



## EMD Coal Committee



### 2015 EMD Coal Committee Mid-Year Report

**William A. Ambrose, Chair**  
Bureau of Economic Geology  
The University of Texas at Austin

**Date**  
November 13, 2015

**Vice-Chairs:**

- **Vice- Chair: University: Dr. John S. Mead, Southern Illinois University**
- **Vice-Chair: Government: Paul Hackley, U.S. Geological Survey, Reston VA.**

**Advisor:**

- **Curtis Evans, Contributing Editor, Canada**

---

#### EXECUTIVE SUMMARY

The world's top 10 coal producing countries since 2012 account for about 90% of the world's total coal production, with China being the top coal-producing and -consuming country and Indonesia and Australia being the top coal-exporting countries. This report focuses on coal production in the top-three coal producing countries (China, United States, and India), which together represented ~65% of the world's coal production (~5.16 billion metric tons [5.68 billion short tons, or bst]) at the beginning of 2013. A current global oversupply of coal, with surpluses at approximately 10 million metric tons (~11 million short tons [mst]) in 2014, has led to a downturn in global coal prices. This will move coal prices below profitable levels for many coal producers in 2014 and 2015, with the result of some mines having to close or suspend operations until more favorable prices return. Worldwide coal prices have been reduced by as much as 50% in the past three years because of increased production from exporters that include the U.S., Australia, South Africa, Indonesia, and Colombia. Economic growth in China has recently slackened, and in combination with pressure from the government to use more natural gas to mitigate air-pollution problems, some coal mines may close. However, demand may pick up in 2016 as the thermal-coal oversupply begins to fall as a result of coal-mine closures. In other Asian markets, Indian utilities may require more imported coal if Coal India cannot meet demand. This could result in a 6% increase in demand to almost 790 million metric tons (~871 mst) by the end of fiscal year 2015.

---

## STATUS OF U.S. COAL ACTIVITIES

U.S. coal consumption in 2014 showed no increase, with third-quarter production on par with that in 2013 (Energy Information Administration, 2015a). The average price of U.S. metallurgical and thermal coal exports during third-quarter 2014 was ~\$95 per metric ton (~\$86 per short ton) and ~\$70 per metric ton (~\$63.50 per short ton), respectively. Wyoming continues to be the top coal-producing state, with 85.7 million metric tons (~94.5 mst) of production from April to June 2014.

The decline in U.S. coal exports in 2014 was primarily controlled by a decrease in world coal demand, depressed international coal prices, and greater coal production in other coal-exporting countries. The Energy Information Administration (2015b) projects coal exports will fall from 88 million metric tons (97 mst) in 2014 to an annual average of 73.5 million metric tons (81 mst) in 2015 and 2016. Coal consumption for electric power in the U.S. decreased by 0.8%, or 6.35 million metric tons (7 mst) in 2014. The Energy Information Administration (2015b) predicts that power sector coal will decrease by 2.2% in 2015, mainly as a result of lower natural gas prices and coal-plant retirements because of implementation of new air-quality and emission standards. An additional decline in coal consumption for electric power (0.5%) is projected in 2016.

Although U.S. coal production for exports continues to be strong, coal's share of the country's overall energy production is declining, primarily the result of expanded natural gas production (Humphries and Sherlock, 2013). Lower demand for coal in U.S. markets is controlled by increasingly strict federal regulations, lower natural gas prices, and coal-plant retirements. Reuters (2012), based on data from NERC (2011), estimated that market conditions and environmental

regulations will contribute to between 59 and 77 GW of coal plant retirements by 2016. Greatest loss of coal-fired electricity generation is projected to occur in the southeastern U.S., with 27 to 30 GW of plant retirements, followed by the northeastern U.S. (18 to 26 GW).

---

## **STATUS OF INTERNATIONAL COAL ACTIVITIES**

Coal still is the second-largest energy commodity worldwide, exceeded only by oil. The world's top 10 coal producing countries since 2012 account for about 90% of the world's total coal production, with China being the top coal-producing and -consuming country and Indonesia and Australia being the top coal-exporting countries (Table 1). This report focuses on coal production in the top-three coal producing countries (China, United States, and India), which together represented ~65% of the world's coal production (~5.16 billion metric tons [5.68 billion short tons, or bst]) at the beginning of 2013 (Energy Information Administration, 2015c). Brief highlights of other leading coal-producing countries are featured at the end of this report.

Over 30% of the world's total energy demand and >40% of generated electricity comes from coal (World Coal Association, 2015). The challenge for coal in the 21<sup>st</sup> century will be improving technology for electricity from coal to address increases in CO<sub>2</sub> emissions, while at the same time continuing to provide access to energy for developing countries. A large portfolio of technologies including advanced power generation (high thermal efficiency) and CCS (carbon capture and storage) must be demonstrated and deployed to realize significant GHG (greenhouse gas) reductions from coal use. Lowering CO<sub>2</sub> emissions from coal-fueled power plants will require an increase in thermal efficiency. The IEA roadmap for technology involving electricity generated from coal with CCS currently envisages slightly less than 280 gigawatts (GW) of CCS-equipped

power plants worldwide by 2030. Approximately 630 GW of coal-fueled power plants with CCS would be required by 2050.

A current global oversupply of coal, with surpluses at approximately 10 million metric tons (~11 million short tons [mst]) in 2014, has led to a downturn in global coal prices (Reuters, 2014). This will move coal prices below profitable levels for many coal producers in 2014 and 2015, with the result of some mines having to close or suspend operations until more favorable prices return. Worldwide coal prices have been reduced by as much as 50% in the past three years because of increased production from exporters that include the U.S., Australia, South Africa, Indonesia, and Colombia. Reuters (2014) reported that the oversupply for seaborne steam (thermal) coal, used primarily for generation of electricity, was estimated by coal traders and analysts to range from 7 to 12 million metric tons (7.7 to 13.2 mst), and surplus coal could continue to be problematic into 2016. Demand for thermal coal in Asia, particularly in China, is slowing. Economic growth in China has recently slackened, and in combination with pressure from the government to use more natural gas to mitigate air-pollution problems, some coal mines may close. However, demand may pick up in 2016 as the thermal-coal oversupply begins to fall as a result of coal-mine closures. In other Asian markets, Indian utilities may require more imported coal if Coal India cannot meet demand. This could result in a 6% increase in demand to almost 790 million metric tons (~871 mst) by the end of fiscal year 2015.

China continues to be the number one producer and consumer of coal in the world (World Coal Association, 2014), using more coal than the United States, Europe, and Japan combined (Moore, 2011; Vince, 2012; Sweet, 2013). China produced more than 4.2 billion metric tons (~4.37 bst) of coal in 2013 (Energy Information Administration, 2015b). China accounts for almost half of the world's coal consumption (~78 quadrillion BTUs [British Thermal Units]) and is the world's

largest power generator (Energy Information Administration, 2015d). China possessed an estimated 122.5 billion metric tons (126 bst) of recoverable coal reserves in 2011, equivalent to ~13% of the world's total coal reserves. China, as of 2012, had more than 18,000 coal mines, of which 95% were underground mines producing primarily bituminous coal, anthracite, and lignite (World Coal Association, 2015). Much of China's thermal coal resources occur in the north-central and northwestern parts of the country. In contrast, coking (metallurgical) coal reserves are found mostly in central and coastal parts of China.

Approximately two-thirds of coal in China is used for power generation (Energy Information Administration, 2015d). China has been a net coal importer since 2009, with recent increased imports resulting from increased demand as well as high internal coal transportation costs caused by bottlenecks in China's railway capacity. These factors have made imported coal economically viable, particularly along coastal regions that are distant from coal mined in western China. China is attempting to consolidate its coal industry, as it has ~10,000 minor local coal mines where inadequate investment, outmoded equipment, and poor safety procedures control inefficient resource development.

Electricity generation in China is operated by state-owned holding companies, although limited private and foreign investments have recently been made in the electricity sector. Chinese power generation growth in 2014 was the slowest since 1998 and growth in steel production was also the weakest in more than 30 years. China has expanded the construction of natural gas-fired and renewable power plants to introduce power to remote population centers.

China's coal production in 2014 is estimated to have dropped 2.5%, having produced 3.52 billion metric tons (3.88 bst) of coal in the first eleven months of 2014. China produced 3.7 billion metric tons (4.1 bst) in 2013. This is the first annual decline in coal production in China in more than a

decade (Reuters, 2015a). This decline is the result of weakening demand from industry and the power sector, oversupply, and initiatives from the government to reduce air pollution.

The coal industry in India was the world's third largest in terms of production and the fifth largest in terms of reserves in 2012 (Energy Information Administration, 2015e). Coal India has a near-monopoly on the coal sector, of which the power sector comprises most of its coal consumption. India continues to undergo regulatory, technical, and distribution difficulties that limit production and prevent efficient transportation of coal to demand centers. Moreover, coal mines in the country are distant from the high-demand markets in western and southern India. Because coal production has failed to keep up with demand, particularly from the power sector which accounted for 69% of coal consumption in 2011. India imported 162.4 million metric tons (179 mst) and was the third-largest coal importer in 2012. India imports thermal coal primarily from Indonesia and South Africa, as well as metallurgical coal from Australia (Energy Information Administration, 2015e). The Indian coal ministry plans to scale down its production target of 795 million metric tons (876.4 mst) in the period from 2016 to 2017, owing to perceived problems in rail transport and compliance with environmental regulations (Thakkar, 2014). India possessed 249 GW of installed electricity generation capacity in 2014. However, owing to fuel shortages and limited transmission capacity, India still experiences electricity shortages and blackouts typically lasting from several hours to days.

Other leading coal-producing countries include Indonesia, Australia, Russia, South Africa, Germany, Poland, and Kazakhstan. Indonesia and Australia are the world's largest and second-largest exporters of thermal coal, respectively (Table 1) (Wulandari, 2014; Cahyafitri, 2014; Asmarini, 2015; Energy Information Administration, 2015f, 2015g). Although levels of coal production in Russia are modest, with 354 million metric tons (390 mst) in 2012, the country has

inaugurated a long-term development plan for its flagging coal industry and is calling for an increase in coal production and electricity generation from coal (Dobrovidova, 2014). Coal still represents >70% of South Africa's total primary energy consumption, although its coal production is expected to peak in the next decade (Energy Information Administration, 2015h; Ryan, 2014). Germany plans to reduce greenhouse gas emissions by 40% (from 1990 levels) by 2020 (Destatis, 2015), although coal accounted for 43% of electricity generation in Germany in 2014. Coal production in Poland is the second largest in Europe, exceeded by Germany (Energy Information Administration, 2015i). Of the 3.9 quadrillion BTU of Poland's primary energy consumption in 2012, coal represented 55%. Coal production in the same year was 143.3 million metric tons (158 mst), or ~20% of total coal production in Europe. Coal represented 63% of Kazakhstan's total energy consumption in 2012 (Energy Information Administration (2015j). A coal-to-liquids (CTL) facility is underway in Akmola Oblast in Kazakhstan (Urazova, 2015). The experimental facility for processing low-rank coal into gasoline and diesel fuel will employ low-temperature plasma in the Fischer-Tropsch process. For every ton of coal delivered from the Maikuben Basin, plans are to produce 0.223 tons of liquid fuel at a cost of 23 cents (42 tenge) per liter.

Top Exporters	2014 Exports (million metric tons)	2015 Exports (million metric tons)	2013 Electrical consumption (million metric tons)	2014 Power generation use ratio
Indonesia	382.0 (a)	450.0 (b)	239.4 (c)	0.49 (d)
Australia	196.0 (e)	202.9 (f)	266.5 (g)	0.64 (h)
United States	97.3 (i)	87.9 (i)	341.4 (j)	0.39 (k)
South Africa	78.0 (l)	79.0 (b)	161.3 (m)	0.62 (n)
Colombia	77.6 (o)	80.0 (b)	0.5 (p)	0.06 (d)

Table 1. Top coal-exporting countries and their coal exports in 2014, projected coal exports in 2015, coal consumption for electric power in 2013 (calculated from indicated source below), and electric power generation use ratio in 2014. Sources: (a). Indonesia Investments (2015); (b). Slideshare (2015), based on sources from globalCOAL; (c). Energy Information Administration (2015f); (d). Worldbank Data (2015); (e). Australia Department of Industry (2014); (f). Reuters (2015b); (g). World Coal Association (2014); (h). Energy Information Administration (2015g); (i). Energy Information Administration (2015a); (j). Energy Information Administration (2015k); (k). Energy Information Administration (2015l); (l). Energy Information Administration (2015m); (m). Energy Information Administration (2015h); (n). Republic of South Africa, Department of Energy (2015). (o). Dodson (2015); (p). Energy Information Administration (2015n).

---

## REFERENCES

Asmarini, W., 2015, Indonesian coal shipments rise despite new export rule: <http://www.reuters.com/article/2014/11/24/indonesia-coal-exports-idUSL3N0TE31G20141124>, last accessed October 8, 2015.



Australian Government Department of Industry, 2014, Resources and Energy Quarterly, December Quarter 2014: <http://www.industry.gov.au/Office-of-the-Chief-Economist/Publications/Documents/req/REQ-2014-12.pdf>, last accessed October 5, 2015.

Cahyafitri, R., 2014, Indonesia's coal production rises, despite plunging prices: The Jakarta Post: <http://www.thejakartapost.com/news/2014/07/12/indonesia-s-coal-production-rises-despite-plunging-prices.html>, last accessed October 8, 2015.

Destatis, 2015, Germany: 43% of electricity came from brown and hard coal in 2014: <https://www.destatis.de/EN/FactsFigures/EconomicSectors/Energy/Energy.html>, last accessed October 8, 2015.

Dobrovidova, O., 2014, Russia reveals plans to boost flagging coal industry: <http://www.rtcc.org/2014/04/22/russia-reveals-plans-to-boost-flagging-coal-industry/>, last accessed October 8, 2015.

Dodson, S., 2015, Colombian thermal coal exports rose in 2014: <http://www.worldcoal.com/handling/16012015/Colombian-thermal-coal-exports-rise-in-2014-1752/>, last accessed October 8, 2015.

Energy Information Administration, 2015a, Quarterly coal report (abbreviated), January-March 2015: <http://www.eia.gov/coal/production/quarterly/pdf/qcr.pdf>, last accessed October 8, 2015.

Energy Information Administration, 2015b, U.S. coal short-term energy outlook: <http://www.eia.gov/forecasts/steo/report/coal.cfm>, last accessed October 8, 2015.

Energy Information Administration, 2015c, Total primary coal production by country: <http://www.eia.gov/cfapps/ipdbproject/IEDIndex3.cfm?tid=1&pid=7&aid=1>, last accessed October 8, 2015.

Energy Information Administration, 2015d, China: Country analysis brief overview: <http://www.eia.gov/beta/international/country.cfm?iso=CHN>, last accessed October 8, 2015.

Energy Information Administration, 2015e, India: Country analysis brief overview: <http://www.eia.gov/beta/international/country.cfm?iso=IND>, last accessed October 8, 2015.

Energy Information Administration, 2015f, Indonesia: Country analysis brief overview: <http://www.eia.gov/beta/international/country.cfm?iso=IDN>, last accessed October 8, 2015.

Energy Information Administration, 2015g, Australia: Country analysis brief overview: <http://www.eia.gov/beta/international/country.cfm?iso=AUS>, last accessed October 8, 2015.

Energy Information Administration, 2015h, South Africa: Country analysis brief overview: <http://www.eia.gov/beta/international/country.cfm?iso=ZAF>, last accessed October 8, 2015.

Energy Information Administration, 2015i, Poland: Country analysis brief overview: <http://www.eia.gov/beta/international/country.cfm?iso=POL>, last accessed October 8, 2015.

Energy Information Administration, 2015j, Kazakhstan: Country analysis brief overview: <http://www.eia.gov/beta/international/country.cfm?iso=KAZ>, last accessed October 8, 2015.

Energy Information Administration, 2015k, U.S. coal consumption by end-use sector, 2008-2014: <http://www.eia.gov/coal/production/quarterly/pdf/t32p01p1.pdf>, last accessed October 8, 2015.

Energy Information Administration, 2015l, What is U.S. electricity generation by energy source?: <http://www.eia.gov/tools/faqs/faq.cfm?id=427&t=3>, last accessed October 8, 2015.

Energy Information Administration, 2015m, South Africa international energy data and analysis: [http://www.eia.gov/beta/international/analysis\\_includes/countries\\_long/South\\_Africa/south\\_africa.pdf](http://www.eia.gov/beta/international/analysis_includes/countries_long/South_Africa/south_africa.pdf), last accessed October 8, 2015.

Energy Information Administration, 2015n, Colombia international energy data and analysis: <http://www.eia.gov/beta/international/analysis.cfm?iso=COL>, last accessed October 8, 2015.

Humphries, M., and Sherlock, M. F., 2013, U.S. and world coal production, federal taxes, and incentives: Congressional Research Service, Report for Congress: <http://www.fas.org/sgp/crs/misc/R43011.pdf>, last accessed October 8, 2015.

Indonesia Investments, 2015, Indonesia lowers 2015 coal-production target on weak global context: <http://www.indonesia-investments.com/news/todays-headlines/indonesia-lowers-2015-coal-production-target-on-weak-global-context/item5830>, last accessed October 5, 2015.

Moore, M., 2011, China's coal rush leaves three million living on the edge: The Telegraph, London: <http://www.telegraph.co.uk/news/worldnews/asia/china/8738873/Chinas-coal-rushleaves-three-million-living-on-the-edge.html>, last accessed October 8, 2015.

NERC (North American Electric Reliability Corporation), 2011, Potential impacts of future environmental regulations: <http://www.nerc.com/files/EPA%20Section.pdf>, last accessed October 8, 2015.

Republic of South Africa, Department of Energy, 2015, Coal overview:  
[http://www.energy.gov.za/files/coal\\_overview.html](http://www.energy.gov.za/files/coal_overview.html), last accessed October 8, 2015.

Reuters, 2012, U.S. study sees 59,000 MW of coal output too costly to run:  
<http://www.reuters.com/article/2012/11/13/us-utilities-coal-idUSBRE8AC05D20121113>, last accessed October 8, 2015.

Reuters, 2014, Global seaborne coal market oversupply to be 10 mln T this year:  
<http://uk.reuters.com/article/2014/07/21/energy-coal-supplies-idUKL6N0PM3M220140721>,  
last accessed October 8, 2015.

Reuters, 2015a, China 2014 coal output seen down 2.5 pct, first drop in a decade:  
<http://www.reuters.com/article/2015/01/29/china-economy-output-coal-idUSL4N0UZ3PO20150129>, last accessed October 8, 2015.

Reuters, 2015b, Even as banks walk away, coal on the rise in Australia:  
<http://www.reuters.com/article/2015/08/11/australia-coal-idUSL3N10M1ZG20150811>, last accessed October 5, 2015.

Ryan, B., 2014, SA's coal industry: muddling along:  
<http://www.financialmail.co.za/coverstory/2014/03/27/sa-s-coal-industry-muddling-along>, last accessed October 8, 2015.

Slideshare, 2015, Changing nature of seaborne thermal coal markets:  
<http://www.slideshare.net/JennyKent1/changing-nature-of-seaborne-thermal-coal-markets>,  
last accessed October 6, 2015.

Sweet, C., 2013, China uses nearly as much coal as the rest of world combined, EIA says: The Wall Street Journal:

<http://online.wsj.com/article/SB10001424127887323829504578272233059490240.html>, last accessed October 8, 2015.

Thakkar, M., 2014, India misses coal target again, will depend more on imports:

<http://economictimes.indiatimes.com/industry/indl-goods/svs/metals-mining/india-misses-coal-target-again-will-depend-more-on-imports/articleshow/31568756.cms>, last accessed October 8, 2015.

Urazova, D., 2015, Coal-to-gasoline plant to be launched in Kazakhstan:

[http://en.tengrinews.kz/industry\\_infrastructure/Coal-to-gasoline-plant-to-be-launched-in-Kazakhstan-258331/](http://en.tengrinews.kz/industry_infrastructure/Coal-to-gasoline-plant-to-be-launched-in-Kazakhstan-258331/), last accessed October 8, 2015.

Vince, G., 2012, Can China create the solutions to our energy problems? News Article, BBC,

London: <http://www.bbc.com/future/story/20120518-chinas-clean-coal-goal>, last accessed October 8, 2015.

Worldbank Data, 2015, Electricity from coal by country:

<http://data.worldbank.org/indicator/EG.ELC.COAL.ZS>, last accessed October 7, 2015.

World Coal Association, 2014, Coal statistics for 2013: [http://www.worldcoal.org/resources/coal-](http://www.worldcoal.org/resources/coal-statistics)

[statistics](http://www.worldcoal.org/resources/coal-statistics), last accessed October 8, 2015.

World Coal Association, 2015, Frequently asked questions:

<https://www.worldcoal.org/resources/frequently-asked-questions/>, last accessed October 8, 2015.

Wulandari, F., 2014, Indonesia coal output may rise even as prices decline, ICMA Says: Bloomberg News: <http://www.bloomberg.com/news/2014-03-31/indonesia-coal-output-may-rise-even-as-prices-decline-icma-says.html>, last accessed October 8, 2015.