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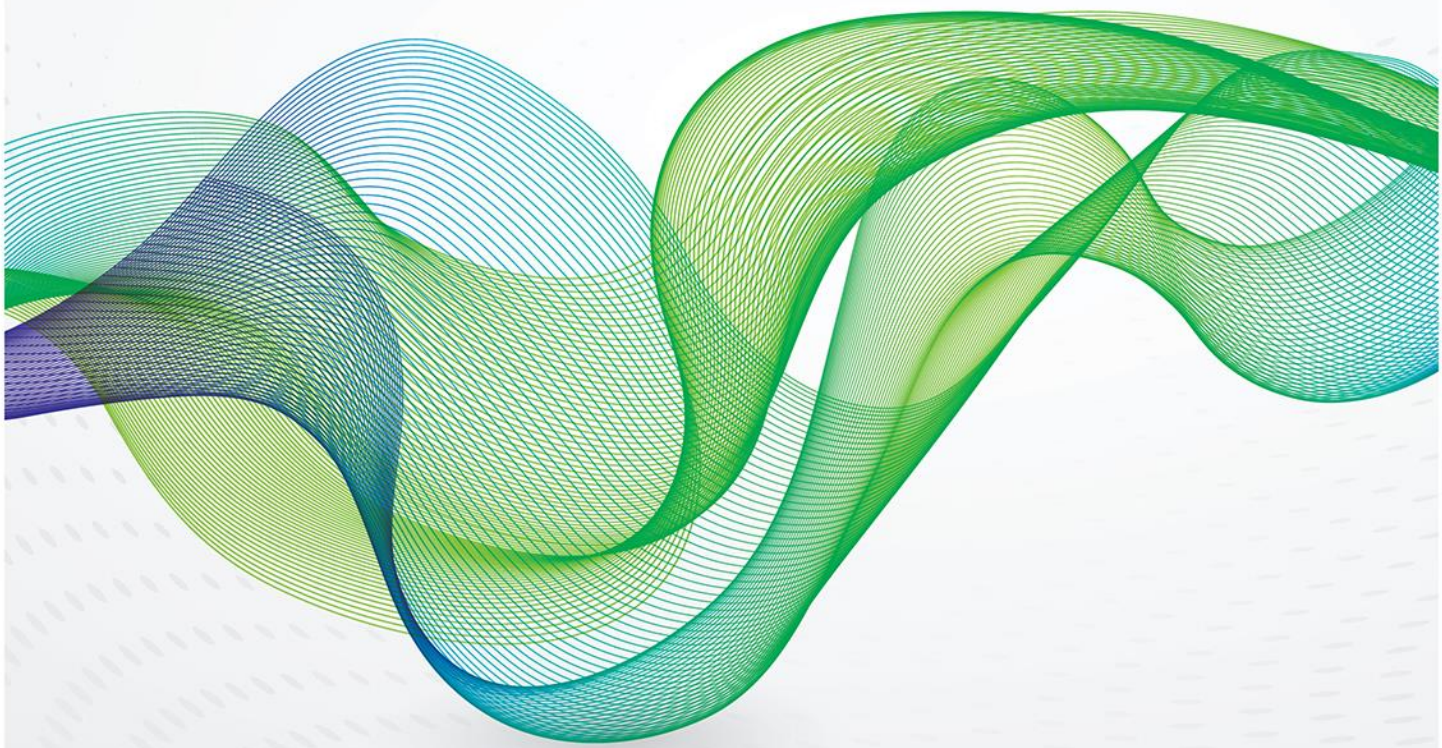
US Coal Exports:

The Long Road to Asian Markets



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I would like to thank the Oxford Institute for Energy Studies for giving me the opportunity to write this report on US coal exports, a topic that has gained a lot of attention in Europe over the past three years amid what was called the 'coal renaissance'. I am very grateful to Bassam Fattouh for his guidance and encouraging support. My special thanks to Matthew Holland, who edited the first draft of this report, and made valuable comments and improvements.

Contents

Structure of the report

This report is dedicated to US steam (or thermal) coal exports. However, as a large part of the report focuses on port developments, which encompass steam and coking coal exports, coking coal (or metallurgical coal) exports are also briefly analyzed.

The first chapter gives an overview of the US market. Historical and demand trends are analyzed as is the impact on the aging US coal fleet of new air quality regulations. The second chapter provides an assessment of US coal production and its trend in the three main producing regions: Appalachian, Interior, and Western. The third chapter assesses the evolution of US exports, their breakdown by importing region (Asia and Europe) and coal type (steam and coking coal). The fourth chapter looks at the existing and proposed coal port infrastructure by state, with a special focus on the proposed export ports on the USA's Pacific Northwest coast. Chapter five analyzes the market, regulatory, and environment challenges US exporters have faced since 2011: the collapse of international coal prices and competition from international suppliers; the uncertain pace of development of international coal trade; permitting issues; evolving regulation on coal royalties; and local opposition to coal exports and coal in general. The conclusion gives an assessment of future coal exports according to different scenarios.

Abstract

Coal has been and remains an important source of energy in the US power sector; it generated half of power generation until 2008. However, the shale gas boom, stringent environmental regulation on local pollutants, and stagnant demand for electricity lowered this share to 39 per cent in 2014. Proposed EPA (Environmental Protection Agency) regulation on CO_2 emissions, expansion of renewable energy and gas-fired electricity generation, and continued energy efficiency gains effectively cap future coal consumption.

To offset the loss on the internal market, US coal mining companies have turned to the export market. Since 2010 they have actively developed their coal exports and achieved record levels in 2011 (97 Mt[1]) and 2012 (114 Mt). However, in the past three years the international coal market has changed dramatically. Prices have collapsed from $130-140/ton in 2011 to $60-70 at the beginning of 2015, as the international market has turned from tightness to oversupply and competition between exporters has become fierce. Weak market conditions caused a 6 per cent drop in US coal exports in 2013 (to 107 Mt) and a sharp 17 per cent decline in 2014 (to 88 Mt).

The USA has traditionally exported large quantities of coking coal produced in the Appalachian basin and is the second-largest coking coal exporter behind Australia. Exported coal has traditionally targeted Europe, as the main export terminals are located on the East Coast and the Gulf of Mexico. US coking coal exports stood at 57 Mt in 2014, two-thirds of US coal exports. In addition, the USA has traditionally exported some steam coal to South American and African countries (around 20 Mt per year in the past decade). Major changes in trade patterns were observed in the 2010-2014 period as the USA made steady inroads into the European and Asian steam coal market.

In 2011 and 2012, the USA achieved record steam coal exports to Europe (31 Mt in 2012). US coal benefitted from the 'coal renaissance' in Europe, where coal-fired electricity generation rose as coal increased its competitiveness against natural gas. But with weak electricity demand and surging renewable electricity generation, the switch to coal in Europe was temporary. US steam coal exports to Europe fell sharply to 16 Mt in 2014, reflecting both declining demand by power utilities and competition from lower cost suppliers, reinforced by unfavorable shifts in exchange rates. Uncertainties about future European steam coal demand make the Pacific market a more viable option for future exports.

US coal exports to Asia increased fivefold between 2009 and 2012 to almost 30 Mt, of which one-third was steam coal. US exporters were able to capture new market shares in Asia, where they saw steam coal exports rise from 1 Mt in 2009 to 10 Mt in 2012. However, demand growth in Asia has slowed and competition from other exporting suppliers in the Pacific basin has become fierce. US steam coal exports to Asia decreased to 8 Mt in 2014, as China reduced its imports and the US lost competitiveness. However, steam coal exports to South Korea and India remained strong.

Steam coal exported to Asia mainly comes from the Powder River basin (PRB) in Wyoming and Montana, both of which boast very large coal reserves and low production costs (around $13/ton). Wyoming is the top US producing state, accounting for around 40 per cent of total national output. Thanks to its low production costs, PRB coal would be competitive in Asia, even in a low price environment, if sufficient export capacity on the West Coast were available. However, there is only one coal terminal in the Pacific Northwest, located at Seattle in Washington, and it shipped just 4 Mt in 2014, a fraction of the PRB production. Due to the importance of Asia in the international coal markets, US exporters have tried to develop new ports and railroads on the Pacific Coast to increase their exports to Asia. Pending approval of the Pacific Northwest terminals, PRB coal has been shipped to Asia through ports in Canada and the Gulf of Mexico.

[1] Mt: million tons. All data in this report are given in metric tons. Original data in short tons was converted on the basis: 1 short ton = 0.9072 metric ton.

The current nameplate capacity of US export terminals stands at 166 Mtpa, while new projects and expansion of existing terminals under consideration at the end of 2014 would add a further 142 Mtpa. Due to declining exports in 2013 and 2014, coal port capacity widely exceeds the demand for US coal. However, there is a regional mismatch between port capacity and future demand which is mostly coming from the Asian market. In the future, despite a slowdown in the growth of international coal trade and fierce competition from low-cost suppliers, demand for US coal is expected to remain strong in some Asian countries as they develop their coal-fired power capacity (India, ASEAN countries), or seek to diversify their sources of supply (South Korea, Japan).

The future level of US steam coal exports to Asia is strongly linked to the level of international prices and the building of new export capacities in the Pacific Northwest, enabling the country to reduce transportation costs and remain competitive on the Asian coal market. In 2011, six new terminals were proposed in Oregon and Washington states, which would together have provided an export capacity of 125 Mtpa. However, projects in the region have encountered challenging permitting issues and strong opposition from environmental groups that have made the terminals a central focus in their campaign against the coal industry and fossil fuels in general. Community and environmental groups have been concerned about coal dust from increased train traffic and the broader climate impacts from the coal being burned overseas. While citizen activism can influence the future of coal terminals but won't stop permits for a proposed terminal that legitimately passed required permit tests, arduous and lengthy permitting processes create major hurdles for potential coal exporters from the Pacific Northwest. Three of the six planned terminals in the Pacific Northwest have been cancelled by their promoters over the past three years because of poor economics, strong opposition or in-site issues. In addition, one of the three remaining projects was rejected in August 2014 due to environmental concerns regarding Indian tribal fisheries, while another, the Pacific Gateway Terminal, is also encountering difficulties as a native tribe has requested the US Army Corps of Engineers to reject the permit application on the basis the project would interfere with tribal fishing grounds.

In this steeple-chase, US coal exporters have not given up, although challenging market conditions and strong public opposition have reduced their ambition. They have expanded coal export capacities on the Gulf Coast, which has benefitted from the investment initially intended for the West Coast. Inland and maritime transportation costs required to ship coal to Asia through the Gulf ports are, however, a heavy burden at current low import prices. Completion of work to widen the Panama Canal in 2016 will create new opportunities to reduce this cost. More demand for US coal exports in the medium to long term can be expected. However, because of the need for new export capacity on the West Coast for US coal to remain competitive against low-cost suppliers in the Pacific basin, increased US exports will probably be delayed until new capacity is built.

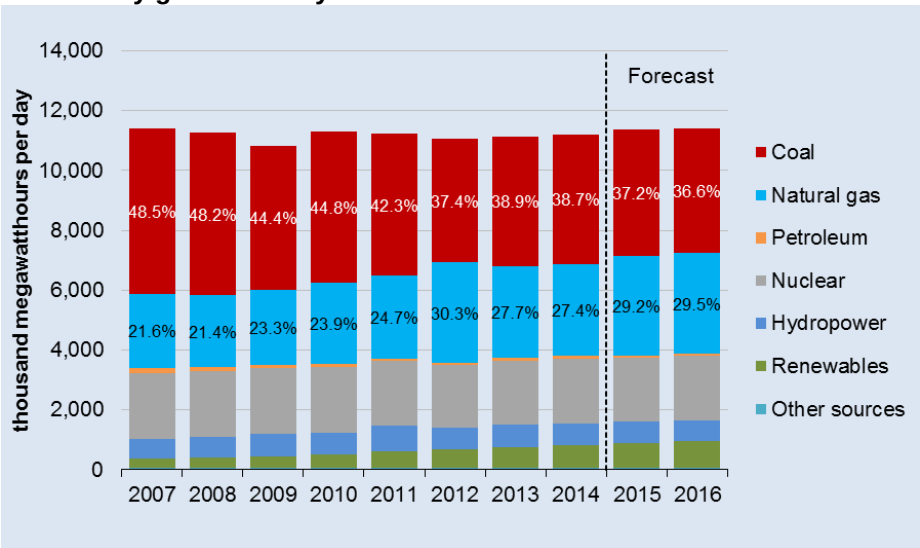
Beyond the construction of new ports on the West Coast, it is the future of coal which is at stake in the USA. The controversial battle over US coal exports illustrates the profound divide between increasing needs for affordable energy in developing countries and the impact on the climate of burning fossil fuels.

1. The US coal market

1.1 Shale gas competition is evicting coal on the US market

The USA is the second-largest coal market in the world and consumed 832 Mt in 2014.[2] About 93 per cent (773 Mt in 2014) of the coal consumed is used for generating electricity. Since 2007, coal demand in the power sector has declined as competition with natural gas has developed. The fast increase of gas production, linked to the shale gas revolution, resulted in a drop in US gas prices from a 10-year high of $8.86 per million British thermal units ($/MMBtu) in 2008 to an average of $2.72/MMBtu in 2012, $3.73/MMBtu in 2013, and $4.39/MMBtu in 2014. This made coal less competitive and caused a significant coal-to-gas switch, limiting the use of coal in the electricity sector. To take advantage of the drop in gas prices, electricity producers added new gas-fired capacity. As a result, coal's market share in electricity generation fell from around 50 per cent in 2008 to 38.7 per cent in 2014, and is expected to dip to 36.6 per cent in 2016, according to the EIA.

Figure 1: US electricity generation by fuel



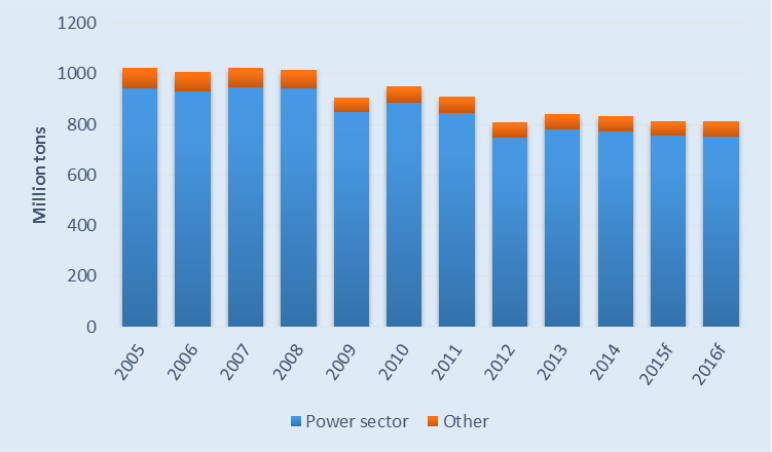
Source: Energy Information Administration (EIA), Short-Term Energy Outlook (STEO), 10 March 2015

Since its peak in 2007, coal consumption in the power sector has decreased by around 20 per cent (or 170 Mt), affecting major coal producers in the country. The EIA projects that coal demand by the power sector will decline to 752 Mt by 2016, as retirements of coal power plants rise in response to the implementation of the Mercury and Air Toxics Standards, electricity sales growth slows, and natural gas prices fall relative to coal prices.

Besides its role in generating electricity, coal also has industrial applications such as in cement production and coke conversion for the smelting of iron ore at blast furnaces used to make steel. These sectors consumed 60 Mt in 2014.

[2] All data are in metric tons: 1 short ton = 0.9072 metric ton. Data for 2014 are preliminary data as published in the EIA's Short Term Energy Outlook (STEO) of 10 March 2015.

Figure 2: US coal demand



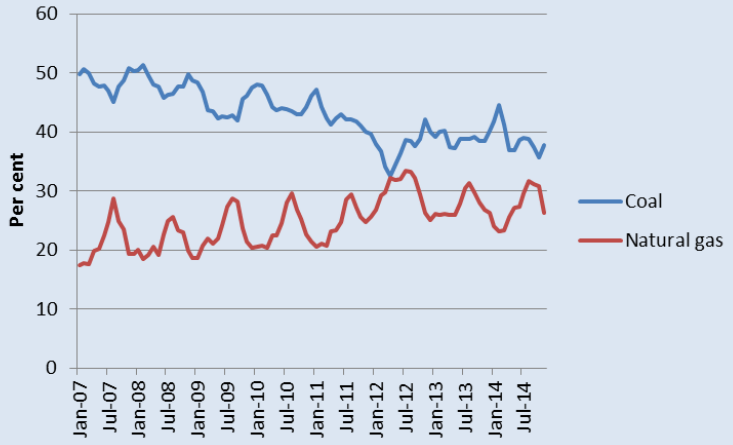
Source: EIA, STEO, 10 March 2015

Box 1: Price is the main driver of short-term competition between coal and gas

The price of coal relative to natural gas is a key determinant of short-term fuel switching between gas and coal. In the medium/long term, other factors also play a role, such as gas flexibility and its best environmental performance. Although gas-fired power plants are more efficient than coal ones[3], the fuel cost in total costs is higher for natural gas-fired power plants than for coal. While the price of coal delivered at power plants has been relatively flat since 2011 ($2.3-2.4/MMBtu), this has not been the case for natural gas. Very low natural gas prices in 2012 ($2.72/MMBtu on average) favored gas burning. That year, coal demand dropped 11 per cent and the share of coal in power generation fell to 37 per cent, displaced by cheap gas, which increased its share to 30 per cent. Coal-fired generation fell by 216 TWh (13 per cent) while gas-fired plants generated an additional 217 TWh (21 per cent), an almost perfect substitution. The sharp decline in coal demand reflected the low level of gas prices but also an unusually mild winter which drove down electricity sales. In 2013, however, consumption by coal power plants rose by 3.9 per cent to 779 Mt, thanks to its improved competitiveness compared to natural gas, the price of which increased by 35 per cent to $3.73/MMBtu. Higher gas prices in 2014 ($4.39/MMBtu) allowed coal to maintain its share in the power mix, thanks again to higher electricity demand during the winter months. Despite some coal plant capacities decommissioned in 2014, the remaining plants operated at higher utilization rates.

[3] The efficiency of power generation from gas means that it competes with coal even when it costs 1.5 times as much. When the ratio of natural gas prices to coal prices is approximately 1.5 or lower, a typical natural gas-fired combined-cycle plant has lower generating costs than a typical coal-fired plant.

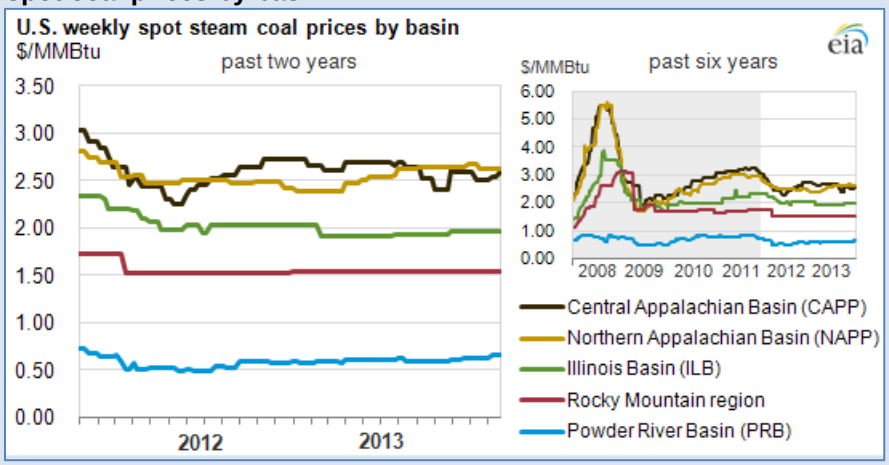
Figure 3: US monthly net electric power generation (January 2007-November 2014)



Source: EIA

In addition, regional prices for both natural gas and coal differ sharply from one region to another. Regions well-endowed with coal resources, in particular low-cost products such as the steam coal of the PRB, enjoy a better position than other regions located far away from coal mines. Hence competition between coal and gas also depends on regional factors. The graph below illustrates the development of coal prices by region. It clearly shows the low price of PRB coal compared with other domestic coals, which favors use of coal over natural gas.

Figure 4: US spot coal prices by basin



Source: EIA, Today in Energy, Spot coal price trends vary across key basins during 2013, 16 January 2014

The natural gas price at Henry Hub was between $3.3/MMBtu and $4.6/MMBtu for most of 2013 and 2014, peaking at $6/MMBtu in February 2014. This has made it more economical to burn PRB and Illinois basin (ILB) coals and many Northern Appalachian basin (NAPP) coals than it was in 2012, when gas prices stayed below $3/MMBtu for much of the year. Central Appalachian basin (CAPP) coal remained mostly uneconomical at 2013/14 gas price levels and continued losing market share as users accelerated efforts to shift to ILB and NAPP coals for their lower prices, supported by the installation of additional scrubbers for sulfur dioxide (SO_2) emission control. These factors meant stronger demand growth of PRB, ILB, and NAPP coals and less demand growth for CAPP coal. Since July 2014, oil prices have been falling rapidly, which will continue to put pressure on gas prices and coal demand in 2015.

1.2 Stricter environmental standards cloud future US coal demand

The economics of burning coal is changing as new air regulations will enter into force in 2015. In addition, the EPA has proposed new rules to cut CO_2 emissions from power plants. Thermal coal capacity was 310 GW in 2012 and is expected to decline to 260 GW by 2020 as the new regulations force the retirement of aging coal-fired power plants.

1.2.1 New regulations on local pollutants

Despite substantial declines from 1990, primarily in response to the implementation of the Clean Air Interstate Rule, the US still emitted 5.1 Mt of sulfur dioxide (SO_2), 13 Mt of nitrogen oxides (NO_X), and around 40 tons of mercury in 2013. Power plants, particularly coal-fired power plants, were the dominant emitters of SO_2 emissions (64 per cent), NO_X emissions (14 per cent) and mercury air emissions (61 per cent). Coal-fired power plants emitted 3.2 Mt of SO_2 and 1.8 Mt of NO_X in 2013 (10.2 Mt and 3.6 Mt respectively in 2005) and were responsible for all mercury air emissions of the electric sector.

In order to reduce emissions of mercury and other toxic air pollutants from power generation, the Mercury and Air Toxics Standards (MATS) was adopted in 2012 and finalized in 2013. The final rule establishes power plant emission standards which will result in preventing about 90 per cent of the mercury in coal burned in power plants being emitted to the air; reducing 88 per cent of acid gas emissions from power plants; and reducing 41 per cent of SO_2 emissions from power plants beyond the reductions expected from the Cross-State Air Pollution Rule. MATS requires fossil-fuel steam electric generators to meet limits based on maximum achievable control technologies (MACT). The standards will take effect by April 2015[4] for electric generation units with capacities greater than 25 MW. The rule allows for state environmental permitting agencies to grant one-year compliance exemptions. Many states are likely to use this flexibility, which means the rule will be fully applied at the beginning of 2016. To comply with the rule, coal-fired power plants have to be equipped with either flue gas desulfurization (FGD) scrubbers or dry sorbent injection (DSI) systems, and activated carbon injection if warranted for mercury control. At the end of 2012, 64.3 per cent of US coal-fired generating capacity in the electric power sector already had the appropriate environmental control equipment to comply with the MATS and allow their operation post 2016. Another 5.8 per cent planned to add control equipment, 9.5 per cent had announced plans to retire, while owners of the remaining 20.4 per cent were faced with the decision of upgrading or retiring their plants.[5]

In addition, SO_2 and NO_X emissions from fossil-fueled power plant units with capacities greater than 25 MW are regulated by the Clean Air Interstate Rule (CAIR) in 27 eastern states and the District of Columbia. CAIR is a cap-and-trade program which went into effect in 2009 for NO_X and in 2010 for SO_2. The FGD scrubbers or DSI systems required by MATS result in SO_2 emissions falling to levels lower than the CAIR cap. Therefore, after MATS is in full effect starting in 2016, SO_2 emissions will decline significantly below the CAIR cap, essentially making CAIR's SO_2 cap nonbinding. However, SO_2 and NO_X caps are scheduled to be tightened in 2015 through the Cross-State Air Pollution Rule (CSAPR) that the EPA finalized in July 2011 to replace CAIR. It seeks to significantly reduce SO_2 and NO_X emissions from power plants in the CAIR states. The rule was challenged, but in April

[4] The standards were challenged in court, but they were upheld by a federal appeals court in April 2014. The story, however, is not finished as the US Supreme Court announced in November 2014 it would review whether the EPA should have considered the cost of complying with MATS. The court accepted several challenges to the rules brought by the utility industry and a coalition of nearly two dozen states, including those where utilities rely mostly on coal for power generation. The power companies and states said the rules would add $9.6 billion in annual costs to the utility industry and the EPA should have taken those costs into account. The EPA has said the public health benefit of reducing the pollutants amounts to between $37 billion and $90 billion a year, far outweighing any industry costs. The agency also has said it believes the rule could prevent up to 11,000 premature deaths each year. (Wall Street Journal, Supreme Court to Review EPA Rule on Power Plant Emissions, 25 November 2014, http://online.wsj.com/articles/supreme-court-to-review-epa-rule-on-power-plant-emissions-1416942022)

[5] Today in Energy, Coal-fired power plant operators consider emissions compliance strategies, EIA, 28 March 2014

2014 the US Supreme Court upheld CSAPR.[6] Accordingly, CSAPR Phase 1 implementation is now scheduled for 2015, with Phase 2 beginning in 2017.

1.2.2 New proposed regulation on CO_2 emissions

The USA has committed to reducing its CO_2 emissions by 26-28 per cent by 2025 compared with levels in 2005. This target was announced in November 2014 when President Obama signed a landmark agreement with Chinese President Xi Jinping. In 2013, US energy-related CO_2 emissions totaled 5.4 Gt, 10 per cent below their 2005 level. Some 40 per cent of these emissions (2 Gt) came from the power sector, within which coal was responsible for 73 per cent. To reduce CO_2 emissions, new regulations have been proposed for both existing and new power plants.

In June 2014, the EPA, under President Obama's Climate Action Plan, proposed new regulations (the Clean Power Plan) to reduce CO_2 emissions from existing fossil-fueled generating units aiming for overall reductions equivalent to 30 per cent of 2005 levels by 2030, while starting to make progress toward meaningful reductions in 2020. There are 1,000 fossil fuel-fired power plants with 3,000 units covered by this rule. The US power capacity totaled 1,063 GW (net summer generating capacity) in 2012, of which 310 GW (29 per cent) was based on coal and 422 GW (40 per cent) fired by natural gas. There were 1,309 coal-fueled generating units in operation at almost 560 plants across the country. The coal fleet is aging: the average age was 42 in 2012.

The proposed regulations include state-specific goals for CO_2 emissions cuts and guidelines for states to follow in developing, submitting, and implementing plans to achieve these goals. Such plans would be due in June 2016, although, under some circumstances, a state may submit an initial plan by June 2016 and a completed plan up to two years later. The emission rate targets vary significantly across individual states, reflecting the application of a series of common building blocks to states with widely different starting points in their respective electricity markets. States can therefore determine their energy mix based upon installed capacity, fuel diversity, and demand forecast. States are also allowed to join existing, or launch new, multi-state programs. States will have to submit their action plans by the end of June 2016, which could become regulation by 2019. However, numerous lawsuits have been filed against the rule, so the timetable could yet be affected. In particular, coal-dependent states argue the proposed interim goals might threaten electricity reliability and require utilities to abandon coal generators that they recently retrofitted to meet previous EPA regulations.

In addition, in September 2013, the EPA issued New Source Performance Standard (NSPS) for new power plants, which proposes to limit emissions from new coal plants to about 500 kilograms (1,100 pounds) of CO_2 per MWh, and to 450 kg (1,000 lbs) per MWh from gas plants. The proposed emission limit would effectively require that new coal-fired electric generating units employ carbon capture and sequestration (CCS) technologies to reduce uncontrolled emissions of CO_2 by approximately 50 per cent. Although the immediate impact of the regulation would be nil (there are no new coal-fired power plants being proposed in the USA given cheaper natural gas supplies and rising local opposition to coal), it does not mean that the new proposal will be easily accepted by the industry. It nevertheless constitutes another argument in favor of gas at the expense of coal.

CCS would theoretically address much of coal's CO_2 emissions. However, substantial economic and technological hurdles for CCS remain. Such technology is not in use at any US power plant but will get its debut at Southern Co.'s new coal-fired facility in Kemper County, Mississippi. This plant, which aims to capture 65 per cent of its carbon emissions and store them underground, was slated to open in May 2014, but has encountered cost overruns and other setbacks delaying its commissioning until May 2015.

[6] The timing of CSAPR's implementation has been affected by a number of court actions. On 30 December 2011, CSAPR was stayed prior to implementation. On 29 April 2014, the U.S. Supreme Court issued an opinion reversing a 21 August 2012 D.C. Circuit decision that had vacated CSAPR. Following the remand of the case to the D.C. Circuit, the EPA requested that the court lift the CSAPR stay and toll the CSAPR compliance deadlines by three years. On 23 October 2014, the D.C. Circuit granted the EPA's request. Source: EPA, http://www.epa.gov/airmarkets/progress/datatrends/summary.html#two

1.3 Coal-fired power plants retirement

In response to the new air pollution regulations, together with weak electricity demand growth and continued competition from generators fueled by natural gas, several power producers are choosing to retire their coal-fired facilities. Already, 27 GW of coal-fired capacity was retired between 2010 and 2014. Most of these power plants were older plants (over 50 years) for which retrofits are not economically viable.

Table 1: Coal-fired power plant retirements, 2010-2014

	Existing coal-fired capacity	Retirements				
	(2012)	2010	2011	2012	2013	2014
Total net summer capacity (MW)	**309,519**	**1,418**	**2,456**	**10,214**	**5,945**	**7,205**
Number of units	1,308	29	31	85	91	94
Average age at retirement		58	63	51	53	55
Average tested heat rate (Btu/kWh)	10,168	11,094	10,638	10,353	N/A	N/A
Capacity factor	56%	36%	33%	35%	N/A	N/A

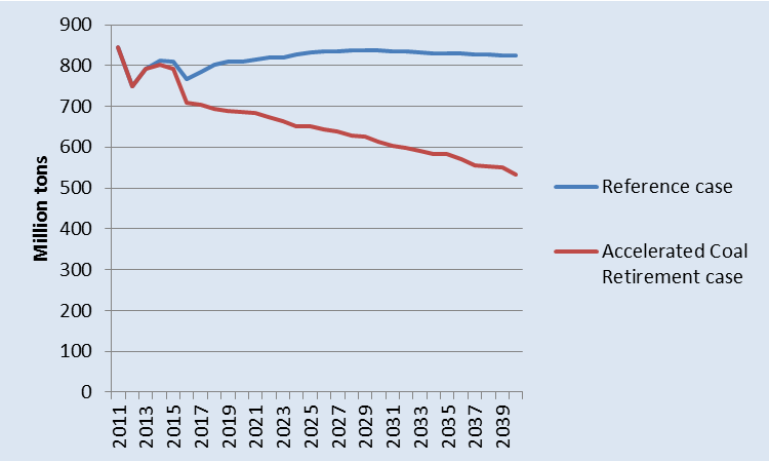
Source: 2010-2012: EIA; 2013-2014: http://www.sourcewatch.org/index.php/Coal_plant_retirements

In April 2014, the EIA projected that retirements from 2012 through 2020 could reach approximately 50 GW, or about 16 per cent of net summer generating capacity available at the end of 2012[7]. Despite those projected retirements, the EIA projects that coal will continue to account for the largest share of the electricity generation mix through 2034, after which it will be overtaken by natural gas. However, throughout the projection the coal share of total generation remains significantly below its historical 50 per cent share, declining to 32 per cent in 2040.

The EIA has also developed an Accelerated Coal Retirement (ACR) case, where higher fuel prices and operation and maintenance (O&M) costs serve as proxies for any combination of factors that would produce a higher rate of coal plant retirements. In the ACR case, 90 GW of capacity, or 80 per cent more than in the reference case, is retired by 2020. Coal-fired generation in 2040 is lower in the ACR case, accounting for only 22 per cent of total power generation.

In the AEO Reference case, after a fall in 2015 and 2016, coal demand by the power sector remains relatively stable at 800-830 Mt in the 2020s and 2030s. In the ACR case, coal demand decreases sharply during the projection period to 535 Mt in 2040—some 300 Mt less than in the reference case.

Figure 5: Power sector coal demand, AEO2014 Reference case & Accelerated Coal Retirement case



Source: EIA, AEO2014

[7] EIA, Annual Energy Outlook 2014 Reference case

The EPA projects retirement of 90 to 115 GW of coal-fired power generation capacity between 2012 and 2020[8] due to the combined impact of the MATS and Clean Power Plan. In such a scenario the decrease in coal demand would accelerate. Bernstein Research estimates that by the end of the decade coal burn by US power plants will decline by as much as 207 Mt or one-quarter of 2013 consumption by US power plants.[9]

While the full implementation of new policies to limit CO_2 emissions from power generation is still uncertain, it could significantly change the outlook for the use of coal in the power sector. Despite uncertainties on its future level, projected domestic coal demand in the power sector is capped and coal miners are incentivized to find new outlets to offset the loss on the internal market.

[8] EPA, Regulatory Impact Analysis for the Proposed Carbon Pollution Guidelines for Existing Power Plants and Emission Standards for Modified and Reconstructed Power Plants, June 2014 http://www.epa.gov/ttn/ecas/regdata/RIAs/111dproposalRIAfinal0602.pdf

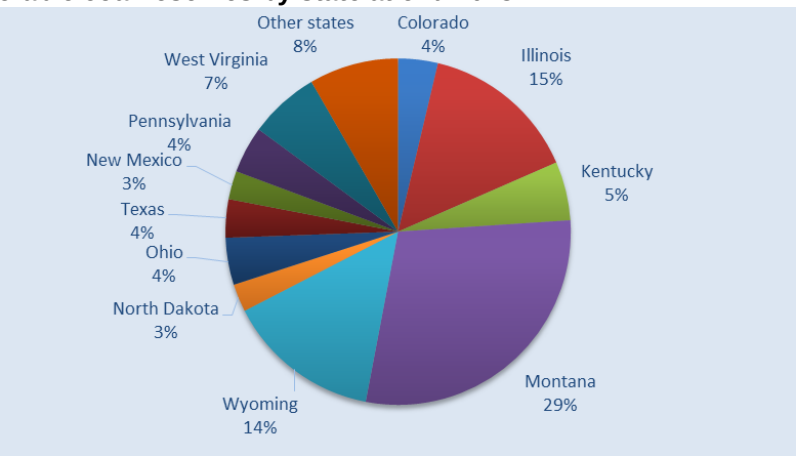
[9] Bernstein Research, 'Bernstein Energy & Power: The Coming Sea Change in Power Sector Coal and Gas Burn and Its Implications for Demand', September 2014.

2. US coal supply

2.1 US coal reserves are huge

The USA holds the world's largest coal reserves. Recoverable coal reserves were estimated at 233 Gt at end 2013[10], over one-quarter of the world's total. At the current consumption rate they can last for over 200 years. US reserves are mostly located in the centre and west of the country. The PRB (Montana and Wyoming) holds 43 per cent, while the extensively-mined eastern producing region (West Virginia, Pennsylvania) accounts for only 11 per cent.

Figure 6: Recoverable coal reserves by state at end 2013



Source: EIA

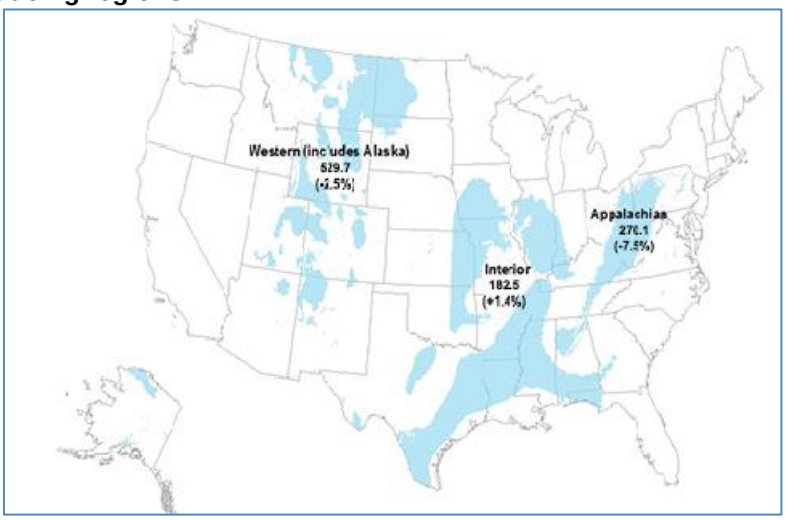
2.2 Regional trends: the Powder River basin dominates US production

Coal is produced in 25 states spread across three major coal-producing areas: the Appalachian, the Interior, and the Western regions, which offer contrasting characteristics and trends. Five states—Wyoming, West Virginia, Kentucky, Pennsylvania, and Illinois—account for 70 per cent of total US production, with Wyoming alone accounting for 40 per cent.

Most of the coal consumed in the USA since the beginning of the 19th century has been mined from the Pennsylvanian strata of the Appalachian basin. However, during the last 40 years, Appalachian production has declined markedly. Production in the USA is structurally moving westwards, where coal production costs are lower. As demand has declined, however, production in the Western region has decreased due to limited foreign markets, while Appalachian and Interior coal has access to ports on the East and the Gulf coasts.

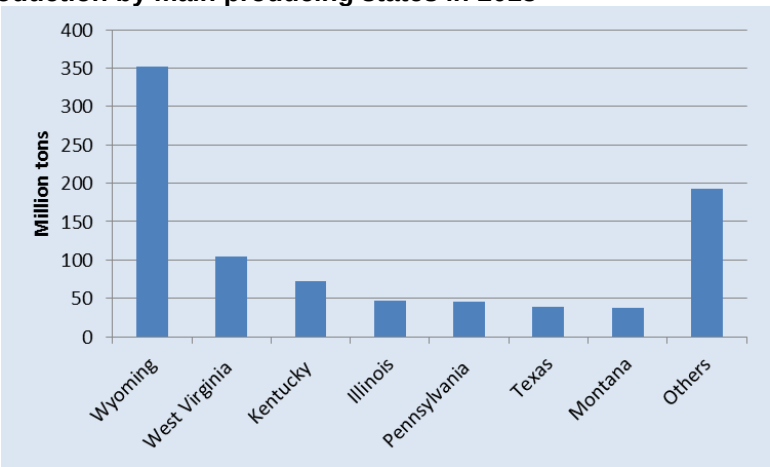
[10] EIA (2015), Annual Coal Report, EIA/DOE, January 2015

Map 1: Coal-producing regions



Source: EIA, data for 2013 production in million short tons (per cent change from 2012)

Figure 7: Coal production by main producing states in 2013



Source: EIA

2.2.1 The Appalachian coal basin

The Appalachian coal basin is the oldest coal-producing region in the USA and fueled most of the Industrial Revolution in the 19th Century. It extends from Alabama to Pennsylvania, across seven states, though West Virginia, Kentucky, and Pennsylvania account for 90 per cent of Appalachia's total production. The region is sub-divided into Northern Appalachian (NAPP), Central Appalachian (CAPP), and Southern Appalachian (SAPP). The region produced 245 Mt of coal (steam and coking coal) in 2014—some 27 per cent of total US production. This is a sharp reduction compared with the 1960s and 1970s when the Appalachia produced three quarters of US output. Alpha Natural Resources and Walter Energy are two of the major coal producers in Appalachia, which produces most of USA's coking coal, which is mainly destined for export.

Most Appalachian mines produce medium- and high-volatile bituminous coal and some low-volatile bituminous coal. The heat rate for Appalachian coal is high at 12,000–13,500 British thermal units per

pound (Btu/lb) compared to 8,200–8,800 Btu/lb for PRB coal.[11] However, the sulfur content is higher in Appalachian coal, ranging from 0.8 per cent to 4 per cent.

Appalachia has many small mines scattered around the region which are usually deep underground. The largest, easiest-to-access seams have already been mined, forcing companies to extract coal from lower-profit seams, which has both lowered productivity and increased costs relative to other regions. Due to its higher cost, Appalachian coal is not only losing market share to natural gas, but also to other US coal basins. Two-thirds (109 Mt) of total decline in US coal production from 2008 to 2014 has occurred in Appalachia, while almost 200 mines were closed or idled in 2013. This decline is expected to continue as coal reserves in the Pennsylvanian strata are depleted and higher-cost reserves are supplanted by lower-cost coal from the Illinois basin.

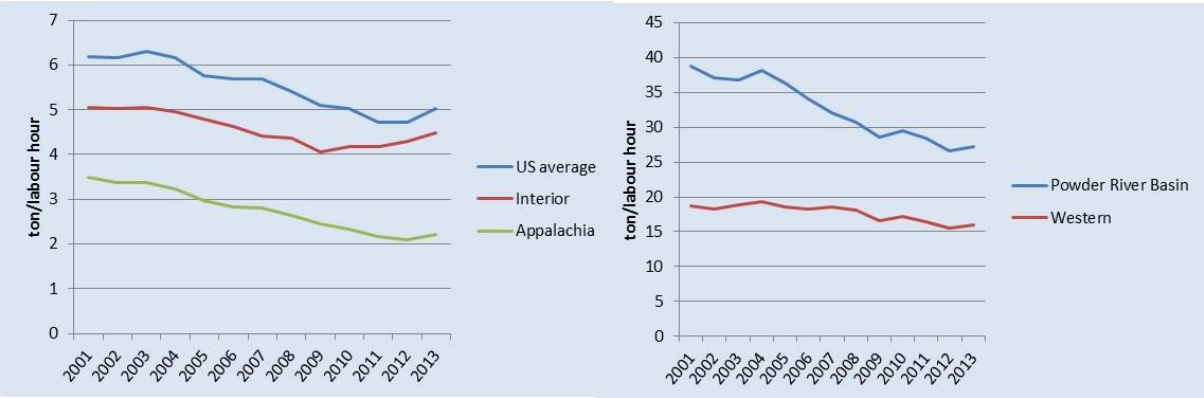
Table 2: Characteristics of coal production in the three main producing regions

	Production in 2013 (Mt)	Number of mines (2013)	Heat rate (Btu/lb)	Heat rate (kcal/kg)	Sulfur content (%)	Number of employees (2013)	Productivity: Average Production per Employee Hour (2013, tons)
Appalachia	246	877	12,000-13,500	6,670-7,500	0.8-4	49,855	2.21
Interior	166	103	10,000-12,500	5,560-6,950	2	15,764	4.49
Western	480	52	8,200-8,800	4,560-4,900	0.4-0.7	14,590	15.98
TOTAL	893	1,032				80,209	5.03

Source: EIA, Market Realist

Due to more difficult geological conditions (deeper seams), US mine productivity fell by 19 per cent on average between 2001 and 2013. The Appalachian region saw the largest decline (37 per cent). The Interior was the best performing region. The closure of high-cost, difficult mines in the past two years allowed a slight recovery in US productivity.

Figure 8: Evolution of productivity in US coal mines by region



Source: EIA

2.2.2 The Interior region

The Interior region (including the Gulf Coast) consists of Arkansas, Illinois, Indiana, Kansas, Louisiana, Mississippi, Missouri, Oklahoma, Texas, and Western Kentucky. Most of the production is concentrated in the Illinois basin (Illinois, Indiana, and Western Kentucky). The region produces bituminous coal with a heat value ranging from 10,000–12,500 Btu/lb, while most of its coals have sulfur content over 2 per cent. The Interior region produced 170 Mt in 2014 and accounted for 19 per cent of US total production. Around 50 per cent of the region's production is mined underground, which makes its coal more expensive to mine than in the PRB. However, its costs are lower than in Appalachia because the coal seams are thicker and closer to the surface. In contrast with other

[11] 1 Btu per pound = 0.5559 kilocalories per kilogram (kcal/kg).

regions, production in the Interior has increased by a quarter (37 Mt) since 2008. The increase is part of a recent rebound after the region was hit hard by the 1990 amendments to the Clean Air Act. The legislation's limitations on SO_2 emissions put the higher-sulfur content of the Illinois basin's reserves at a disadvantage to the lower-sulfur reserves of Appalachia and the PRB. Most of the coal-fired power plants in Illinois chose to switch to lower-sulfur coal rather than install the necessary pollution control scrubbers required to meet federal regulations. The recent increases in production and demand for Illinois coal are due to the retrofit of FGD scrubbers on many existing power plants, which enables them to switch to (or switch back to) Illinois basin coals.

Peabody is a major producer in the region, while Arch Coal also operates mines in Illinois. Apart from public companies, some master limited partnerships (MLPs[12]) also operate in the region. The MLPs include Alliance Resource Partners LP and Natural Resource Partners LP, with the latter leasing its ILB coal mines to a private company—Foresight Energy—which is the largest private coal miner operating in the region. Other coal miners include Murray Energy and Armstrong Coal.

Illinois coal production has a logistical advantage as it has access to all of the largest rail carriers and the Ohio and Mississippi rivers. All of the exported coal from the region is a shipped from the Gulf Coast. The attractiveness of the Gulf for exports will be further enhanced in 2016 when the expansion of the Panama Canal is complete. However, Illinois coal has to compete with other suppliers, Colombia in particular, which are less expensive and have lower-sulfur content.

2.2.3 The Western region

The Western region, which includes the 24 states west of the Mississippi River, produced 489 Mt of coal in 2014, accounting for 54 per cent of total US production. 13 out of these states produce coal, though the region's production is dominated by the PRB located in Wyoming and Montana. These two states produced 40 per cent of the total US production. The PRB region holds very large surface mines, including the North Antelope Rochelle in Wyoming, owned by Peabody Energy, which is the largest coal mine in the world. It has estimated reserves of more than 2.2 Gt and produced 101 Mt in 2013. Arch Coal's Black Thunder mine, also located in Wyoming, is among the 10 biggest coal mines in the world and produced 91 Mt in 2013.

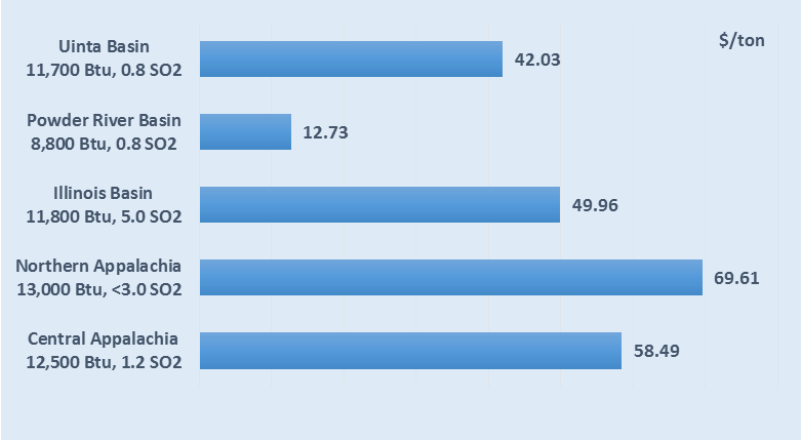
PRB coal (which is steam coal only) has lower sulfur content than coal produced in the East, ranging from 0.4 to 0.7 per cent, but it also has lower calorific value. PRB coal is sub-bituminous in rank with heat rates between 8,200 and 8,800 Btu/lb (4,560-4,900 kcal/kg). It is available close to the surface, and is easier and cheaper to mine than in other regions, which in combination with favorable government policies has made the PRB the cheapest coal-producing region in the USA. Alpha Natural Resources reported costs of $12.5/ton in its PRB operations in the third quarter of 2014, compared to $68.7 for the eastern operations.[13] Apart from Alpha, Cloud Peak Energy, Peabody Energy, and Arch Coal also produce coal in the PRB.

The difference between the three regions in terms of productivity and coal quality is translated into coal prices which contrast widely between the geological basins, as illustrated in the following figure.

[12] Master Limited Partnerships (MLPs) are unique investments that combine the tax benefits of a limited partnership (LP) with the liquidity of common stock. An MLP has a partnership structure but issues investment units that trade on an exchange like common stock. The modern form of MLPs was defined by the Tax Reform Act of 1986 and the Revenue Act of 1987, which outline how companies can structure their operations to realize certain tax benefits and define which companies are eligible. In order to qualify, a firm must earn 90 per cent of its income through activities or interest and dividend payments relating to natural resources, commodities or real estate. It has to distribute most of its cash flows as dividends to investors and instead of paying a corporate income tax, the tax liability of the entity is passed on to its unit holders (Source: Investopedia.com)

[13] Alpha Natural Resources, Alpha Natural Resources Announces Results for Third Quarter 2014, 30 October 2014 http://www.alphanr.com/News%20Releases/3Q14%20Earnings%20Release.pdf. Original data in short tons.

Figure 9: Average monthly coal spot prices (January 2015)



Source: EIA (original data in short tons, converted into metric tons)

Output of PRB coal increased almost without exception for three decades until 2008. It has, however, declined by 86 Mt since 2008, in response to lower domestic demand and lack of other outlets due to the limited West Coast export capacities. Since the harsh 2013/14 winter, transportation constraints have further limited coal production in the region. Demand for rail cars rose, prompted by a shorter grain harvest and rising domestic oil production in the Bakken Shale (located in Montana and North Dakota) and the Niobrara Shale (located in Colorado and Wyoming). As shale oil production increased, this affected the carloads assigned to transport coal.[14] The severe winter 2013/14 caused a backlog which congested the network. This has been a key issue for coal companies operating out of the northern part of the PRB. While coal demand was on the rise, companies had to reduce shipments due to lack of railcars. The constraints cost Arch Coal 4-5 Mt in coal shipments during the fourth quarter of 2013 and first quarter of 2014, while Peabody's sales were reduced by about 15 Mt.

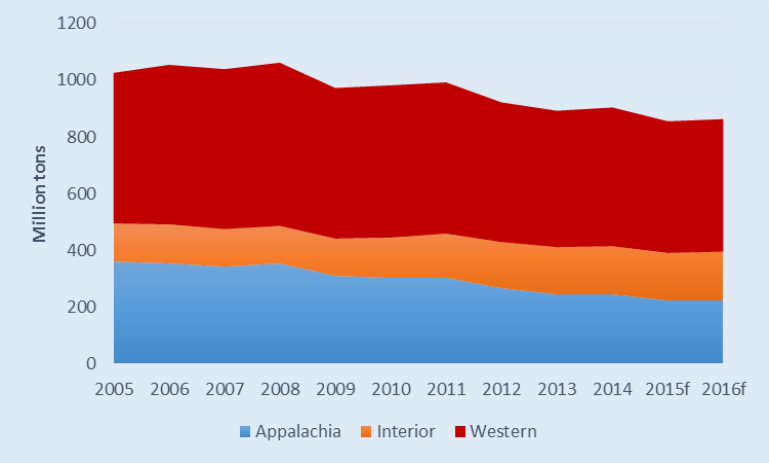
As illustrated in Figure 9, PRB coal has a clear cost advantage against coal produced in the East. However, as future coal demand in the power sector is capped by environmental regulation, future production in the region depends on exports and the building of coal export infrastructure in the Pacific Northwest. Approximately 87 per cent of coal produced in the PRB comes from federal lands managed by the Department of the Interior's Bureau of Land Management (BLM). In light of current depressed market conditions and the uncertainty caused by the current political and regulatory environment towards coal and the coal leasing program (see Section 5.2.2), the latest federal lease sale for PRB coal, held in August 2013, failed to attract any bidders.

2.3 Declining production

The decrease in coal demand has triggered a decrease in production to 904 Mt in 2014, down 15 per cent (or 158 Mt) since its peak in 2008. Though this is already the lowest output level since the 1990s, the EIA projects a further decline to 855 Mt in 2015 and 863 Mt in 2016. Regional shifts in production are significant. Appalachian coal production is projected to decline as a result of higher mining costs, weak demand from export markets, and a shift to higher-sulfur, lower-cost Interior region coal. Interior region coal production is projected to grow slightly as many power generators switch to it from Appalachian and Western region coal. Western region coal production is therefore projected to decrease slightly.

[14] Star Tribune, Rail congestion expected to plague Powder River Basin coal into late 2014, 21 May 2014, http://trib.com/business/energy/rail-congestion-expected-to-plague-powder-river-basin-coal-into/article_c6a69fec-55db-5933-b338-01757e3e6572.html

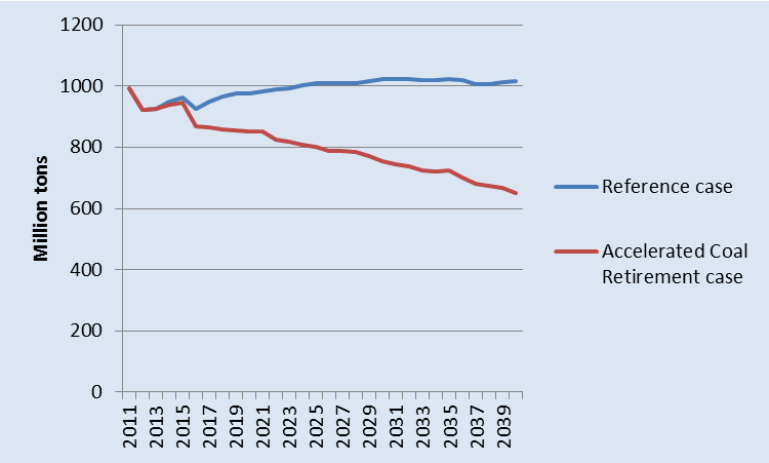
Figure 10: US production by major region (2005-2016)



Source: EIA, STEO, 10 March 2015

In the longer term, US coal production varies across the AEO2014 cases, reflecting different assumptions about coal production and transportation costs, natural gas prices, and actions to limit greenhouse gas (GHG) emissions. In the AEO2014 Reference case, coal production recovers briefly after 2012 before dropping back to 2012 levels in 2016 as the need for electricity generators to comply with MATS leads to a wave of coal-fired capacity retirements. From 2016 to 2030, coal production increases gradually as growing electricity demand and rising natural gas prices spur the use of coal for power generation. After 2030, when existing coal units reach maximum utilization rates and virtually no new capacity is built, coal production stabilizes. Overall, US coal production grows by an average of 0.3 per cent per year in the reference case, to 1 Gt in 2040. On a regional basis, strong production growth in the Interior region contrasts with generally stagnant production in Appalachian and the Western regions. In the ACR case production falls to 650 Mt in 2040, 35 per cent less than in the reference case. While Appalachian production is projected to decrease in both scenarios, most of the decrease in the ACR case occurs in the PRB where production declines to 280 Mt in 2040.

Figure 11: Coal production, AEO2014 Reference case and Accelerated Coal Retirement case



Source: EIA, AEO2014

2.4 Major coal producers

Coal production is highly concentrated in the USA. The top 10 producers account for three-quarters of total production and half comes from just four producers: Peabody Energy, Arch Coal, Cloud Peak Energy, and Alpha Natural Resources. In order to remain profitable in a low-price market, US producers focus on cost reductions. This includes mine idling, the sale of non-core assets and mine

closures. Subsequently, the number of US mines has been reduced drastically, from over 1,400 in 2010 to 1,229 in 2012 and 1,061 in 2013.

Table 3: Top 10 producers in the USA

Rank	Company	Production in 2013 (Mt)	% of total US production
1	Peabody Energy Corp	166	18.6%
2	Arch Coal Inc	118	13.2%
3	Cloud Peak Energy	78	8.7%
4	Alpha Natural Resources	77	8.6%
5	Rio Tinto Group	56	6.3%
6	Murray Energy Corp	53	5.9%
7	Westmoreland Coal Co	47	5.2%
8	Alliance Resource Operating	35	3.9%
9	Energy Future Holdings Corp	26	3.0%
10	NACCO Industries Inc	26	2.9%
	Top 10	**682**	**76.4%**

Source: IEA

Recent years have seen 26 US coal companies go into bankruptcy (chiefly in Kentucky and West Virginia), including once major producers such as James River Coal and Patriot Coal Corporation. In line with decreasing production, US coal mining jobs dropped by 9,400 in 2013, representing more than 10 per cent of total coal employment, from 89,800 in 2012 to 80,400 in 2013. Coal company revenues and stock prices plummeted in 2014, forcing mining companies to further cut operations, especially in Appalachia where expenses are higher, and to lay off roughly 6 per cent of their employees during the first half of the year.

3. U.S coal exports

3.1 After reaching record highs, US coal exports are declining

To offset the loss on the internal market, US coal mining companies have turned to the export market. They have actively developed their coal exports since 2010 and achieved record levels in 2011 (97 Mt, up 31 per cent compared to 2010) and 2012 (114 Mt, up 17 per cent). However, exports have fallen since 2013 as the international market has turned from tightness to oversupply, prices have collapsed, and competition between exporters has become fierce.

The US exports both steam coal and coking coal. Steam coal is used for electricity generation and in industrial applications for the production of steam and direct heat. Coking coal is used as raw material for the production of steel.

Though the USA has traditionally exported large quantities of coking coal to Europe and some steam coal to South American and African countries, major changes in trade patterns were observed in the 2010-2014 period.

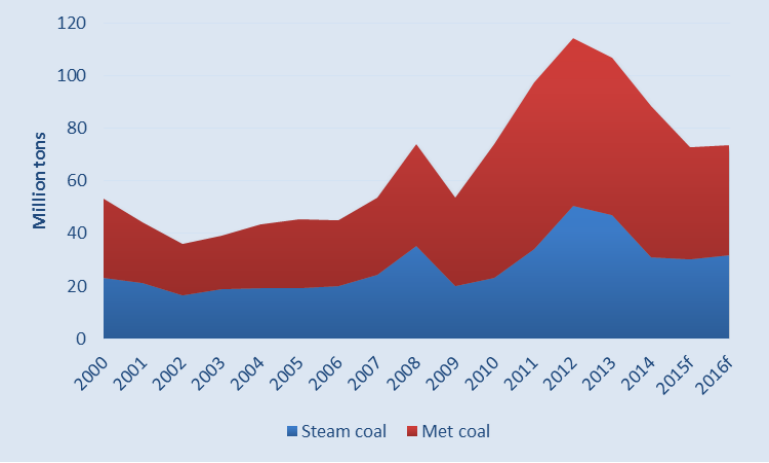
The increase in coal exports from 2010 to 2012 was a substantial turnaround from the early to mid-2000s, when US coal producers exported roughly 50 Mt of coal per year, between 31 and 48 per cent of which went to Canada alone. The surge in US coal exports, from 54 Mt in 2009 to 114 Mt in 2012, was attributable to a number of factors, including: substantial growth in total world coal trade; the recovery of coal import demand in OECD countries following the economic downturn in 2009; weather- and labor-related supply disruptions in some of the key coal-exporting countries; substantial declines in demand for coal in the US electric power sector in 2011 and 2012; and high prices for both coking and steam coals in international markets.

The USA benefitted from increased export sales to European and Asian markets, with exports to Europe increasing by 33 Mt and exports to Asia by 24 Mt from 2009 to 2012. US coal exports to the Americas remained mostly unchanged over the same period, with declines in coal exports to Canada offset by increased sales to Brazil, Chile, and Mexico.

However, the decline in international coal prices and competition from other exporting countries caused a 6 per cent drop in coal exports in 2013 (to 106.7 Mt) and a sharp 17 per cent decline in 2014 (to 88.3 Mt). European buyers reduced their coal imports from the US by 13 per cent in 2014 (to 48 Mt), while Asian buyers reduced theirs by 28 per cent (to 18 Mt). The EIA expects that during 2015 and 2016 there will be no improvement in global market conditions and that coal exports will fall to 73 Mt, which would be the lowest since 2010. The drop will be particularly sharp for coking coal.

Due to their recent drop, US coal exports accounted for just 6.7 per cent of global coal exports in 2014, compared with 9 per cent in 2012.

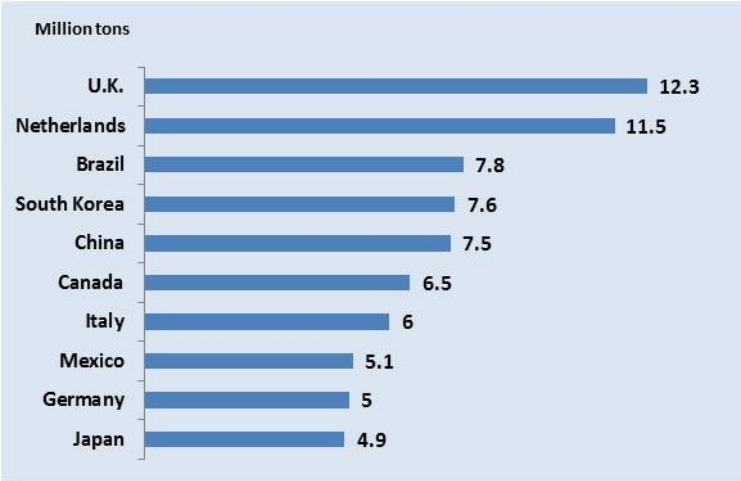
Figure 12: US coal exports, by type of coal (2000-2016)



Source: EIA, STEO, 10 March 2015

The United Kingdom was the largest importer of US steam coal in 2013 and Brazil was the largest importer of coking coal. In the first three quarters of 2014, UK coal imports from the USA fell by 22 per cent.

Figure 13: Top importers of US coal, 2013



Source: EIA

3.2 US coking coal exports

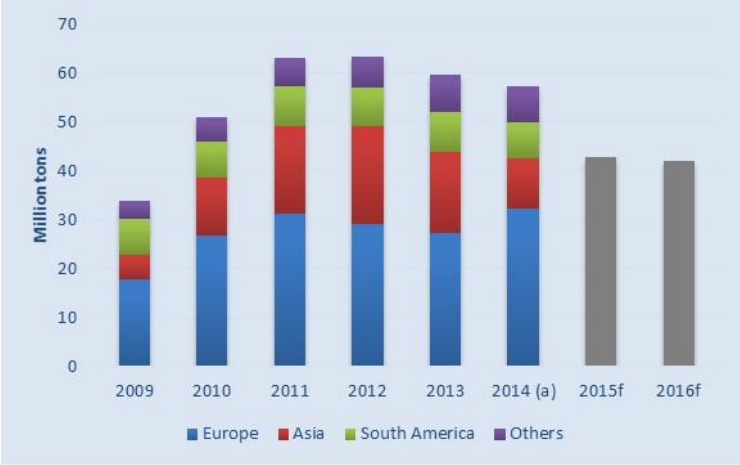
The USA is the second-largest coking coal exporter in the world and experienced a significant increase in coking coal exports in 2010 and 2011. Exports surged 50 per cent in 2010, boosted by the recovery of the iron and steel industry after its collapse in 2009. In 2011, buyers of Australian coking coal—the largest exporting country, accounting for three-quarters of all exported volumes—had to replace lost tonnage due to flooding in Queensland that forced Australian producers to declare force majeure and cut their production and exports. Coking coal buyers from all over the world turned to North American suppliers. US coking coal exports surged to 63 Mt in 2011, up 12 Mt on 2010, and achieved a similar level in 2012. Since then, however, prices of coking coal have declined sharply as supplies from Australia have resumed growth and demand has softened. This has led to a decline in US coking coal exports by 6 per cent to 59.6 Mt in 2013 and 4 per cent in 2014 to 57.2 Mt.

Most US coking coal is produced in the Appalachian region and exported from the East Coast. The EU as a whole is the main destination of US coking coal which enjoys a transportation premium compared with Australian coal, which is of course much further away. In 2014, European buyers

increased their US coking coal imports by 19 per cent to 32 Mt. Since 2011, the USA has also increased its coking coal exports to Asia, although the country accounts for a small and falling share of Asian coking coal imports. In 2014, Asian buyers reduced their US coking coal imports by 39 per cent to 10 Mt, in part due to the high cost of Appalachian coal mining and transportation to Asia, reducing the attractiveness of US coking coal for the region.

Due to low international coking coal prices and fierce competition from other suppliers, the EIA projects a sharp decline in US coking coal exports to 42.9 Mt in 2015 and 41.9 Mt in 2016.

Figure 14: US coking coal exports by destination (2009-2016)



(a) First nine months annualized

Source: EIA

3.3 US steam coal exports

In 2011 and 2012, the USA also recorded a strong growth in steam coal exports. The first destination was Europe where the 'coal renaissance' benefitted US exporters. Europe has traditionally been the main target of US exports as the coal export terminals are located on the East Coast and the Gulf of Mexico. Exports to Europe (including Turkey) increased from 8 Mt in 2010 to 18 Mt in 2011 and 31 Mt in 2012. US exporters were also able to capture new market shares in Asia, where they saw steam coal exports rise from 0.8 Mt in 2009 to 9.6 Mt in 2012, accounting for 19 per cent of total US steam coal exports. This completely new business was powered both by low freight rates and the high international steam coal prices of 2010 and 2011. Overall, US steam coal exports reached a record level of 50.7 Mt in 2012.

Coal from the Appalachian basin, the main source of steam coal exports to Europe, has high production and inland transportation costs and requires high international coal prices to make exports profitable. PRB is the main source of steam coal exports to Asia, though limited port capacity on the West Coast constrains exports to this region. Alternatively, PRB coal has to be exported from the Gulf Coast, but in this case the USA suffers a large maritime freight disadvantage compared with Australian or Indonesian coal. This means that steam coal prices have to be sufficiently high to cover production, internal transportation, handling, and maritime freight costs. Though this was clearly the case in 2011, the fall in steam coal prices since 2012 has made PRB exports from the East Coast and the Gulf of Mexico unprofitable. In 2013, steam coal exports declined by 7 per cent to 47.2 Mt and even more sharply in 2014, down 34 per cent to 31.1 Mt. The drop was mainly driven by falling demand from Europe, due to competition from others suppliers (such as Russia and Colombia) as well as declining coal demand by power utilities. Unless there is a major supply disruption in Russian or Colombian exports, US steam coal exports to Europe won't see any recovery in the short term. The EIA expects US steam coal exports to all destinations to stand at around 30-31 Mt in 2015 and 2016.

Figure 15: US steam coal exports by destination (2009-2016)

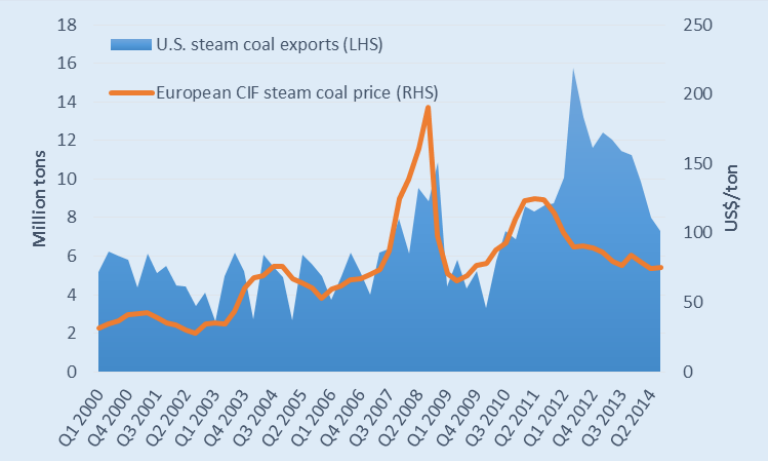
(a) First nine months annualized

Source: EIA

Box 2: The United States: still a swing supplier?

Traditionally, the USA has been the swing supplier of the coal market. US exporters enter the international coal market when prices are high and withdraw when prices come down. In this way, they play the role of 'regulator' of the market. The figure below shows the development of US steam coal exports since 2000 in relation to European steam coal import prices.

Figure 16: US coal exports vs. European steam coal import prices (2000-2014)



Source: EIA, McCloskey

It shows that steam coal exports follow the trend in steam coal prices; rising when coal prices rise and decreasing when prices drop. That said, in 2012 coal exports rose by 16 per cent despite coal prices falling 24 per cent. One explanation for the resilience of exports is the signature of contracts for several shipments when prices were higher (legacy contracts), and take-or-pay obligations with railways companies and coal terminals, which force companies to use the infrastructure to minimize financial losses. Exports reached their peak level in Q2 2012 (16 Mt) and have declined since then. Exports in Q3 2014 (7.3 Mt) were less than half those of Q2 2012.

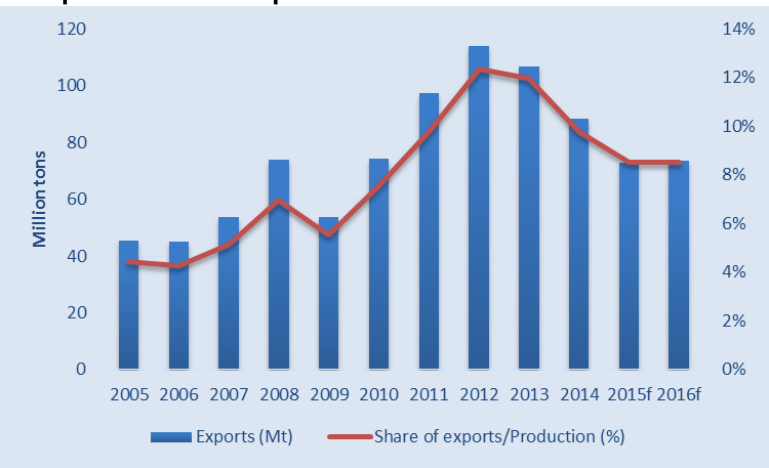
3.4 US coal imports

The USA also imports coal, as some coal electric generating units along the Gulf Coast and the Atlantic Coast find it cheaper to import coal from other nations than to have domestic coal transported by rail or barge. Most of the imported coal is being used by utilities in the Southern states, including Alabama and Florida. In 2013, the USA imported 8 Mt, of which Colombia accounted for three-quarters. In 2014, imports increased sharply to 10.8 Mt as Colombian coal improved its competitiveness against US coal. Some utilities also relied on imported coal to increase their inventories before the winter as US rail deliveries were uneven in 2014 partly due to a particularly cold winter.

3.5 The three coal-producing regions offer contrasted exposure to the export market

Between 2000 and 2010, about 5 per cent of the coal produced in the USA was exported to other countries. In 2012, this share increased to 12 per cent and still accounted for 10 per cent in 2014, but is projected to decline to 8.5 per cent in 2015 and 2016.

Figure 17: Share of exports in US coal production



Source: EIA, STEO, 10 March 2015

Coal export activity varies significantly across states, affecting the level of economic activity related to coal exports. As expected, the Appalachian region is the most exposed to international sales. Almost 40 per cent of production in West Virginia, the nation's third-largest producing state, was destined for the export market in 2012. In contrast, Wyoming, the largest producing state, exported only 1 per cent of its production in 2012. The state-to-state variation in the share of coal production that is exported abroad is related to two primary factors: first, the type of coal produced, and second, the proximity and connectivity of the state to international ports with coal shipping capacity. The low export share of Wyoming's production is due to the lack of export capacity in the Pacific Northwest which constrained both exports and production. As coal sales to the US market are declining, the only possible outlet is the export market which requires new infrastructure. Pending the construction of export capabilities, production in the Western region is declining. The situation in the Interior region is mixed, as export capacity on the East Coast and the Gulf Coast allows increasing exports from the Illinois basin, provided coal can compete with foreign suppliers.

Table 4: Domestic and foreign distribution of US coal by main states in 2012

	U.S. sales (Million tons)	Exports (Million tons)	Total sales (Million tons)	Share of Exports in Total sales (%)
Appalachia	**179.8**	**79.6**	**259.5**	**30.7%**
West Virginia	65.3	43.1	108.4	39.7%
East Kentucky	31.9	5.5	37.4	14.7%
Pensylvannia	36.0	13.1	49.1	26.7%
Interior	**145.0**	**15.6**	**160.6**	**9.7%**
Illinois	31.2	12.5	43.7	28.6%
Texas	39.3	0.0	39.3	0.0%
Western Kentucky	35.6	2.5	38.2	6.6%
Western region	**471.1**	**18.8**	**489.9**	**3.8%**
Wyoming	361.9	2.8	364.7	0.8%
Montana	24.1	8.2	32.4	25.5%
U.S. TOTAL	**795.9**	**114.1**	**910.0**	**12.5%**

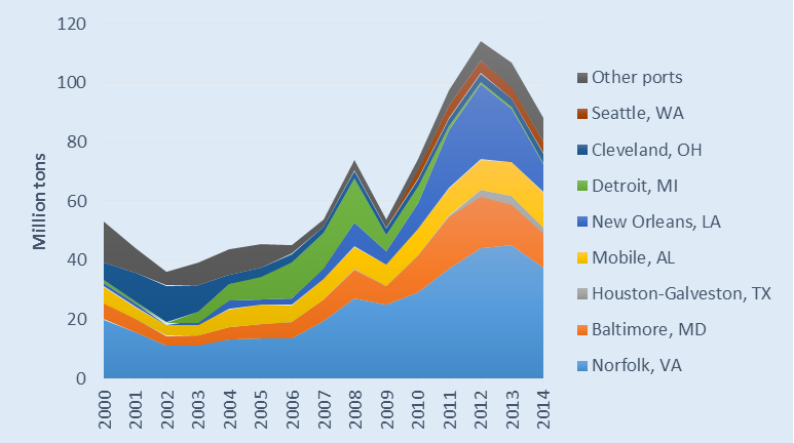
Source: EIA

4. Coal export infrastructure

4.1 Main exporting ports

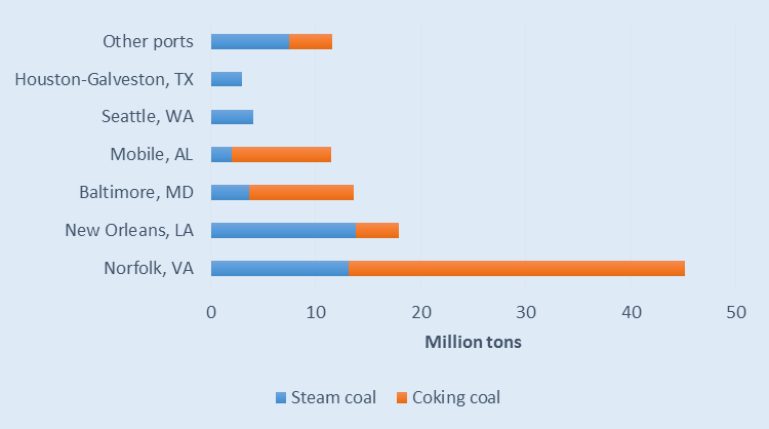
In 2014, six ports (Norfolk, Baltimore, New Orleans, Mobile, Houston, and Seattle) shipped 87 per cent of US coal exports, up from 61 per cent in 2000. Among them, East Coast ports at Norfolk and Baltimore represented 56 per cent, while southern ports at Houston, Mobile, and New Orleans made up 26 per cent. Norfolk, Virginia, is America's largest coal export facility and shipped 45.2 Mt in 2013, though in 2014 its exports slid 19 per cent year-on-year, to 36.6 Mt. Norfolk has nevertheless consistently remained the largest export facility, servicing approximately one-third to one-half of US coal exports since 2000. Exports from New Orleans, Louisiana, surged after 2010 and reached 25 Mt in 2012, three times higher than in 2008. However, exports from New Orleans have declined sharply since, to 18 Mt in 2013 and then only 9.4 Mt in 2014. This made Mobile, with 12 Mt exported in 2014, the second-largest coal port in the USA. Seattle, Washington, on the Pacific, accounted for 5 per cent of US exports and shipped 4 Mt, all of which was steam coal from the PRB. Coal exports from Seattle have risen in recent years as coal production in the PRB seeks access to Asian coal markets. Eastern ports are primarily used to export coking coal produced in the Appalachian basin, though since 2010 they have increasingly exported steam coal.

Figure 18: Total coal exports by main port (2000-2014)



Source: EIA, USITC

Figure 19: Coal exports by port and type of coal, 2013



Source: EIA

4.2 Current port capacity

At the beginning of the decade, the surge of coal exports, from 54 Mt in 2009 to 114 Mt in 2012, led to congestion issues at some US ports, hitting shippers with high demurrage costs. While total coal port capacity was adequate, its regional breakdown did not correspond to buyers' demand. In particular, the lack of port infrastructure on the West Coast was a major hurdle for coal producers in the PRB region. This spurred a new wave of investment in coal export infrastructure to facilitate the growth of US coal exports. Coal export port capacities were raised from 125 Mtpa in 2010 to 166 Mtpa in 2013, with most of the investment routed to expansion of existing terminals on the East Coast and new ports/reopening of ports on the Gulf Coast. New projects and expansion of existing terminals under consideration at the end of 2014 would add a further 142 Mtpa. In addition, Canadian port capacity increased to 58 Mtpa.

As Asia has been the engine of growth of seaborne coal imports, US producers have proposed new coal port projects in the Pacific Northwest to reduce transport costs to Asia. Faced with resistance from environmental groups and local residents, they have used export terminals in British Columbia, Canada, and have also turned their attention to the Gulf Coast, and recently to the Pacific Southwest and Mexican ports. Although plans to construct new coal ports along the coastlines of Washington and Oregon to support exports of Western coal to Asia face some considerable hurdles, a substantial number of projects on the US Gulf Coast are moving ahead.

Table 5: Coal export port capacities in North America for selected regions

State/Terminals (existing or proposed)	Capacity in 2010 (Mtpa)	Capacity in 2013 (Mtpa)	Proposed expansion or new terminal (Mtpa)	Total capacity after expansion (Mtpa)
East Coast	75	99.4	2.4	101.8
Northwest Coast	-	5	92	97
Gulf Coast	50	56.2	47.4	103.6
Southwest Coast	-	5	0	5
TOTAL US	**125**	**165.6**	**141.8**	**307.4**
British Colombia, Canada	39	58	18.5	76.5
TOTAL US and British Colombia	**164**	**223.6**	**160.3**	**383.9**

Excludes port capacity at Detroit and the Great Lakes (used in the past to export to Ontario, Canada).

Only expansions and new terminals still under review at the end of 2014 are considered.

Source: IEA, T. Parker Host and John T. Boyd Cy., and ports announcements.

Due to declining exports in 2013 and 2014, coal port capacity widely exceeds the demand for US coal. While US ports have capacity to ship 166 Mtpa, export levels in 2014 represented 53 per cent of this. However, there is still a regional mismatch between port capacity and future demand which is mostly coming from the Asian market. While coal port capacities are well developed and developing on the East and the Gulf Coasts, the Pacific Coast still lacks infrastructure, despite several proposed ports.

Map 2: Main coal terminals in North America

Source: Platts

4.3 West Coast: only two remaining projects

In 2013 and 2014, the port of Seattle shipped 4 Mt of PRB coal annually—only 1 per cent of PRB production. The challenge therefore is to build new coal terminals in the Pacific Northwest, which offers a more direct and much shorter route to Asian markets than ports on the Gulf and East Coasts.

Several projects including new ports and railways to expand terminal capacity in the Pacific Northwest have been proposed since the beginning of the decade. Various entities, including consortia involving Kinder Morgan, Peabody, Arch Coal, Ambre Energy of Australia, SSA Marine, and Rail America, have proposed up to six coal terminals for the Washington and Oregon coasts. These proposals accounted for between 120 and 142 Mtpa in total export capacity. However, projects on the West Coast face strong local opposition and challenging permitting issues. Community and environmental groups are concerned about coal dust from increased train traffic and the broader climate impacts from the coal being burned overseas. Local opposition has delayed coal export projects, while changes in market conditions have stopped some of them. Currently, of the six proposed terminals only the two largest port projects proposed in the state of Washington—the Millennium Bulk Terminals Longview (MBTL) and Gateway Pacific Terminal (GPT)—are still under review, but have been delayed due to longer and more comprehensive permit requirements. When (and if) fully operational, their export capacity would reach 92 Mtpa.

Box 3: The Gateway Pacific Terminal and the Millennium Bulk Terminals Longview

The proposed GPT is a deep-water marine terminal at Cherry Point in Whatcom County, Washington, sought by SSA Marine and Peabody. The GPT is designed to have multi-commodity capabilities allowing for the export of a variety of bulk commodities including coal, grain, limestone, and iron. When fully operational, the terminal would handle up to 54 Mtpa of bulk commodities, mostly coal (48 Mtpa). Backers of the project say it would create 1,250 direct and indirect jobs and generate $140 million in wages and tax revenue annually. In a related project, BNSF Railway Inc. has proposed adding rail facilities adjacent to the terminal site. Originally expected to start construction in 2013, the GPT has suspended its timetable pending environmental impact statements (EISs) from the Army Corps of Engineers and the state Department of Ecology and Whatcom County.

In November 2014, after a Vessel Traffic and Risk Assessment Study for the GPT was released, a native tribe, the Lummi Nation, asked the US Army Corps of Engineers to reject the permit application for the terminal because it would interfere with tribal fishing grounds. At this stage, there is no additional information regarding the request. However, past case law involving Lummi fishing suggests the GPT could be in trouble.

The MBTL is an operating bulk materials port on the Columbia River, Washington. Current operations include importing alumina. The project, developed by Arch Coal and Ambre Energy, involves redeveloping the brownfield industrial site at Longview port, Washington. The facility with a capacity of 44 Mtpa of coal is expected to be completed by 2018. Once fully operational, the terminal is expected to produce 300 direct and indirect permanent jobs and generate $146 million (2012 dollars) per year in tax revenues. The state Department of Ecology, Cowlitz County and the US Army Corps of Engineers are preparing draft EISs which are expected to be finalized by the end of 2015[15].

The four smaller projects in Oregon and Washington states were all cancelled or denied approval by state agencies. Rail America scrapped its proposal to build a 5 Mtpa-export terminal at Grays Harbor, Washington, in August 2012. In April 2013, the Port of Coos Bay, Oregon, ended its exclusive negotiating agreement with Metro Ports of California, which had been exploring a coal export terminal in Coos Bay. Kinder Morgan scrapped its proposal to build a coal terminal at the Port of St. Helens, Oregon, in May 2013 due to on-site issues, and in August 2014, the Oregon Department of State Lands (ODSL) denied Ambre Energy approval to build a coal-loading dock at the Port of Morrow. The ODSL stated that the Morrow Pacific coal export project 'was not consistent with the protection, conservation and best use of the state's water resources'. The project is located along the Columbia River in East Oregon. The coal export terminal at the Port of Morrow in Boardman would have transferred nearly 8 Mtpa of PRB coal from Montana and Wyoming to Asian markets. Ambre Energy would have brought the coal by train from Montana and/or Wyoming to Boardman and stored it in covered storage buildings at the Port of Morrow before transferring it to barges using an enclosed conveyor system. The barges would then have taken the coal down the Columbia River to Port Westward in Clatskanie, where it would have been transferred onto ocean-going ships bound for Asia. Ambre Energy, the Port of Morrow, and the state of Wyoming appealed the ODSL's decision. But in October 2014, the ODSL rejected the appeal saying Wyoming lacks standing in the matter.

[15] At a recent hearing in November 2014, the commissioners were asked to approve a $1.3 million amendment for the Department of Ecology's review of the terminal. The study must include a review of coal dust exposure, greenhouse gas emissions and climate change, energy and natural resources, and a coal market assessment. The four-year study, already underway, was mandated by the administration of Governor Jay Inslee and will take at least until 2016 to complete. Cowlitz County officials said the state may be putting the county in economic jeopardy by requiring excessive environmental review.

Table 6: Proposed coal ports in the Pacific Northwest

State/Project	Location	Capacity (Mtpa)	Main companies	Investment ($ million)	Status
Washington					
Gateway Pacific Terminal	Cherry Point (Bellingham)	54 Mtpa bulk, 48 Mtpa coal	SSA Marine/Peabody Coal	600-700	Scoping summary report released in March 2013. Draft environmental impact statements (EISs) under preparation and expected to be circulated for comments at the beginning of 2016.
Millennium Bulk Terminals	Columbia River (Longview)	44 Mtpa	Joint venture between Ambre Energy and Arch Coal	600	Scoping summary report released in February 2014. Draft environmental impact statements (EISs) under preparation and expected to be circulated for comments in 2015/2016.
Grays Harbor	Grays Harbor	5 Mtpa	RailAmerica	na	**Cancelled in 2012.**
Oregon					
Kinder Morgan Port	Port Westward, Columbia River	13.6 Mtpa up to 27.2 Mtpa	Kinder Morgan	150-200	**Cancelled. Site not convenient for a coal terminal**
Morrow Pacific coal export terminal	Port of Morrow/Port of St Helen's (Boardman → Clatskanie by barge)	3.5 up to 8 Mtpa	Ambre Energy	242	**Approval denied in August 2014. Appeal by Ambre Energy and Wyoming state rejected** in October 2014.
Port of Coos Bay	Coos Bay	6 to 10 Mtpa	Metro Port, CA	200-250	**Cancelled in 2012.**
	TOTAL	**120-142**			

Source: Ports' websites, T. Parker Host, John T. Boyd Cy.

4.4 The Gulf Coast alternative

The Gulf Coast is the USA's second-largest export region with 32 Mt of coal shipped from the ports of New Orleans, Mobile and Houston/Galveston in 2013, compared with 38 Mt in 2012. Exports decreased sharply in 2014 to 23.2 Mt, mainly due to lower steam coal exports from New Orleans.

The coal terminals on the Gulf Coast, including those on the Lower Mississippi River, have a current capacity of 56 Mtpa. The Gulf is expected to be an outlet for increased production and exports of steam coal not only from the Illinois basin but for PRB coal, due to delays in constructing new coal terminals in the Pacific Northwest. From a pure logistical viewpoint, prospects on the Gulf Coast are better than on the West Coast, since rail and shipping infrastructure have already been developed to handle bulk commodities like coal, gravel, and timber products. However, there are logistical and financial drawbacks to Gulf Coast ports for export of PRB coal. The ports are far away from both the PRB coal mines and the Asian markets, and PRB coal has to compete with Illinois coal. However, the prospects of Asia-bound exports of US coal from the Gulf Coast will benefit from the widening of the Panama Canal, which will reduce the length and duration of shipping journeys, and therefore transportation costs.

The proposed terminals, although each smaller in scale than the projects in Washington, would altogether add 85 Mtpa in port capacity along the Gulf Coast. However, several projects have been cancelled, mainly due to changes in market conditions and local opposition. Local opposition to coal terminals was not expected to be strong on the 'Energy Coast', as it is called. The Gulf Coast is home to extensive offshore oil and gas drilling, petroleum refining, and other energy-related activities, which helps to make political and local cultures generally more favorable towards the extraction industries. However, resistance to new coal terminals and expansion of current capacity has been strong, led by environmental organizations, such as the Clean Gulf Commerce Coalition (see section 5.2.3).

Yet, expansion at existing terminals and new projects may almost double Gulf Coast coal export capacity to 104 Mtpa. It remains to be seen however how many new terminals will be built. Ongoing expansions at existing ports may be sufficient to accommodate the future needs of exporting companies. For instance, Walter Energy cancelled its export port project in Mobile and signed additional handling agreements with the Port of Mobile instead.

Table 7: Operating and proposed coal ports on the US Gulf Coast

State/Terminals (existing or proposed)	Owner	Capacity in 2013 (Mtpa)	Proposed expansion or new terminal (Mtpa)	Total capacity after expansion (Mtpa)	Comments
Port of New Orleans, Louisiana					
United Bulk Terminal	Oiltanking	10.9	9.1	20	
International Marine terminal (IMT)	Kinder Morgan/AEP	10	4.5	14.5	Ongoing expansion (total incremetal capacity: 10 Mtpa), expected to be completed at end 2014
RAM Terminal	RAMACO/Armstrong Coal	0	10	10	Approved in November 2014
Convent Marine Terminal, Lower Miss. River, LA	Raven Energy (Foresight Energy and Cline Group)	9.1	8.9	18	
Burnside Bulk Terminal, Lower Miss. River, LA	Impala (Trafigura)	0	7.5	7.5	Completed its first coal (petcoke) cargo in July 2014. Could potentially expand to 15 Mtpa
Pin Oak, Lower Miss. River, LA	Midstream operators	0	6-8	0	Cancelled
Castleton, Lower Miss. River, LA	Midstream operators	0	5-7	0	Cancelled
Other Lower Mississippi River terminals	Midstream operators	18.6	3.4	22	
	TOTAL	**48.6**	**54.4-58.4**	**92**	
Mobile, Alabama					
McDuffie Coal Terminals	Alabama State Port Authority	10.9	5.4	16.3	New state investment will expand capacity by about 50%.
Bulk Material Handling Plant	Alabama State Port Authority	2.7	-	2.7	Mainly steam coal bound for southeast power generation markets
Chipco Terminal	Cooper Marine and Timberlands	1	-	1	
Blue Creek Coal Terminal	Walter Energy	0	2.7	0	Cancelled in May 2014. Sold to Port of Alabama, which will develop a container port instead.
	TOTAL	**14.6**	**8.1**	**20**	
Corpus Christi, Texas					
Cline Terminal	Ambre Energy	0	1.8	0	Cancelled
New Elk Terminal	Cline Group	0	2.7	0	Cancelled
La Quinta Trade Gateway	Port of Corpus Christi	0	na	0	Cancelled. Plans envisaged either developing the entire site as a coal export bulk terminal or part of it
	TOTAL	**0**	**4.5**	**0**	
Hosuton-Galveston, Texas					
Deepwater Terminal (Port of Pa	Kinder Morgan	5.4	3.7	9.1	Ongoing expansion, to be completed by end 2014
Houston Bulk Terminal	Kinder Morgan	2.2	0.3	2.5	Ongoing expansion, to be completed by end 2014
Jacintoport Bulk Terminal	Jacintoport LLC	0	13.6	0	Seems to be shelved
	TOTAL	**7.6**	**17.6**	**11.6**	
	GRAND TOTAL	**56.2**	**81-85**	**103.6**	

Source: Ports' websites, T. Parker Host, John T. Boyd Cy.

New projects on the Gulf Coast are led by Kinder Morgan, the USA's largest midstream energy company. Despite dropping plans in 2013 for an export coal terminal in the Pacific Northwest (Port Westward), Kinder Morgan is spending $417.6 million on expanding and improving coal export terminals in other regions, predominantly on the Gulf Coast. This investment will increase the export capacity at four ports from 23 Mtpa in 2010 to 40.5 Mtpa by the end of 2014. Kinder Morgan handled 30 Mt of coal in 2013 and 2014 through its East Coast and Gulf Coast terminals and projects that it will surpass that by 2 Mt in 2015, partly thanks to terminal expansions.

Table 8: Kinder Morgan coal export expansions

Export terminal	Kinder Morgan investment (US$ million)	Incremental capacity (Mtpa)	Export Name Plate Capacity (Mtpa) (a)				
			2010	2011	2012	2013	2014
International Marine terminal (IMT), Myrtle Grove, LA	162.8	10	4.5	4.5	4.5	10	14.5
Houston Bulk Terminal (HBT), TX	51.5	2.4	0	2	2	2.4	2.4
Deepwater Terminal, Houston, TX	174	9.1	0	0	0	0	9.1
Pier IX Terminal, Newport News, VA	29.3	1.3	13.2	13.2	13.2	13.2	14.5
TOTAL	**417.6**	**22.8**	**17.7**	**19.7**	**19.7**	**25.6**	**40.5**

(a): original data in short tons, converted in metric tons and rounded

Source: Kinder Morgan

These expansions are secured through take-or-pay agreements with coal companies (Peabody and Arch Coal in particular), equivalent to 26.4 Mt in 2014 (annualized). [16] Under multi-terminal agreements signed in July 2012, Peabody will gain additional access to export coal from Colorado, the PRB and Illinois basin at Kinder Morgan's Deepwater Terminal and Houston Bulk Terminal near Houston, and International Marine Terminal (IMT) in Myrtle Grove, LA, through 2021 and 2020, respectively. This will increase Peabody's Gulf Coast export capacity to approximately 5-7 Mt of coal per year between 2014 and 2020. Peabody has also secured a rail service agreement with Union Pacific Railroad (UP) to transport the company's Colorado coal to Kinder Morgan's Houston terminals. Likewise, in January 2012, Arch Coal signed a long-term throughput agreement with Kinder Morgan to access export facilities on the Gulf Coast and the East Coast, though specific tonnage was not announced. The coal will be both steam and coking coal from Arch mines in Appalachia, the PRB, the Western region, and the Illinois basin.

4.4.1 Louisiana

United Bulk Terminals and International Marine Terminal are the two major coal terminals in Louisiana, both located in the Port of New Orleans. United Bulk Terminals bought its Davant terminal in 2011 and is investing about $80 million to upgrade it. The company, a division of Germany's Oiltanking Group intends to nearly double the terminal's export capacity to 20 Mtpa. Kinder Morgan is completing a 10 Mtpa-expansion of its terminal at International Marine Terminal.

On the Lower Mississippi River, Convent Marine in St. James Parish is expanding its coal terminal capacity from 9 Mtpa to 18 Mtpa. Also in the Lower Mississippi region, energy trader Trafigura acquired a terminal at Burnside in Ascension Parish in 2011. The terminal, which reopened in July 2014 with an initial capacity of 7.5 Mtpa, could be expanded up to 15 Mtpa.

In addition, a new terminal has been proposed in Plaquemines Parish, 30 miles south of New Orleans by RAMACO and supported by Armstrong Coal, a coal reserve and infrastructure development group based in Kentucky. Despite local opposition, the RAM Terminal was approved by the Army Corps of Engineers in November 2014 and was expected to be fully operational within two years of construction commencing with a capacity of 10 Mtpa. However, the project still has some hurdles to overcome. In August 2013, Louisiana's Department of Natural Resources (DNR) gave the RAM Terminal a Coastal Use Permit (CUP) to run the coal export facility, which is located in the same area as a river sediment diversion project. However, in October 2013, community and environmental organizations filed suit against Louisiana's DNR approval and in December 2014, a Louisiana state court ruled that the permit is invalid. While the RAM project was expected to come online in 2016, this decision will certainly delay things and may yet cause the project's cancellation.

[16] Kinder Morgan, Terminals, presentation at Investors' conference by John Schlosser President Terminals Group, 2014 http://www.kindermorgan.com/investor/presentations/2014_Analysts_Conf_04_Terminals.pdf

4.4.2 Mobile, Alabama

The main coal terminals in Mobile, McDuffie Coal Terminal and Bulk Material Handling Plant, are owned and operated by the Alabama State Port Authority's Port of Mobile, which is also home to private bulk terminal operators. The two coal terminals currently export about 11 Mt of coal, but are equipped to export 14 Mtpa. The Port Authority is investing $120 million to expand the combined capacity of the terminals to 19 Mtpa.

Walter Energy intended to develop its own coal terminal at the port. In 2011, the company bought the idled Blue Creek Coal Terminal to export its Yellow Creek coking coal production when the company put it on full production. The company, however, sold the terminal to the Alabama State Port Authority in August 2014. At the same time, Walter Energy secured a long-term extension of its existing coal handling agreement with the Port Authority for its current and future export requirements. Walter Energy currently exports approximately 7 Mt of coking coal through the McDuffie Coal Terminal.

4.4.3 Corpus Christi, Texas

Since 2011, the Port of Corpus Christi in Texas has exported coal mined in the Western region by New Elk Mining Company (a subsidiary of Cline Mining) and Ambre Energy. Both companies planned to build a new coal terminal at the port, while the Port Authority was also developing its own proposal to incorporate a coal export facility to the proposed La Quinta Trade Gateway. However, the three projects have been abandoned. Both Ambre Energy and Cline Mining terminated their lease with the port for a planned coal export terminal in Corpus Christi and no longer consider a coal export terminal viable in this area. The Corpus Christi port authorities have concluded that the coal export market is too volatile and risky to invest significant sums in new or expanded shipping facilities.[17]

4.4.4 Houston, Texas

The two operating coal export facilities in Houston, Kinder Morgan's Deepwater Terminal and Houston Bulk Terminal, have an export capacity of 7.6 Mtpa and shipped 3 Mt in 2013. Kinder Morgan invested $174 to increase the capacity of the Deepwater Terminal to 9.1 Mtpa by the end of 2014. The terminal is served by Union Pacific and BNSF Railway. The Houston Bulk Terminal, which is also served by UP and BNSF, is currently undergoing expansion work to bring its capacity to 2.5 Mtpa.

Jacintoport International, a cargo handling and stevedoring firm headquartered in Houston, operates Jacintoport Terminal under a long-term lease from the Port Authority of Houston. The firm intended to build a coal export facility with a capacity of 13.6 Mtpa, though this proposal now seems have been shelved, with no recent project information available.

Houston is approximately 1,400 miles from the PRB, which is likely to be the primary supply basin to draw exports through the ports, with other coals provided by Western region bituminous mines in Utah and Colorado. Houston is one of 10 US ports that is being dredged and fully prepared for the Panama Canal's widening and deepening by 2016.

Box 4: Port of Houston and widening of the Panama Canal

One of the most significant growth events in the Houston region involves the extensive expansion of infrastructure and operations at the Port of Houston to coincide with the current expansion of the Panama Canal. The $6 billion Panama Canal expansion project, which began in 2007 and was originally planned to be completed in 2014—now scheduled to be completed at the end of 2015 and to come online at the beginning of 2016—will accommodate larger-than-Panamax ships which cannot currently traverse the canal system. With the completion and operation of two new flights of locks parallel to, and in addition to, the old existing locks, the shipping capacity through the canal system

[17] Port of Corpus Christi, Boardbook Regular meeting, 10 December 2013, http://www.portofcorpuschristi.com/images/pccpdfs/Agenda/2013_12_10/Dec per cent2010 per cent20BOARDBOOK.pdf

will be doubled. Almost 8,000 miles will be saved for these post-Panamax ships by bypassing the trip around South America. When the Panama Canal expansion is completed, exports through Houston are expected to increase by 40 per cent in the short term, and fivefold by 2035.

This predicted growth will be brought about, in large part, by the current natural gas boom in Texas. A significant growth is expected when LNG vessels, currently barred from the canal due to their size, can access the expanded waterway. Significant export growth through the port is also expected to come from efforts to further capitalize on the Panama Canal expansion by capturing the coal export market. Coal export terminals, such as Kinder Morgan's facilities in Houston, are being expanded to provide US coal producers increased opportunities for coal exports to Asian markets. To accommodate all the expected increased cargo volumes and larger ships, the Port of Houston is proceeding with a $3 billion expansion of infrastructure and operations at the terminal facilities and in the ship channel.

The expanded Panama Canal and accommodation of larger ships will make it less expensive to export US coal to Asian markets, though how much less expensive is still unclear. Shippers await the Panama Canal Authority's new toll structure for the expanded locks. In August 2012, the canal's former administrator illustrated the projected cost savings. A shipment of eastern US coal from the Port of Baltimore to Xiangang, China, in a Panamax vessel that fits the existing canal cost about $35/ton in 2012. Shipping the same amount of coal between the same two cities in the larger post-Panamax vessels would cost approximately $25/ton at the freight rate conditions of 2012. However, the freight market has collapsed since then, reducing the potential saving by almost half.

4.5 East Coast

The East Coast has the largest coal export capacity and export volumes in the US, with capacity currently reaching almost 100 Mtpa. As the infrastructure here is already well developed, there are few expansion projects on the drawing board. An exception is in Virginia, where Kinder Morgan is investing $29.3 million to expand capacity at Virginia's Pier IX terminal from 14.5 Mtpa to 16 Mtpa.

Exports from Hampton Roads and Baltimore reached record levels in 2012 with 44 Mt and 18 Mt respectively, of which 30 Mt and 14 Mt respectively was coking coal. Since then, coal exports have decreased. Hampton Roads' coal exports totaled 36.6 Mt in 2014, down 19 per cent from 2013, while Baltimore exported 12.9 Mt in 2014, 5 per cent lower year-on-year.

Table 9: Operating and proposed coal ports on the US East Coast

State/Terminals (existing or proposed)	Owner	Capacity in 2013 (Mtpa)	Proposed expansion or new terminal (Mtpa)	Total capacity after expansion (Mtpa)
Baltimore, Maryland				
CNX Marine	Consol	13.1	-	13.1
Chesapeake Bay Terminal	CSX	12.7	-	12.7
Sparrows point		0	0.9	0.9
	TOTAL	**25.8**	**0.9**	**26.7**
Hampton Roads, Virginia				
Lamberts Point (Pier 6)	Norfolk Southern	34.5	-	34.5
Pier IX	Kinder Morgan	14.5	1.5	16
Dominion Terminal Associates (DTA)	Alpha, Arch, and Peabody	20	-	20
	TOTAL	**69**	**1.5**	**70.5**
Other East Coast				
Fairless Hills, Philadelphia, PA	Kinder Morgan	1.8	0	1.8
Shipyard River Terminal, Port of Charleston, SC	Kinder Morgan	1.8	0	1.8
Port of Tampa, FL		1	0	1
	TOTAL	**4.6**	**0**	**4.6**
	GRAND TOTAL	**99.4**	**2.4**	**101.8**

Source: Ports' websites, T. Parker Host, John T. Boyd Cy.

4.6 The Pacific Southwest, California, and Mexico

Port capacity in the Pacific Southwest (San Francisco and Los Angeles, California) is limited to less than 5 Mtpa. Nevertheless, exports from the two ports are expanding as demand in Mexico is increasing. Data from the US International Trade Commission (USITC) show that shipments from San Francisco doubled in 2014, up to 2.7 Mt from 1.2 Mt in 2013. Most of San Francisco's shipments went to Mexico, where purchases of US coal rose 17 per cent in the first half of 2014. Utilities along Mexico's coast are burning coal mined from the Uinta basin, a region that covers parts of Utah and Colorado. Union Pacific moves the coal on trains through the Rocky Mountains to the Californian ports.[18] Coal shipped from Los Angeles totaled 1.5 Mt in 2014, unchanged from 2013.

However, these increases should be temporary. The San Francisco Board of Supervisors, the legislative body within the government of the City and County of San Francisco, passed a resolution in October 2014 urging Port of San Francisco to prohibit the movement of fossil fuels through the city's ports.

Other proposed projects to ship US coal to Asia from the Pacific Southwest include the development of a coal terminal in northern Mexico. MEXPORT Coal & Minerals Terminal has proposed to build a $700 million terminal in the Mexican state of Sonora near the town of Guaymas on the Gulf of California. The project aims to ship 30 Mtpa per year to Asia, sourced from the PRB and other mining regions in the Western region of the US. The rail journey for the PRB coal would be about 2,100 km, longer than the journey to Vancouver, but less than to Ridley.[19] Further down the coast, the Mexican port of Lazaro Cardenas has been considered as a possible shipping point for PRB coal exports. However, these projects face a challenging transportation issue. To reach the ports, coal would have

[18] Bloomberg, U.S. West Coast Coal Exports Rise as Mexico to China Buy, 21 October 2014, http://www.bloomberg.com/news/2014-10-21/u-s-west-coast-coal-exports-rise-as-mexico-to-china-buy.html

[19] Mccloskey Coal Report, 22 August 2014

to be switched to US railway lines, and then to the Ferromex rail line at the US-Mexico border, adding switching fees to already high transportation costs. In the current price environment, such projects seem highly uncertain.

4.7 The Canadian alternative

Canada is a major player in the global coal trade, ranking among the world's top 10 exporters. In 2013, the country exported 36.6 Mt of coal, up 5.2 per cent from 2012. Most of the exported coal is coking coal (33.1 Mt in 2013). Because the vast majority of Canada's exports are bound for Asia, virtually all the coal exported by Canada leaves from British Columbia (BC). Coking coal is the backbone of BC's mining sector, accounting for 43 per cent of Canadian $8.5 billion revenue in 2013 compared with 4 per cent of revenue from steam coal.[20] The three coal ports of the province—Westshore, Neptune (both near Vancouver), and Ridley (near Prince Rupert)—have a current capacity of 58 Mtpa.

Since 2011, US producers have increasingly used BC's ports to export steam coal to Asia. In 2013, according to ports statistics, Westshore Terminals handled 30.1 Mt, of which 9.3 Mt was US steam coal. Overall, coking coal accounted for almost 60 per cent of total coal exports at Westshore in 2013, while steam coal was at 40 per cent. Neptune exported 8.1 Mt of coking coal, while Ridley Terminals handled 10.3 Mt of coal, of which 2.6 Mt was US steam coal. Overall US steam coal exports through Canadian terminals reached around 12 Mt in 2013. Because of increasing exports of Canadian coking and steam coal from the PRB, Canadian ports have been highly utilized. This has triggered investments in capacity expansions, such as the expansion of the Westshore Terminals to 33 Mtpa in 2013. Ridley is also being expanded, although the initial plan to double capacity to 25 Mtpa by 2015 has been postponed until at least 2019. It is estimated that an expansion to 18 Mtpa would be high enough for Ridley to handle demand for shipments until the end of 2019. Neptune Bulk Terminal, BC's third-largest coal port, will expand coal capacity to 18.5 Mtpa by 2015, following a project permit issued by Port Metro Vancouver[21] in January 2013.

In addition, in August 2014, Port Metro Vancouver granted a permit for the Fraser Surrey Docks to be expanded to export 4 Mtpa of coal, saying it would not harm the environment or local residents.[22] Fraser Surrey Docks is an existing terminal that has applied to handle coal. The decision followed a two-year review, which included a full environmental impact assessment, public hearings, and public health assessments. The terminal will transfer coal arriving from the US on rail cars to barges, which would then carry the coal to nearby Texada Island to eventually be shipped to Asia. The Canadian $15 million coal facility is scheduled to become operational in the fall of 2015. Shipping capacity could eventually be raised to 8 Mtpa. Fraser Surrey Docks is owned by Macquarie Infrastructure Partners, an investment fund managed by Australia's Macquarie Group. However, the project has run into fierce opposition from local municipal governments, environmentalists, residents, and other groups that have raised concerns about the terminal's potential harm to local air quality and global GHG emissions. The project has been revised to include new measures to reduce coal dust escaping from trains and barges, and a ban on the storage of coal at the facility. Nevertheless, opponents of the terminal announced in September 2014 their intention to appeal the approval by Port Metro Vancouver.[23] Lawyers for Ecojustice, on behalf of environmental groups and local residents, argue

[20] PWC, Digging deep, the mining industry in British Columbia 2013, 2014, http://www.pwc.com/ca/en/mining/publications/pwc-mining-industry-british-columbia-2014-05-en.pdf

[21] Port Metro Vancouver is a non-shareholder corporation established by the federal government in 2008 to manage all ports in the Metro Vancouver region. It is run by a federally-appointed board of directors representing government and industry.

[22] Port Metro Vancouver noted coal is already the most heavily traded commodity at the port, and the amount shipped from the new facility would represent only a 10 per cent increase. CBC News, Surrey Fraser coal terminal approved by Port Metro Vancouver, 21 August 2014, http://www.cbc.ca/news/canada/british-columbia/surrey-fraser-coal-terminal-approved-by-port-metro-vancouver-1.2743022

[23] Peace Arch News, Court challenge aims to block new coal terminal, 19 September 2014, http://www.peacearchnews.com/news/275828961.html

the port authority was wrong to decide the project would have no significant adverse effect on the environment, in particular on GHG emissions. The appeal is ongoing.

Taking into account the Fraser Surrey Docks project, the total export capacity of BC's ports is expected to reach 76.5 Mtpa by 2015, while capacity of rail transportation has also been expanded. Canada has two major rail operators which transport coal, Canadian National (CN) and Canadian Pacific (CP). In 2011, both operators invested almost Canadian $3 billion on infrastructure and fleet upgrades, with much of this money supporting coal shipments.

Up to 2013, coal export terminals in British Colombia operated near their full capacity. This is still the case for Westshore, which expects 2014 coal volumes to be roughly 31-32 Mt, compared with 30.1 Mt in 2013. Westshore Terminals has contract commitments for more than 90 per cent of its annual capacity through 2021. However, 2014 was a much more difficult year for the Ridley terminal, where coal exports fell 41 per cent in 2014 to 7.1 Mt. This was mainly due to the decision by Walter Energy to temporary idle three coking coal mines in east-central BC that were key exporters through Ridley.[24] Walter Energy has been the largest user of the Ridley terminal since its acquisition of Canadian Western Coal in April 2011.[25] In January 2011, Arch Coal signed a five-year agreement with Ridley Terminals that gave Arch throughput capacity at the terminal of up to 2 Mt for 2011 and up to 2.5 Mtpa for 2012 through 2015.[26]

Table 10: Capacity at Canada's West Coast ports

	Capacity in 2013 (Mtpa)	Capacity with current expansion (Mtpa)	
Ridley (Prince Rupert)	12	18	Plans to double export capacity to 25 Mtpa postponed until at least 2019. Current capacity: 18 Mtpa. Exports coking and steam coal
Neptune (North Vancouver)	12.5	18.5	Authorized in January 2013. Expected to be completed in 2015. Used to export coking coal
Westshore (Robert Bank)	33	36	Expansion to 33 Mtpa completed in 2013. Replacement of old equipment to add 2-3 Mtpa. Exports coking and steam coal
TOTAL	**57.5**	**72.5**	
Fraser Surrey Docks (Vancouver)	0	4	Authorized in August 2014. Could potentially be raised to 8 Mtpa. Contracts with U.S. PRB producers
Pacific Coal Terminal, Port Moody (a)	<1	0	Temporary permit, ending at end 2013 (exports of coking coal)
TOTAL	**58**	**76.5**	

(a) From 2011 to 2013, Pacific Coal Terminal had a temporary permit to handle coal (coking coal from Teck Resources), transferring the product from train to vessel without any storage on site.

Source: IEA, Ports' websites

The capacity at BC's ports available for US producers depends on future expansion of Canadian coal exports. The decline in coking coal prices has also hit Canadian producers. In addition to the closure of coking coal mines by Walter Energy, Teck Resources—the world's second largest exporter of seaborne coking coal—has announced it is deferring the restart of its Quintette coal mine in BC until market conditions for a restart are more favorable, freeing some export capacity in the short term.

Canadian steam coal exports are uncertain. The expansion at Ridley Terminals was partly designed to accommodate increasing production and exports of Coalspur's Vista coal project in Alberta. Coalspur is a coal development company with coal leases in the Hinton region of Alberta. Coalspur's flagship project, the Vista coal project, is intended to produce 6 Mtpa, and to be expanded to 12 Mtpa, which would make it the largest steam coal export project in the country. Coalspur has secured export

[24] Walter Energy press release, Walter Energy to Idle Canadian Operations, 15 April 2014, http://investorrelations.walterenergy.com/phoenix.zhtml?c=71978&p=irol-newsArticle&ID=1918701

[25] Western Coal produced high quality coking coal from three mines in northeast British Columbia (Canada), high quality coking coal and compliant steam coal from four mines located in West Virginia (US), and high quality anthracite and coking coal in South Wales (UK). In February 2011, Western Coal signed long-term agreements with Ridley Terminals for 6 Mtpa.

[26] Arch Coal press release, Arch Coal Announces Agreement With Canada's Ridley Terminal for Pacific Coast Exports, 18 January 2011 http://news.archcoal.com/phoenix.zhtml?c=107109&p=irol-newsArticle&ID=1517028

allocation of up to 13.5 Mtpa through two agreements with Ridley Terminals, with 10 Mtpa committed and the option for an additional 3.5 Mtpa.[27] The agreements were in place for 14 years with an option to extend for seven more. However, in May 2014, Coalspur announced that construction of the project, which was due to start in June 2014, would be delayed due to funding issues and challenging market conditions. In March 2015, K.C. Euroholdings (KCE) bought Coalspur making the Vista coal project more likely to move forward.

In the meantime, excess capacity at Ridley is available for US producers. However, the terminal is 3,000 km away from the PRB—a long haul in comparison to the 1,900 km to reach Westshore. US companies are therefore trying to get access to Westshore. Cloud Peak Energy and US Colorado-based producer Westmoreland Coal recently signed an agreement involving transfer of rights, under which Cloud Peak Energy acquired the contracted capacity at Westshore of Westmoreland Coal, allowing Cloud Peak to increase its annual exports through the terminal to 5.4-5.9 Mt starting in 2015[28] and 6.3-6.8 Mt in 2019 from a projected 3.6-4.1 Mt in 2014. Westmoreland will instead export production from its Coal Valley Mine in Alberta through Ridley.

Overall, additional coal export capacity is available in BC, mainly at Ridley. However, in the longer term, the Canadian terminals are not expected to provide significant capacity to US coal exports. Expansions are much lower than the volumes expected to be handled by the ports proposed in the state of Washington. In addition, BC's ports would continue to favor Canadian coking coal that offers a higher price on international markets. Should the steam coal market recover, operators of the Vista coal project have long-term contracts with Ridley Terminals. This would leave little capacity available for US producers, estimated at around 20 Mtpa taking into account the additional capacity at Fraser Surrey Docks.

[27] Northern View, Ridley Terminals signs agreement for more coal with Coalspur, 30 March 2012, http://www.thenorthernview.com/news/145179235.html

[28] Platts, Cloud Peak Energy says terminal deal will allow it to boost PRB coal exports, 8 August 2014, http://www.platts.com/latest-news/coal/houston/cloud-peak-energy-says-terminal-deal-will-allow-21048033

5. Challenges faced by project promoters

5.1 Market challenges

5.1.1 International coal prices have collapsed

A rapid increase in coal demand by power utilities around the world, but especially in the Asia/Pacific basin, led to a spectacular increase in steam coal trade in the 2000s, driving steam coal prices to a record high of over $200/ton in July 2008. The financial and economic crisis in 2009 reduced coal demand in many countries, but even that year traded volumes continued growing thanks to rising Chinese imports. Although prices collapsed after the financial crisis, a steep rise in Chinese imports turned the market from oversupply to tightness and drove prices up again. China became a net importer in 2009 and continued to increase its coal imports steeply. In 2011, it became the world's largest coal importer, outpacing Japan and helping increase Asian prices to $146/ton in January 2011. Chinese demand spurred investment in all exporting countries from Indonesia to Russia and the USA.

In addition, on the Atlantic market, European steam coal imports increased from 2010 as high gas prices favoured coal burning in the power sector, a trend reinforced by the collapse of CO_2 prices after 2011. This new demand added to the pressure on the international market. European prices rose to $128/ton in March 2011 when the accident at the Fukushima Daiichi nuclear plant, and the decision by the German government to phase out nuclear energy, led to worries over a potential shortage of coal.

However, the investment in new mines and port infrastructure decided during the boom years started to enter the market and resulted in a supply glut. Despite record volumes imported by China in 2012 and 2013, prices started to fall as the increase in supply outpaced the demand for imports. The drop was reinforced in 2014 by the decrease in Chinese and European imports. European steam coal prices stood at $75/ton CIF[29] ARA[30] on average in 2014, a decrease of $47 compared to their average in 2011. At this level, exports are no longer economically viable for most American mines, particularly those in the Appalachian region. In the Pacific basin, Asian steam coal prices fell to an average of $78/ton in 2014, down 42 per cent from $134.4/ton in 2011. Prices started 2015 at multi-year lows: $55 in Europe and $70 in Asia on 23 January 2015. At these price levels, even the lowest-cost Illinois basin suppliers are not making profits.

In response to these lower prices, coal producers in the USA and around the world have started to cut production at their high-cost mines. However, the cuts have not been sufficient to rebalance the market. In the short term, prices are expected to stay low as the market remains oversupplied. As lower prices force less competitive mines to close over the next few years, supply availability is expected to tighten and reduce some of the downward price pressure. However, prices are not expected to reach the peak seen at the beginning of 2011.

[29] CIF: Cost Insurance and Freight

[30] ARA: Amsterdam, Rotterdam and Antwerp (the major coal ports in northwest Europe)

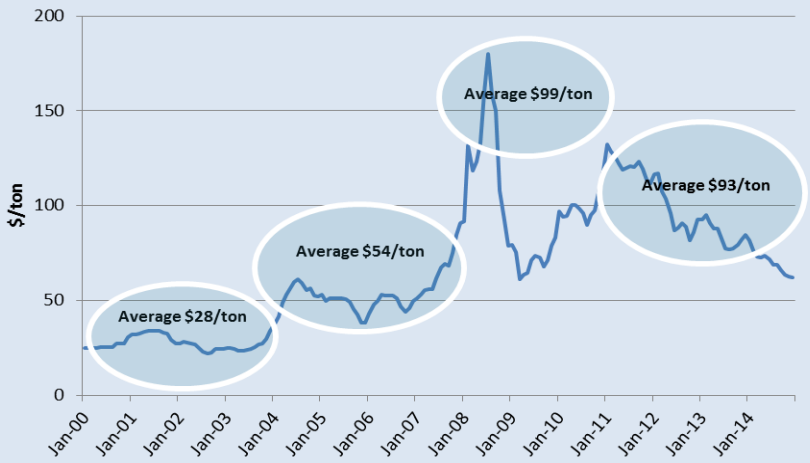
Figure 20: Evolution of international steam coal prices, CIF Europe and Asia (2007- 2015)

Source: McCloskey

Box 5: Boom and bust in the coal industry

International prices for steam coal are mainly determined by market forces (domestic prices may include subsidies). Due to long lead times for the development of new coal mines, railways, and export capacity, coal prices are cyclical. When supply is tight, prices can rise steeply, incentivizing investment in new infrastructure, while excess supply leads to price falls until the market rebalances. In the short term, prices are volatile. Supply constraints (flooding of mines for instance) make coal vulnerable to sudden shocks. On the demand side, lower electricity demand and high coal stocks may lead to a fall in international coal prices. The following figure illustrates the long-term evolution of Australian FOB[31] prices since 2000 and shows boom and bust cycles in coal prices. Since the middle of 2011, the market has turned from tightness to oversupply and prices have fallen from $132/ton in January 2011 to $61/ton in January 2015. It is expected that prices have bottomed out and will rise by the end of 2015 or in 2016. However, the rebalancing of the market is highly dependent on Chinese imports which are quite uncertain.

Figure 21: Australian FOB steam coal prices



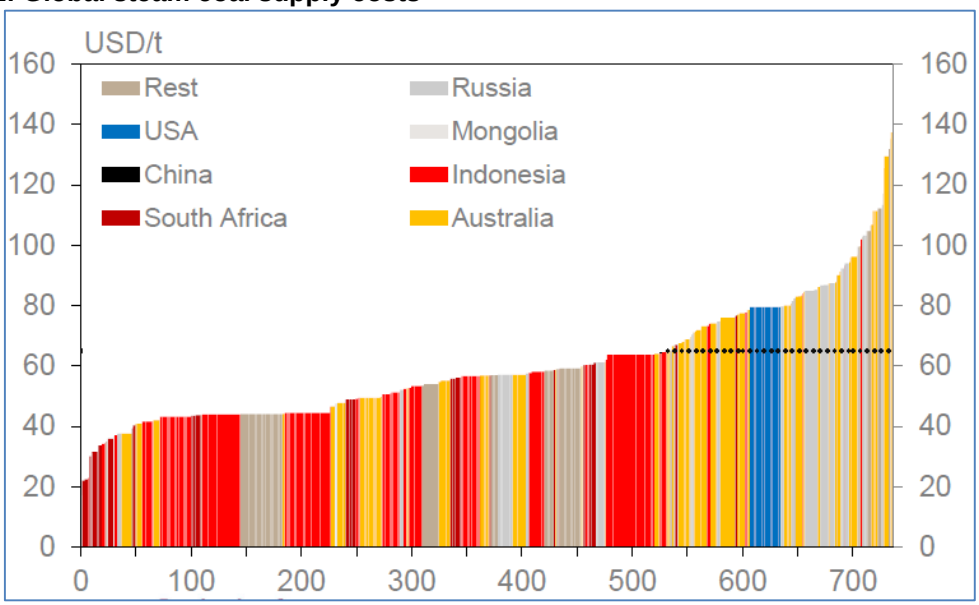
Source: World Bank

[31] FOB: Free on Board

5.1.2 The US is among the highest-cost supplying countries, except for PRB coal

Most US steam coal exports originate from the Central Appalachian (CAPP) and the Illinois basins. The cost curve of global traded steam coal shows that US coal is at the fourth quartile of the cost curve. CAPP coal is amongst the highest-cost coal produced in the world, and despite cost reductions in the past two years, cannot breakeven at current price levels. Illinois coal is less expensive and exports from the basin have increased in the past two years, but with the recent fall in European and Asian coal prices, even the lowest-cost Illinois producers cannot breakeven.

Figure 22: Global steam coal supply costs



Source: Westpac, November 2014

In light of lower prices, global miners have responded by aggressively reducing their operating costs and cutting production at their high-cost mines. However, they have also increased the production of their lowest-cost mines to maintain revenues and reduce unit costs. Closures/idling of high-cost coal mines is particularly pronounced in the Appalachian region due to the high cost of mining in the region. In 2013, 45 mines were closed or idled in West Virginia, a trend that has continued since. However, supply costs remain higher in the USA than in other supplying countries, like Indonesia, Australia, and South Africa in the Pacific basin, and Colombia and even Russia in the Atlantic basin. This trend is reinforced by the evolution of exchange rates in 2014. Almost all currencies in coal-exporting countries depreciated against the US dollar. As coal trade around the world is transacted in US dollars, depreciation of local currencies has favored coal exporters outside the US, making even more difficult for US miners to compete.

The analysis of supply costs is different for coal produced in the PRB. Production costs here are very low as coal is mined from open-cast pits with high strip ratios of one to three, leaving most of the vast PRB coal reserves range in the lowest part of the cost curve. If exported from the Pacific Northwest, coal from the PRB could be delivered to Asian markets for approximately $60/ton[32], perhaps even less as freight rates have declined with the drop in oil prices. Exports therefore remain an attractive option even at current Asian prices. The main problem is the lack of export infrastructure. In the

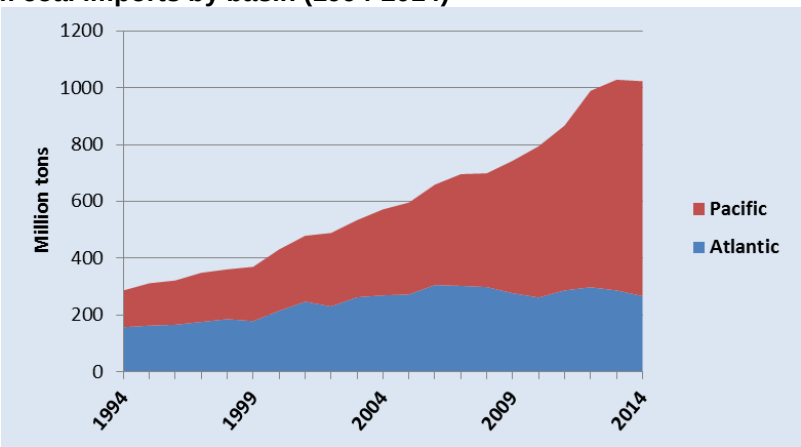
[32] Energy Policy Research Foundation, Inc. (EPRINC), The Economic Value of American Coal Exports, August 2012, http://eprinc.org/2012/08/the-economic-value-of-american-coal-exports/

absence of railways and ports in the Pacific Northwest, PRB coal has to be transported to Canadian or Gulf Coast ports, thus incurring higher transportation costs.

5.1.3 The growth in steam coal trade has moderated

The volume of steam coal traded has tripled since 1994, from 287 Mt to an estimated 1023 Mt in 2014, at an average annual growth rate of 6.6 per cent. While Europe and Japan accounted for the bulk of demand until 2000, Asia accounted for most of the growth in the last decade. The steam coal market is split into two major markets, the Atlantic and the Pacific basins[33]. The surge of Asian imports has shifted the centre of gravity in international coal trade to the Pacific. With steam coal imports of 756 Mt in 2014, the Pacific basin has a leading position in the international market: it accounts for 74 per cent of the steam coal trade, compared to just 28 per cent in 1990. The trend was remarkable in the past six years, with an increase of the basin's share of 17 percentage points during 2008–2014, driven by the surge in Chinese and Indian imports. In the Atlantic basin, although Europe is still a major player on the international coal scene, its role is shrinking from year to year. Today, it accounts for only 16 per cent of global steam coal imports, compared with 44 per cent in 1990.

Figure 23: Steam coal imports by basin (1994-2014)



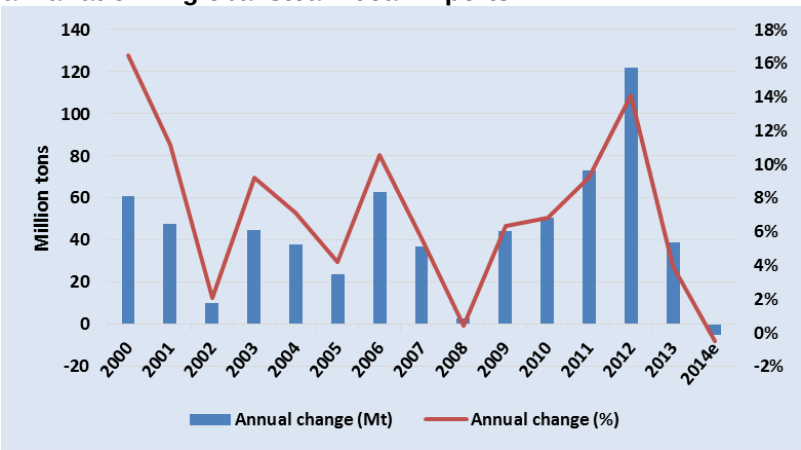
Notes: includes cross-border over-land trade.

Source: VDKI, IEA, BREE.

The growth in steam coal trade is slowing down. In 2013, the growth was only 3.9 per cent as imports by China slowed drastically. In 2014, trade stagnated (first estimates show a reduction of 0.5 per cent or 5 Mt) under the combined effect of reduced imports by China and Europe and increasing imports in India and ASEAN countries. China imported 231 Mt of steam coal in 2014, still a huge amount but a 7.6 per cent decrease over 2013, in sharp contrast with the dazzling growth of 59 per cent recorded in 2012.

[33] The Atlantic basin is made up of utilities and traders from Europe (including the countries bordering the Mediterranean), the eastern seaboards of North, Central, and South America, and the northern and western coasts of Africa. The Pacific basin is made up of utilities from China, India Japan, South Korea, and Taiwan. Other smaller buyers include Malaysia, Philippines, Thailand and the west coast of North America and South America.

Figure 24: Annual variation in global steam coal imports



Source: IEA, estimates

In the Pacific basin, China has been the engine of growth in international coal trade, increasing its steam coal imports from 33 Mt in 2008 to 250 Mt in 2013. However, China's coal industry has been in crisis since 2012. Demand growth weakened significantly due to the economic slowdown, the fight against air pollution, and the increasingly large role played by clean energy sources. Demand even decreased in 2014, its first decline since 1998, as strong hydroelectricity generation reduced demand by power plants. As the domestic mining sector suffers from overcapacity and weak financial performance, the government has adopted a series of measures to strengthen the sector, including a mandated reduction in coal imports and the introduction of import taxes. The government has also introduced quality restrictions on coal imports favoring high-quality coal imports. Coal demand in China has not yet peaked, however, as the country is still developing its coal-fired power capacity, as well as coal conversion projects. The growth is nevertheless expected to slow dramatically. In addition, China's future recourse to the international coal market is uncertain. Policy measures in China (quality restrictions, import taxes, royalties, and so forth), currency rates, and other factors could incline the balance towards domestic or international supplies with implications worldwide.

India is expected to be the next engine of growth of the international coal trade. The country is the third-largest consumer of coal (791 Mt in 2013) and relies on the fuel for two-thirds of its electricity generation. The policy of the new Indian prime minister is aimed at electrifying the entire country by 2020, while currently a quarter of the population has no access to electricity. For this, the government has initiated a vast program to increase India's power generation capacity, based on coal, nuclear, and renewable energy sources. Coal is expected to provide the bulk of the increase, given its low cost and its domestic abundance. However, despite significant coal resources, Indian production has difficulties in keeping pace with the increase in demand due to economic, environmental, and administrative constraints. The new government has undertaken a thorough reform of the mining sector, including its liberalization and the further privatization of Coal India. The new coal policy aims to double Coal India's production to almost 1 Gt by 2019 and to reduce imports.

For now, however, India is in a difficult situation: while it is expected to become the second-largest coal market in the world within five years, outpacing the USA, it will need to import more coal, despite its own significant resources. In 2014, steam coal imports increased by 22 per cent to 173 Mt, though the decline in coal prices allowed India to limit the impact of this increase on its trade balance. Imports are foreseen to continue growing in the short and medium term. Eventually, however, they may peak and start decreasing if coal production is able to keep pace with the increase in demand, which has not been possible so far.

The ASEAN countries are also emerging as a new outlet for coal exporters. Thanks to the low price of coal, many countries in the region (Vietnam, Malaysia, and Thailand) are turning to coal to meet their growing electricity needs. This move is facilitated by foreign investment from countries wishing to

export their highly-efficient coal burning technologies. In this endeavor, Japan is in the lead. In its new energy policy adopted in April 2014, the country promotes the export of clean coal technologies. Japanese investment in coal-fired power plants extends to almost all ASEAN countries. For its own electricity needs, Japan aims to restart some of its nuclear plants. The two reactors at Sendai, operated by Kyushu Electric, should be the first to restart. Japan's new energy policy also promotes the development of high-efficiency coal plants as a source of base-load power generation. New coal-fired power plants are planned to be built by 2020 and small-size plants are under construction around Tokyo to take advantage of the liberalization of the electricity sector from 2016. After strong growth in 2013, Japanese coal imports stagnated in 2014, with coal plants already running at full capacity. In the future, imports should decline slightly according to the pace and timing of the restart of the nuclear power plants.

In the Atlantic basin, coal had been experiencing a renaissance in Europe since 2010, but it was short-lived. Already in 2013, coal demand was declining, while in 2014 it decreased again by 4 per cent to stand at 700 Mt (all coals). The decline in the past two years is due to lower demand by power utilities, following weak demand for electricity, the growing share of renewable energy sources, and the closure of old coal-fired power plants under the effect of the Large Combustion Plants Directive, which restricts SO_2 and NO_X emissions. While in 2013, steam coal imports continued to rise to offset the decline in domestic production, they were down in 2014, with demand declining faster than production. Almost all coal-consuming countries in Europe experienced a decline in consumption and imports.

Overall, the global trade in steam coal is still expected to increase, but the growth will be sharply reduced compared with the rates registered in the past decades, meaning competition between suppliers will become even fiercer. Low-cost suppliers in Australia and Indonesia are eager to expand their market share and are increasing their production, even in the current weak market. Despite difficulties competing with Indonesian and Australian producers at this time, interest in PRB coal remains strong. Some customers in Asia, like South Korea and Japan, increasingly look to the USA for future deliveries in order to diversify their coal supplies. The added benefit to Asian buyers is a strong, constant supply chain of the products from a diversified and reliable supply chain. Thus, an increase in US coal deliveries to this supply chain allows for mitigation of supply interruptions due to extraordinary events, either weather-related, such as flooding in Australia, or policy-driven, such as potential caps on exports in Indonesia and South Africa to cover increasing local demand.

5.1.4 Longer-term growth is uncertain but could still provide room for expansion

In the longer term, the expansion of coal demand is threatened by new climate change policies. On the other hand, financing of new coal-fired power stations continues unabated. A recent study shows that commercial banks lent €66 billion in coal financing in 2014, a more than fourfold rise when compared to 2005.[34] The projections of future coal demand by the International Energy Agency (IEA) illustrate this wide range of uncertainty. In the New Policy Scenario, the central scenario of the IEA World Energy Outlook 2014 (WEO2014), coal demand grows on average by 0.5 per cent per year between 2012 and 2040, reaching over 6,350 million tons of coal equivalent (Mtce). This growth rates compares with growth of 2.5 per cent per year over the past 30 years. Almost two-thirds of the projected increase in world coal demand occurs in the next 10 years, with the pace of growth slowing thereafter, in large part because Chinese coal demand peaks by around 2030. China, together with other developing Asian economies, accounts for nearly all the growth in coal demand in non-OECD countries, while coal demand is projected to decline in all major OECD regions. Accounting for 24 per cent of the global energy mix in 2040, coal remains just ahead of natural gas (24 per cent) and behind oil (26 per cent). Non-OECD Asia constitutes most of the growth in coal demand. Non-OECD Asia electricity demand is expected to increase from 7,400 TWh in 2012 to almost 18,000 TWh in 2040, and its coal capacity to double from 995 GW in 2012 to 1,992 GW in 2040. As many countries in non-OECD Asia rely on coal imports, global coal trade is expected to continue growing. Coal net trade

[34] Bank Track, Banking on coal 2014, 29 October 2014, http://www.banktrack.org/manage/ems_files/download/banking_on_coal_2014_pdf/banking_on_coal_2014.pdf

between WEO regions grows by 40 per cent to 1,430 Mtce in 2040 compared with 1,022 Mtce in 2012, mainly due to strong growth in demand from coal-fired power plants in Asia.

In contrast, the outlook for coal use is weak in the 450 Scenario, which assumes that policies are adopted to set the energy system on track to have a 50 per cent chance of keeping the long-term increase in average global temperature to 2°C. Global coal demand is one-third lower in 2040 relative to 2012, returning to the level of use in the early 2000s. But even in this scenario, demand for coal by Asian countries continues growing in the next 10 years. In particular, non-OECD Asian countries still increase their coal capacity to 1,249 GW by 2020 before this capacity declines. Global net coal trade between WEO regions fall after 2020 to 594 Mtce in 2040.

In the Current Policies Scenario, world coal demand grows on average at 1.5 per cent per year in the period 2012-2040, three times faster than in the New Policies Scenario, with coal overtaking oil as the world's leading fuel by around 2025. Virtually all of the growth in coal demand is in non-OECD countries, with coal use within the OECD remaining essentially flat over the projection period. Inter-regional coal trade nearly doubles to over 1,850 Mtce by 2040.

The following table illustrates the wide range of uncertainty coal exporters have to face when projecting future coal trade. Investment decisions in such an environment are quite risky as coal terminals could become stranded assets if the 450 Scenario materializes.

Table 11: Inter-regional coal trade by scenario

			New Policies Scenario		Current Policies		450 Scenario	
Mtce	1990	2012	2020	2040	2020	2040	2020	2040
Inter-regional trade	**309**	**1,022**	**1,187**	**1,482**	**1,279**	**1,856**	**1,062**	**594**

Total net exports for all WEO regions, not including trade within regions.

Source: WEO2014

Box 6: Financing of new coal-fired power plants in the world

Financing of new coal power plants has been under review by major developed countries since 2013. The move started in June 2013 in the USA, when President Obama unveiled his Climate Action Plan, which included an end to financing for new coal power plants overseas with public funds, such as financing by the US Export-Import Bank, the US Trade and Development Agency, and the US Treasury Department, in an effort to fight global warming. On the heels of this announcement, in July 2013, the World Bank adopted a new energy strategy that limits financing of coal-fired power plants to 'rare circumstances', restricting financial support to countries that have 'no feasible alternatives' to coal, as it seeks to balance environmental efforts with the energy needs of poor countries.

Also in July 2013, the European Investment Bank (EIB), which primarily finances EU member states, announced its own restrictions to funding power plants. The EIB has introduced an emissions performance standard (EPS) of 550 gCO_2/kWh for all fossil fuel power plants. The new lending criteria represent an alignment of the EIB's energy investment with the EU energy and climate policy. The new EPS means that only coal plants co-burning biomass would be eligible, or coal plants using CCS (even partially). The EIB has introduced derogations to the rule. Plants which contribute to the security of supply may be exempted from the EPS limit, as well as plants located in isolated energy systems.

The European Bank for Reconstruction and Development (EBRD) has followed the move and in December 2013 announced a new strategy that will guide its energy sector investments for the next five years. The bank will limit its financing of coal-fired power generation projects to 'rare and exceptional circumstances in which there is no economically feasible alternative energy sources'. In addition, the bank will use a shadow price for carbon and other emissions to assess whether investments are economically viable. The decision is part of a wider EBRD investment strategy which focuses on energy efficiency and clean technology.

Several EU countries have taken similar action including the UK, Denmark, Iceland, Sweden, Norway, Finland, and France.

In July 2014, in response to the restrictions, the leaders of Brazil, Russia, India, China, and South Africa launched the New Development Bank with $50 billion in subscribed capital and authorized capital of $100 billion as an opening bid to finance 'infrastructure and sustainable development projects' in emerging economies and developing countries, including energy (and coal) projects. The bank will be based in Shanghai, while its presidency will rotate through each country, beginning with India.

Japan also gives support for coal-fired power plants in developing nations. The Japanese view is that without public loans and insurance from developed countries, emerging countries will choose the less costly, inefficient technologies (subcritical coal power plants), thus aggravating the global CO_2 issue. The Japanese government highlights the significant and growing role of coal in developing countries, in particular in emerging Asia, and therefore the necessity to adopt the best available technologies for new plants. Japan has therefore positioned high-efficiency coal power technologies as a pillar of its infrastructure export policy. Under Prime Minister Shinzo Abe's growth strategy, Tokyo seeks each year to back overseas coal-fired power plant projects worth about $4 billion. Recent projects financed with Japanese assistance include power plants in Morocco, Philippines, Bangladesh, Vietnam, and Malaysia.

5.2 Regulatory and environment challenges

5.2.1 US laws regulating coal exports

In contrast with oil and natural gas, federal law does not restrict the export of coal to overseas markets. However, the siting and construction of port facilities are both highly regulated. Permitting is a highly complex process which involves federal, state, and local governments. They have to perform environmental reviews and produce Environmental Impact Statements (EISs) of the project's potential impact as a condition of siting and constructing the marine terminals. The US Army Corps of Engineers produces an EIS under the authority provided in the Rivers and Harbors Act, the Clean Water Act, and the National Environmental Policy Act (NEPA), while the state and local agencies produce an EIS under the State Environmental Policy Act (SEPA) and various state laws. Based on these reviews, which include public meetings, the lead agencies[35] have the authority to: (1) approve the proposal; (2) condition the approval of the proposal based on mitigating specific adverse environmental impacts; or (3) in some cases, deny the proposal if reviews show that the proposal is likely to have significant adverse environmental impacts that cannot be mitigated to an acceptable level. Each of permitting agencies makes their own independent decision on the applicable permit application.

Scoping is the first step in the environmental review process. It determines the scope of what will be studied in the EIS. Various environmental advocacy groups, which oppose the coal export terminals, have pushed for regulators to study the cumulative effect of all pending projects in the case of the terminals in the Pacific Northwest, looking at factors such as increased train traffic, as well as health and environmental concerns. In particular, opponents argue that the impact of burning coal in other parts of the world must be considered as part of environmental impact reviews. Supporters of the projects say that each project should be considered separately and the review should be limited to local environmental impacts. For both the Morrow Pacific Terminal (whose permit was denied by the Oregon Department of State Lands in August 2014) and the Gateway Pacific Terminal in Washington, the US Army Corps of Engineers indicated that its review would be limited to the local impact of the terminals and would not include the impact of burning coal overseas or of interstate rail transport. By

[35] The lead agencies are those charged with managing the environmental review process under applicable statutes. The lead agency for the NEPA environmental review process is the US Army Corps of Engineers, while the lead agencies for the SEPA environmental review process are the state and local agencies, for instance the Washington Department of Ecology and Whatcom County in the case of the Gateway Pacific terminal.

contrast, the Washington Department of Ecology and Whatcom County announced that the scope of their reviews of the Millennium project will be more extensive and would encompass the global impacts of the transportation and the ultimate use of coal.

The permitting process is a lengthy one. Scoping can take one to two years to be completed (from February 2012 to February 2014 in the case of the Millennium project[36]), while a draft EIS takes approximately two years. It is then open to public comments that are considered and responded to in the final EIS. The preparation of the final EIS takes an additional one to two years. The projects must also secure various other state and local permits prior to construction. The vastly expanded scope of the Washington Department of Ecology review appears poised to cause significant additional delays or restrictions to the projects—delays that could stretch well beyond what is customary and reasonable. Prolonged delays, according to the supporters of the projects, have detrimental impacts of the economy without considerable environmental benefits. The state expanded the scope of the EIS beyond the federal scope, and the resulting delay was said by the National Association of Manufacturers (NAM) to likely be in violation of US WTO obligations.[37]

The lengthy reviews are a major hurdle for project promoters of the Pacific terminals who also face evolving assessment of royalties due on PRB coal sales.

5.2.2 Reviewed coal-leasing program and royalties

About 40 per cent of US coal production comes from public lands, though this share is almost 90 per cent in the PRB region. The Bureau of Land Management (BLM) in the US Department of the Interior (DOI) oversees the US federal coal-leasing program and is responsible for most of the daily management and regulatory oversight of the public and Indian coal resources, including exploration, lease administration, and production verification. The program has existed for nearly a century, beginning with the enactment of the Mineral Leasing Act of 1920. Production of coal on federal and Indian lands is dominated by Wyoming, which accounted for 80 per cent of the total in 2013. Montana, Colorado, Utah, and New Mexico were the next biggest coal producers on federal and Indian lands.

Royalties paid on coal production and bonus bids to acquire the right to produce on federal lands are an important part of both federal and state revenues. The DOI collects more than $1 billion in bonus and royalty revenues from coal mining companies each year. In 2012, bonuses and royalties exceeded $2.4 billion, the highest amount recorded in the last decade. Under the Mineral Leasing Act of 1920 and its amendments, coal companies are required to pay a royalty of at least 12.5 per cent of the value of surface-mined coal and 8 per cent for coal from underground mines. The law authorizes the Secretary of the Interior to set the regulations by which the value of federal coal is determined for calculating a royalty.

BLM has a legal obligation to hold competitive lease sales and secure a fair market value (FMV) for coal on public lands (the Federal Coal Leasing Amendments Act of 1976). However, a June 2013 audit by the DOI's Office of Inspector General,[38] and a February 2014 Government Accountability Office (GAO) report[39], found major deficiencies in the federal coal-leasing program and concluded that it lacked rigor and oversight over the leasing process. In particular, the GAO report noted that competition for coal leases was still lacking, with roughly 90 per cent of the 107 leases it examined involving only a single coal company bidding. The report also concluded that the DOI lacked rigor and oversight in determining the FMV of federal coal leases, and was not fully considering the potential of

[36] See timetable at Department of Ecology, http://www.ecy.wa.gov/geographic/millennium/index.html

[37] National Association Manufacturers (NAM), LNG and coal: Unreasonable delays in approving exports likely violate international treaty obligations, NAM, November 2013, http://www.nam.org/Issues/Energy-and-Environment/Affordable-Energy/LNG-and-Coal-Report-NOV-2013/LNG-and-Coal--Unreasonable-Delays-in-Approving-Exports-Likely-Violate-International-Treaty-Obligations-(Full-Report)/

[38] US Department of the Interior, Office of Inspector General, Coal management program, Report No.: CR-EV-BLM-0001-2012, June 2013, http://www.eenews.net/assets/2013/06/11/document_pm_01.pdf

[39] US Government Accountability Office, Coal leasing: BLM Could Enhance Appraisal Process, More Explicitly Consider Coal Exports, and Provide More Public Information, February 2014, http://www.gao.gov/products/gao-14-140

coal exports despite market changes. It also concluded that the DOI was providing limited information to the public. The report from the DOI's Office of Inspector General also found 'weaknesses in the current sale process that could put the Government at risk of not receiving the full value for the leases'. The report noted that, due to lack of competition, the FMV served as a substitute for competition, so the importance of a right determination of the FMV. BLM determines FMVs by using either the comparable sales approach, based on previous comparable leasing bids, or the income method, which is an estimation of annual costs and revenues associated with the development of coal. However, in most cases, BLM uses the comparable sales approach with the risk of undervaluing coal bids. For instance, the DOI's report identified lost bonuses of $2 million from recent lease sales and $60 million in potentially undervalued lease modifications.

Both reports included recommendations to improve future lease sales and to adapt royalties to the new market conditions. BLM concurred with the 13 recommendations made by the DOI's Office of Inspector General and the eight recommendations made by the GAO and started to address them. Specifically, BLM signed a memorandum of understanding with the Office of Valuation Services (OVS) to enhance the review of FMVs.

Evaluating the effective returns earned by the Office of Natural Resource Revenue (ONRR) under the current royalty structure revealed several problems:[40]

- The first problem is transparency. The royalty rates applied to each lease, prices used to determine royalties due, and allowable cost deductions are all considered proprietary and data are withheld. As a result, there is little outside oversight of the royalty structure, engendering uncertainty about how the government is balancing competing interests.
- Second, the cost of administering the current royalty structure is high. Royalties are often based on non-market transactions where prices are uncertain and the ONRR uses complex valuation methods that are expensive to administer.
- Third, coal valuation procedures raise questions about fair returns to the US government. The ONRR values coal for royalties at the first point of sale, even in the case of 'captive transactions' or non-arm's-length contracts (within affiliates or to coal cooperatives), limiting royalty collections when the coal is remarketed at significantly higher prices, including for export.

Following the recommendations of the audit by the DOI's Office of Inspector General and the GAO report, in December 2014, the DOI announced the release of a draft proposed federal regulation[41] by the ONRR governing the valuation of federal oil and gas, and federal and Indian coal resources, as well as expanded guidance on the production of coal on public lands issued by BLM. Both initiatives seek to provide greater clarity and certainty for the energy industry and are part of the department's larger effort to help ensure the American public receives a fair return for the production of domestic energy resources. BLM also sent updated guidance to the field that will help ensure a consistent and efficient coal lease sale process, increase clarity in determining FMV, and provide guidance on independent review of appraisal reports. The guidance will enable BLM to account for export potential through analysis of comparable sales and income.

The ONRR proposed new rules governing the valuation of federal oil and gas and federal and Indian coal were published in January 2015. The most significant changes (as far as coal is concerned) include the proposals to:

[40] Headwaters Economics, Summary: An Assessment of U.S. Federal Coal Royalties. Current Royalty Structure, Effective Royalty Rates, and Reform Options, January 2015, http://headwaterseconomics.org/wphw/wp-content/uploads/Summary-Coal-Royalty-Valuation.pdf

[41] Bureau of Land Management (BLM), Interior Department Announces Initial Steps to Strengthen Federal Energy Valuation Rules, Expand Guidance on Federal Coal Program, 19 December 2014, http://www.blm.gov/wo/st/en/info/newsroom/2014/december/nr_12_19_2014.html

- Eliminate the current valuation benchmarks for non-arm's-length federal and Indian coal sales, and instead, value such coal based on the gross proceeds received from the first arm's-length sale (affiliate re-sales); and
- Adopt a 'default rule' for valuing oil, gas, and coal, which gives ONRR discretion, in certain circumstances, to establish a greater royalty value than the gross sales proceeds less allowable costs.

The royalty rate and bonus bid valuation are key issues for PRB sales due to their overwhelming share in federal lands production. Two comments included in all studies about the coal lease program can be misleading: the export role of PRB, and its actual market price. While all studies published by government agencies, think tanks, or environmental groups, refer to coal exports and their record high in 2012 at 114 Mt, little mention is given about the small role played by PRB and Wyoming in this figure, which can be misleading. While exports increased dramatically up to 2012, no more than 1.6 per cent of coal from Wyoming is exported annually. However, the issue is relevant for future coal exports from the state, although it may be almost impossible to determine the proportion of coal which is going to be exported and above all its future price overseas.

Another misleading comment is about the low market price of PRB coal compared with coal from other regions and the resulting low royalty collected from its sales. While PRB has a low market price (approximately $13/ton), its actual delivered costs tend to be much higher because PRB coal is mostly transported long distances by rail. Transportation and handling charges for PRB coal can be as much as $27.5-$38.5/ton when delivered to markets in the Southeast and the Ohio Valley.[42] Transportation cost for coal exports from the PRB are also higher than from other coal producing regions due to the lack of ports in the Pacific Northwest. This means that the impact of the new royalty valuation may not be as high as expected, as coal lessees can deduct transportation and washing costs from the total sale price upon which federal coal royalties are due.

The new proposed rules were open to comments until 9 March 2015. If implemented in this form, the new rules will likely increase royalty payments for coal used in power generation in the USA and for coal exports. In addition, the BLM updated guidance to ensure a consistent and efficient coal lease sale process will likely make leases of federal lands more costly, reducing the attractiveness of exporting coal.

5.2.3 Local opposition and environmental issues

While the federal government is unlikely to block coal exports terminals in the Pacific Northwest on climate change grounds, environmental groups have made coal terminals a central focus in their campaign against the coal industry and fossil fuels in general. Environmentalists want to keep the coal in the ground to reduce climate change.

At the local level, the coal export industry faces resistance from community and environmental groups concerned about air and water pollution from coal dust and added rail and barge traffic. Environmental groups warn local residents about the likely impacts of the proposed terminals, such as increased railroad traffic, airborne coal dust coming from uncovered coal train cars and generated when coal is moved by machinery at shipping terminal sites, and possible coal train derailment. In addition, in some states, in Louisiana for instance, they are concerned about the pollution of water in case of flooding, in particular into the sensitive wetlands, and about the possible interference with the coastal restoration program. A new organization, the Clean Gulf Commerce Coalition, was formed to halt proposed new coal export capacity on the Gulf Coast.

[42] Today in Energy, Two Wyoming mines accounted for 20% of U.S. coal production by tons in 2012, 29 March 2013, http://www.eia.gov/todayinenergy/detail.cfm?id=10591

Box 7: Opposition to new coal terminals on the Gulf Coast

The Clean Gulf Commerce Coalition (CGCC) aims at cleaning-up existing coal terminals in the Gulf Coast region and stopping any new coal export terminals. In addition to Louisiana Environmental Action Network (LEAN), members include Air Alliance Houston, the Gulf Restoration Network (GRN), the Louisiana Bucket Brigade, Public Citizen Texas, the Sierra Club, Texas Environmental Justice Advocacy Services, and the Texas Organizing Project.

Specifically, its main aims are to:

- Reduce climate change by stopping the construction of new coal export facilities along the Gulf Coast, and the expansion of existing facilities.
- Reduce emissions of air and water pollution at existing facilities and force owners to employ the best available control technologies and practices.
- Seek reduction and discontinuation of coal exports from existing facilities.
- Build alliances with the communities that are most affected by coal transportation and storage, including those that are located next to coal terminals, waterways and rail lines. Support these communities in reducing their exposure to pollution.

The major focus of the CGCC is the RAM terminal and the Port of Houston expansion projects.

Source: The Clean Gulf Commerce Coalition

Environmental groups have increasingly learned that they can be as effective in blocking a given project by adding costs, delay, and uncertainty as by having the project expressly prohibited. One of their actions to stop new coal terminals consists in filing, or helping citizens to file, suit against the projects or approval decision taken in favor of the projects. For instance, Gulf Restoration Network (GRN), Louisiana Environmental Action Network (LEAN), and the Sierra Club filed suit in New Orleans' US District Court for the Eastern District of Louisiana against the United Bulk coal export terminal in Davant for violating the Clean Water Act. In October 2013, community and environmental organizations filed suit against Louisiana's DNR approval of the RAM project, and in December 2014, the state court ruled that the permit is invalid (see 4.4.1), despite the recent permit approval by the US Army Corps of Engineers.

Coal exporters face the risk that the long and costly process necessary to clear all environmental hurdles makes their investment less competitive in the future, or even stranded, as the global energy world makes the transition to cleaner energy sources.

The coal terminals are also on the radar of international environmental groups as part of their wider campaign against coal and fossil fuels in general.[43] The main focus is on the climate change impact of the burning of coal in foreign nations. To have a 50 per cent chance of keeping temperatures from rising more than 2ºC during the 20th century, the cumulative CO_2 emissions between 2011 and 2050 should not exceed 1,100 Gt CO_2: also known as the carbon budget. According to some studies, the implication is that a share of fossil fuels resources (particularly coal resources) should be left in the ground to avoid dangerous climate change, unless technologies are developed that can successfully capture, permanently store, or use the CO_2 emissions.

The issue has driven a controversial debate in the USA with several studies assessing the full cycle impact of US coal exports, with various results, depending on the assumptions made in the scenarios.[44] While some studies show that 'under the right scenario', exporting coal to power plants in

[43] See for instance Carbon Tracker, Carbon Supply Cost Curves: Evaluating Financial Risk to Coal Capital Expenditures, 22 September 2014, http://www.carbontracker.org/report/carbon-supply-cost-curves-evaluating-financial-risk-to-coal-capital-expenditures/ and BankTrack, http://www.banktrack.org/dodgydealmap.

[44] See for instance: Meditrackers, Stanford Expert: PRB Coal Exports Will Lower Global Emissions, 29 August 2014, http://mediatrackers.org/montana/2014/08/29/stanford-expert-prb-coal-exports-will-lower-global-emissions; The Energy Foundation, The Impact of Powder River Basin Coal Exports on Global Greenhouse Gas Emissions, May 2013,

South Korea could lead to a decrease in CO_2 emissions compared to burning coal at plants in the USA, the only relevant question is whether US coal would displace other sources of coal (exports by other foreign suppliers or national production) or would increase coal consumption of the importing country. In the current oversupplied market, there is no doubt that if US terminals are not permitted, this will not impede coal consumption to grow in countries that are building new coal-fired power plants.

Citizen activism can influence the future of coal terminals but won't stop permits for a proposal that legitimately passed required permit tests. Activism influences the market, however, and to a lesser extent the political system. It remains that the long and arduous permitting process and strong opposition to the projects are additional hurdles for their promoters, which already have to adjust to challenging market conditions. This led some project promoters to cancel their proposed coal terminals. Three different projects in Texas were terminated in 2014 (Cline, New Elk, and the Jacintoport terminals in Houston). The main reason behind these cancellations was the changing economic conditions in the past three years. In the Pacific Northwest, three projects were shelved in 2012/2013, a fourth was denied permit by the Oregon Department of State Lands in August 2014, and a fifth is encountering difficulties linked to tribal fishing rights.

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http://www.powereconconsulting.com/WP/assets/GHG-Impact-PRB-Coal-Export-Power-Consulting-May-2013_Final.pdf; Centre for American Progress, 5 Things You Should Know About Powder River Basin Coal Exports, August 18, 2014, http://cdn.americanprogress.org/wp-content/uploads/2014/08/PowderRiver-factsheet.pdf ;

6. Conclusion: No quick and easy fix

The outlook for future US coal exports depends on the interplay of economic, environmental, and regulatory factors. The review of economic factors shows that market conditions are currently challenging and their future uncertain. According to the three WEO2014 scenarios, global coal trade (between WEO regions) could increase by 40 per cent by 2040 compared with 2012 in the New Policy Scenario, decrease by half in the 450 Scenario, and double in the Current Policy Scenario. This is the range of uncertainty that US coal exporters have to face when making investment decisions in new export capacity.

The level of US coal exports is strongly linked to prices of delivered coal in consuming markets. The overall drop in international prices has consequently forced many producers to carefully consider their cost structure under tighter, and sometimes even negative, margins. Coal exports fell in 2014 because of slower Chinese demand and a loss of competitiveness of US steam coal in Europe. In addition, US exporters are faced with unfavorable shifts in exchange rates, making their products less attractive in competition for global market share. In the Atlantic basin, the low level of US steam coal exports to Europe will last as long as European prices remain low, thus making US coal exports unprofitable. In the medium and longer term, European steam coal demand is expected to decline as the region turns to cleaner energy sources.

Asian demand for US coal has declined due to a slowdown in coal demand and fierce competition between suppliers. It is, however, expected to remain strong, even in a period of significant price competition, due primarily to energy requirements of Asian buyers. Currently, the cost of logistics for access to Asian markets represents a significant burden on deals made overseas. The increase of US steam coal exports to the Pacific basin depends on the building of new export capacities on the US West Coast enabling the country to remain competitive on the Asian coal market.

Although infrastructure projects that would allow the export of low-cost coal from the PRB to the Pacific are under consideration, they are encountering challenging permitting issues and strong local opposition. While citizen activism can influence the future of coal terminals but won't stop permits for a proposed terminal that legitimately passed required permit tests, arduous and lengthy permitting processes create major hurdles for potential coal exporters from the region. Environmental groups have made the terminals a central focus in their campaign against the coal industry and fossil fuels in general. Coal exporters face the risk that the long and costly process necessary to clear all environmental hurdles makes their investment less competitive in the future, or even stranded, as the global energy world makes the transition to cleaner energy sources. Six planned export terminals in the Pacific Northwest and the Gulf of Mexico have already been cancelled by their promoters over the past three years because of poor economics and strong opposition. In addition, a key permit for building a dock at Port Morrow, which would have allowed barging coal down the Colombia River to Port Westward, was denied in August 2014 due to environmental concerns regarding tribal fisheries. The Pacific Gateway Terminal is also encountering difficulties as a native tribe, the Lummi Nation, has asked the US Army Corps of Engineers to reject the permit application on the basis the project would interfere with tribal fishing grounds.

In this steeple-chase, US coal exporters have not given up, although the challenging market conditions and strong public opposition have reduced their ambition. They now estimate that if just one of the large capacity coal terminal projects in the US Pacific Northwest survives the permitting and construction process, that facility would likely be able to handle all the PRB coal exports into the Asian market, now estimated at 30-40 Mt per year, with a large proportion going to South Korea and some to Japan, Taiwan, and ASEAN countries.[45]

Pending the approval of ports on the West Coast, coal infrastructure on the Gulf Coast is being expanded and has benefitted from the investment initially intended for the West Coast. There have recently been large increases in export capacity in the Gulf Coast through expansions at existing

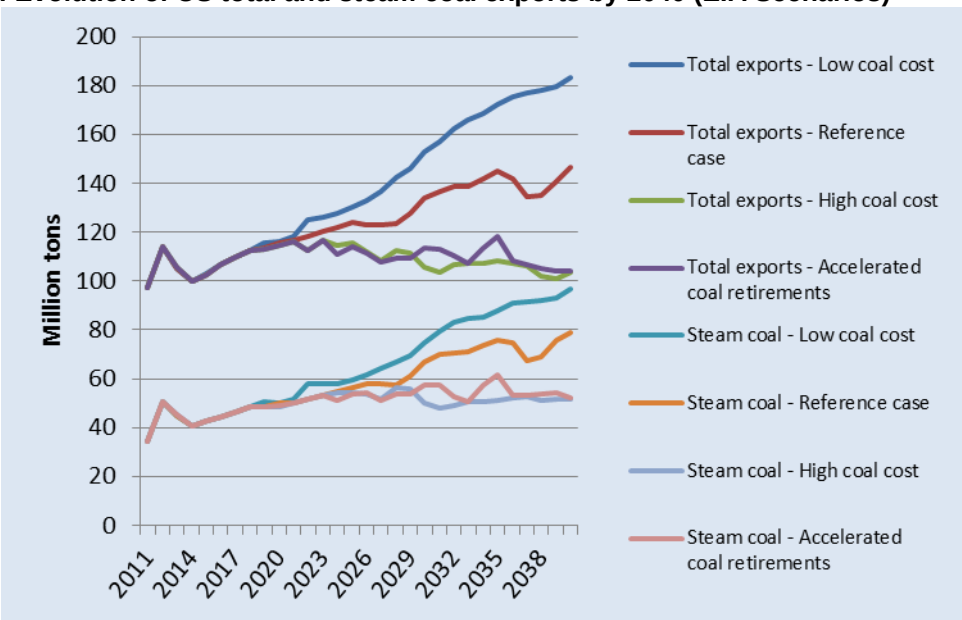
[45] McCloskey Coal Report, Export market for PRB coal likely to be about 30-40 Mt per year, 23 January 2015

terminals and growth in mid-stream river capacity. Trafigura opened a new terminal on the Mississippi River in July 2014. Also in 2014, Kinder Morgan completed its expansion projects at International Marine Terminal in Myrtle Grove, Louisiana, and Deepwater Terminal in Houston, Texas. Inland and maritime transportation costs required to ship coal from Wyoming to the Midwest, down the Mississippi River, load it onto freighters, and send it to Asia are, however, a heavy burden at current low import prices. The commissioning of the expanded Panama Canal in 2016 will create new opportunities to reduce this cost.

More demand for US coal exports in the medium to long term can be expected due to the projected growth in demand for coal as an affordable energy source in the developing world, in particular in non-OECD Asia (India and ASEAN countries), and in some OECD Asian countries for supply diversification purposes. However, because of the need for new export capacity on the West Coast, increased US exports will probably be delayed until new capacity is built.

In the AEO2014 Reference case, US coal exports fall from their peak in 2012 (114 Mt) until 2015 before increasing gradually to 140 Mt in 2035 and remain flat through 2040, maintaining 12 per cent to 14 per cent shares of total US coal production over time. Steam coal exports are not expected to regain their 2012 level (51 Mt) before 2022. They grow gradually to 70-75 Mt by 2040, but the level of exports is highly sensitive to coal cost and price development. In a high coal cost case, steam coal exports remain flat at 50-55 Mt after 2022. High coal mining and transportation costs can be seen as a proxy of limited available export capacity on the West Coast, making transportation costs to Asia higher.

Figure 25: Evolution of US total and steam coal exports by 2040 (EIA Scenarios)



Source: EIA/AEO2014

Beyond the construction of new ports on the West Coast, it is the future of coal which is at stake in the USA. The fight against US coal exports illustrates the profound divide between increasing needs for affordable energy in developing countries and the impact on the climate of burning fossil fuels.

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