a report of the Oxford Institute for Energy Studies from 2017. Exports of hard coal to China increased from 36.7 million tonnes to 50.8 million tonnes (Table T7).

India, Indonesia's largest coal export market, is steadily raising the level of its own production and reducing its imports from Indonesia. Indonesian steam coal deliveries to India (excluding lignite) fell by 23 % from 123.4 million tonnes in the previous year to 94.6 million tonnes. Despite the regressive development in hard coal exports (-4.9 %), Indonesia remains the dominant steam coal exporter for the Asian-Pacific region. About 303 million tonnes – 97% of the exports – were supplied to this economic region (Table T6). Aside from India and China, the second half of the demand from the Asian-Pacific region came from high-growth ASEAN countries.

According to a report from the Epoch Times of 21 February 2017, attacks by pirates on the trade routes to the Philippines are causing serious problems.

## RUSSIA

### General

The Russian economy suffered a recession in 2015. Gross domestic product (GDP) decreased by 3.0 %. In 2016, GDP declined by only 0.2 %, and it is expected to grow again by 1.5 % in 2017. On 28 April 2017, the Russian central bank lowered the basic interest rate by 0.5 %-points to 9.25 %.

This lowering of the interest rate, the largest since autumn 2016, continued Russia's path back to normalcy in money policy. During the rouble crisis at the end of 2014, it had raised the basic interest rate to 17 %. Since then, inflation has declined sharply and in the middle of April was only 4.2 % in comparison with the same month of the previous year. The central bank is convinced that it will be able to achieve its inflation target of less than 4 % before the end of the year. The weak rise in real income that is a consequence of the recession is one of the factors that have led to lower inflation.

### Production

According to the Russian Coal Group, there were 169 mining companies producing hard coal in Russia in 2016. 107 of these companies operate opencast pits; 62 of them produce coal from underground mines. The reserves held by these Russian mining companies amount to 15 billion tonnes.

According to the Russian Energy Minister Valery Grishin, production in 2016 amounted to 383.8 million tonnes.

This corresponds to an increase of 3.3 % over the 371.7 million tonnes of the previous year. 172 million tonnes were sold on the domestic market in 2016.

Hard Coal Production Russia			
	2014	2015	2016
	Mill. t	Mill. t	Mill. t
Coking Coal	92	95	98
Steam Coal <sup>1)</sup>	265	278	286
<b>Total <sup>2)</sup></b>	<b>357</b>	<b>372</b>	<b>384</b>
<small>1) incl. anthracite, 2) 2015 Rounding-off difference Source: Rosinormugol</small>			

LB-T9

Infrastructure

The Russia railways, especially the rate system, are the greatest obstacle to further development of Russian mining in new sales regions. Problems with the Russian railway and the supply of carriages are in the meantime yearly occurrences and reflect the lack of adequate investments in past years. As of the end of 2016, these bottlenecks hindered transports to both the Baltic Sea and the Black Sea. In many cases, the storage capacities in the ports are decisive.

The governor of the Kuzbass region, Aman Tuleyev, took this as an occasion to protest strongly to Arkady Dvorkovich, Russia’s Deputy Prime Minister, and to Oleg Belozyorov, the president of the Russian railway company RZhD, and to point out the economic problems for Russian hard coal mining because of the rising costs in combined rail and seaborne traffic. Freight costs to the seaports rose by 34% in 2016.

At the moment, the capacity of the Russian coal export terminals comes to 91 million tonnes. The major part of the export capacities is in the east of the country. The port of Vostochny has 24% of the export capacities and 15% of capacities is in Vanino. In the Baltic Sea region, the largest terminals are at Ust-Luga (17% share of export capacities) and Murmansk on the Barents Sea (13%).

The expansion of several ports on the Pacific coast is planned; they are scheduled to be available before 2020. Capacities for bulk goods are expected to rise to 190 million tonnes to 230 million tonnes by 2030. 155 million tonnes of this will serve for export to the Asian-Pacific region.

Export

Hard coal is in fifth place on the export list of the Russian economy that is so rich in raw materials. Russia is a major global exporter of hard coal following countries such as Australia and Indonesia. 87% of the Russian seaborne exports is steam coal. An upward trend in exports through the Baltic seaports was of special importance for the development of sales. During the first quarter of the year, they were 18% higher than in the same period of the previous year.

In 2015, the weak Russian rouble still supported the Russian export economy. Figure LB-B1 shows that income in US dollars declined sharply. Owing to the weak rouble, however, income in roubles remained almost constant until the beginning of 2016. The extent to which companies incurred costs in roubles as well was therefore decisive. 60% of the mining equipment, however, is said to have been billed in US dollars.



At the beginning of 2016, the upward flight of the US dollar had reversed and, at the same time, hard coal prices rose significantly. The income of the Russian mining companies now rose both in roubles and in US dollars. At the same time, their competitiveness fell again because of the increased value of the rouble. It can therefore be assumed that investment activities by Russian mining companies will continue to be cut back. Some Russian mining companies surely found themselves under economic pressure.

Driven by the markets in Asia, North Africa and Turkey, exports of Russian steam coal rose by 11% from 118 million tonnes in 2015 to 131 million tonnes in 2016. Russia's most important customer country in Asia was South Korea. 24.6 million tonnes of the seaborne Russian exports went to this country. Exports to Japan amounted to around 18.5 million tonnes, exports to China to 15.9 million tonnes. Exports to North Africa and the Mediterranean region also posted strong growth. Exports to Egypt and Morocco each rose by two-thirds, although starting from relatively low levels. Exports to Turkey increased from 8.3 million tonnes in 2015 to 10.6 million tonnes in 2016. The cause for the growing sales figures in this region: the prices of the Russian suppliers were more competitive than those of the South African suppliers. Exports to Poland benefited from the rise in the price level on the Polish market. 5.3 million tonnes were sold in this country after 0.6 million tonnes in 2015.

According to the Russian Minister of Energy, Valery Grishin, an increase in total hard coal exports of 6% is expected for 2017. Total exports (seaborne and land) in 2016 came to 164.7 million tonnes according to this source.

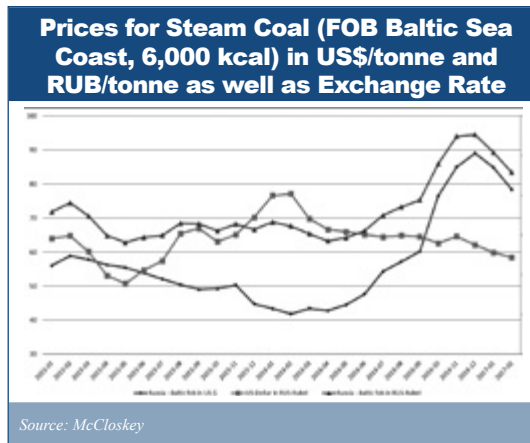


Figure LB1

Key Figures Russia			
	2014	2015	2016
	Mill. t	Mill. t	Mill. t
<b>Coal Production</b>	357	372	384
<b>Hard Coal Exports <sup>1)</sup> Seaborne</b>	143	142	150
• Steam Coal	110	118	131
• Coking Coal	33	17	19
<b>Imports Germany</b>	13.7	16.7	17.8
• Steam Coal	12.3	14.9	16.1
• Coking Coal	1.2	1.6	1.3
• Coke	0.2	0.2	0.1
<b>Export Quota in %</b>	40	38	39

*1) Seaborne only; breakdown into coke and steam coal not possible for 2014 and 2015*

Source: Own calculations

LB-T10

In Germany, total imports from Russia increased by 1.3 million tonnes to 17.8 million tonnes, making Russia the most important coal supplier for Germany once again.

## COLOMBIA

### General

According to the German Foreign Office, Colombia pursues economic policies oriented to free market principles. Free trade agreements have been concluded in particular with the USA and the EU. In the estimation of the GTAI, the free trade agreement with the USA is not at risk because of Donald Trump's election.

Colombia's gross domestic product in 2015 increased by 3.1 % after +4.6 % in the previous year. Estimates indicate that the Colombian economy grew by 1.9 % in 2016, the weakest growth since 2009 (+1.7 % for that year). Low raw material prices and certain special factors put a damper on growth. In addition, the peace process with the FARC guerrillas, the subject of intense controversy in the country, unsettled consumers. Nevertheless, among the large Latin American national economies, Colombia is still the country with the historically highest growth rates.

If the oil price were to rise again for a longer period, this would have positive effects on the national budget and investment opportunities. An economic upswing could also then be expected in neighbouring countries, and this would in turn have positive effects on Colombian exports. On the other hand, rising prices for the export products oil and coal could strengthen the weak Colombian peso, which declined by about 11 % in value over the previous year, and weaken the competitiveness of the processing industry ("Dutch disease").

The tax reform that entered into effect at the beginning of 2017 should in any case have a positive impact on the na-

tional budget and investment opportunities. A lower deficit and the possible joining of the OECD will most likely strengthen further the trust in the Colombian economy. In its this year's Global Competitiveness Report 2016-2017, the World Economic Forum put Colombia economically in 61st place out of a total of 138 countries, the same as the previous year. Colombia has been using this index for orientation since 2006 within the framework of a national system for the improvement of competitiveness. The system enjoys broad acceptance in the country today. At the forefront are currently public-private partnership financing models for the fostering of innovations – previously, along with the institutions, one of the country's weaknesses. Its strengths include the development of the financial markets and market size.

The peace agreement concluded with the FARC guerrillas on 26 September 2016 could stabilise the country in the long term and strengthen its competitiveness by an extraordinary measure. The peace process suffered a damper on 2 October 2016 when the proposals were rejected by a thin margin in a referendum, but the government immediately launched a second initiative for the peace process. Despite the setback, the awarding of the Nobel Peace Prize to Colombia's president Juan Manuel Santos on 7 October 2016 found a positive echo worldwide. Santos dedicated the prize to the millions of victims of the civil war that has been going on for more than 50 years. The UN Secretary-General at the time, Ban Ki-moon, declared that the peace process in Colombia "should inspire the entire world." In the meantime, a second peace agreement has been signed. Following the peace agreement with the FARC guerrillas, the government is trying to find a resolution to the long-lasting conflict with the ELN guerrillas. This is a huge challenge

because other armed groups will attempt to fill the vacuum left by the disarming of the FARC and possibly of the ELN.

In Germany, some of the media attempted to make it appear that Colombia is “the dark side of the energy turnaround” (*Der Spiegel*) because without the contribution of coal-fired power generation Germany would not succeed in the energy turnaround. As a rule, such discussions did not lose a single word about the peace process in Colombia. The progress made over many years in many socio-political fields is also ignored. But there are a good many positive reports on the further political development in Colombia.

## Production

Colombia's hard coal production (steam and coking coal) increased by 6 % from 85.5 million tonnes to 90.9 million tonnes in 2016 (source: National Mining Agency). The Cesar Department, where the companies Drummond, Glencore and Colombia Natural Resources (Murray Energy) operate, produced 48.3 million tonnes in 2016, 6 % more than in the previous year. La Guajira (Cerrejón and Caypa) produced 32.7 million tonnes, a decline of 3 %. Cerrejón, the largest producer, struggled with drought and dust pollution during the first quarter of 2016, only to suffer from heavy rains in the second quarter. Drummond's production rose by 9.7 % from 25.9 million tonnes to 28.4 million tonnes. Glencore's production, on the other hand, fell from 17.6 million tonnes in 2015 to 16.9 million tonnes in 2016. The La Francia Mine belonging to the company Colombia Natural Resources produced 3.0 million tonnes, two-thirds more than in the previous year (1.8 million tonnes).

Production in Norte de Santander rose from 1.9 million tonnes to 2.2 million tonnes because the opening of the border between Venezuela and Colombia in August 2016 removed the hindrance to export through Venezuelan ports. The border was reopened after one year so that Venezuela could import urgently needed food and medicines from Colombia. In December 2016, Venezuela closed its border to Colombia again, but for only 72 hours. In Boyacá, production of primarily metallurgical coal increased by about 1 million tonnes to 3.1 million tonnes after major restrictions in the previous year. Production in Cundinamarca rose by 9% to 2.3 million tonnes. Current projects from the government indicate a production level for the entire country of 97 million tonnes in 2017 (+8 %).

The conclusion of a collective bargaining agreement between the trade union Sintracarbon and Glencore secures a stable framework. After 20 days of negotiations, the employees voted not to go on strike, but to continue negotiations. Finally, an agreement for three years was reached and signed on 29 December 2016. Among other provisions, there will be a rise in wages of 0.42 % above the consumer price index in each of the three years.

A new collective bargaining agreement was concluded earlier, on 13 December 2016, between the train union Sintraime and the railway company Fenoco; the latter's network of railway lines is important for the mining companies.

## Infrastructure

Owing to the great significance of the Colombian railway system for hard coal mining, it has repeatedly been the target of political protests that do not have anything to do with mining itself. The railway line was blocked from 4 to

5 January 2017 to force the central government to take notice of the social demands of the population.

The first test runs on an 800-km-long railway line connecting the city La Dorada in the country's interior with the port Santa Marta on the Caribbean coast were conducted on 18 October 2016. The opening of this new railway line is scheduled for 30 May 2017, but is expected in any case during the second quarter of 2017. The companies Drummond, Glencore and Murray Energy's Colombia Natural Resources can transport their production from the province Cesar via this railway line to the ports of Ciénaga and Santa Marta. This is expected to reduce the freight costs for transport of metallurgical coals and high-grade steam coal by 25 % to 30 % in comparison with transport by lorry.

Reports have been circulating for many years about the project to make the Magdalena River navigable. At the beginning of 2017, the construction project with a value of US\$800 million was begun by the companies Odebrecht (Brazil) and Valorcon (Colombia). The project includes making the river navigable over a length of 256 km and doing maintenance work on the entire length of 908 km.

### Export

Steam coal exports rose in comparison with 2015 by 10.1 % to 88.6 million tonnes. Cerrejón exported 32.4 million tonnes, a little less than in the previous year. Drummond significantly increased its exports by 17 % to 32.6 million tonnes and became the Number One steam coal exporter in Colombia. Prodeco's exports rose by an even greater 22 %. There are reports that Drummond would like to broaden its presence in Asia and is no longer satisfied with the role of swing supplier while Cerrejón intends to concentrate on its traditional Atlantic market.

### Steam Coal Exports by Company

Exporter	2014	2015	2016
	Mill. t	Mill. t	Mill. t
Cerrejón	34.2	33.4	32.4
Drummond	23.2	27.9	32.6
Prodeco	18.3	16.9	20.6
Colombia Natural Resources (CNR)	0.033	2.6	2.8
Other (incl. Central Colombia)	1.4	0.8	1.4
<b>Total</b>	<b>77.1</b>	<b>81.6</b>	<b>89.8</b>

Source: Own evaluation

#### LB-T11

Exports to Europe declined slightly by 2.6 % to 56.1 million tonnes. In contrast, exports to America increased by 8.7 % to 24.9 million tonnes. Exports to Asia rose from 0 to 19.6 million tonnes in 2015. They fell again significantly back to 7.6 million tonnes in 2016.

### Structure of the Colombian Steam Coal Exports<sup>1)</sup>

	2014	2015	2016
	Mill. t	Mill. t	Mill. t
<b>America</b>	<b>21.9</b>	<b>22.9</b>	<b>24.9</b>
North America (USA + Canada)	7.1	8	7.1
South and Central America	14.8	14.9	17.8
<b>Asia</b>	<b>0</b>	<b>0</b>	<b>7.6</b>
<b>Europe</b>	<b>53</b>	<b>57.6</b>	<b>56.1</b>
Mediterranean Region	14.6	17.3	20.9
North-western Europe	38.4	40.3	35.2
<b>Total</b>	<b>75</b>	<b>80.5</b>	<b>88.6</b>

<sup>1)</sup> Smaller quantities of coking coal and coke are not included in the export figures.

Source: MCR, own calculations

#### LB-T12

Colombia is one of the four 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 Europe. Last year, lower freight costs opened arbitrage opportunities for Colombia in comparison with South Africa. Figure LB-B2 shows why, as mentioned above, exports to Asia declined again. Colombia's freight cost advantage shrank significantly in the second half of 2016, and at the end of the year it even temporarily turned into a freight cost disadvantage.

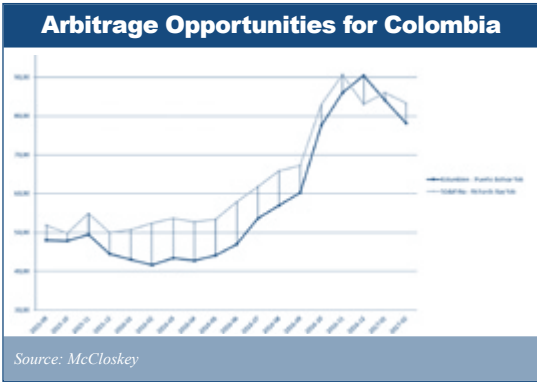


Figure LB2

The complete overview below shows that Colombia's export quota is almost 100%.

Key Figures Colombia			
	2014	2015	2016
	in Mill. t	in Mill. t	in Mill. t
Steinkohleförderung	88,6	85,5	90,9
Steinkohleexporte	77,1	83,2	89,7
• Kraftwerkskohle	74,9	80,5	88,6
• Kokskohle	2,2	2,7	1,1
Einführen Deutschland	7,4	9,9	10,7
Exportquote in %	87	97	99

Source: verschiedene Auswertungen

LB-T13

## REPUBLIC OF SOUTH AFRICA

### General

The consulting and accounting firm PwC headlined its eighth report on South Africa's mining industry with the words, "South Africa's mining industry continues to face tough times." Free cash flow last year was at its lowest level of any year since the financial crisis in 2008. The only options for action available to the companies were the pruning of new projects, a focus on profitable mines instead of full exploitation of all capacities and cost cutbacks.

Although coal remained the raw material industry with the highest revenues in the country, its share in the income for the industry declined slightly in comparison with 2015 to 29 % in 2016. While the economic position of the industry can at least be calculated, the general political conditions are problematic, if not to say unpredictable.

South Africa's economy is on its way to recession for the first time since the worldwide economic crisis. According to reports from the National Statistical Office, gross domestic product (GDP) in the second quarter of 2017 declined by about one percent point following 0.7 %-points in the first quarter of 2017. The primary cause is supposedly a decline in processing industries and in trade while a "drought of the century" is apparently over. The GDP declined by 0.3 %-points in the fourth quarter of 2016. With this third drop in succession, South Africa is undoubtedly on its way into recession, and the country's rating, which has already been set at junk level by two agencies, could find itself under even greater

pressure. Prices for food, electricity and fuels are already rising.

The FAZ on 8 June 2017 titled its story: "Hostile Takeover – South Africa's President Zuma Is Turning the State into a Private Company." If only half of the allegations made about the South African president Jacob Zuma since the end of May 2017 are true, then "the man is ripe for a prison sentence." In November 2016, a report of 335 pages published by the South African anti-corruption officer Thuli Madonsela contained serious charges against President Zuma and his government. A judicial investigative commission was set up as a consequence. The Indian entrepreneurial family Gupta, which does business in the energy, transport and mining sectors as well as others, has been in the spotlight of criticism for a long time because of their close association with Zuma. People are already talking about the "Guptaleaks." At the beginning of April 2017, President Zuma drew the ire of the finance world when he dismissed Finance Minister Gordhan. A power struggle for "access to the state's coffers" had been raging between Finance Minister Gordhan and supporters of President Jacob Zuma, and the Finance Minister lost. Two rating agencies responded to the dismissal with a creditworthiness rating at junk level. Fitch announced its decision in April 2017 only a few days after the same announcement from Standard & Poor's (S&P).

In this context, it should be mentioned that India procured 37.5 million tonnes of hard coal from South Africa – so it was the destination of exactly half of all exports.

### Production

In 2016, domestic demand increased by 1.8 %, but production rose by only 1%. This led to a reduction in the ex-

port quota from 30.3 % to 29.7 %. In April 2017, domestic demand proved so strong that coal for domestic sale was significantly more expensive than for the export. A price of \$93.60/tonne free on truck (FOT) was in contrast to \$77.50/tonne FOB (6,000 kcal). However, this applied primarily to nuts of a specific grain size (10-25 mm) so that it can be assumed that there were production problems for some of the suppliers. But since the product can also be exported, the result was the price situation described above.

## Export

### Structure of the Exports in 2016

	Total Europe <sup>1)</sup>		Asia	Miscellaneous
	Mill. t	Mill. t	Mill. t	Mill. t
Steam Coal	74.2	15.2	50.2	8.8
Anthracite	1.3	0.3	0.4	0.6
<b>Total</b>	<b>75.5</b>	<b>15.5</b>	<b>50.6</b>	<b>9.4</b>

<sup>1)</sup> Incl. neighbouring Mediterranean countries

Source: IHS Exports: Coal and coke by country and type

LB-T14

By far the most important export country for South Africa is India (as described above), even though exports (excluding anthracite) declined from 40 million tonnes in 2015 to 37 million tonnes in 2016. Shipments to Pakistan of 5 million tonnes are in second place. They are followed by exports to Italy (3 million tonnes) and South Korea (2.6 million tonnes). South Korea's imports from South Africa reached a record high of 1.23 million tonnes in February 2017. This volume represents about 50 % of the imports of the entire year 2016. South Korea's imports from South Africa in February 2017 were 57 % higher than the previous month and

14 % above December 2016, previously the best month. One of the causes is said to be arbitrage opportunities with respect to Australia. On the other hand, purchases were brought forward because of an increase in the South Korean import tax on coal per 1 April 2017. Finally, South Korea's demand for steam coal will rise in the long term as well after the completion of new power plants. Per January 2017, 5 GW of power plant capacity went online within one year, the most recent block with a capacity of 1.02 GW on 18 January 2017.

Exports to Germany declined by 58 % to 2 million tonnes. 4 % of the steam coal imports to Germany still comes from South Africa.

### Key Figures Republic of South Africa

	2014	2015	2016
	Mill. t	Mill. t	Mill. t
Hard Coal Production	261.3	252.1	254
<b>Hard Coal Exports <sup>1)</sup></b>	<b>76.8</b>	<b>76.5</b>	<b>75.5</b>
• Steam Coal	74.8	74.8	74.2
• Anthracite	2	1.7	1.3
<b>Imports Germany</b>	<b>5.1</b>	<b>3.4</b>	<b>1.8</b>
• Steam Coal	5.1	3.4	0.2
• Anthracite	0	0	0
<b>Export Quota in %</b>	<b>29.4</b>	<b>30.3</b>	<b>29.7</b>

<sup>1)</sup> Seaborne only

Source: VDKi

LB-T15

# USA

## General

2016 was one of the worst years ever for the American coal industry. Hard coal production fell by 18% from 813 million tonnes in 2015 to 666 million tonnes in 2016. Since net exports dropped by only 10 million tonnes to 43 million tonnes, the decline in production was caused almost completely by a decline in demand of 137 million tonnes. The table below shows a breakdown according to region. The decline in the West of -18% was precisely within the parameters of the trend in the American coal industry; the decline of -21% in the Appalachians was above average; and the decline in the Midwest of -16% was slightly lower.

Production in the USA According to Region			
	2014	2015	2016
	Mill. t	Mill. t	Mill. t
Appalachians	242	201	159
Middle West	172	152	128
West	493	460	379
<b>Total</b>	<b>907</b>	<b>813</b>	<b>666</b>
Source: EIA			

LB-T16

As reported in the past year, many well-known American companies had to file for the creditor protection of Chapter 11 bankruptcy: Peabody Energy Corporation, Patriot Coal, Walter Energy, Alpha Natural Resources and Arch Coal. In the meantime, the programmes have been concluded or the restructuring of the companies is close to completion. Restructuring is complete at Arch Coal, and Alpha Natural Resources has become the company Contura. Peabody Energy submitted a plan to avoid bankruptcy on

23 December 2016. On 3 April 2017, Peabody Energy announced that the company had left Chapter 11 bankruptcy with a positive result. On 4 April 2017, its stock began trading again on the New York Stock Exchange.

Consol Energy, on the other hand, was the only listed American hard coal mining company that remained in the Dow Jones US Coal Index. According to Bloomberg, this corporation is currently looking for a buyer for its coal business. Credit Suisse Group AG and Bank of America are said to be on the lookout for suitable buyers. Murray Energy Corp. and Alliance Resource Partners LP have been mentioned as potential purchasers.

The great question remains whether – and if so, to what extent – an improvement in the hard coal situation will come about because of the election results in the United States. It is certain that the “war on coal” of the previous (Obama) Administration can be declared over. That does not mean, however, that structural changes that have been concluded can be reversed again. The American environmental policies (Clean Power Act and Mercury and Air Toxics Standards of the US Environmental Protection Agency) led to the decommissioning of older hard coal-fired power plants. This effect is irreversible. According to a study from Preqin, investments in the energy business in the USA flow almost exclusively to the oil and natural gas sectors, not to the coal sector.

The competition from American shale gas is almost completely unaffected by political influence – in the USA, at least. The prospects for US coal exports to the Asian-Pacific region are also driven by the market and dependent on decisions made by the Chinese central government, which have recently become especially important fac-



tors because of the Chinese market strength. These decisions also affect the Atlantic coal market, especially in north-western Europe. The price level there, above all for steam coal, will remain relatively unattractive for US coal exports in the foreseeable future.

As early as February 2017, President Trump revoked two measures that had been issued by the Obama Administration during the “war on coal.” One was the calculation of the production levy on coal that in the opinion of the Obama Administration was to allow taxpayers to enjoy part of the revenues from coal exports to Asia. Another was the regulation of mining wastes within the framework of water protection. On 28 March 2017, President Trump signed a decree ordering a revision of the “Plan for Clean Energy” issued by Obama.

The US states had also been obligated by the previous administration to reduce the CO<sub>2</sub> emissions of their power plants by 32 % by 2030. This was the contribution of the Obama Administration to the Paris Climate Agreement. The plan had not yet entered into force, however, because about 30 states had filed court challenges.

Robert Murry, CEO of Murray Energy, the largest coal corporation in the USA, welcomed Trump’s actions, but simultaneously warned against exaggerated expectations. In “The Guardian” of 27 March 2017, this statement was headlined with “Trump can’t bring mining jobs back.” But this is only partially true. To come back to the metaphor “war on coal”: while battles were lost, the war is over.

As has already been indicated, the relationship of coal and natural gas prices plays a decisive role alongside the American environmental policies for the competitiveness

of hard coal in electric power generation. The share of electric power generation from natural gas overtook the share of electric power generation from hard coal in April 2015. Calculated on a yearly basis, the share of natural gas in 2016 came to 34 % in comparison with 33 % in the previous year while the share of coal in 2016 fell to 30 % from 32 % in the previous year, according to the Energy Information Administration (EIA), an agency of the US Department of Energy (DOE). Nuclear energy remains unchanged with a share of 20 %. Renewable energy sources, including hydroelectric power, contribute 15 % to electric power generation.

The Short-term Energy Outlook of the EIA expects the electric power generation share of natural gas to fall again in the coming years from 34 % in 2016 to 32 % in the years 2017 and 2018 because prices for natural gas can be expected to rise. In contrast, the share of electric power generation from coal will rise from 30 % in 2016 to 31 % in the years 2017 and 2018. The non-conventional renewable energy sources will contribute 9 % and 10 % to electric power generation in the years 2017 and 2018, respectively. The contribution of hydroelectric power will remain unchanged at 7 % while the share of nuclear energy will drop slightly to 19 %.

The EIA expects not only an increase in electric power generation from coal, but therefore also a rise in coal production by 4 % in 2017 and by 2 % in 2018. This estimate is in significant contrast to the estimate of the Institute for Energy Economics and Financial Analysis (IEEFA) that has been reported in some of the media. It “expects” a further decline in hard coal production by about 40 million tonnes. This decline may possibly only be “hoped for” because the “Institute,” which is financed by a family foundation, has

declared its commitment “to reduce dependence on coal and other non-renewable energy resources.”

Cyclone Debbie in March 2017 led to high losses of production and exports in Queensland and to sharp price increases. Owing to the production restrictions in the USA, one might have expected US suppliers to step into the role of a swing supplier again. However, the US mining industry is currently preoccupied with recovering from the influence of government regulation, the keen price competition with natural gas and the Chapter 11 proceedings. When significantly more stable coking coal prices were noted in the middle of 2016, production in the USA increased only slightly. At the end of the year, additional supplies were recorded from American providers, but they were still not especially large. From today's viewpoint, they were most likely only short-term capacity adjustments. It is not possible to detect a long-term trend from this.

## Infrastructure

The threat of a trade dispute between the USA and Canada could have an impact on US coal exports. According to press reports, President Trump appears to have set his sights on Canadian exports of softwood. The prime minister of British Columbia, in any case, has turned to the government in Ottawa to obtain a prohibition of the shipment of American coal through Canadian ports. From the Canadian standpoint, this would also have the benefit that capacities for the export of metallurgical coal would become free. According to US sources, the action would affect about 10 million short tons from the Powder River Basin (see the report as well on Canada).

The American logistics company Lighthouse Resources from Utah has secured for itself the long-term ownership

rights to the Millennium Bulk Terminals Project that is to be built on the Columbia River in Longview, Washington. This project would provide capacity for the shipment of 44 million annual tonnes of coal from the Powder River Basin. The facility would create an important sales channel to Asian customers. The same company withdrew from another American project (Morrow Pacific Project), however, because shipment through the Canadian Westshore Terminal appeared to be more promising. This channel now, however (as reported above), is fraught with enormous resistance.

On 7 January 2017, the first carbon capture and storage (CCS) power plant in the USA began operation on an industrial scale. In the Petra Nova power plant of 240 MW, 90% of the CO<sub>2</sub> emissions are separated and transported to an oil field to increase oil production (enhanced oil recovery). So this is a carbon capture and utilisation (CCU) project, not CCS. This process is rewarding when oil prices exceed \$50 per barrel.

## Export/Import

Coal exports from the United States decreased by 19 % in comparison with 2015 to 54 million tonnes in 2016. Just under two-thirds of this volume are coking coal, a good one-third is steam coal. The changes varied to a rather large degree. Steam coal exports declined by 29.2 %, coking coal exports by 2.6 % in comparison with 2015. Just under half (48 %) of the steam coal exports from the United States went to the European Union in 2016, of which 37 % went to Germany. The other half went to South and North America as well as to Asia, whereby 14% of the steam coal exports from the USA went to Mexico and 6% went to South Korea. The European Union was also an important supplied region for coking coal (35 %). The other volumes

went to South and North America, including Brazil at 17 %, and to Asian countries, including Japan at 10 % and South Korea at 8 %.

The decline in exports to Germany of 17 % was in line with the general trend. A massive drop was seen in exports to Great Britain, falling from 3.8 million tonnes to 0.9 million tonnes. This extreme drop of 75 % reflects the energy policy situation in Great Britain (see European Union). Exports to Italy declined by 44 %. In total, exports to the EU fell by 28 %. The decline in South Korea's imports by 30 % to 3.9 million tonnes made itself felt especially strongly in the exports to Asia. Exports to Japan remained almost stable at 4.1 million tonnes while exports to Brazil climbed substantially to 6.2 million tonnes.

American coal was exported primarily by sea (50 million tonnes); a small part went overland to Canada (4 million tonnes).

### Exports USA 2016

	Coking Coal Mill. t	Steam Coal Mill. t	Total Mill. t
Seaborne	33.7	16.2	49.9
Overland (Canada)	3.4	1	4.4
<b>Total</b>	<b>37.1</b>	<b>17.2</b>	<b>54.3</b>

Source: McCloskey

LB-T17

### Import-Export Balance USA (Seaborne)

	2011	2012	2013	2014	2015	2016
	Mill. t	Mill. t	Mill. t	Mill. t	Mill. t	Mill. t
Export (seaborne)	91	107	100	82	62	50
Import (seaborne)	11	7	7	9	9	7
(Export) Balance	<b>80</b>	<b>100</b>	<b>93</b>	<b>73</b>	<b>53</b>	<b>43</b>

Source: McCloskey

LB-T18

### Key Figures USA

	2014	2015	2016
	Mill. t	Mill. t	Mill. t
<b>Hard Coal Production</b>	<b>907</b>	<b>813</b>	<b>666</b>
<b>Hard Coal Exports</b>	<b>82</b>	<b>67</b>	<b>54</b>
• Steam Coal	29	24	17
• Coking Coal	53	38	37
<b>Hard Coal Imports</b>	<b>10</b>	<b>10</b>	<b>8</b>
<b>Imports Germany</b>	<b>11</b>	<b>11</b>	<b>9</b>
• Steam Coal	8	8	6
• Coking Coal	3	3	3
<b>Export Quota in %</b>	<b>9</b>	<b>8</b>	<b>8</b>

Source: Various and own calculations

LB-T19

## CANADA

### General

Canada is a medium-size mining country and an important coking coal exporter by sea. The major share of production and export mines is in British Columbia and Alberta.

According to the most recent "Report on Energy Supply and Demand in Canada" from 2015, 45.3 % of the primary energy consumption in Canada is covered by oil, 34.6 % by natural gas, a consequence of the country's wealth in oil and natural gas. Coal contributes a mere 7.1 %. The Canadian "Energy Fact Book – 2016-2017" published values for the electric power generation structure in Canada in 2014 (!). It shows that hydroelectric power contributes 59.3 % of electric power generation, nuclear energy 15.9 % and oil and gas 10.2 %. Coal's share was only 9.5 %. More than half of the coal-fired power generation is in Alberta. The share of non-renewable energy sources, excluding hydroelectric power, amounted to 5.1 %.

Canada is pursuing ambitious climate protection targets. On 21 November 2016, the Canadian Minister for the Environment, Catherine McKenna, announced a plan for a substantial reduction in hard coal-fired power generation in the country by 2030. This plan moves up the deadline introduced in 2012 for the refitting of hard coal-fired power plants with CO<sub>2</sub> separation technology (carbon capture and storage) or decommissioning from 2040 to 2030. The sea-coast province Nova Scotia, however, had already asked for an exemption so that it could continue to cover peak loads during winter months from hard coal-fired power plants even after 2030. Saskatchewan will also take this route. Alberta, the province with the largest number of

hard coal-fired power plants, had previously decided on an exit from hard coal-fired generation of electric power by 2030. The requirement to either outfit power plants with CO<sub>2</sub> capture and storage technology or to decommission them completely within the next 13 years must also be considered against the backdrop that Canada already obtains 64% of its electricity supply from renewable energy sources and can depend primarily on hydroelectric power.

### Production

The production of steam and coking coal in Canada was rather lower in 2016 than in 2015. Production of 60.4 million tonnes was about 2 million tonnes below the level of the previous year.

### Infrastructure

The western Canadian province British Columbia and specifically its prime minister, Christy Clark, pressured the government in Ottawa in 2017 to prohibit the transport of American coal through British Columbia. This is in part a reaction to the trade restrictions initiated by US President Donald Trump in the form of import duties of 20% on Canadian softwoods. Another element is that the action releases port capacities for the export of Canadian coking coal. It is assumed that as consequence 10 million short tons from the Powder River Basin cannot be exported through Canada in 2017. In the previous year, a total of 6.2 million short tons of American coal from the USA was exported through Canadian ports.

The heating up of the discussion regarding the protectionist American trade policies is also to be seen in the setting of the elections in Canada's province British Columbia on 9 May 2017. British Columbia's prime minister, Christy Clark, announced that she would impose a CO<sub>2</sub> tax of

C\$70/tonne on coal exports if the export of American coal through Canadian ports is not prohibited. Prime Minister Justin Trudeau promised on 5 May 2017 to consider carefully Christy Clark's proposal. Clarke was re-elected, but her Liberal Party lost seats and may be dependent on support from the Greens Party, but its support in this matter is virtually guaranteed. A prohibition of American coal exports or a CO<sub>2</sub> tax would most likely entail substantial financial losses for the Westshore and Ridley Terminals. The aforementioned production from the Powder River Basin affects the Westshore Terminal. The Ridley Terminal shipped 2.2 million tonnes of coal from Alberta in 2016. This was more than half of the transshipment at this terminal.

<b>Export/Import Balance Canada 2015/2016</b>		
	<b>2015</b>	<b>2016</b>
	Mill. t	Mill. t
Exports Steam Coal	2.3	2.2
Exports Coking Coal	27.8	28
<b>Total</b>	<b>30.1</b>	<b>30.2</b>
Imports Steam Coal	3.7	2.9
Imports Coking Coal	3.9	3.4
<b>Total</b>	<b>7.6</b>	<b>6.3</b>
<b>Export/Import Balance</b>	<b>22.5</b>	<b>23.9</b>

Source: McCloskey

LB-T20

Canadian exports of 30.2 million tonnes break down into 2.2 million tonnes of steam coal and 28 million tonnes of coking coal. Overall, exports have stabilised and rose very slightly over 2015 by 0.1 million tonnes (0.3 %). The largest buyers were Japan at 7.9 million tonnes, South Korea at 5.6 million tonnes and Germany at 1.5 million

<b>Key Figures Canada</b>			
	<b>2014</b>	<b>2015</b>	<b>2016</b>
	Mill. t	Mill. t	Mill. t
<b>Hard Coal Production <sup>1)</sup></b>	69	62	60.4
<b>Hard Coal Exports</b>	34	30.1	30.2
• Steam Coal	3	2.3	2.2
• Coking Coal	31	27.8	28
<b>Imports Germany</b>	1.5	1.3	1.5
• Coking Coal	1.5	1.3	1.5
<b>Export Quota in %</b>	49	49	50

<sup>1)</sup> Incl. hard lignite  
Source: Various and own calculations

LB-T21

tonnes. Canadian exports of 30.2 million tonnes break down into 2.2 million tonnes of steam coal and 28 million tonnes of coking coal. Overall, exports have stabilised and rose very slightly over 2015 by 0.1 million tonnes (0.3 %). The largest buyers were Japan at 7.9 million tonnes, South Korea at 5.6 million tonnes and Germany at 1.5 million tonnes.

## POLAND

### General

Since the electoral victory of the Law and Justice Party on 25 October 2015, the Polish hard coal mining industry has received strong political support, especially in its dealings with the European Union. This is also urgently needed. Many Polish lignite- and hard coal-fired power plants will not be able to meet the stricter emissions conditions pursuant to LCP BREF, although they are in conformity with the limits for the best available technology (BAT) set by the Industrial Emissions Directive (IED) (see Europe).

### Production

The restructuring of Polish hard coal mining industry was a significant factor in 2015 and 2016. It was possible to prevent the bankruptcy of Kompania Weglowa in 2016. It began with eleven mines in 2016, employed 86,804 miners per 30 September 2016 and operates today under the name Polish Mining Group. A key element for the restructuring of the Polish hard coal mining industry was the assignment of greater responsibility to state-owned electricity provider companies. Eleven unprofitable mines or parts of mines were brought together in a newly established restructuring company, most recently the "Jas-Mos" mine on 01 October 2016. The Polish restructuring plan, which provided 7.95 billion zloty for social and environmental protection measures, was approved by the European Commission. In addition to Kompania Weglowa, Jastrzębie Coal Company S.A. with 5 mines, Katowice Coal Holding S.A. with 4 mines, Tauron Extraction S.A. with 3 mines and five companies with 1 or 2 mines, among them the company Lubelski Wegiel Bogdanka (LWB), are still in operation.

Table T22 shows that the development of production according to company has varied greatly. Production by Kompania Weglowa and Katowice Coal Holding S.A. declined by 13 % and 10 %, respectively. In contrast, production by Weglokoks Kraj Sp. Zo.o. and other small companies rose relatively strongly. Tauron and Bogdanka also reported increasing production.

The *Börsenzeitung* of 6 January 2017 reported highly positive news about two Polish entrepreneurs from the hard coal mining industry. The stock of the hard coal producer Lubelski Wegiel Bogdanka (LWB) doubled in value to a price of about 69 zloty (€ 15.60) in 2016. Bogdanka contributes about 10 % of the Polish hard coal market. The stock price for the Polish coke producer Jastrzbska Spolka Weglowa (JSW) rose even more sharply. The price quintupled to more than 10 zloty (€ 2.25). While the price development of JSW can be explained by the current development of the coke market, Bogdanka can thank its substantially better economic situation in comparison with the other mines for the improvement. Bogdanka, 66% of which is held by the energy company ENEA, enjoys a highly positive earnings position.

In contrast to the development of individual mining companies, some of them in private hands, production is still in a steady decline. 70.4 million tonnes of hard coal were produced in 2016, a decline of 2.5 % over 2015. About 19% of the production is coking coal.

Polish coke production fell slightly from 9.5 million tonnes in 2015 to 9.4 million tonnes in 2016.

### Infrastructure

The export logistics in Poland are well developed. We-

## The Largest Hard Coal Producers in Poland

Company	Production		
	2015 Mill. t	2016 Mill. t	Change over PY
Kompania Weglowa S. A.	27.2	23.6	-13.2 %
Katowicka Holding Weglowy	10.6	9.5	-10.4 %
Jastrzebska Spółka Weglowa S. A.	16.3	16.8	3.1 %
LW Bogdanka	8.5	9	5.9 %
Tauron Wydobycie S.A.	4.9	5.3	8.2 %
Weglokoks Kraj Sp. Zo.o.	1.3	2.3	76.9 %
Other Mines	3.4	3.9	14.7 %
<b>Total</b>	<b>72.2</b>	<b>70.4</b>	<b>-2.5 %</b>

Source: Agencji Rozwoju Przemysłu (ARP)

### LB-T22

glokoks exported 1.8 million tonnes of the 4.1 million tonnes overland by rail.

## Export

Poland has again been a net exporter since 2015; in 2016, just as in the previous year, imports of 8.3 million tonnes were offset by exports of 9.2 million tonnes. The greatest share of the imports came from Russia (5.2 million tonnes) while 1.7 million tonnes came from Australia. Two-thirds of the imports (5.6 million tonnes) were steam coal, one-third was coking coal (2.7 million tonnes).

Weglokoks' share in Polish hard coal exports has been declining for years. Still about 80 % in 2010, the share is now less than half. Exports declined further from 4.7 million tonnes to 4.1 million tonnes in comparison with 2015. The volumes marketed by Weglokoks were exported by sea (56 %) and by land transport (44 %). Exports in 2016 break down as shown below (Weglokoks only):

## Export Weglokoks 2016

	Coking Coal Mill. t	Steam Coal Mill. t	Total Mill. t
Seaborne	0	2.3	2.3
Overland	0.5	1.3	1.8
<b>Total</b>	<b>0.5</b>	<b>3.6</b>	<b>4.1</b>

Source: Weglokoks

### LB-T23

Polish hard coal exports remained constant at the level of the previous year (9.2 million tonnes) in 2016. While exports of steam coal fell slightly to 6.7 million tonnes, coking coal exports rose to 2.5 million tonnes.

Polish coke exports, on the other hand, rose from 5.5 million tonnes (2015) to 5.9 million tonnes in 2016.

## Key Figures Poland

	2014 Mill. t	2015 Mill. t	2016 <sup>1)</sup> Mill. t
<b>Hard Coal Production</b>	72.5	72.2	70.4
<b>Hard Coal Exports</b>	8.8	9.2	9.2
• Steam Coal	6.8	6.9	6.7
• Coking Coal	2	2.3	2.5
<b>Coke Exports</b>	5.9	5.5	5.9
<b>Hard Coal Imports</b>	10.3	8.3	8.3
<b>Imports Germany</b>	4.4	4.1	2.8
• Steam Coal	2.9	3.1	1.5
• Coking Coal	0	0	0
• Coke	1.5	1	1.3
<b>Export Quota in %</b> (coke converted into coal terms)	23	23	24

<sup>1)</sup> Provisional

Source: Various analyses

### LB-T24

The largest buyers of steam coal were Germany (about 1.5 million tonnes) and the Czech Republic (2.8 million tonnes). Most of the coking coal went to the Czech Republic (1.1 million tonnes); further quantities were supplied to Slovakia, Austria and Ukraine.

An import tax of \$15/tonne was imposed on hard coal in Turkey in 2016. Even more surprising was that the tax became effective only shortly after its announcement. The industry attempted to “talk down” the tax rate from \$15/tonne to \$5-\$10/tonne. The tax is not applied to exports from the European Union and EFTA countries. The only country from this group that can profit from this exemption is Poland. In 2016, Poland was able to increase its exports to Turkey relatively strongly by 200,000 tonnes to 269,000 tonnes, but in absolute terms, this is rather a marginal figure.

## PEOPLE’S REPUBLIC OF CHINA

### General

According to an OECD country report from March 2017, China’s gross domestic product will presumably double between 2010 and 2020. However, income development in the metropolises is becoming increasingly disjointed from that of rural areas. The structural transformation has begun, but a significant part must still be carried out. The IMF presented its annual report on the position of the Chinese economy on 12 August 2016 and did not hold back with criticism. According to government statements, China wants to reduce its dependency on heavy industry

and encourage the development of high technology. This will enable wage increases and heighten domestic consumption so that the dependency on exports is reduced.

In fact, the restructuring of the economic system is proceeding at a slower pace than announced, according to the IMF. This is especially true of the inefficient state-owned operations. The indebtedness of Chinese companies, which amounts to 145 % of the GDP, is viewed as a high risk. The state-owned companies have especially high debt. The debt at China’s shadow banks amounts to 30 % of the gross domestic product. The risk of default is especially great here. Determined reform, however, faces a threat of mass unemployment. If the government does not act, there is a risk that growth will be cut in half and debt will grow even more rapidly, which would exacerbate the problems. The start of a financial crisis and the collapse of the banking system are real possibilities. President Xi Jinping calls the maintenance of stability one of the top goals. When he speaks of stability, he means the prevention of mass unemployment. The government policies are understandable from this perspective, but that does not make them any less risky. According to the Frankfurter Allgemeine Zeitung of 3 May 2017, China’s economy is already “slackening.” One important early indicator points to the beginning of a downward trend.

At the end of 2017, the National Development and Reform Commission (NDRC, cf. also the guest comment) released all sections of the 13th Five-Year Plan. It includes a road map as well for the energy sector with an action plan up to 2020. Among other goals, the share of coal in energy consumption is to fall to less than 58 %. The National Office for Statistics reports that this share was still 62 % in 2016. According to the NDRC, special emphasis



is to be placed on the reduction of capacities in smaller mines in northern and eastern China while at the same time the capacities of modern mines are to be increased. In consequence, the NDRC expects total coal production to rise by 4 % in comparison with 2015 by 2020.

Chinese electric power generation increased by 5.2 % in 2016. The contribution to growth from renewable energy sources in absolute terms came to 152 TWh in comparison with 52 TWh from coal. This is substantial growth, but the share of coal-fired power generation still amounts to 65.2 % in comparison with 25.8 % from renewable energy sources. Relatively speaking, the rise in electric power generation from renewable energy sources at 10.9 % in comparison to 1.3 % for coal was even significantly higher. The strongest relative growth, starting from a comparatively low base, was solar energy; it posted 71.9 % and was followed by wind energy at 30.1 %. If electric power generation from renewable energies is broken down to the specific sources, we see that hydroelectric power at 19.7 % still, just as in the past, holds the decisive share. In a system of fluctuating electric power generation from renewable energy sources, this is a great advantage because hydroelectric power can also play the role of the flexibility source. The share of wind energy in electric power generation came to 4 %, the share of solar energy to 1.1 % and the share of biomass to 1.0 %. Electric power generation from natural gas and nuclear power also grew in the two-digit range, but the share of both energy sources is below that of wind energy. The Chinese electric power generation system is undergoing massive restructuring. It must be kept in mind here, however, that the megacities in northern China are supplied with district heating from coal and that there are limits to the restructuring here.

In December 2016, Chinese authorities increased the trade margins and transaction fees on the raw materials exchanges in Dalian and Zhengzhou and on the Shanghai Futures Exchange and introduced trading limits, all with the intent of curbing speculation with raw materials on the country's futures exchanges. For instance, the Dalian Commodity Exchange (DCE) increased the trade margin for coking coal and coke contracts three times within one week.

China is also attempting to restructure the steel industry in the same way as hard coal mining and to decommission capacities, but this effect was noticeable only in the first half of 2016. Smaller economic programmes were supposed to slow down this decline to some degree and actually led to a revitalisation of infrastructure investments and in the real estate sector. This resulted in a rise in steel consumption of 1.3 %, a greater rise than worldwide (1 %). China expects consumption of the same magnitude in 2017 and a decline of 2 % in 2018. Crude steel production rose by 1.2 % and pig iron production increased by 0.7 % in 2016. Contrary to government information, production capacities in China's steel sector rose and did not decline in 2016. The increase supposedly corresponds to twice the steel capacity of Great Britain.

Power/Crude Steel/Pig Iron Production		2014	2015	2016
Electric Power Generation	TWh	5,629	5,694	5,990
Crude Steel Production	Mill. t	822.7	798.8	808.4
Pig Iron Production	Mill. t	711.6	695.9	700.7
Source: world-steel, NBS				

LB-T25

**Production**

In May 2017, the Chinese Ministry for Coal and Mine Safety declared that 2,672 small mines in China would be closed by 2018. These are mines with an annual capacity of less than 90,000 tonnes. The total capacity of the affected mines was estimated at 184 million tonnes as of the end of 2016. In 2015, there were still 10,800 small mines; about 1,000 of them were decommissioned in 2016.

In the south-western province of Yunnan, 613 mines with capacities of 31.4 million tonnes are scheduled for decommissioning in 2017 while 273 mines with a capacity of 32.4 million tonnes will be decommissioned in the neighbouring province of Sichuan. In Heilongjiang, 456 mines with a capacity of 30 million tonnes, in Hunan 328 mines with a capacity of 20.4 million tonnes will be decommissioned. In Shaanxi, on the other hand, the corresponding figure is only 3 million tonnes.

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**Guest Comment**

**Background Information Explaining the Actions of the National Development and Reform Commission (NDRC) Against the Chinese Coal Industry**

Sita Juan ZHANG  
Shanghai, 02/05/2017

**1. General Information About the NDRC**

The National Development and Reform Commission (NDRC), formerly the National Commission for Develop-

ment and Planning, is a department of the State Council and is responsible for economic development and the country's activities for reform and economic opening of the country. Its key tasks include the strengthening and improvement of macroeconomic steering and strong advancement of a sustainable, fast and solid development of the Chinese economy.

Of all the departments under the State Council, the NDRC is the department with the greatest influence on the economy and society because it is responsible for all important aspects of China's development. It oversees the preparation of the national strategy, i.e. the five-year plan. The NDRC is responsible for the development and implementation of the strategies for economic and social development, middle- and long-term programmes, annual plans, guidelines for price policies and comprehensive industrial policy. Moreover, the NDRC is in charge of the coordination of solutions for urgent problems related to the strength of economic performance.

By steering the regional development and reform centres (DRCs) at the provincial and municipal level, the NDRC supervises and coordinates China's economic and social development. The State Council consists of 33 departments, whereby the National Energy Administration (NEA) as headquarters is responsible for the development policy management of the Chinese energy industry, including the preparation and implementation of plans and directives, administration of energy sectors such as coal, oil, natural gas, electricity, renewable energies etc., approval and review of investments in the energy industry, preparation of forecasts and precautionary actions, submission of recommendations for energy price adjustments and imports/exports.

The NDRC and the NEA in particular hold the decisive and exclusive authority to make decisions regarding energy production and the determination and supervision of pricing. The NEA is a cross-ministry agency with authority over all actors on the Chinese energy market.

The brief remarks below about the National Energy Commission (NEC) will facilitate understanding of the background to decision-making processes at the NDRC/NEA. It was established in 2008. Under the direction of Li Ke Qiang, the NEC is in particular responsible for the preparation of a national energy strategy, the handling of major questions/issues within the energy sector and coordination of domestic energy production and international cooperation within the energy industry. The managing directors of NDRC and NEA are permanent members of the National Energy Commission, and the National Energy Commission is in charge of implementation activities.

## **2. Key Regulations of the Coal Industry – 13<sup>th</sup> Five-Year Plan for the Coal Industry**

The 13th Five-Year Plan for the Economic Development of the Coal Industry (2016–2020), issued by the NDRC in December 2016, emphasises that China's economic development has long been supported by coal and that 90% of the country's energy consumption is still covered by coal. The NDRC confirms that coal will continue to be the most important energy source for a long time to come, although the development of the coal industry faces serious challenges from overcapacities, inadequate production, neglect of environmental protection, occupational safety etc. According to NDRC's economic background analysis, it is assumed that the demand for energy will decline because of improved energy efficiency and the presumably restricted growth of large energy

consumers such as the steel industry, the non-ferrous metals industry and the construction materials industry. Estimates indicate that coal's share will fall to 58 % by 2020 and that the share of renewable energies will increase and replace a certain percentage of coal consumption. The NDRC names a number of targets related to the development of the coal industry that are to be achieved by 2020:

- Alleviation of pressure from overcapacities in coal production (800 million tonnes of low-grade production from small coal mines using obsolete mining technology will be decommissioned; 500 million tonnes of high-grade production capacity from high-quality, modern and large coal mines that will be expanded and modernised); in 2020, coal production will amount to 3.9 billion tonnes and there will be 6,000 coal mines. In general, it appears that the NDRC will not issue any permits for new coal mines and increases in capacity within the next 3 years.
- The NDRC intends to implement these measures for the adaptation of the industrial structures and modification of the regional production regulations: reduction of coal production in eastern China because of the high production costs and difficult mining conditions; restriction of coal production in central and north-eastern China because the coal seams are fairly deep underground and cannot be mined cost-efficiently; and increase in coal production in western China without compromising the relatively fragile local surroundings.
- The advancement of clean, high-performance and low-emission development.

One important decision contained in the 13th Five-Year Plan is that the NDRC has determined the optimisation of production allocation according to region (eastern Chi-

This is of key importance for future price estimates. As the remarks below show, the NDRC is acting both as a “visible hand” and an “invisible hand” in its steering of the coal industry. The NDRC will continue to reduce overcapacities and aggressively drive production capacity from large coal mines. NDRC’s intervention will have an impact on both demand and supply and consequently on the price of coal.

na, central/north-eastern China, western China) and the encouragement of the merger of the 14 largest mining regions so that their coal production in China in 2020 will make up 95 % of total coal production.

### 3. Fluctuation of the Coal Price in China in 2016

Although China has initiated various measures for the closing of small coal mines and has encouraged M&A activities by large competing mining companies for several years, 2016 was the first year in which the NDRC implemented official regulations for the reduction of coal production. On 1 February 2016, the NDRC announced the “Views for Reduction of Overcapacities in Coal Production” (No. 7, 2016).

Summary of the “Views”:

The directive requires the reduction of 500 million tonnes in coal production capacity and the reorganisation of 500 million tonnes of coal production capacity within 3 to 5 years from 2016. No permits for new coal mines will be issued over the next 3 years.

Small coal mines with annual capacity of less than 300,000 tonnes that have been the cause of very serious accidents during coal mining and coal mines with an annual capacity of less than 150,000 tonnes that have been

responsible for serious accidents will be closed down within the next 1 to 3 years.

The recommendation is to shut down coal mines that produce coal under difficult conditions such as high methane concentrations or deep coal seams

Coal mines that are noteworthy for long-term losses, exhausted coal deposits and long-term tax debts will be closed.

M&A activities initiated by large coal mines should be based on modern production capacities.

The number of working days annually in coal mines has been limited to 276 days since 2016.

The reasons given for this restriction is that the NDRC believes that the economic decline, the change in the industry mix and dangerous production conditions have led to substantial problems in the coal industry. A reduction in coal production appears to be a reasonable solution to these problems – e.g. declining profits in coal mining, low shift performance, severance payments and social secu-

After several years of efforts to restructure the coal industry, the number of coal mines has been reduced and total production capacity has dropped. Because of the economic collapse in China, the demand for coal has also fallen. In July 2016, Xu Shaoshi pointed out that a cutback in capacity of 280 million tonnes should be sought in 2016. During a press conference in October 2016, the NDRC announced that 80% of the required reduction in capacities had been achieved. The speed with which the capacities are being reduced is growing. In March 2017, Xu Shaoshi announced that capacities in 2016 were reduced by 290 million tonnes.

city of the employees – and has been incorporated as a long-term strategy in the 13th Five-Year Plan (to 2020). The NDRC hopes that the cuts in capacity will cause the coal price to rise to a reasonable level, thereby improving the loss situation of the coal mines.

#### 4. Looking Back at 2016-2017

At the beginning of the year, the Bohai-Rim Thermal Coal Price Index posted a value of CNY 371 per tonne (calorific value of 5,500 kcal/kg). The coal price in China was adversely affected by the international market. The overcapacity in 2015 was regarded as another reason for the low price.

In April, the NDRC organised a work conference on short notice with the objective of driving the reduction of capacities in cooperation with 25 ministries. The heavyweight NDRC announced not only a regulation as guidelines for the industry, but also demanded a strong team for implementation and achievement of the set targets. In April, the coal price rose to about CNY 389 a tonne.

In May, the coal mines in Inner Mongolia, Shaanxi and Shanxi began to comply strictly with the legal limit of 276 workdays. As a consequence, coal production weakened slightly. The coal price rose and in June amounted to about CNY 401 a tonne and in July to about CNY 430 a tonne.

The upward trend of the MPI indicates a slight economic recovery for China. While the production capacity of many hydroelectric plants declined because of the dry weather, the demand for electricity rose because of the high temperatures in the summer.

In August, the NDRC sent work groups to the coal mining regions to supervise and manage the measures for the reduction of capacities. At the end of August, the coal price shot up to about CNY 494 a tonne.

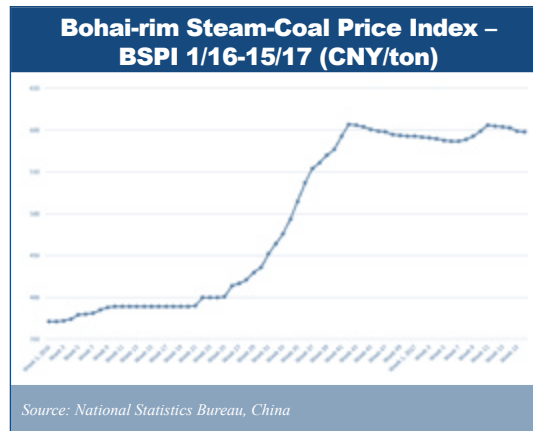


Figure LB3

In response, the stockpiles of large coal consumers – such as power plants, for instance – declined drastically because of the reduction in coal production. Speculation about the coal price also drove the demand for coal upward.

The NDRC realised that it was time to stabilise coal production to prevent any further increase in the price and convened a meeting with dozens of large coal mines, including Shenhua and Zhongmei for the purpose of restructuring coal production capacities. A new regulation for the number of workdays was adopted and raised the limit from 276 to 330 for a number of coal mines.

Since September is the time when coal is stockpiled for heating in winter, the NDRC announced that the mining of coal would also be permitted during the Golden Week (national holiday). At the end of August, the coal price came to CNY 561 a tonne.

Confronted with the dilemma of an extremely sharp rise in the coal price within a very short time and increased demand for coal because of the approaching winter, the NDRC convened a crisis meeting with representatives of the 22 largest coal mines to discuss ways to reduce capacities while simultaneously guaranteeing production/supply; further agenda points were structural transformation and modernisation and sustainable development. At the end of October, the coal price came to between CNY 593 and CNY 607 a tonne.

On 3 November, the NDRC held a crisis meeting on the “price policy of the mines.” To reduce the prices on its part, the NDRC supervised large coal mines. In addition, it called upon the responsible authorities for railway transport and inland shipping on 9 November to increase their transport capacities for the coal needed in winter. One week later, the NDRC demanded the signing by the responsible provincial governments of a middle- to long-term agreement on the guarantee of stable coal supply. All legal coal mines were authorised to set the number of workdays again to 330. At this time, the coal price came to CNY 604 a tonne; according to the NDRC, this was an acceptable magnitude.

In March 2017, the NDRC announced that the targets for total coal production set for 2017 came to 3.65 billion tonnes and would be maintained at this level; moreover, 150 million tonnes of production capacity from coal mines using obsolete mining technology would be eliminated in this year. As long as the coal price is above the “acceptable magnitude,” no further directives for reduction of production capacity would be required, according to the NDRC.

5. Some Thoughts

I. In the long term, it can be assumed that the NDRC will

not deviate from its strategy of eliminating inefficient, dangerous and environmentally harmful coal production, improving the industrial consolidation via M&A and continuing to drive the development to the use of clean energy. The government’s work report from 2017 notes that the envisioned target for capacity reduction in 2017 is more than 150 million tonnes and is therefore lower than the target for 2016. In the meantime, it is a good idea to track the speed of capacity cutbacks.

II. The NDRC – the “invisible hand” of the government – will continue to pursue its goals, but usually lags behind the market, and this has a direct impact. Once the 14 largest mining regions hold 95 % of the total coal production in China, NDRC’s intervention will quickly affect the market.

III. There are certainly a great many other factors that should be taken into account when predicting the future development of the coal price – for instance, the international market price, China’s economic recovery, alternative energy sources, introduction of energy-efficient technologies, short-term changes in demand, speculative investments and (must not be forgotten) the influence of the Chinese government.

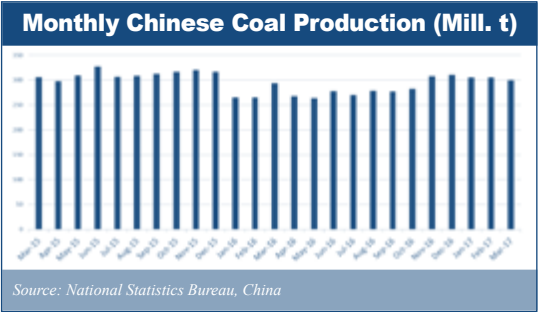


Figure LB4

\*\*\*\*\*

Coal Production in the Four Largest Mining Provinces and Companies in China		
	2015	2016
	Mill. t	Mill. t
Inner Mongolia	914	832
Shanxi	976	810
Shaanxi	521	506
Shenhua Energy	281	290
Source: Various analyses		

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### Infrastructure

Production restrictions in China that have been introduced for occupational safety and environmental protection reasons strengthen the importance of import coal. There is talk among dealers that the maintenance work on the Daqin railway line is consequently more noticeable than in past years. The maintenance work planned for the summer will cause capacity reductions of 20 %. This railway company increased its freight rates by 10 % as early as March 2017. Costs for the transport of coal from Shanxi to the port of Qinhuangdao would increase by \$1/tonne while an additional \$2/tonne would apply to transports from Inner Mongolia. It is assumed that transport volume will continue to increase in 2017. The capacity of this railway line was increased in February 2017 by 30 % in comparison with the previous year.

The investments in Chinese hard coal mining and in coal processing during the first four cumulative months of 2017 declined by about 10 % in comparison with the same period of the previous year to \$6.66 billion. In the

same period, private investors contributed \$3.7 billion, a decline of 17.2 % in comparison with the same period last year.

### Import/Export

China is included in the Country Reports because the country was once a major export country. In 2016, China's gross export quota amounted to only 0.67 %. 8.6 million tonnes of coal and 10.2 million tonnes of coke were exported.

Chinese imports of hard coal rose substantially again in 2016. At 183.4 million tonnes, they were 17.6 % higher than in the previous year. Steam coal imports increased by 17.8 %, the imports of coking coal by even more (23.5 %) and of anthracite by 6.5 %.

The news agency Reuters reported on 20 February 2017 that coal imports from North Korea were to be stopped completely after the government in Pyongyang had caused tremendous concern among the international community by conducting new rocket tests in the previous week. The Chinese steel manufacturers must now look for alternatives, presumably in Russia or Australia. North Korea covers only a small part of China's total coal imports, but it is the most important foreign supplier of high-grade anthracite.

Import/Export Development			
	2015	2016	Difference 2015 / 2016
	in Mill. t	in Mill. t	in Mill. t
Imports Steam Coal *	107.9	124.1	16.2
Imports Coking Coal	48	59.3	11.3
<b>Total Imports</b>	<b>155.9</b>	<b>183.4</b>	<b>27.5</b>
Exports Steam Coal *	4.2	7.4	3.2
Exports Coking Coal	1	1.2	0.2
Exports Coke	9.8	10.2	0.4
<b>Total Exports</b>	<b>15</b>	<b>18.8</b>	<b>3.8</b>
* Incl. anthracite, excl. lignite Source: McCloskey CCR			

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Key Data People's Republic of China <sup>1)</sup>			
	2014	2015	2016
	Mill. t	Mill. t	Mill. t
Hard Coal Production	3,598	3,545	3,360
<b>Hard Coal Exports</b>	<b>5.2</b>	<b>5.2</b>	<b>8.6</b>
• Steam Coal	4.5	4.2	7.4
thereof anthracite	2.1	3.0	3.7
• Coking Coal	0.7	1.0	1.2
<b>Coke Exports</b>	<b>8.6</b>	<b>9.8</b>	<b>10.2</b>
<b>Hard Coal Imports</b>	<b>228</b>	<b>155.9</b>	<b>183.4</b>
• Steam Coal	135.2	83.1	97.7
• Coking Coal	62.4	48.0	59.3
• Anthracite	30.4	24.8	26.4
<b>Imports Germany</b>	<b>0.12</b>	<b>0.12</b>	<b>0.13</b>
Steam Coal	0.02	0.02	0.03
Coke	0.1	0.1	0.1
<b>Export Quota in %</b>	<b>0.4</b>	<b>0.51</b>	<b>0.67</b>
<sup>1)</sup> Excluding lignite Source: Various analyses, McCloskey			

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# VENEZUELA

## General

According to the International Monetary Fund (IMF), Venezuela's economic growth recovered to as much as 5.6 % in 2011 and 2012, weakened in 2013 and has shrunk since the drop-in oil prices from the middle of 2014 by 3.9 % (2014) and 6.2 % (2015). A little more than two years after the death of President Hugo Chávez, Venezuela under the rule of the left-wing government of President Nicolás Maduro is in a catastrophic economic and political position. Inflation and supply bottlenecks as well as budget deficits and rising national debt are the outward signs of the crisis. The country so rich in raw materials has not succeeded in using its income from raw materials to initiate self-sustaining development. Therefore, every decline in oil prices exacerbates the country's existing structural problems. This assessment is broadly shared. The Maduro government, on the other hand, speaks of an "economic war" by the entrepreneur camp and blames foreign influence for the country's misery.

The political conflicts came to such a head at the end of March/beginning of April 2017 that there were not only mass protests, but the Supreme Court revoked the authority of the Parliament and transferred it to the Court itself. The members of Parliament called this a "coup d'état." To the surprise of the president, the Chief Prosecutor Ortega considered this to be a breach of the constitution. The National Defence Council that was then convened with President Maduro as its chair ended its



crisis meeting by demanding that the Court review its decisions to revoke Parliament's authority and to lift the immunity of its members so that "the institutional stability and the balance of the powers of government" would be maintained. But Venezuela's situation has not improved since then. There have regularly been mass protests and conflicts with the police that have resulted in deaths. The decision that Capriles, the leader of the opposition, may not hold any political office for 15 years has only heightened tensions. After critical remarks regarding the violent suppression of the protests critical of the government came from military circles, there have been reports of the arrest of soldiers. For the moment it can only be recorded that the situation is quite chaotic.

### Production

Hard coal production in 2016 came to just 0.3 million tonnes, a decline of 80 % over the previous year. Venezuela has lost its position as a major coal-exporting country. The poor economic condition of the country, lack of

spare parts, inadequate maintenance and labour conflicts are mentioned as reasons for the decline in production.

### Export

All hard coal production was exported. In addition, there were stockpiles that had been held in Venezuelan ports since the closing of the border between Venezuela and Colombia in August 2015. An improvement in the situation is not in sight. It must be assumed that exports will fall to zero in 2017.

### Key Figures Venezuela

	2014	2015	2016
	Mill. t	Mill. t	Mill. t
<b>Hard Coal Production</b>	2	1.6	0.27
<b>Hard Coal Exports</b>	2	1.6	0.54 *
<b>Imports Germany</b>	0	0	0
• Steam Coal	0	0	0
<b>Export Quota in %</b>	<b>100</b>	<b>100</b>	<b>100 *</b>

\* of which 0.3 million tonnes in stockpiles ex Colombia  
Source: IHS

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### Production/Exports by Company <sup>1)</sup>

	2014	2015	2016
	Mill. t	Mill. t	Mill. t
Carbones del Guasare	0.6	-	-
Interamerican Coal	0.6	0.5	-
Carbones De La Guajira <sup>2)</sup>	0.4	0.8	0.3
Miscellaneous	0.41	0.3	-
<b>Total</b>	<b>2.01</b>	<b>1.6</b>	<b>0.3</b>

<sup>1)</sup> Estimate; <sup>2)</sup> Including production of Carbones del Guasare  
Source: Own calculations

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## VIETNAM

### General

According to the International Monetary Fund (IMF), the Vietnamese economy has developed very steadily over recent years with consistent growth rates throughout this time of at least 5% and a peak of over 7 % (2007). In 2015, Vietnam achieved growth of 6.7 % in comparison with 2014 and almost reached the level of 7 % in growth (in each case, real growth) – the strongest growth in five years. According to a report in the FAZ, such positive economic development in Asia is otherwise found only in China, India and the Philippines, although there are major doubts about the announced values from China and India. According to the country information portal maintained by the German Society for International Cooperation (GIZ), growth in the first half of 2016 declined slightly in comparison with the same period of the previous year to 5.5 %. The continuing drought in the Mekong Delta and a massive fish die-off in central Vietnam are viewed as possible causes. This resulted in economic growth of only 6.2 % for all of 2016. Growth slowed once again at the beginning of 2017, however. The causes are still not foreseeable.

According to information from GTAI, Vietnam is strongly pushing the expansion of its energy infrastructure. Government plans provide that electric power generation capacities are to increase from about 39 gigawatts (GW) to 60 GW in 2020, about half again as much. The growing electricity consumption is to be covered primarily by the construction of new coal-fired power plants. Pursuant to the revised version of the National Power Development Plan VII (Decision No. 428/QĐ-TTg of 18/03/2016 for the planning period 2016 to 2030), their electric power generation share is to rise from 34 % in the base year 2015 to 55 % in 2025, then to decline slightly by 2030 to a share of 53%. The share of renewable energy sources (excluding hydroelectric power) is to grow as well (from just under 4 % to 7 % in 2025 and 11% in 2030). Expansion opportunities for hydroelectric power remain limited, however, so that its share in total Vietnamese electric power generation of 30 % in 2015 will almost certainly decline to 12 % at the end of the planning horizon. Vietnam wants to do increasingly without nuclear power for cost reasons (share in 2030 just under 6 %).

VIETNAMNET Bridge, Vietnam's first English-language online magazine, reported in December 2016 that the country wanted to consider the environmental impact

of coal by requiring the coal mining industry to pay high environment taxes and levies, which would make it very difficult for the companies to compete with providers from other countries. In addition, the export tax for coal in Vietnam is 10 % – according to government information, this is a very high level in a worldwide comparison.

**Export**

Owing to these factors as well as its strong economic growth, Vietnam’s exports in recent years have continued to decline while imports have risen. In 2016, the latter rose by 92 % to 13.6 million tonnes, contrasted by exports in the amount of 1.3 million tonnes. The export quota is now a mere 3.3 %. The primary suppliers of import coal are Australia and Indonesia.

Key Figures Vietnam			
	2014	2015	2016
	Mill. t	Mill. t	Mill. t
Hard Coal Production	40.8	41.5	39.6
Hard Coal Export	7.2	1.75	1.3
thereof China	4.1	0.7	0.5
Export Quota in %	18	4.2	3.3
Imports	3.1	7	13.6
Source: Various analyses			

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## Report in figures (provisional for 2016)

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German notion for decimal separator and thousands separator was used for technical reasons:

- “,” corresponds to “.”
- “.” corresponds to “ , ”

## World Energy Consumption According to Energy Sources and Regions

Energy Source	2010	2011	2012	2013	2014	2015
Oil	5.754	5.836	5.913	5.970	6.074	6.188
Natural Gas	4.083	4.167	4.266	4.361	4.402	4.479
Nuclear Energy	900	859	800	805	822	833
Hydroelectric Power	1.100	1.136	1.191	1.231	1.263	1.276
Hard Coal and Lignite	5.080	5.189	5.320	5.524	5.587	5.485
Miscellaneous and Renewable Energies	162	286	342	404	452	521
<b>Total</b>	<b>17.079</b>	<b>17.473</b>	<b>17.832</b>	<b>18.295</b>	<b>18.600</b>	<b>18.782</b>
Consumption Regions	2010	2011	2012	2013	2014	Share in % 2015
North America	23,1	22,7	21,8	21,8	21,8	21,3
Asia/Australia	38,1	39,1	40,3	40,7	41,3	41,8
from 2007 EU 27	14,5	13,9	13,0	13,1	12,5	12,4
CIS	8,3	8,3	8,5	7,9	7,7	7,2
Rest of World	16,0	16,0	16,4	16,5	16,7	17,3
<b>Total</b>	<b>100,0</b>	<b>100,0</b>	<b>100,0</b>	<b>100,0</b>	<b>100,0</b>	<b>100,0</b>
<b>Coal Consumption</b> (Hard Coal and Lignite)	<b>5.080</b>	<b>5.189</b>	<b>5.320</b>	<b>5.524</b>	<b>5.587</b>	Mill. TCE <b>5.485</b>
Consumption Regions	2010	2011	2012	2013	2014	Share in % 2015
North America	15,6	14,5	12,6	12,6	12,6	11,2
Asia/Australia	67,1	67,9	69,7	70,6	71,5	72,9
from 2013 EU 28	7,9	8,3	7,9	7,5	7,0	6,8
CIS	4,8	4,7	4,9	4,6	4,2	4,0
Rest of World	4,6	4,6	4,9	4,7	4,7	5,1
<b>Total</b>	<b>100,0</b>	<b>100,0</b>	<b>100,0</b>	<b>100,0</b>	<b>100,0</b>	<b>100,0</b>

*Includes commercially traded energy sources only  
Source: BP Statistical Review of World Energy Until 2015*

Table 1

World Hard Coal Production/Foreign Trade <sup>1)</sup>									Mill. t
	Production	2011 Export	Import	Production	2012 Export	Import	Production	2013 Export	Import
Germany	14	0	41	11	0	45	8	0	50
France	0	0	19	0	0	18	0	0	19
Great Britain	18	1	27	17	0	45	13	0	49
Spain <sup>2)</sup>	9	0	13	6	0	21	4	0	13
Poland	77	14	10	79	7	10	77	11	11
Czech Republic	12	7	2	11	5	2	9	5	2
Romania	4	0	4	4	0	4	4	0	3
<b>from 2013 EU 28</b>	134	22	182	129	12	214	114	16	216
Russia	321	97	10	353	127	30	347	143	22
Kazakhstan	106	29	1	121	30	0	120	30	0
Ukraine	76	6	10	85	0	10	84	8	11
<b>Designated Countries</b>	503	132	21	559	157	40	551	181	33
Canada	33	33	9	67	35	10	69	39	9
USA	984	74	15	922	114	8	905	106	8
Colombia	75	72	0	89	81	0	86	75	0
Venezuela	4	4	0	3	3	0	2	2	0
<b>Designated Countries</b>	1,096	183	24	1,081	233	18	1,062	222	17
<b>Republic of South Africa</b>	250	68	0	260	76	0	256	73	0
<b>Australia</b>	355	300	0	366	316	0	410	358	0
India	537	0	86	580	0	129	554	0	161
PR China <sup>3)</sup>	3,410	19	166	3,660	9	235	3,671	7	288
Japan	0	0	184	0	0	185	0	0	191
Indonesia <sup>4)</sup>	295	240	0	386	304	0	342	335	0
<b>Designated Countries</b>	4,242	259	436	4,626	313	549	4,567	342	640
Other Countries	141	89	390	145	57	343	235	45	331
<b>World</b>	6,720	1,053	1,053	7,166	1,164	1,164	7,195	1,237	1,237

1) Domestic and seaborne trade, 2) Production incl. "Lignito Negro"  
3) Production incl. lignite (estimated approx. 50 million tonnes), from 2013 excluding lignite, 4) Indonesia imports 2014 incl. lignite

Table 2

World Hard Coal Production/Foreign Trade <sup>1)</sup>									Mill. t
Production	2014 Export	Import	Production	2015 Export	Import	Production	2016 Export	Import	
8	0	54	8	0	56	4	0	53	Germany
0	0	14	0	0	14	0	0	14	France
12	0	38	9	0	27	4	0	8	Great Britain
4	0	15	3	0	19	2	0	15	Spain <sup>2)</sup>
73	9	10	72	9	8	70	9	8	Poland
9	4	3	8	4	2	7	4	3	Czech Republic
2	0	2	2	0	2	k. A.	0	2	Romania
106	13	205	100	4	192	87	13	156	<b>from 2013 EU 28</b>
357	166	30	373	166	22	384	174	22	Russia
120	30	0	107	30	0	102	30	0	Kazakhstan
65	5	17	40	8	15	41	8	16	Ukraine
542	201	47	520	204	37	527	212	38	<b>Designated Countries</b>
69	34	8	62	30	8	60	30	6	Canada
907	88	10	813	67	10	666	54	8	USA
89	77	0	86	83	0	91	90	0	Colombia
2	2	0	2	2	0	0	1	0	Venezuela
1,067	201	18	963	182	18	817	175	14	<b>Designated Countries</b>
261	77	0	252	77	0	254	75	0	<b>Republic of South Africa</b>
441	387	0	421	387	0	433	391	0	<b>Australia</b>
612	0	215	626	0	216	639	0	181	India
3,598	5	228	3,545	5	187	3,360	5	185	PR China <sup>3)</sup>
0	0	188	0	0	191	0	0	189	Japan
389	348	0	414	327	0	419	311	0	Indonesia <sup>4)</sup>
4,599	353	631	4,585	332	594	4,418	316	555	<b>Designated Countries</b>
34	40	371	157	40	385	194	34	453	Other Countries
7,050	1,272	1,272	6,998	1,226	1,226	6,730	1,216	1,216	<b>World</b>

Sourcen: Statistics from Kohlenwirtschaft, ECE, IEA, statistics of the importing and exporting countries, own calculations

Table 2

Hard Coal Seaborne Trade									Mill. t
Exporting Countries	2011			2012			2013		
	Coking Coal	Steam Coal	Total	Coking Coal	Steam Coal	Total	Coking Coal	Steam Coal	Total
Australia	133	148	281	145	171	316	171	188	359
USA	60	31	91	59	48	107	56	44	100
South Africa	1	66	67	1	75	76	0	73	73
Canada	26	6	32	30	4	34	35	3	38
PR China	5	10	15	1	8	9	1	6	7
Colombia	3	78	81	1	80	81	1	74	75
Indonesia <sup>2)</sup>	0	270	270	0	304	304	0	335	335
Poland	0	3	3	0	3	3	0	6	6
Russia	8	93	101	8	109	117	15	116	131
Venezuela	0	4	4	0	3	3	0	2	2
Miscellaneous	3	30	33	11	21	32	0	16	16
<b>Total</b>	<b>239</b>	<b>739</b>	<b>978</b>	<b>256</b>	<b>826</b>	<b>1,082</b>	<b>279</b>	<b>863</b>	<b>1,142</b>
Importing Countries/ Regions	2011			2012			2013		
	Coking Coal	Steam Coal	Total	Coking Coal	Steam Coal	Total	Coking Coal	Steam Coal	Total
Europe <sup>1)</sup> , thereof	48	148	196	42	193	235	43	190	233
EU 28 (from 2013)	39	116	155	37	149	186	38	156	194
Asia, thereof	140	531	671	139	601	740	194	658	852
Japan	55	120	175	52	133	185	48	143	191
South Korea	22	107	129	21	105	126	21	105	126
Taiwan	0	66	66	0	66	66	0	67	67
PR China	21	109	130	34	145	179	51	158	209
Hong Kong	0	13	13	0	12	12	0	13	13
India	33	81	114	31	98	129	54	107	161
Latin America	4	31	35	20	17	37	19	12	31
Miscellaneous (incl. USA)	47	29	76	55	15	70	23	3	26
<b>Total</b>	<b>239</b>	<b>739</b>	<b>978</b>	<b>256</b>	<b>826</b>	<b>1,082</b>	<b>279</b>	<b>863</b>	<b>1,142</b>
<i>Figures excl. overland traffic</i> <i>1) Incl. neighbouring Mediterranean countries</i> <i>2) Indonesia from 2013 incl. lignite</i> <i>Assessment of various sources</i>									

Table 3



Hard Coal Seaborne Trade										Mill. t
2014			2015			2016				
Coking Coal	Steam Coal	Total	Coking Coal	Steam Coal	Total	Coking Coal	Steam Coal	Total	Exporting Countries	
186	201	387	185	202	387	191	200	391	Australia	
53	29	82	38	24	62	17	37	54	USA	
0	77	77	0	77	77	0	75	75	South Africa	
31	3	34	27	2	29	28	2	30	Canada	
1	5	6	1	4	5	1	8	9	PR China	
1	75	76	3	80	83	1	89	90	Colombia	
0	348	348	0	327	327	0	311	311	Indonesia <sup>2)</sup>	
0	3	3	0	2	2	0	2	2	Poland	
33	110	143	17	125	142	19	131	150	Russia	
0	2	2	0	2	2	0	1	1	Venezuela	
4	25	29	0	19	19	0	2	2	Miscellaneous	
309	878	1.187	271	864	1.135	257	858	1,115	Total	
2014			2015			2016			Importing Countries/ Regions	
Coking Coal	Steam Coal	Total	Coking Coal	Steam Coal	Total	Coking Coal	Steam Coal	Total		
70	140	210	38	154	192	44	144	188	Europe <sup>1)</sup> , thereof	
64	104	168	33	114	147	39	110	149	EU 28 (from 2013)	
199	694	893	206	643	849	184	637	821	Asia, thereof	
43	145	188	41	150	191	43	146	189	Japan	
6	125	131	25	110	135	25	103	128	South Korea	
0	67	67	0	66	66	0	67	67	Taiwan	
48	161	209	48	108	156	59	124	183	PR China	
0	14	14	0	11	11	0	9	9	Hong Kong	
37	178	215	47	169	216	40	141	181	India	
17	16	33	1	32	33	1	33	34	Latin America	
23	28	51	26	35	61	28	44	72	Miscellaneous (incl. USA)	
309	878	1.187	271	864	1.135	257	858	1,115	Total	

Table 3

World Coke Production							1,000 t
Country/Region	2010	2011	2012	2013	2014	2015	2016
<b>Europe</b>							
Austria	1,400	1,350	1,310	1,350	1,330	1,291	1,250
Belgium	1,880	1,867	1,788	1,654	1,260	1,250	1,260
Bosnia-Herzegovina	920	891	694	703	766	751	805
Bulgaria	0	0	0	0	0	0	0
Czech Republic	2,396	2,436	2,317	2,348	2,395	2,200	2,084
Finland	828	852	881	878	783	773	882
France	3,110	2,841	3,186	3,331	3,231	3,280	3,200
Germany	8,150	7,990	8,050	8,379	8,740	9,250	9,387
Hungary	1,018	1,049	1,026	924	923	960	890
Italy	3,708	4,154	3,607	2,080	1,930	1,878	1,988
The Netherlands	1,882	1,998	1,860	1,967	2,000	2,020	2,050
Poland	9,546	9,134	8,637	9,104	9,357	9,450	9,400
Romania	0	0	0	0	0	0	0
Slovakia	1,550	1,555	1,583	1,425	1,458	1,676	1,750
Spain	2,021	2,045	1,761	1,610	1,483	1,594	1,504
Sweden	1,118	1,151	1,048	1,009	1,037	1,129	1,094
Great Britain	3,774	3,717	3,487	3,616	3,500	2,668	1,200
<b>Europe Total</b>	<b>43,301</b>	<b>43,030</b>	<b>41,235</b>	<b>40,378</b>	<b>40,193</b>	<b>40,170</b>	<b>38,744</b>
<b>CIS</b>	<b>48,220</b>	<b>49,673</b>	<b>48,135</b>	<b>46,657</b>	<b>44,197</b>	<b>41,805</b>	<b>43,226</b>
<b>North America</b>	<b>19,624</b>	<b>19,632</b>	<b>19,230</b>	<b>19,214</b>	<b>18,235</b>	<b>16,749</b>	<b>14,200</b>
<b>Latin America</b>	<b>12,350</b>	<b>13,018</b>	<b>13,531</b>	<b>12,747</b>	<b>13,503</b>	<b>13,436</b>	<b>13,066</b>
<b>Africa</b>	<b>2,691</b>	<b>2,618</b>	<b>2,404</b>	<b>2,301</b>	<b>2,413</b>	<b>2,092</b>	<b>1,824</b>
<b>Middle East</b>	<b>5,320</b>	<b>5,135</b>	<b>5,459</b>	<b>5,186</b>	<b>5,388</b>	<b>5,885</b>	<b>5,580</b>
<b>Asia</b>							
China	384,060	427,790	441,620	473,050	476,910	447,780	449,110
India	19,756	20,389	20,699	21,582	22,573	22,267	21,650
Indonesia	0	0	0	112	991	1,130	1,147
Japan	37,500	35,400	34,700	35,200	34,200	32,400	33,159
South Korea	12,835	15,799	14,607	15,572	16,899	17,426	17,528
Pakistan	323	250	150	50	50	80	0
Taiwan	4,752	4,859	4,821	6,103	6,277	6,026	6,227
Vietnam	384	530	447	465	641	725	1,218
<b>Total</b>	<b>459,610</b>	<b>505,017</b>	<b>517,044</b>	<b>552,134</b>	<b>558,541</b>	<b>527,834</b>	<b>530,039</b>
<b>Australia</b>	<b>3,149</b>	<b>2,982</b>	<b>2,858</b>	<b>2,619</b>	<b>2,474</b>	<b>2,472</b>	<b>2,448</b>
<b>WORLD Total</b>	<b>594,265</b>	<b>641,105</b>	<b>649,896</b>	<b>681,236</b>	<b>684,944</b>	<b>650,443</b>	<b>649,127</b>
Source: Association information							

Table 4

Grades of Steam Coal Traded on World Market							
Exporting Countries	Volatile	Ash	Tot. Moisture	Sulphur	Fine Coal Particles	Grinding Hardness	Calorific Value
	%	%	%	%	%	HGI	kcal/kg
<b>Atlantic Suppliers</b>							
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
<b>Pacific Suppliers</b>							
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 - 0,95	58 - 83	35	5100 - 6800
<b>Germany</b>	<b>19 - 33</b>	<b>6 - 7</b>	<b>8 - 9</b>	<b>0,7 - 1,4</b>	<b>58 - 65</b>	<b>60 - 90</b>	<b>6600 - 7100</b>
<i>Data in rough ranges</i> <span style="float: right;"><i>Sourcen: Cf. Table 6</i></span>							

Table 5

Grades of Coking Coal Traded on World Market						
Exporting Countries/ Grades	Volatile %	Ash %	Bound Moisture %	Sulphur %	Phosphorus %	Crucible Swelling Number FSI
<b>Low Volatility</b>						
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
<b>Medium Volatility</b>						
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	
<b>High Volatility</b>						
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
<b>Germany</b>	26.6 <sup>1)</sup>	7.4 <sup>1)</sup>	1.5 <sup>1)</sup>	1.1 <sup>1)</sup>	0.01-0.04	7-8
<i>Data in air-dry ranges</i>						
<sup>1)</sup> Coke application mixture						
<sup>2)</sup> CSR value (coke strength under reduction) characterises the hot strength of the coke after being heated to 1,100° C and subsequent gassing with CO2 The CSR values assigned to the coal are guide values only.						
<i>Sources: Australian Coal Report, Coal Americas, company information</i>						

Table 6

**Grades of Coking Coal Traded on World Market**

Coke Strength CSR Value <sup>2)</sup>	Fluidity max. ddp <sub>m</sub>	Contraction max. %	Dilatation max. %	Reflection mean %	Macerals		Minerals %
					reactive %	inert %	
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 Exports from Australia							1,000 t
Importländer	2010	2011	2012	2013	2014	2015	2016
Germany	4,303	4,280	4,451	4,739	5,673	5,737	6,505
France	2,946	2,363	2,719	3,317	3,219	3,707	3,860
Belgium/Luxembourg	1,298	1,179	992	444	39	1,610	231
The Netherlands	1,217	1,470	1,202	2,651	2,785	2,432	3,784
Italy	1,741	1,557	1,519	821	657	840	778
Great Britain	3,612	3,585	2,357	2,458	1,803	1,729	1,218
Denmark	0	0	0	0	0	0	0
Spain	1,715	1,337	1,118	1,062	1,438	1,401	1,197
Portugal	0	0	0	0	0	0	0
Sweden	1,825	1,092	1,057	1,056	1,079	1,311	1,363
Other		364	379	695	1,360	1,671	2,039
<b>From 2013: EU 28</b>	18,657	17,227	15,794	17,243	18,053	20,438	20,975
Israel	592	498	678	496	174	172	0
Turkey	1,304	787	1,221	311	633	1,987	1,505
Romania	0	0	0	0	0	0	0
Other Europe <sup>1)</sup>	288	0	0	0	0	0	77
<b>Europe</b>	20,841	18,512	17,693	18,050	18,860	22,597	22,557
Japan	117,768	106,171	113,626	123,811	120,186	125,619	121,722
South Korea	43,629	46,037	46,201	49,819	55,052	59,586	51,088
Taiwan	28,706	26,878	24,378	27,128	29,869	30,001	36,129
Hong Kong	440	895	679	446	518	488	307
India	32,862	30,224	32,071	34,813	46,826	48,114	48,342
PR China	37,069	34,000	62,894	87,923	93,351	71,416	75,058
Brazil	3,457	2,198	2,691	3,044	4,745	6,615	6,434
Chile	944	1,135	717	913	901	2,151	3,640
Other Countries	15,042	15,025	15,376	12,110	16,992	21,185	25,309
<b>Total Exports</b>	<b>300,758</b>	<b>281,075</b>	<b>316,326</b>	<b>358,057</b>	<b>387,300</b>	<b>387,772</b>	<b>390,586</b>
<sup>1)</sup> Incl. neighbouring Mediterranean countries Source: McCloskey							

Table 7

Hard Coal Exports from Indonesia							1,000 t
Importing Countries	2010	2011	2012	2013	2014	2015	2016
Germany	69	34	0	0	0	53	180
The Netherlands	0	927	71	15	0	83	0
Italy	7,094	4,882	3,692	3,365	3,516	3,106	1,686
Great Britain	162	390	0	0	0	0	0
Ireland	0	0	0	0	0	0	0
Denmark	0	0	0	0	0	0	0
Spain	2,115	1,877	5,634	3,392	4,071	4,826	4,944
Slovenia	840	559	332	k/A	k/A	240	377
Other	2,220	851	2,071	1,638	1,053	285	13
<b>ab 2013 EU 28</b>	12,500	9,520	11,800	8,410	8,640	8,593	7,200
USA	1,240	1,180	469	650	1,390	732	562
Chile	980	483	160	0	0	0	0
Japan	26,040	24,950	31,800	26,010	32,050	32,406	33,038
South Korea	34,650	36,720	37,700	36,080	35,330	32,704	35,019
Hong Kong	9,540	8,650	11,673	11,100	10,970	9,267	9,424
Taiwan	21,770	19,090	19,600	22,110	21,980	24,008	20,290
Malaysia	8,600	11,880	12,600	12,140	12,250	16,505	17,272
Philippines	5,160	6,050	9,300	10,140	9,680	15,804	17,503
Thailand	8,770	6,780	11,421	8,440	16,467	17,730	16,384
India	36,500	52,800	60,520	82,720	104,740	123,365	94,609
PR China	68,060	77,950	83,300	106,940	88,180	36,684	50,843
Other Countries	6,164	13,836	13,657	77,260	40,323	9,362	9,081
<b>Total Exports <sup>1)</sup></b>	<b>239,974</b>	<b>269,889</b>	<b>304,000</b>	<b>402,000</b>	<b>382,000</b>	<b>327,160</b>	<b>311,225</b>
<i>1) From 2013 incl. lignite, from 2015 excl. lignite  Sourcen: Company information, own calculations</i>							

Table 8

Hard Coal Exports from Russia							1,000 t
Importing Countries	2010	2011	2012	2013	2014	2015	2016
Germany	10,308	10,731	11,227	12,841	13,494	16,528	17,779
Belgium/Luxembourg	0	0	0	2,620	2,304	1,694	1,299
Italy	862	2,346	2,600	4,406	4,341	4,023	1,860
Great Britain	7,332	11,592	14,600	17,748	16,200	7,374	11,145
Spain	768	1,917	2,300	2,196	2,157	5,012	2,463
Finland	2,900	5,111	2,700	3,586	3,784	2,063	1,926
Poland	1,402	1,389	1,700	1,300	1,303	607	5,268
Romania	308	438	450	460	460	489	464
Other	13,532	12,802	10,200	9,894	10,632	13,984	11,843
<b>from 2013 EU 28</b>	37,412	46,326	45,777	55,051	54,675	64,025	54,047
Turkey	9,139	8,180	9,785	8,580	8,460	11,091	11,495
<b>Europe</b>	46,551	54,506	55,562	63,631	63,135	75,116	65,542
Japan	10,575	11,608	15,292	8,422	14,519	16,824	18,544
South Korea	8,574	13,100	11,438	12,853	16,841	23,067	24,605
Taiwan	1,116	3,498	3,330	2,994	5,464	7,466	7,631
PR China	11,660	10,836	20,183	27,251	25,921	15,780	15,939
Other Countries <sup>1)</sup>	9,056	7,434	11,195	15,649	17,520	5,147	17,502
<b>Total Exports <sup>2)</sup></b>	<b>87,532</b>	<b>100,982</b>	<b>117,000</b>	<b>130,800</b>	<b>143,400</b>	<b>143,400</b>	<b>149,763</b>
<sup>1)</sup> 2008–2016 exports via Cyprus/Lebanon; part of these quantities were exported to unknown countries.							
<sup>2)</sup> Hard coal exports only (seaborne)							
Sourcen: 2008–2016 company information, own calculations, seaports' vessel tracking database							

Table 9



Hard Coal Exports from the USA							1,000 t
Importing Countries	2010	2011	2012	2013	2014	2015	2016
Germany	5,727	8,140	9,809	12,044	11,099	10,913	9,107
France	2,788	3,615	3,720	3,728	1,990	1,208	1,215
Belgium/Luxembourg	2,080	2,783	2,360	1,745	917	1,066	1,031
The Netherlands	3,314	5,908	7,178	4,352	4,571	4,441	3,283
Italy	3,000	5,070	7,747	5,981	5,331	3,112	1,733
Great Britain	3,980	6,283	10,856	11,986	8,898	3,811	964
Ireland	0	219	208	0	0	0	0
Denmark	73	146	0	0	0	40	55
Spain	1,837	1,551	1,975	1,430	1,357	1,151	1,263
Portugal	531	891	1,127	356	201	126	85
Finland	428	452	266	374	670	352	395
Sweden	676	633	613	438	651	585	262
Other	4,076	1,717	3,786	3,565	3,472	2,956	1,889
<b>from 2013 EU 28</b>	<b>28,510</b>	<b>37,408</b>	<b>49,645</b>	<b>45,999</b>	<b>39,157</b>	<b>29,761</b>	<b>21,282</b>
Israel	0	0	17	0	0	0	0
Turkey	2,296	2,670	4,871	4,521	4,045	1,863	1,349
Romania	0	937	607	819	0	0	179
Other Europe <sup>1)</sup>	3,069	6,330	5,951	4,583	2,725	411	942
<b>Europe</b>	<b>33,875</b>	<b>47,345</b>	<b>61,091</b>	<b>55,922</b>	<b>45,927</b>	<b>32,035</b>	<b>23,752</b>
Canada	10,528	6,022	6,393	6,284	5,884	5,190	4,391
Mexico	1,682	2,526	3,126	5,102	4,267	3,410	2,799
Argentina	281	233	471	427	413	0	94
Brazil	7,177	7,867	7,206	7,742	7,233	5,737	6,218
Japan	2,869	6,209	5,169	4,783	4,475	4,224	4,133
South Korea	5,237	9,479	8,250	7,648	7,282	5,527	3,888
Taiwan	227	0	227	342	91	0	89
Other Countries	11,787	17,033	21,615	17,689	12,424	10,644	8,929
<b>Total Exports</b>	<b>73,663</b>	<b>96,714</b>	<b>113,548</b>	<b>105,939</b>	<b>87,996</b>	<b>66,767</b>	<b>54,293</b>
<sup>1)</sup> Incl. neighbouring Mediterranean countries							
Source: McCloskey							

Table 10

Hard Coal Exports (Steam Coal Only) from Colombia							1,000 t
Importing Countries	2010	2011	2012	2013	2014	2015	2016
Germany	7,397	10,550	8,972	9,794	7,265	9,850	10,649
France	2,329	1,100	1,239	1,765	695	756	1,077
Belgium/Luxembourg	125	68	75	0	31	0	0
The Netherlands	9,061	7,412	13,053	10,305	8,502	8,462	6,887
Italy	1,715	1,593	1,916	1,264	1,205	2,661	3,561
Great Britain	4,417	4,198	6,365	6,195	6,867	4,100	598
Ireland	1,048	1,942	1,729	1,773	1,792	2,131	1,146
Denmark	1,092	4,998	3,153	1,927	1,248	574	548
Greece	76	480	0	0	0	0	0
Spain	2,272	2,125	4,340	2,981	6,067	5,869	4,653
Portugal	1,553	2,069	3,212	3,246	4,196	5,357	4,960
Finland	277	459	0	0	0	0	0
Sweden	0	1,169	0	0	0	0	0
Slovenia	0	1,031	214	222	238	165	632
Other		858	0	619	298	360	451
<b>from 2013: EU 28</b>	31,362	40,052	44,268	40,091	38,404	40,285	35,162
Israel	3,770	5,595	5,713	4,901	5,257	5,845	4,547
Other Europe <sup>1)</sup>	3,006	10,222	8,424	7,660	9,300	11,499	16,358
<b>Europe</b>	38,138	55,869	58,405	52,652	52,961	57,629	56,067
Japan	119	145	220	278	0	20	240
Hong Kong	0	0	0	0	0	0	0
USA	11,301	6,928	5,029	4,511	5,565	6,341	5,649
Canada	1,843	1,488	1,125	1,593	1,516	1,711	1,444
Brazil	1,123	1,631	1,776	2,076	4,448	5,042	4,570
Other Countries	16,683	10,033	13,189	12,537	10,546	9,757	20,599
<b>Total Exports</b>	<b>69,207</b>	<b>76,094</b>	<b>79,744</b>	<b>73,647</b>	<b>75,036</b>	<b>80,500</b>	<b>88,569</b>
<sup>1)</sup> Incl. neighbouring Mediterranean countries, Turkey							
Sources: McCloskey, company information							

Table 11

Hard Coal Exports from the Republic of South Africa							1,000 t
Importing Countries	2010	2011	2012	2013	2014	2015	2016
Germany	3,363	2,644	1,972	2,533	5,082	3,400	1,983
France	1,030	1,190	1,060	1,150	850	390	650
Belgium/Luxembourg	500	430	320	0	0	50	0
The Netherlands	1,087	1,056	2,838	5,047	6,358	2,150	1,014
Italy	3,400	3,630	3,120	2,040	1,540	4,120	2,799
Great Britain	470	670	810	620	1,160	350	117
Ireland	220	50	90	140	140	98	80
Denmark	780	1,380	630	300	690	350	433
Greece	50	0	80	0	0	40	0
Spain	3,670	2,470	2,360	1,720	2,980	2,430	1,020
Portugal	320	0	0	360	160	390	160
Finland	0	0	0	0	0	0	0
Other	170	180	400	390	190	30	527
<b>from 2013: EU 28</b>	15,060	13,700	13,680	14,300	19,150	13,798	8,988
Israel	2,490	3,180	4,770	3,490	2,580	2,590	1,003
Morocco	810	70	140	250	860	4,360	2,243
Turkey	3,182	2,760	2,890	2,850	3,690	7,150	1,570
Other Europe <sup>1)</sup>	6,482	6,010	7,800	6,590	7,130	14,100	4,816
<b>Europe</b>	21,542	19,710	21,480	20,890	26,280	27,898	15,578
Japan	300	620	470	560	150	160	0
South Korea	2,260	3,520	1,550	150	310	330	2,739
Taiwan	2,990	3,490	4,500	5,815	1,400	1,400	765
Hong Kong	160	0	0	0	0	0	0
India	22,397	17,071	23,170	21,030	30,600	39,750	37,567
PR China	6,960	10,460	12,950	13,703	3,370	0	60
USA	170	40	490	0	680	540	250
Brazil	1,099	1,030	1,130	320	935	910	879
Other Countries	10,534	11,380	10,450	10,291	12,750	5,546	17,631
<b>Total Exports</b>	<b>68,412</b>	<b>67,321</b>	<b>76,190</b>	<b>72,759</b>	<b>76,475</b>	<b>76,534</b>	<b>75,469</b>
<sup>1)</sup> Incl. neighbouring Mediterranean countries							
Sourcen: South African Coal Report, own calculations							

Table 12

Hard Coal Exports from Canada							1,000 t
Importing Countries	2010	2011	2012	2013	2014	2015	2016
Germany	1,203	1,736	1,516	1,214	1,462	1,317	1,487
France	166	104	55	0	31	0	92
Belgium/Luxembourg	48	55	0	0	0	0	0
The Netherlands	696	267	412	227	30	165	517
Italy	1,016	1,000	767	817	403	288	283
Great Britain	284	505	99	186	423	185	0
Denmark	0	0	0	0	0	0	0
Spain	64	120	1	58	1	2	63
Portugal	0	0	0	0	0	0	0
Finland	416	422	303	428	537	526	587
Sweden	0	0	60	0	0	22	0
Other	59	221	0	291	614	449	367
<b>from 2013: EU 28</b>	3,952	4,430	3,213	3,221	3,501	2,954	3,396
Other Europe <sup>1)</sup>	840	182	500	567	551	834	1,039
<b>Europe</b>	4,792	4,612	3,713	3,788	4,052	3,788	4,435
Japan	10,615	9,265	9,526	10,108	8,850	8,306	7,914
South Korea	6,553	8,611	6,360	7,594	0	5,680	5,627
Taiwan	638	1,070	1,005	1,151	1,509	1,252	1,417
Brazil	1,693	2,281	1,813	1,677	2,263	1,113	901
USA	1,470	1,330	898	911	834	980	705
Chile	259	216	253	327	274	366	638
Mexico	697	400	183	278	158	130	0
Other Countries	5,944	5,602	10,761	12,712	16,320	8,505	8,527
<b>Total Exports</b>	<b>32,661</b>	<b>33,387</b>	<b>34,512</b>	<b>38,546</b>	<b>34,260</b>	<b>30,120</b>	<b>30,164</b>
<sup>1)</sup> Incl. neighbouring Mediterranean countries							
Sourcen: McCloskey, own calculations							

Table 13

Hard Coal Exports from the People's Republic of China							1,000 t
Importing Countries	2010	2011	2012	2013	2014	2015	2016
Germany	7	11	9	8	23	16	12
France	0	0	0	0	0		0
Belgium/Luxembourg	14	0	0	0	0	0	1
The Netherlands	0	0	0	0	0	11	1
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
<b>EU-15</b>	21	11	9	8	23	27	14
Japan	6,436	6,222	3,989	3,020	2,070	1,503	2,667
South Korea	7,207	5,559	3,662	3,303	2,835	2,014	3,543
Taiwan	4,418	2,197	1,270	835	467	414	976
Hong Kong	395	1	0	0	59	0	1
India	0	173	0	0	0	2	1
Malaysia	12	6	0	0	4	15	17
Thailand	0	0	1	0	0	22	36
North Korea	224	205	172	129	80	71	132
Philippines	2	0	0	0	0	22	1
Brazil	0	0	0	0	0	0	0
Other Countries	225	127	24	18	59	1,099	1,256
<b>Total Exports</b>	<b>18,940</b>	<b>14,501</b>	<b>9,127</b>	<b>7,313</b>	<b>5,597</b>	<b>5,189</b>	<b>8,644</b>

Source: MCR and others

Table 14

Hard Coal Exports from Poland							1,000 t
Importing Countries	2010	2011	2012	2013	2014	2015	2016
Germany	3,659	2,659	2,406	3,007	2,931	3,098	1,521
France	597	10	212	534	0	228	157
Belgium	232	1	80	450	2	2	3
The Netherlands	81	0	0	147	54	51	159
Italy	0	0	0	0	1	65	7
Great Britain	598	634	89	665	230	123	51
Ireland	257	206	140	170	148	101	92
Denmark	455	60	60	553	365	150	141
Spain	23	20	20	19	26	25	25
Portugal	0	0	0	0	0	0	0
Finland	220	37	148	358	183	85	76
Austria	883	435	786	807	887	850	846
Sweden	134	84	105	184	117	100	85
Czech Republic	1,444	1,820	1,540	1,663	2,604	2,633	2,815
Slovakia	638	568	302	767	500	619	650
Hungary	118	133	98	93	58	163	169
Other	557	10	383	401	38	52	58
<b>From 2013: EU 28</b>	9,896	6,677	6,369	9,818	8,144	8,345	6,855
Other Countries	480	101	667	1,018	699	874	2,350
<b>Total Exports</b>	<b>10,376</b>	<b>6,778</b>	<b>7,036</b>	<b>10,836</b>	<b>8,843</b>	<b>9,219</b>	<b>9,205</b>
<i>Sourcen: McCloskey, German Federal Statistical Office and own calculations</i>							

Table 15

Hard Coal Imports of EU Countries – Imports Incl. Domestic Trade of Member States							1,000 t
	2010	2011	2012	2013	2014	2015	2016
Germany	41,000	44,200	44,900	50,100	53,600	55,500	53,100
France	18,900	15,300	17,000	18,300	14,300	14,300	13,500
Italy	22,700	24,000	25,000	20,800	20,000	19,600	17,900
The Netherlands	11,800	11,700	12,400	12,400	12,400	12,400	14,500
Belgium	3,500	4,000	3,500	5,200	4,400	4,200	3,700
Luxembourg	200	200	n/a	n/a	n/a	n/a	n/a
Great Britain	26,500	31,700	44,800	44,800	38,300	25,500	8,200
Ireland	2,200	1,900	2,200	1,200	1,800	2,400	1,800
Denmark	4,100	6,100	3,900	5,000	4,500	2,800	2,900
Greece	600	600	200	200	200	300	300
Spain	12,800	15,300	22,300	13,500	14,700	19,000	14,700
Portugal	2,700	3,600	5,000	4,200	4,400	5,100	5,300
Finland	5,900	7,000	4,000	5,100	5,400	3,500	3,900
Austria	4,000	3,800	2,900	3,500	3,200	3,200	3,600
Sweden	3,000	2,700	2,200	2,500	2,500	2,700	3,100
Poland	10,000	15,500	10,100	10,800	10,300	8,200	8,300
Czech Republic	1,900	2,400	2,000	2,100	2,900	2,900	3,100
Hungary	1,800	1,500	1,500	1,300	1,300	1,300	1,500
Slovakia	3,500	3,400	3,400	7,100	6,700	4,100	4,000
Slovenia	600	500	600	500	400	400	400
Croatia	n/a	n/a	n/a	1,200	1,000	1,000	1,200
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	2,900	3,300	2,300	1,700	1,600	1,100	700
Romania	1,400	1,200	1,300	900	700	1,200	1,000
<b>Other EU 28 from 2013</b>	<b>182,000</b>	<b>199,900</b>	<b>800 212,300</b>	<b>700 213,100</b>	<b>204,600</b>	<b>190,700</b>	<b>166,700</b>
<b>Coke</b>	Coke: 8,000	Coke: 8,000	Coke: 8,000	Coke: 6,000	Coke: 6,000	Coke: 7,600	Coke: 8,000

Source: EURACOAL

Table 16

Primary Energy Consumption in Germany <span>Mill. t TCE</span>							
Energy Source	2010	2011	2012	2013	2014	2015	2016
Hard Coal	57.9	55.3	58.3	61.0	58.1	58.6	55.6
of which import coal	(44.4)	(43.4)	(46.8)	(52.4)	(52.1)	(51.3)	(48.4)
Lignite	51.6	53.3	56.1	55.6	53.6	53.5	51.9
Oil	160.0	154.8	154.9	158.3	154.1	153.2	155.3
Natural Gas	107.1	99.3	99.6	104.4	91.4	94.2	103.1
Nuclear Energy	52.3	40.2	37.0	36.2	36.2	34.2	31.5
Hydroelectric and Wind Power	7.2	8.1	8.9	9.2	9.4	12.1	12.1
Foreign Trade Balance Electric Power	-2.2	-0.8	-2.8	-4.2	-4.4	-6.4	-6.6
Other Energy Sources	47.9	51.0	51.0	47.7	50.5	52.1	53.8
<b>Total</b>	<b>481.8</b>	<b>461.2</b>	<b>463.0</b>	<b>468.2</b>	<b>448.9</b>	<b>451.5</b>	<b>456.7</b>
							Share in %
Energy Source	2010	2011	2012	2013	2014	2015	2016
Hard Coal	12.0	12.0	12.6	13.0	12.9	13.0	12.2
of which import coal	(9.2)	(9.4)	(10.1)	(11.0)	(11.6)	(11.4)	(10.6)
Lignite	10.7	11.6	12.1	11.9	11.9	11.9	11.4
Oil	33.2	33.6	33.5	33.8	34.3	33.9	34.0
Natural Gas	22.2	21.5	21.5	22.3	20.4	20.9	22.6
Nuclear Energy	10.9	8.7	8.0	7.8	8.1	7.6	6.9
Hydroelectric and Wind Power	1.5	1.8	1.9	2.0	2.1	2.7	2.7
Foreign Trade Balance Electric Power	-0.5	-0.2	-0.6	-0.9	-0.9	-1.4	-1.4
Other Energy Sources	10.0	11.0	11.0	10.1	11.2	11.4	11.6
<b>Total</b>	<b>100,0</b>	<b>100,0</b>	<b>100,0</b>	<b>100,0</b>	<b>100,0</b>	<b>100,0</b>	<b>100,0</b>
Sources: Arbeitsgemeinschaft Energiebilanzen, German Federal Statistical Office, own calculations							

Table 17



Coal Transshipments in German Seaports							1,000 t
	2010	2011	2012	2013	2014	2015	2016
<b>North Sea Ports</b>							
Hamburg	5,276	5,805	5,111	5,629	5,924	7,672	7,434
Wedel-Schulau	0	530	239	42	-	-	-
Bützfleth	5	8	6	0	6	-	-
Wilhelmshaven	1,843	1,924	1,597	3,301	3,112	4,093	2,480
Bremen Ports	1,796	1,599	1,783	1,270	1,636	1,710	1,175
Brunsbüttel	434	424	710	793	525	485	782
Emden	2	-	-	-	-	-	-
Nordenham	2,235	2,792	2,240	1,574	1,277	1,107	958
Papenburg	141	0	-	-	-	-	-
Other North Sea Ports SH	610	0	-	3	7	-	-
Other North Sea Ports LS	7	3	-	-	-	-	-
<b>Total</b>	<b>12,349</b>	<b>13,085</b>	<b>11,686</b>	<b>12,612</b>	<b>12,487</b>	<b>15,067</b>	<b>12,829</b>
<b>Baltic Sea Ports</b>							
Rostock	1,200	1,345	1,335	1,032	1,234	985	1,184
Wismar	34	0	-	-	-	-	-
Stralsund	-	-	1	-	-	-	-
Lübeck	-	-	-	2	-	-	-
Flensburg	209	237	235	255	239	254	227
Kiel	479	271	503	178	325	231	158
Sassnitz	5	1	1	1	2	-	-
Wolgast	-	-	-	-	-	-	-
Other Baltic Sea Ports	-	-	-	-	-	-	5
<b>Total</b>	<b>1,927</b>	<b>1,854</b>	<b>2,075</b>	<b>1,468</b>	<b>1,800</b>	<b>1,470</b>	<b>1,574</b>
<b>Total Transshipment</b>	<b>14,276</b>	<b>14,939</b>	<b>13,761</b>	<b>14,080</b>	<b>14,287</b>	<b>16,537</b>	<b>14,403</b>
Source: German Federal Statistical Office							

Table 18

Consumption, Import/Export and Generation of Electric Power in Germany							
	2010	2011	2012	2013	2014	2015	2016
<b>Gross Electricity Consumption</b> in TWh	614.7	605.8	605.6	603.9	591.1	595.1	594.7
<b>Foreign Trade Electricity</b> in TWh							
Exports	59.9	56.0	67.3	72.2	74.5	85.4	80.7
Imports	42.2	49.7	44.2	38.4	38.9	33.6	27.0
Saldo (Exportüberschuss)	-17.7	-6.3	-23.1	-33.8	-35.6	-51.8	-53.7
<b>Gross Electric Power Generation</b> in TWh	632.4	612.1	628.6	637.7	626.7	646.9	648.4
<b>Use of Energy Sources for Electric Power Generation</b> in TWh							
	2010	2011	2012	2013	2014	2015	2016
Hard Coal	117.4	112.4	116.4	127.3	118.6	117.7	111.5
of which import coal <sup>1)</sup>	(86.8)	(84.9)	(89.1)	(101.8)	(91.6)	(103.0)	(102.5)
Lignite	145.9	150.1	160.7	160.9	155.8	154.5	150.0
Natural Gas	89.3	86.1	76.4	67.5	61.1	62.0	80.5
Fuel Oil	8.7	7.2	7.6	7.2	5.7	6.2	5.9
Nuclear Energy	140.6	108.0	99.5	97.3	97.1	91.8	84.6
Hydroelectric/Wind Power	58.8	66.6	72.8	74.7	76.9	98.2	98.4
Other	71.7	81.7	95.2	102.8	111.5	116.5	117.5
<b>Total</b>	<b>632.4</b>	<b>612.1</b>	<b>628.6</b>	<b>637.7</b>	<b>626.7</b>	<b>646.9</b>	<b>648.4</b>
<sup>1)</sup> Procurements of power plants							
Sources: BDEW, Statistics of Kohlenwirtschaft, BAFA, AG Energiebilanzen, DIW, own calculations							

Table 19

European/International Prices							
	2010	2011	2012	2013	2014	2015	2016
Steam Coal Marker Prices 1 % S, CIF NW Europe							
US\$/TCE	107.74	141.73	107.92	95.29	87.83	66.08	68.53
€/TCE	81.27	101.82	83.99	71.75	66.15	59.56	62.18
Source: McCloskey (converted from 6000 kcal/kg to 7000 kcal/kg)							
Sea Freight Rates Capesize Units to Destination Ports ARA (Amsterdam, Rotterdam, Antwerp)							
South Africa US\$/t	12.41	10.74	8.13	9.38	9.07	5.01	4.43
USA/East Coast US\$/t	15.06	12.01	9.62	11.44	10.00	7.14	6.37
Australia/NSW US\$/t	22.15	19.43	15.05	18.03	16.54	8.93	7.95
Colombia US\$/t	14.75	11.89	9.63	11.33	9.87	6.22	5.53
Source: Frachtkontor Junge, own calculations							

Table 20

Hard Coal and Hard Coal Coke Imports to Germany								1,000 t
Countries	2013				2014			
	Steam Coal*	Coking Coal	Coke	Total	Steam Coal*	Coking Coal	Coke	Total
Poland	2,938	70	1,317	4,325	2,925	6	1,458	4,389
Czech Republic	365	0	325	690	362	0	297	659
Spain	0	0	3	3	0	0	1	1
France	0	0	19	19	0	0	1	1
Other	2,485	33	809	3,327	5,489	35	450	5,974
<b>EU-28</b>	5,788	103	2,473	8,364	8,776	41	2,207	11,024
CIS	11,975	867	249	13,091	12,312	1,183	227	13,722
Norway	680	0	0	680	435	0	0	435
USA	8,933	3,111	0	12,044	7,725	3,374	0	11,099
Canada	0	1,214	0	1,214	0	1,462	0	1,462
Colombia	9,794	180	25	9,999	7,265	116	0	7,381
South Africa	2,533	0	0	2,533	5,034	48	0	5,082
Australia	128	4,611	0	4,739	350	5,323	0	5,673
PR China	8	0	0	8	14	9	101	124
Indonesia	0	0	0	0	0	0	0	0
Venezuela	59	0	0	59	0	0	0	0
Other Third Countries	0	135	0	135	0	204	0	204
<b>Third Countries</b>	34,110	10,118	274	44,502	33,135	11,719	328	45,182
<b>Total</b>	<b>39,898</b>	<b>10,221</b>	<b>2,747</b>	<b>52,866</b>	<b>41,911</b>	<b>11,760</b>	<b>2,535</b>	<b>56,206</b>

Sources: German Federal Statistical Office, BAFA, own calculations

\* Steam coal incl. anthracite

Table 21

Hard Coal and Hard Coal Coke Imports to Germany								1,000 t
2015				2016 <sup>1)</sup>				Countries
Steam Coal*	Coking Coal	Coke	Total	Steam Coal*	Coking Coal	Coke	Total	
3,097	1	998	4,096	1,519	2	1,282	2,803	Poland
566	0	266	832	392	0	142	534	Czech Republic
0	0	0	0	0	1	1	2	Spain
0	0	15	15	0	0	66	66	France
2,951	36	318	3,305	2,340	32	298	2,670	Miscellaneous
6,614	37	1,597	8,248	4,251	35	1,789	6,075	<b>EU-28</b>
14,885	1,643	196	16,724	16,516	1,282	0	17,798	CIS
561	0	0	561	621	15	0	636	Norway
7,734	3,179	0	10,913	6,363	2,744	0	9,107	USA
0	1,316	0	1,316	0	1,487	0	1,487	Canada
9,850	98	0	9,948	10,649	0	76	10,725	Colombia
3,225	175	0	3,400	1,790	193	0	1,983	South Africa
118	5,619	0	5,737	417	6,088	0	6,505	Australia
16	0	75	91	11		118	129	PR China
4	49	0	53	31	149	0	180	Indonesia
0	0	0	0	0	0	0	0	Venezuela
188	234	97	519	301	35	93	429	Other
36,581	12,313	368	49,262	36,699	11,933	287	48,979	<b>Third Countries</b>
<b>43,195</b>	<b>12,350</b>	<b>1,965</b>	<b>57,510</b>	<b>40,950</b>	<b>12,028</b>	<b>2,076</b>	<b>55,054</b>	<b>Total</b>
* Steam coal incl. anthracite <sup>1)</sup> Prepared base cumulative values from destatis								

Table 21

Germany – Energy Prices/Exchange Rates							
	2010	2011	2012	2013	2014	2015	2016
Exchange Rates							
€/US\$	0.7543	0.7184	0.7783	0.7530	0.7527	0.9013	0.9034
Source: Deutsche Bundesbank							
Border-crossing Prices for Coking Coal and Hard Coal Coke – €/t							
Imported Coking Coal	174.78	185.30	188.42	127.19	104.67	100.52	86.35
Imported Hard Coal Coke	259.37	319.78	258.72	204.88	193.66	187.04	159.87
Sources: From 2003, German Federal Statistical Office; Hard coal coke German Federal Statistical Office							
Border-crossing Prices for Hard Coal in €/TCE: Use in Power Plants							
	Q1	Q2	Q3	Q4	Value for Year		
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		
2016	56.87	56.12	65.03	88.28	67.07		
Source: BAFA Section 422 (border-crossing prices = CIF price ARA + freight German border)							
Energy Prices Free Power Plant €/TCE							
Energy Source	2010	2011	2012	2013	2014	2015	2016
Natural Gas	222.00	241.00	264.00	265.00	244.00	228.00	184.00
Heavy Fuel Oil	270.00	355.00	394.00	349.00	309.00	180.00	151.00
Steam Coal	90.00	112.00	98.00	84.00	78.00	73.00	72.00
Sources: BAFA, statistics from Kohlenwirtschaft, own calculations							

Table 22

## The Hard Coal Market in Germany

### Volumes and Prices 1957 - 2016

Quantities								Prices							
Imports of Hard Coal and Coke t=t				Domestic Production of Hard Coal Tonnes Usable Production				Steam Coal From Third Countries <sup>1)</sup>				Domestic Coal <sup>2)</sup>			
Year	Mill. t	Year	Mill. t	Year	Mill. t	Year	Mill. t	Year	€/TCE	Year	€/t 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	2016	55.2	1986	80.3	2016	3.8	1986	60	2016	67	1986	130	2016	180

Figures: From 1991, incl. new German states; euro values rounded off

<sup>1)</sup> Price free German border

<sup>2)</sup> Estimated break even price

Sources: German Federal Statistical Office, statistics from Kohlenwirtschaft, BAFA, own calculations

Table 23

## Members VDKI

Member Companies	Area	Phone	Fax	Website
<b>AG der Dillinger Hüttenwerke</b> <i>Werkstraße 1, 66763 Dillingen/Saar, Germany</i>	+49 6831	47-2220	47-3227	<a href="http://www.dillinger.de">www.dillinger.de</a>
<b>Antwerp Port Authority</b> <i>Entrepotkaai 1, 2000 Antwerp, Belgium</i>	+32 3	205 22 46	205 22 69	<a href="http://www.portofantwerp.be">www.portofantwerp.be</a>
<b>AVALON Trading LP</b> <i>Glasgow G2 4JR, 272 Bath Street</i>	+7 459	2870095	0044 203 0041 664	<a href="http://www.avalon.ms">www.avalon.ms</a>
<b>BS/ENERGY</b> Braunschweiger Versorgungs-Aktiengesellschaft & Co. KG <i>Taubenstraße 7, 38106 Braunschweig, Germany</i>	+49 531	383-0	383-2644	<a href="http://www.bvag.de">www.bvag.de</a>
<b>Bulk Trading S.A.</b> <i>Piazza Molino Nuovo 17, 6900 Lugano, Switzerland</i>	+41	9161 15-130	9161 15-137	<a href="http://www.bulktrading.ch">www.bulktrading.ch</a>
<b>CMC Coal Marketing Company Ltd.</b> <i>Fumbally Square, New Street, Dublin 8, Ireland</i>	+353 1	708 2600	708 2699	<a href="http://www.cmc-coal.ie">www.cmc-coal.ie</a>
<b>Currenta GmbH &amp; Co. OHG</b> <i>BIS-EN-BM, Geb. G11, 51068 Leverkusen, Germany</i>	+49 214	3057885	30657885	<a href="http://www.currenta.de">www.currenta.de</a>
<b>DAKO Coal GmbH</b> <i>Kämpenstrasse 151, 58456 Witten, Germany</i>	+49 2302	970 30 17	970 30 70	<a href="http://www.dako-coal.com">www.dako-coal.com</a>
<b>DB Cargo AG</b> <i>Rheinstraße 2, 55116 Mainz, Germany</i>	+49 6131	15-61100	15-61199	<a href="http://www.dbcargo.com">www.dbcargo.com</a>
<b>Douglas Services GmbH</b> <i>Rohrbergstr. 23 b, 65343 Eltville, Germany</i>	+49 6123	70390	703920	
<b>EnBW AG</b> <i>Durlacher Allee 93, 76131 Karlsruhe, Germany</i>	+49 721	63-23314	914-20071	<a href="http://www.enbw.com">www.enbw.com</a>
<b>Enerco bv</b> <i>Keerweg 2, 6122 CL Buchten, The Netherlands</i>	+31 46	48 19 900	48 59 211	<a href="http://www.enerco.nl">www.enerco.nl</a>
<b>Engie Energy Management Trading</b> <i>Boulevard Simon Bolivar/Simon Bolivarlaan 34, 1000 Brüssels, Belgium</i>	+32	2518 61 11	2501 59 06	<a href="http://www.engie.com">www.engie.com</a>
<b>Ernst Russ Shipbroker GmbH &amp; Co. KG</b> <i>Neumühlen 9, 22763 Hamburg</i>	+49 40	380303-213	380303-399	<a href="http://www.russbroker.de">www.russbroker.de</a>
<b>EUROKOR Barging B.V.</b> <i>Gieterijstraat 93, 2984 AB Ridderkerk, The Netherlands</i>	+31 180	481 960	481 969	<a href="http://www.eurokorbarging.nl">www.eurokorbarging.nl</a>
<b>European Bulk Services (E.B.S.) B.V.</b> <i>Elbeweg 117, 3198 LC Europoort Rotterdam, The Netherlands</i>	+31 181	258 121	258 125	<a href="http://www.ebsbulk.nl">www.ebsbulk.nl</a>
<b>Europees Massagoed-Overslagbedrijf (EMO) bv</b> <i>Missouriweg 25, 3199 LB Maasvlakte RT, The Netherlands</i>	+31 181	37 1111	37 1222	<a href="http://www.emo.nl">www.emo.nl</a>
<b>EVN AG</b> <i>EVN Platz, 2344 Maria Enzersdorf, Austria</i>	+43 2236	200 12352	200 82352	<a href="http://www.evn.at">www.evn.at</a>
<b>Evonik Industries AG</b> <i>Paul-Baumann-Straße 1, 45722 Marl, Germany</i>	+49 2365	49-6084	49-806084	<a href="http://www.evonik.de">www.evonik.de</a>
<b>Exxaro International Trading AG</b> <i>Bahnhofstrasse 18, 6301 Zug, Switzerland</i>	+41 41	727 0570	727 0579	<a href="http://www.exxaro.com">www.exxaro.com</a>
<b>Frachtcontor Junge &amp; Co. GmbH</b> <i>Ballindamm 17, 20095 Hamburg, Germany</i>	+49 40	3000-0	3000-343	<a href="http://www.frachtcontor.com">www.frachtcontor.com</a>
<b>Freepoint Commodities Europe LLP</b> <i>157-197 Buckingham Palace Road, London SW1W 9SP, UK</i>	+44	203 262 6264	203 262 6900	<a href="http://www.freepoint.com">www.freepoint.com</a>



## Members VDKI

Member Companies	Area	Phone	Fax	Website
<b>GLENCORE International AG</b> <i>Baarermattstrasse 3, 6341 Baar, Switzerland</i>	+41 41	709 2000	709 3000	<a href="http://www.glencore.com">www.glencore.com</a>
<b>Grosskraftwerk Mannheim AG</b> <i>Marguerrestr. 1, 68199 Mannheim, Germany</i>	+49 621	8684310	8684319	<a href="http://www.gkm.de">www.gkm.de</a>
<b>GUNVOR SA</b> <i>Rue du Rhone 82-84, 1204 Genève, Switzerland</i>	+41 22	718 79 00	718 79 29	<a href="http://www.gunvorgroup.com">www.gunvorgroup.com</a>
<b>HANSAPORT Hafenbetriebsgesellschaft mbH</b> <i>Am Sandauhafen 20, 21129 Hamburg, Germany</i>	+49 40	740 03-200	74 00 32 22	<a href="http://www.hansaport.de">www.hansaport.de</a>
<b>HCC Hanseatic Coal &amp; Coke Trading GmbH</b> <i>Sachsenfeld 3-5, 20097 Hamburg, Germany</i>	+49 40	23 72 03-0	23 26 31	<a href="http://www.hcc-trading.de">www.hcc-trading.de</a>
<b>HMS Bergbau AG</b> <i>An der Wuhlheide 232, 12459 Berlin, Germany</i>	+49 30	656681-0	656681-15	<a href="http://www.hms-ag.com">www.hms-ag.com</a>
<b>Holcim (Germany) AG</b> <i>Willy-Brandt-Str. 69, 20457 Hamburg, Germany</i>	+49 40	360 02-0	36 24 50	<a href="http://www.holcim.com">www.holcim.com</a>
<b>HTAG Häfen und Transport AG</b> <i>Neumarkt 7-11, 47119 Duisburg, Germany</i>	+49 203	47989-0	47989-193	<a href="http://www.htag-duisburg.de">www.htag-duisburg.de</a>
<b>ICT Coal GmbH</b> <i>Katernberger Str. 107, 45327 Essen, Germany</i>	+49 201	860 44 61	860 44 65	<a href="http://www.ict-coal.de">www.ict-coal.de</a>
<b>IMPERIAL Shipping Holding GmbH</b> <i>Dr.-Hammacher-Str. 49, 47119 Duisburg, Germany</i>	+49 203	5794-0	5794-229	<a href="http://www.imperial-shipping.com">www.imperial-shipping.com</a>
<b>Incolab Services B.V.</b> <i>Röntgenstraat 3, 3261 LK Oud Beijerland, The Netherlands</i>	+31 186	610 355	610 552	<a href="http://www.incolab.com">www.incolab.com</a>
<b>Inspectorate Germany GmbH</b> <i>Daimlerstr. 4a, 47167 Duisburg, Germany</i>	+49 203	860 967-13	860 967-20	<a href="http://www.inspectorate.com">www.inspectorate.com</a>
<b>JERA Trading Pte. Ltd.</b> <i>Cardinal Place, 80 Victoria Street, London SW1E 5JL, UK</i>	+49 30	700 140 460	700 159 510	<a href="http://www.jeratrading.com">www.jeratrading.com</a>
<b>Knight Energy Services Ltd.</b> <i>Unit 1, Palermount Ind. Estate, Bypass Road, Dundonald, Kilmarnock, Ayrshire, KA2 9 BL, UK</i>	+44	1563 850 375		<a href="http://www.ahkggroup.com">www.ahkggroup.com</a>
<b>L.B.H. Netherlands B.V.</b> <i>Rijdsdijk 13, 3161 HK Rhooen, The Netherlands</i>	+31 10	506 50 00	501 34 00	<a href="http://www.lbh.nl">www.lbh.nl</a>
<b>Niederrheinische Verkehrsbetriebe Aktiengesellschaft (NIAG)</b> <i>Rheinberger Str. 95 a, 47441 Moers, Germany</i>	+49 2841	205 528	999 398 544	<a href="http://www.niag-online.de">www.niag-online.de</a>
<b>OBA Bulk Terminal Amsterdam</b> <i>Westhavenweg 70, 1042 AL Amsterdam, The Netherlands</i>	+31 20	5873701	6116908	<a href="http://www.oba-bulk.nl">www.oba-bulk.nl</a>
<b>OVET B.V.</b> <i>Mr F.J. Haarmanweg 16 d, 4538 AR Terneuzen, The Netherlands</i>	+31 11	5676700	5620316	<a href="http://www.ovet.nl">www.ovet.nl</a>
<b>Oxbow Coal GmbH</b> <i>Renteilichung 44a, 45134 Essen, Germany</i>	+49 201	439 529-0	439 529-50	<a href="http://www.oxbow.com">www.oxbow.com</a>
<b>Peabody COALTRADE GmbH</b> <i>Ruhrallee 185, 45136 Essen, Germany</i>	+49 201	89 45 135	89 45 45	<a href="http://www.peabodyenergy.com">www.peabodyenergy.com</a>
<b>Pfeifer &amp; Langen GmbH &amp; Co. KG</b> <i>Dürener Str. 40, 50189 Elsdorf, Germany</i>	+49 2274	701-300	701-293	<a href="http://www.pfeifer-langen.com">www.pfeifer-langen.com</a>
<b>Port of Amsterdam</b> <i>De Ruijterkade 7, 1013 AA Amsterdam, The Netherlands</i>	+31 20	523 45 77	523 40 77	<a href="http://www.portofamsterdam.nl">www.portofamsterdam.nl</a>

## Members VDKI

Member Companies	Area	Phone	Fax	Website
<b>Port of Rotterdam</b> <i>Wilhelminakade 909, 3072 AP Rotterdam, The Netherlands</i>	+31 10	252 1638	252 4041	<a href="http://www.portofrotterdam.com">www.portofrotterdam.com</a>
<b>RAG Verkauf GmbH</b> <i>Shamrockring 1, 44623 Herne, Germany</i>	+49 2323	15-5410	15-5412	<a href="http://www.rag-verkauf.de">www.rag-verkauf.de</a>
<b>PSB Inspection B.V.</b> <i>James Wattweg 2 c, 3133 KK Vlaardingen, The Netherlands</i>	+31 10	31 38 907		<a href="http://www.psbinspection.com">www.psbinspection.com</a>
<b>Rheinbraun Brennstoff GmbH</b> <i>Stüttgenweg 2, 50935 Köln, Germany</i>	+49 221	480-1364	480-1369	<a href="http://www.energieprofi.com">www.energieprofi.com</a>
<b>RheinCargo GmbH &amp; Co. KG</b> <i>Hammer Landstr. 3, 41460 Neuss, Germany</i>	+49 2131	53 23-0	53 23-100	<a href="http://www.rheincargo.com">www.rheincargo.com</a>
<b>Rhenus PartnerShip GmbH &amp; Co. KG</b> <i>August-Hirsch-Str. 3, 47119 Duisburg, Germany</i>	+49 203	8009-326	8009-221	<a href="http://www.rhenus.de">www.rhenus.de</a>
<b>RWE Supply &amp; Trading GmbH</b> <i>Altenessener Str. 27, 45141 Essen, Germany</i>	+49 201	12-09	12-17900	<a href="http://www.rwetrading.com">www.rwetrading.com</a>
<b>SEA-Invest N.V.</b> <i>Skaldenstraat 1, 9042 Gent, Belgium</i>	+32 9	255 02 51	259 08 93	<a href="http://www.sea-invest.be">www.sea-invest.be</a>
<b>Ssp Stockpile surveying and protection B.V.</b> <i>Zuideinde 36, 2991 LK Barendrecht, The Netherlands</i>	+31	180 55 65 61	180 55 62 89	<a href="http://www.ssp-rotterdam.nl">www.ssp-rotterdam.nl</a>
<b>Stadtwerke Flensburg GmbH</b> <i>Batteriestraße 48, 24939 Flensburg, Germany</i>	+49 461	487-0	487-1880	<a href="http://www.stadtwerke-flensburg.de">www.stadtwerke-flensburg.de</a>
<b>Stadtwerke Hannover AG</b> <i>Ihmeplatz 2, 30449 Hannover, Germany</i>	+49 511	430-0	430-2772	<a href="http://www.energcity.de">www.energcity.de</a>
<b>STEAG GmbH</b> <i>Rüttenscheider Str. 1-3, 45128 Essen, Germany</i>	+49 201	801-3230	801-3232	<a href="http://www.steag.com">www.steag.com</a>
<b>SUEK AG, Swiss Office</b> <i>Vadianstrasse 59, 9000 St. Gallen, Switzerland</i>	+41 71	226 85 00	226 85 03	<a href="http://www.suekag.com">www.suekag.com</a>
<b>Südzucker AG</b> <i>Maximilianstr. 10, 68165 Mannheim, Germany</i>	+49 621	421-0	421-466	<a href="http://www.suedzucker.de">www.suedzucker.de</a>
<b>swb Erzeugung AG &amp; Co. KG</b> <i>Theodor-Heuss-Allee 20, 28215 Bremen, Germany</i>	+49 421	359-2270	359-2366	<a href="http://www.swb-gruppe.de">www.swb-gruppe.de</a>
<b>Terval s.a.</b> <i>Rue l'Île Monsin 129, 4020 Liège, Belgium</i>	+32	4 264 9348	4 264 0835	<a href="http://www.terval.com">www.terval.com</a>
<b>THB Transport- und Handelsberatungsgesellschaft mbH</b> <i>Auf dem Dreieck 5, 28197 Bremen, Germany</i>	+49 421	536 868	536 86-78	<a href="http://www.thb-bremen.de">www.thb-bremen.de</a>
<b>Trianel Kohlekraftwerk Lünen GmbH &amp; Co. KG</b> <i>Frydagstr. 40, 44536 Lünen, Germany</i>	+49 2306	3733-0	3733-150	<a href="http://www.trianel-luenen.de">www.trianel-luenen.de</a>
<b>Uniper Global Commodities SE</b> <i>Holzstraße 6, 40221 Düsseldorf, Germany</i>	+49 211	732 75-0	732 75-1552	<a href="http://www.eon.com">www.eon.com</a>
<b>Uniper Kraftwerke GmbH</b> <i>E.ON-Platz 1, 40479 Düsseldorf, Germany</i>	+49 211	4579-0	4579-501	<a href="http://www.eon.com">www.eon.com</a>
<b>Vattenfall Energy Trading GmbH</b> <i>Dammthorstrasse 29-32, 20354 Hamburg, Germany</i>	+49 40	668 780 168		<a href="http://www.vattenfall.com">www.vattenfall.com</a>
<b>Vattenfall Europe Wärme AG</b> <i>Puschkinallee 52, 12435 Berlin, Germany</i>	+49 30	267-10095	267-10719	<a href="http://www.vattenfall.de">www.vattenfall.de</a>
<b>Vitol S.A.</b> <i>Boulevard du Pont d'Arve 28, 1205 Geneva, Switzerland</i>	+41	22 322 1111	22 781 6611	<a href="http://www.vitol.com">www.vitol.com</a>
<b>Zeeland Seaports</b> <i>Schelpenpad 2, 4531 PD Terneuzen, The Netherlands</i>	+31 115	647 400	647 500	<a href="http://www.zeeland-seaports.com">www.zeeland-seaports.com</a>

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## Board of Directories

### **President:**

Dr. Wolfgang Cieslik  
STEAG GmbH, Essen

### **Executive Vice-President:**

Alexander Bethe  
JERA Trading Pte. Ltd.

Holger Becker  
Grosskraftwerk Mannheim AG, Mannheim

Dr. Stefan Bockamp  
Uniper Kraftwerke GmbH

Ulf Kerstin  
RWE Supply & Trading GmbH, Essen

Bert Lagendijk  
L.B.H. Netherlands B.V., NL - Rhoon

Bernhard Lümмен  
Oxbow Coal GmbH, Essen

Dr. Tobias Mirbach  
Energie Baden-Württemberg AG

Dirk Schmidt-Holzmann  
TERVAL s.a., B-Liège

Hans-Joachim Welsch  
AG der Dillinger Hüttenwerke, Dillingen/Saar

Rainer Winge  
SÜDZUCKER AG

Markus Witt  
Vattenfall Europe Wärme AG, Berlin

### **Management:**

Prof. Dr. Franz-Josef Wodopia

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### **Important information to figures, data and facts**

All figures shown for 2016 are provisional. Corresponding hints were not considered in text, tables, lists and other statements of numbers.

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