

## Coal 2014 **Challenges and prospects**

---



Cover: „Steinkohle 1“ from the series „Bergwerk Prosper-Haniel“ by Miles Coolidge

Project Description by the artist Miles Coolidge:

As a continuation of my large-scale photographic work focusing on the unintended consequences of the Industrial Revolution, I researched the desirability and feasibility of making a life-scale image of a coal seam in a historical mine in Germany's industrial "heartland", the Ruhrgebiet. In this work I focused on the path taken by the German industrial revolution, which, for a variety of reasons, owes its spectacular growth in part to the analysis and repurposing of the coal-derived waste products generated by the exploitation of its own natively abundant energy source (coal).

The four resulting photographs that make up the series Bergwerk Prosper-Haniel are named for the mine in which their subject – an exposed seam of coal – was found. They result not only from my interest in the historical character of their subject, but from my concern with the material properties of photography as well. The chemical composition of the pigments of the ink "carbon black", I was using, seems to be a generic industrial byproduct of the incomplete combustion of coal tars. Thus the images attain the unusual status of quite literally being what they represent.

German Coal Association

# Coal Annual Report **2014**

(Excerpt)

## Foreword



The cessation of mining in the Saar coalfield and on the left bank of the Lower Rhine in 2012 saw German coal production in 2013 fall below the 10 million tonne mark for the very first time. With Auguste Victoria colliery in Marl set to shut down with effect from 1st January 2016 and Prosper-Haniel mine in

Bottrop and Ibbenbüren colliery both scheduled for closure at the end of 2018 we are now facing the complete termination of the German coal production in just over four years time. The fact that this process has so far been carried out in such an orderly and socially responsible way is testament to the huge effort that has been put in and to the real solidarity that has been displayed by the workforce. And I am sure that this positive spirit will be maintained right to the end of the phase-out process.

The agreement to end subsidised coal mining in Germany – concluded in 2007 between the Federal Government, the coalfield Länder of North Rhine-Westphalia and Saarland, the IGBCE (Mining, Chemical and Energy Industrial Union) and the coal industry – is due to be fully implemented in 2019 and it now seems certain that this will spell the end of coal mining in Germany. However, the final shut-down of this branch of industry will not at the same time mean the end of RAG as an operating company.

RAG will continue to exist beyond the year 2018, though with a much reduced workforce. As part of our obligations to the coalfield communities we intend to ensure that the Ruhr and Saar remain viable areas in which to live after the mining industry disappears. And one of our key tasks will be to shoulder the 'eternity tasks left behind by the mining industry, which essentially means mine water management, polder protection measures and groundwater purification. After 2018 we shall of course also be assuming responsibility for mining subsidence problems, inherited liabilities and mining-related environmental rehabilitation, which includes abandoned mine shafts and shallow mine workings, insofar as these are considered as part of the property rights of RAG Aktiengesellschaft.

Another key question surrounding the end of the coal mining is how to make the best use of former colliery land. RAG has extensive experience in redeveloping sites of this kind. Furthermore, the commercial exploitation of our wide-ranging technical expertise on the international marketplace, along with the countless new ideas being developed for using existing mining infrastructure as locations for renewable energy production, is creating opportunities that we are determined to pursue vigorously. And in accepting change and recognising it as an opportunity we are being supported in full measure by the Land government of North Rhine-Westphalia.

Coal continues to make a significant contribution in proportionate terms to German energy supply security. For the foreseeable future coal, together with lignite and natural gas, will have to provide the bridge that is needed to the age of purely renewable electricity generation that is the aim of government and part of the social consensus. Trade in coal and its by-products will therefore continue to be part of the RAG portfolio in the years ahead, all the more so when Germany's coal supplies have to be completely based on imported fuel from 2019 on.

'Coal 2014 – challenges and prospects' is the title of the latest GVSt Annual Report. This indicates that we want to remain responsible for what happens in the coalfield areas in the years to come. We shall produce coal in a reliable manner until the agreed end-date and will thereafter continue to manage the phase-out process in an orderly and socially responsible way. Years of confrontation with structural change in the coalfield areas have helped us develop unrivalled expertise in preparing for the post-mining era. And marketing this know-how also provides us with opportunities and potential in the international arena.

This year's Annual Report presents the current situation of the German coal industry. Moreover it reviews the latest trends in German energy policy from a coal-industry perspective, trends which can no longer be viewed separately from European energy policy. The Report also covers developments in the field of environment and climate policy, and in the international energy and commodities markets, as they impact on the coal industry. A special section takes a look back at the historical importance of the coal mining industry and examines

the special responsibility that we have borne – and will continue to exercise – towards those who live in the coalfield communities.

Coal production will continue to be RAG's main business activity until the end of 2018. Until that date we shall be consistent in supplying coal to our customers as agreed. And in the period beyond 2018 we will remain reliable partners to policy makers, our customers and all those who live in the former coalfield areas.

Herne, October 2014



Bernd Tönjes  
Chairman of the Executive Board  
German Coal Association

# Editorial

## General conditions

The German economy is expected to undergo a significant upturn in 2014. Nevertheless, there are still domestic and, more particularly, external risks to be faced and the financial crisis in the eurozone, with its serious impact on the real economy, is by no means over. Investment activities have been hesitant. Our huge dependence on imports of energy from Russia, combined with the conflict in Ukraine, has raised deep concern about security of energy supplies to Germany and indeed to Europe in general. A new European energy security strategy is now being discussed. Work has already been under way for some time on developing a European energy and climate strategy for the period to 2030 and the European Commission put forward concrete proposals to this effect earlier this year. Up to now environmental concerns have always been at the forefront of this strategy. A 'backloading' arrangement was also agreed in 2014 for the European emissions trading system as a way of shoring up the persistently low prices of CO<sub>2</sub> certificates in the trading period to 2020 by temporarily creating a scarcity of emission allowances. However this measure has so far failed to drive up prices to any real degree.

Meanwhile the German energy transition is in full swing. The main focus for 2014 has been the reform of the Renewable Energy Sources Act ( EEG), as agreed by the grand coalition government, which came into force on 1st August 2014. This measure aims to contain the rising cost associated with the expansion of renewable energies, concentrate future support on wind power and solar energy and bring about the full integration of regenerative power production into the electricity market in the longer term. Complementary expansion targets and corridors have also been defined for renewables' contribution to gross electricity consumption, namely 40 to 45 % for 2025 and 55 to 60 % for 2035.

For the German coal industry a particularly important aspect in this area is the further development of the 'special equalisation scheme' for energy-intensive companies, a category that also includes the coal sector. Failing this the coal industry would have had to face considerable and unforeseen additional costs. This provision has been recognised by the Commission's new Environmental and Energy State Aid Guidelines that entered into force this summer. After intensive talks between Berlin and Brussels the Guidelines can generally be regarded as a positive result, as can the

outcome of the Commission's investigation procedure against the German Renewable Energy Act that has been in existence since 2012. Following the conclusion of the EEG amendment the Federal Government now wants to focus more intensively on grid expansion, increased energy efficiency and, in particular, the future design of the electricity market.

The fact that the energy transition still has a number of problems to face is confirmed, for example, by the statement issued by the Independent Expert Commission on the Federal Government's second monitoring report 'Energy of the Future' of April 2014. In the area of energy efficiency the experts have pointed to the better use that should be made of the large potential in the building sector and have called for the land use requirement of the energy transition to be included in the monitoring process. As far as cost efficiency is concerned they want to see end-user costs for electricity and other energy services calculated and recorded collectively, rather than the individual components of the electricity price. Greater account should also be taken of the distribution effects and the innovation activities resulting from the energy transition. As regards electricity supply security greater attention needed to be paid to the remaining guaranteed capacity, regional disparities and short-term disruptions. Finally, in view of the high reliance on imported energy, the Expert Commission wanted the diversification and concentration of supply sources, and possibly mutual trade links too, to be included and featured in the report. It remains to be seen what conclusions the Federal Government will now draw in its first 'Progress Report', which is part of the energy-turnaround monitoring process, due to be presented at the end of 2014.

The energy transition is to be seen as a 'generation project', as energy-related structures only evolve very slowly. The mix of primary energy consumption (PEC) and power generation for 2013, for example, only showed slight changes compared with previous years, even though the input from government-promoted renewables continues to increase. In 2013, and in contrast with the trend for preceding years, PEC did not fall but in fact increased even more than overall economic performance. Energy-related CO<sub>2</sub> emission also showed a rise again. Both developments were primarily attributed to the relatively extreme weather fluctuations. 2013 was quite a cold year and the heating fuels oil and gas were much more in demand than usual. Coal recorded an increase in consumption due to its price advantage over gas for power

generation and the somewhat restrained development of the wind and solar power sectors, which was another weather-related factor. Given the warmer conditions so far experienced in 2014 PEC is likely to be significantly lower than in the previous year and coal is expected to be replaced to a large degree by renewables in the electricity generating sector.

After the mine closures of 2012 Germany is now left with three operating collieries producing a combined total of some 7.5 million tonnes a year, about 90 % of which are sold to the electricity industry. Only small amounts of coal are still delivered to the steel producers and heat market.

The German coal industry will continue as scheduled with its politically predetermined adjustment and phase-out process. In the months ahead this process will take place against a background of labour and social provisions that will pose new financial and administrative challenges for the employers. The legislative measures already agreed in respect of pension and long-term care insurance will result in higher social security contributions as payments towards pension insurance will not be reducing and those required for long-term care will increase. Political projects like the gender quota pose a particular challenge for branches such as the mining industry. And there will be more of the same in the form of EU initiatives. Mobility policy, for example, is one particular project that will measurably increase the cost of occupational pension schemes.

### Responsibilities in the post-mining era

As the body responsible for the coal mining industry RAG Aktiengesellschaft (RAG) will have to face a number of additional challenges. For one thing the company has to manage the phase-out process while at the same time operating as a reliable supplier of coal until the end of 2018. In addition to this it remains responsible for the impact caused by many years of mining in the coalfields of North Rhine-Westphalia and Saarland and will continue to be so indefinitely beyond the 2018 milestone. To this effect RAG launched an initiative in early 2014, with its partners RWE Power AG and the Land government of North Rhine-Westphalia, that is designed to create better transparency in handling mining subsidence issues and produce a fair reconciliation of interests between the mining companies and those parties who have been affected by mining operations. The assumption of responsibility also includes an agreement concluded by RAG with a Ruhr coalfield action group for the proactive revitalisation

of former mining sites, the mine-water planning concept for the former Saar coalfield and for North Rhine-Westphalia, and the greater efforts being taken in-house to use mining infrastructure for renewable energy generation. The RAG Group is also consistently aligning its business interests in preparation for the period following the closure of the German coal industry.

RAG is supporting structural change in those regions that have long been defined by their coal and steel industries, though it has no intention of neglecting the cultural heritage of those former times. The transition to the era of renewable energy in the former coalfields will at the same time provide the company with potential (prospects/perspectives) for its professional expertise and it fully intends to actively pursue opportunities of this kind. RAG has already generated real impetus in this area and its commitment to a long-term involvement in the economic and social development of the soon-to-be former coalfield communities has been emphatically underlined, most recently at the company's future forum held on 10th June in conjunction with the RAG Foundation at the Zollverein World Heritage Site.

### Occupational health and safety and environment protection

The German coal industry also fulfils its responsibilities when it comes to occupational health and safety and environment protection.

Health and safety results have maintained the positive trend of recent years, as witnessed by a further drop in notifiable accidents. The high priority that workplace safety has always enjoyed within the mining industry is to be sustained right down to the finishing line. With this in mind RAG has laid down a strategy for 'Staying safe until 2018'. And the commitment of the industry's management and workforce to health and safety matters is not only limited to Germany, for their expertise is also being applied at international level too – which includes our involvement in the International Social Security Association.

Over the course of the last year there has been some public discussion about the waste material that was stored below ground during the 1990s. It was a condition of this operation that the material in question should be effectively isolated from the biosphere on a permanent basis. Regular mine-water analyses carried out over the years have confirmed that the stored material presents no risk for the environment.

In 2013, as in previous years, mine gas utilisation continued to play its part in the overall climate protection effort. North Rhine-Westphalia has now followed the Saarland in being able not only to generate electricity from this source but also to extract the useful heat and feed it into the district heating network.

The programme of measures and activities that the German coal industry has set up in the area of health and safety and environment protection is of course very much dependent on the political provisions at national and local government level, but also on the framework that the EU has put in place for this purpose. Germany sees itself as playing a leading role in the field of climate protection. However, as the self-imposed target for 2020 will probably not be achieved with the measures that have been planned to date the Federal Environment Ministry reacted in April 2014 by launching a 'Climate Action Programme 2020'. The German Government is also planning a Climate Protection Plan 2050 whose remit is to be determined as part of a broadly-based dialogue process in 2016.

Following the adoption of Germany's first Climate Protection Act in North Rhine-Westphalia last year representatives from business, science, administration and civil society drew up strategies and proposals for a plan that would be capable of achieving the environmental targets. The plan was to be prescribed for a period of five years.

In the area of air quality the various measures already stipulated by the EU have resulted in a significant reduction in the concentration of pollutants such as dust particles, sulphur dioxide, lead, nitrous oxides, carbon monoxide and benzene. However Brussels believes there is a need for further action and in December 2013 the EU proposed a new package of measures for reducing air pollution. This contains stricter emission limits for air pollutants and includes a new 'Clean Air for Europe' programme. Europe also practises a flow management system whose objective is to achieve a closed materials cycle that prevents the discharge of large amounts of waste. By comparison, coal-fired power stations in the USA present quite a different picture and the technology they use requires large amounts of residue material to be disposed of at landfill sites. The same applies to mercury separation, a process that has been agreed and decided but is still a long way from being implemented.

It should be noted in this context that Germany is one of the few countries to have introduced any kind of limit for

mercury emissions. German coal-fired power stations not only comply with these limits but in fact operate well within the threshold. The German approach also delivers high separation rates for sulphur and NO<sub>x</sub> compounds in conjunction with a material flow management system.

### European and international energy and raw materials markets

Economic development in China, a country that in recent years has demonstrated a huge appetite for consuming raw materials, has reflected the global economic and euro crises by levelling off somewhat and after the previous boom years this has had a sobering impact on the international mining industry. A dramatic fall in prices on the various commodities markets has led to widespread capacity reductions, job losses and investment cutbacks. The international development and commercial banks have reacted to the worsening slump in raw materials prices and with environmental considerations also coming into play have been displaying greater caution when it comes to the financing of coal-mining projects around the world. The ongoing use of fracking technology as a way of exploiting unconventional fuel reserves is set to have a long-term impact. The USA, for example, is becoming increasingly self-sufficient in oil and gas and this alone will bring about a permanent change in the future energy world order.

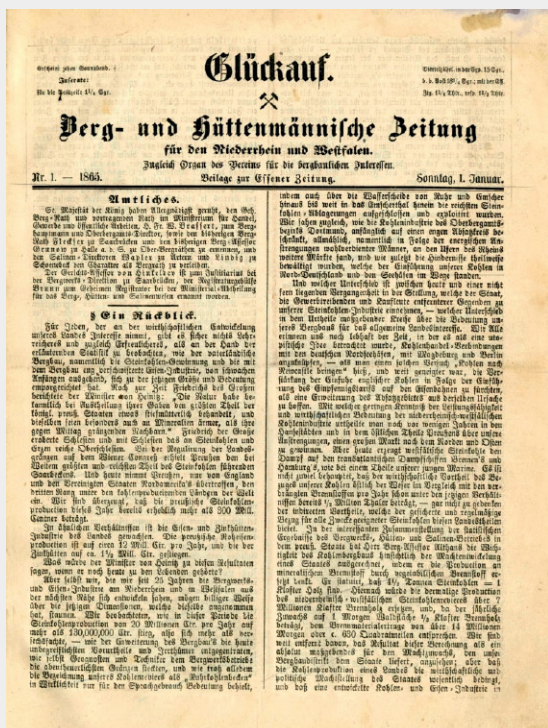
The German business community is again showing greater interest in an active strategy for securing raw material supplies, even though companies have not yet made any real effort, for various reasons, to involve themselves in the overseas mining sector. The Berlin-based German Federation of International Mining and Mineral Resources brings together German companies and banks that are directly or indirectly involved in international mineral and raw material extraction projects.

The importance of a sustainable approach is increasing in line with the growing awareness that we need to consider the basic needs of our own citizens as well as those of neighbouring countries and subsequent generations around the world. Sustainability has to be seen in conjunction with the sense of fairness and justice that applies to the fight against energy poverty in a steadily growing global population. China, long branded by environmental organisations as 'the world's biggest polluter', has been using its coal-based economic development to cut poverty levels significantly and increase living standards – the only country



## Editor's note

This year's Annual Report of the German Coal Association (GVSt) has an unusual layout. Its theme, which can be viewed from a number of different perspectives, is developed along artistic lines and uses black and white 'coal industry' images taken by the photographic artists Miles Coolidge, Wolf R. Ussler and Thomas Steltzmann. These appear on the cover and at the start of each chapter and are accompanied by messages written by mineworkers from former collieries.



Cover page from the first edition of Glückauf Magazine dated 1st January 1865

The publication of this year's Annual Report coincides with a technical-scientific symposium marking the 150-year anniversary of Glückauf Mining Magazine. Now distributed under the title 'Mining Report Glückauf' this journal has for many decades been the voice of the mining community organisations. It has been part of the coal industry story through all its highs and lows since 1st January 1865 and will remain so in the years ahead.

in the world to do so. China has now adopted sustainability targets in its current Five Year Plan and is working consistently to implement this. The USA, now overtaken by China as the world's number-one emitter of pollutants, has spent the summer of 2014 discussing a much tougher climate protection policy than could have been imagined just a few years ago. India is considering a sustainable energy strategy based on four key target areas, namely energy provision through increasing electrification, security of supply based

on a balanced energy mix, affordability and environmental compatibility. Only Australia has opted for a complete U-turn in its existing climate protection policy, following a change of government, and is now giving greater consideration to industry-oriented aspects in its energy and mining strategy.

# Statistics

## World primary energy consumption

year	nuclear energy	non-renewable energies			renewable energies		total
		coal and lignite	mineral oil	natural gas	hydro	other fuels	
	mtce						
1970	28	2,277	3,262	1,326	146	827	7,866
1980	247	2,724	4,320	1,853	206	1,066	10,416
1990	738	3,205	4,477	2,525	271	1,420	12,636
2000	955	3,123	5,005	3,091	329	1,534	14,037
2005	1031	4,191	5,488	3,522	379	1,960	16,571
2010	1028	4,968	5,882	3,918	422	1,986	18,204
2011	964	5,395	5,876	3,985	429	2,041	18,690
2012 <sup>1</sup>	841	5,550	5,870	4,100	418	2,260	19,039
2013 <sup>1</sup>	867	5,617	5,923	4,174	431	2,335	19,347
2020 <sup>2</sup>	1,267	6,009	6,392	4,680	561	2,577	21,486
2035 <sup>2</sup>	1,600	6,332	6,667	5,890	716	3,658	24,863

<sup>1</sup> estimated <sup>2</sup> outlook

nuclear energy and renewables evaluated by efficiency method; incl. traditional energies

Sources: BP Statistical Review, 2014; WEC Germany, 2014

IEA New Policies Scenario, 2013

## Global CO<sub>2</sub> emissions

	1990 (base year)	2000	2005	2010	2012	2013	changing rates	
							2013 vs 2012	2013 vs 1990
regions/countries	mt						%	
Annex-I-Staaten <sup>1</sup>	14,988.8	14,432.0	14,900.2	14,170.5	13,816.2	13,843.2	0.2	-7.6
EU-28	4,442.0	4,143.0	4,270.5	3,917.6	3,727.4	3,658.1	-1.9	-17.6
thereof EU-15 <sup>1</sup>	3,375.1	3,382.6	3,486.0	3,166.0	2,997.7	2,945.5	-1.7	-12.7
thereof Germany <sup>1/2</sup>	1,042.1	891.5	861.7	829.4	821.7	841.4	2.4	-19.3
Australia <sup>1</sup>	276.1	346.6	380.4	399.4	397.8	385.4	-3.1	39.6
Canada <sup>1</sup>	459.0	567.7	576.7	554.4	550.5	553.5	0.5	20.6
USA <sup>1</sup>	5,100.6	5,963.1	6,103.3	5,712.8	5,375.0	5,514.7	2.6	8.1
Russia <sup>1</sup>	2,505.4	1,477.0	1,531.7	1,602.4	1,656.8	1,646.1	-0.6	-34.3
Ukraine <sup>1</sup>	718.9	293.5	320.6	289.7	302.7	291.9	-3.6	-59.4
Japan <sup>1</sup>	1,141.1	1,251.5	1,282.1	1,191.1	1,275.6	1,265.3	-0.8	10.9
Korea	229.3	437.7	469.1	564.5	593.1	598.9	1.0	161.2
India	582.3	972.5	1,164.4	1,710.4	1,903.4	1,982.1	4.1	240.4
China	2,277.7	3,350.0	5,443.9	7,294.1	8,445.3	8,774.7	3.9	285.2
rest of Far East	696.3	1,160.1	1,450.4	1,694.3	1,779.6	1,822.8	2.4	161.8
Middle East	557.1	869.5	1,112.8	1,488.1	1,607.2	1,644.8	2.3	195.2
Africa	544.5	680.5	828.7	967.2	1,001.8	1,014.6	1.3	86.4
Brazil	192.4	303.6	322.7	388.5	427.0	454.3	6.4	136.1
Mexico	265.3	349.6	385.8	417.9	439.9	435.7	-1.0	64.2
r.o. Latin America	383.8	495.4	540.5	660.2	707.0	727.5	2.9	89.5
Other States	1,407.5	1,511.4	1,715.6	1,907.3	1,995.1	2,002.9	0.4	42.3
World	21,779.3	24,172.7	27,899.2	30,759.9	32,185.2	32,773.3	1.8	50.5

<sup>1</sup> Annex-I-countries according to United Nations Framework Convention on Climate Change (see also <http://unfccc.int>)

<sup>2</sup> temperature- and inventory-adjusted

Sources: H.-J. Ziesing, "...CO<sub>2</sub>-emissions...", in ET 9/2014 and ET 5/2014

## Global electricity generation

	coal and lignite	nuclear energy	mineral oil	natural gas	hydro and others	total
year	TWh					
1970	2,075	80	1,625	—	1,175	4,955
1980	3,163	714	1,661	976	1,802	8,316
1990	4,286	1,989	1,216	1,632	2,212	11,335
2000	5,759	2,407	1,402	2,664	2,968	15,200
2005	7,040	2,640	1,240	3,750	3,550	18,220
2010	8,685	2,756	1,000	4,760	4,207	21,408
2011	9,139	2,584	1,062	4,847	4,481	22,113
2012 <sup>1</sup>	9,301	2,630	1,081	4,963	4,660	22,635
2013 <sup>1</sup>	9,459	2,711	1,047	5,051	4,779	23,047
2020 <sup>2</sup>	10,619	3,400	801	5,983	7,196	27,999
2035 <sup>2</sup>	12,312	4,294	556	8,313	11,612	37,087

<sup>1</sup> estimated <sup>2</sup> outlook

Sources: BP Statistical Review, 2014; WEC Germany, 2014; IEA New Policies Scenario, 2013

## World reserves of coal, lignite, mineral oil and natural gas 2013

	coal and lignite	mineral oil	natural gas	total
regions	bnt ce			
EU-27	21	1	2	24
rest of Europe and Central Asia <sup>1</sup>	141	29	65	235
Africa	33	27	17	77
Middle East	1	168	95	264
North America <sup>2</sup>	156	47	14	217
Central and South America <sup>3</sup>	10	69	9	88
China	80	4	4	88
India	59	1	2	62
Indonesia	9	1	4	14
Far East	3	2	4	9
Australia <sup>4</sup>	50	1	4	55
World	563	350	220	1133
	50 %	31 %	19 %	100 %

<sup>1</sup> Rest of Europe, Russia, Kazakhstan, Ukraine, Mongolia<sup>2</sup> including Canadian oil sands <sup>3</sup> including Mexico <sup>4</sup> including New-Zealand

Source: BP Statistical Review, 2014

## World reserves and production of coal 2012

	reserves	production
regions	bnt ce	
EU-27	18.511	0.128
rest of Europe and Central Asia	131.303	0.480
Africa	36.210	0.269
Middle East	1.203	0.001
North America	229.914	0.921
Central and South America	8.943	0.093
China	180.600	3.505
India	80.417	0.558
Far East	20.816	0.506
Australia	61.082	0.374
World	768.999	6.835

Source: DERA/BGR, 2013

## Primary energy consumption in EU-27\*

	coal and lignite	mineral oil	natural gas	nuclear energy	hydro and others	total
year	mt ce					
2005	431	1,003	606	367	123	2,530
2010	402	814	631	342	261	2,450
2011	409	785	578	337	263	2,372
2012 <sup>1</sup>	419	885	572	286	249	2,411
2013 <sup>1</sup>	407	865	563	284	276	2,395
2020 <sup>2</sup>	356	675	582	323	372	2,308
2035 <sup>2</sup>	207	525	651	303	518	2,204

\* from 2013 EU-28 <sup>1</sup> estimated <sup>2</sup> outlook

Sources: BP Statistical Review, 2014; IEA New Policies Scenario, 2013

## Power generation in EU-27\*

	coal and lignite	mineral oil	natural gas	nuclear energy	hydro and others	total
year	TWh					
2005	990	160	660	930	440	3,180
2010	862	86	758	917	687	3,310
2011 <sup>1</sup>	884	74	696	907	696	3,257
2012 <sup>1</sup>	903	73	615	883	821	3,295
2020 <sup>2</sup>	764	37	577	866	1,113	3,357
2035 <sup>2</sup>	397	20	801	810	1,582	3,610

\* from 2013 EU-28 <sup>1</sup> estimated <sup>2</sup> outlook

Sources: EU-Commission: Energy in Figures - Statistical Pocketbook, 2014; BP Statistical Review, 2014; IEA New Policies Scenario, 2013

## Coal and lignite production and imports in EU-28\* in 2013

country	production			imports
	coal	lignite	total	coal
mt ce				
Poland	66	20	86	9
United Kingdom	11	0	11	42
Germany	6	54	60	43
Czech Republic	7	12	19	2
Spain	4	—	4	16
Bulgaria	2	8	10	1
Romania	2	7	9	1
Greece	—	16	16	—
Hungary	—	3	3	1
Slovenia	—	1	1	1
Slovakia	—	1	1	4
Kroatia	—	—	—	1
Italy	—	—	—	20
France	—	—	—	16
Netherlands	—	—	—	11
Finland	—	—	—	4
Denmark	—	—	—	5
Belgium	—	—	—	3
Sweden	—	—	—	2
Portugal	—	—	—	4
Austria	—	—	—	2
Ireland	—	—	—	1
EU-28	98	122	220	189

\* Croatia's accession to the EU on 1.7.2013

Source: EUROCOAL 2014

## Primary energy consumption in Germany

	mineral oil	coal	lignite	natural gas	nuclear energy	wind energy	hydro, biomass and others <sup>2</sup>	total
year	mt ce							
1980	206.7	85.2	115.7	73.9	20.7	0.0	5.9	508.1
1990	178.0	78.7	109.2	78.2	56.9	0.0	7.6	508.6
1995	194.1	70.3	59.2	95.5	57.4	0.2	10.2	486.9
2000	187.6	69.0	52.9	101.9	63.2	1.2	15.6	491.4
2005	176.3	61.7	54.4	110.9	60.7	3.3	29.4	496.7
2010	159.8	58.5	51.6	108.3	52.3	4.6	50.0	485.1
2011	154.4	58.5	53.4	99.3	40.2	6.0	52.2	464.0
2012 <sup>1</sup>	154.4	58.9	56.1	99.6	37.0	6.2	46.6	458.8
2013 <sup>1</sup>	158.3	61.0	55.5	108.0	36.2	6.3	46.5	471.8

<sup>1</sup> preliminary <sup>2</sup> incl. negative elec. exchange balance

nuclear energy and renewables evaluated by efficiency method

Source: AGE, 8/2014

## German coal sales

	domestic			EU countries		third countries	total sales
	heat market	power stations	steel industry	steel industry	others		
year	mt ce						
1960	61.3	22.1	31.3	27.0		5.3	147.0
1970	28.5	31.8	27.9	19.8	5.7	3.2	116.9
1980	9.4	34.1	24.9	13.0	4.8	2.1	88.3
1990	4.1	39.3	19.8	5.2	2.2	0.4	71.0
2000	0.7	27.6	10.0	0.0	0.3	0.0	38.6
2005	0.3	20.3	6.1	0.0	0.1	0.0	26.8
2010	0.3	10.6	3.7	0.0	0.2	0.0	14.8
2011	0.3	10.1	2.3	0.0	0.1	0.0	12.8
2012	0.3	9.9	1.1	0.0	0.1	0.0	11.4
2013	0.3	6.6	0.9	0.0	0.2	0.0	8.0

## German coal industry workforce<sup>1</sup>

by end of year	workers		white-collar employees		staff (workers and white-collar employees)	
	under-ground	surface	under-ground	surface	total	thereof apprentices
	in 1,000					
1957	384.3	169.3	16.3	37.4	607.3	48.2
1960	297.0	140.2	16.8	36.2	490.2	22.7
1965	216.8	110.5	15.6	34.1	377.0	15.2
1970	138.3	75.6	13.0	25.8	252.7	11.5
1975	107.9	60.9	11.5	22.0	202.3	14.1
1980	99.7	55.8	10.6	20.7	186.8	16.4
1985	90.1	47.4	10.2	18.5	166.2	15.7
1990	69.6	35.9	8.9	15.9	130.3	8.3
1995	47.2	25.7	6.1	13.6	92.6	2.9
2000	25.6	18.2	3.8	10.5	58.1	2.3
2005	17.7	10.9	2.6	7.3	38.5	3.2
2010	10.7	6.7	1.5	5.3	24.2	1.1
2011	9.0	5.8	1.4	4.7	20.9	1.1
2012	7.1	5.1	1.3	4.1	17.6	1.0
2013	5.6	4.3	1.1	3.5	14.5	0.8

<sup>1</sup> workforce including short-time workers and trainees

## Power generation in Germany

	coal	lignite	nuclear energy	mineral oil	natural gas	wind energy	hydro, biomass and others	total
year	TWh							
1980	111,5	172,7	55,6	27,0	61,0	0,0	39,8	467,6
1990	140,8	170,9	152,5	10,8	35,9	0,1	38,9	549,9
1995	147,1	142,6	154,1	9,1	41,1	1,5	41,3	536,8
2000	143,1	148,3	169,6	5,9	49,2	9,5	50,9	576,5
2005	134,1	154,1	163,0	12,0	72,7	27,2	59,5	622,6
2010	117,0	145,9	140,6	8,7	89,3	37,8	93,7	633,0
2011	112,4	150,1	108,0	7,2	86,1	48,9	100,4	613,1
2012	116,4	160,7	99,5	7,6	76,4	50,7	118,5	629,8
2013 <sup>1</sup>	122,2	161,0	97,3	6,6	66,7	53,4	124,2	631,4

<sup>1</sup> preliminary

## Rationalisation efforts in German coal industry

year	output per manshift underground	output <sup>1</sup> per working face	mines <sup>2</sup>	working faces
	kg saleable <sup>3</sup>	t saleable <sup>3</sup>	number	
1960	2,057	310	146	1,631
1970	3,755	868	69	476
1980	3,948	1,408	39	229
1990	5,008	1,803	27	147
2000	6,685	3,431	12	37
2005	6,735	3,888	9	24
2010	6,092	3,018	5	16
2011	6,623	3,156	5	14
2012	6,876	3,739	3 <sup>4</sup>	11
2013	6,624	3,454	3	8

<sup>1</sup> daily face output <sup>2</sup> data status: end of year excl. small mines

<sup>3</sup> until 1996 Saar figures in t = t <sup>4</sup> as at: 01.01.2013

## Coal production in Germany

	area				total
	Ruhr	Saar	Aachen	lbben- büren	
year	mt saleable				
1957	123.2	16.3	7.6	2.3	149.4
1960	115.5	16.2	8.2	2.4	142.3
1965	110.9	14.2	7.8	2.2	135.1
1970	91.1	10.5	6.9	2.8	111.3
1975	75.9	9.0	5.7	1.8	92.4
1980	69.2	10.1	5.1	2.2	86.6
1985	64.0	10.7	4.7	2.4	81.8
1990	54.6	9.7	3.4	2.1	69.8
1995	41.6	8.2	1.6	1.7	53.1
2000	25.9	5.7	—	1.7	33.3
2005	18.1	4.7	—	1.9	24.7
2010	9.6	1.3	—	2.0	12.9
2011	8.7	1.4	—	2.0	12.1
2012	8.4	0.4	—	2.0	10.8
2013	5.7	—	—	1.9	7.6



## Coal industry data for 2013

**Mines** (as at 01.01.2014) **3**

**Workforce<sup>1</sup> total** **14,549 employees**

- Ruhr coalfield	11,448 employees
- Saar coalfield	668 employees
- Ibbenbüren	2,433 employees

**Coal production total** **7.6 mt saleable<sup>2</sup>**

≅ 7.8 mt ce<sup>3</sup>

- Ruhr coalfield	5.7 mt saleable
- Saar coalfield	— mt saleable
- Ibbenbüren	1.9 mt saleable

### Technical statistics

output per production unit	3,454 t saleable/day
average seam thickness	207 cm
average face length	308 m
average winning depth	1,225 m
deepest shaft	1,550 m

**Sales total** **8.0 mt ce**

- electricity industry	6.6 mt ce
- steel industry	0.9 mt ce
- heat market	0.5 mt ce

### German coal's contribution

- to primary energy consumption in Germany	2 %
- to electricity generation in Germany	4 %
- to coal consumption	13 %
- to coal-fired electricity production	18 %

<sup>1</sup> at year end; including staff on short time working and trainees

<sup>2</sup> saleable includes water and ash content

<sup>3</sup> t ce = tonnes of coal equivalent. 1 kg t ce = 7,000 kcal or 29,308 kJ

---

German Coal Association