



STATUS OF GLOBAL COAL MARKETS AND MAJOR DEMAND TRENDS IN KEY REGIONS

Sylvie CORNOT-GANDOLPHE

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Executive Summary

For the second consecutive year, the coal sector registered good results in 2018. Global coal demand continues to increase (+0.7% in 2018), reversing the trend observed in 2015-16. Coal accounted for 26% of global primary energy consumption, maintaining its position as the second-largest energy source after crude oil, and the first for electricity generation with 38% of global power generation. In the six major producing countries (China, India, the United States [US], Indonesia, Australia and Russia, which together account for 83% of global production), coal production registered strong growth, except in the US where production fell. International steam coal trade picked up, driven by continued rise in Chinese imports and, for the first time since 2014, a sharp increase in India's steam coal imports. Steam coal prices reached levels not seen since 2011. This had a strong impact on coal importing countries, notably in Southeast Asia, where new coal plants, based on an expected "cheap" imported coal, were commissioned in 2018. In Europe, the high level of coal prices combined with high CO₂ prices in the second half of 2018 and the fall in spot gas prices at the end of the year mean that coal lost its competitiveness against natural gas in the power sector and coal generation decreased in 2018. Since the end of January 2019, international steam coal prices have collapsed, with different implications on coal and gas competition depending on regional pricing of gas (spot or oil-indexed) and the existence of carbon policies.

But the world still offers a contrasted picture. The increase in coal demand in 2018 was again driven by stronger coal-fired electricity generation in Asia, mainly in China, India and Southeast Asia, while coal demand declined in North America and Europe. Coal demand increased slightly in China, but the share of coal in the energy mix continued its decline (59% in 2018 compared to 71% in 2011). The fight against air pollution is a key driver of this reduction, with coal replaced by gas. India's consumption increased by around 8% in 2018, mainly driven by demand from the electricity sector, but coal use by steel, aluminium and cement producers also rose. In Southeast Asia, coal imports and demand grew, strongly driven by the increase in electricity demand and the reliance on coal for power generation. The Middle East and North Africa (MENA) region is building new coal plants to diversify its electricity mix. Of note was the commissioning of a large ultra-supercritical coal power plant in

Morocco and plans in Egypt to develop nearly 10 GW of coal capacity by 2025 despite a strong potential for gas and renewables.

Conversely, despite President Trump's efforts to promote coal, US coal demand continued its fall. Power utilities are more and more turning to natural gas and renewables. Since 2015, about 40 gigawatts (GW) of coal-fired power capacity have been retired, of which 13 GW in 2018, twice as much as in 2017. In the European Union (EU), coal demand continued its long structural decline due to reduced demand by power utilities. In 2018, electricity production from renewable energy sources (RES) accounted for 32.3% of EU electricity generation, against 19.2% for coal (including lignite). Coal demand was stable in the traditional coal importers in the Pacific Basin (Japan, South Korea and Taiwan).

Overall, coal is still strong but its expansion is expected to stop and its future is bleak. Coal in the power sector is the principal focus of climate-related policies due to its high carbon intensity, making CO₂ emissions from coal a leading contributor to climate change, in addition to poor air quality. Coal-fired electricity generation accounted for 30% of global CO₂ emissions and coal power plants were the single largest contributor to the growth of CO₂ emissions in 2018. The global coal fleet is still expanding (2 GW at the beginning of 2019) but net capacity additions were only 19 GW in 2018, far behind the 171 GW of renewable capacity added that year. Following the 2015 Paris Agreement, which prompted many nations across the world to accelerate their efforts to reduce coal consumption, several governments and power utilities have decided to phase out coal from their electricity mixes and joined the “Powering Past Coal Alliance”. Coal reduction or phase-out policies are being adopted or considered by more and more countries (e.g. Germany). With declining deployment and high levels of retirement, the global coal fleet could start declining by 2022.

The outlook for future coal demand differs widely in the short-medium term and long term and according to regions. In the short-medium term, coal demand is expected to remain stable as strong growth in India and Southeast Asia is offset by declines in Europe and North America, and almost stable demand in China. In the long term, depending on policies adopted to decarbonize electricity generation mainly, global coal demand could remain at its current level or fall by 60% over the period 2017-2040. In sustainable scenarios, the share of coal-fired electricity generation drops dramatically in the long term. Phasing out the use of unabated coal-fired power generation is a key feature. In countries where coal generation is still part of the electricity mix, carbon capture and storage (CCS) will be vital to reduce emissions of coal power plants but its large scale adoption on coal power plants is far from certain.

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Introduction

2018 was again a good year for the coal industry. Global coal demand and trade expanded, and steam coal prices rose to levels not seen since 2011. Against the backdrop of favourable seaborne conditions, Peabody Energy, the leading global pure-play coal company, concluded 2018 with strong earnings. Glencore, the world's fourth-biggest coal mining company but also the largest supplier to the seaborne market, recorded strong results. Coal made up the biggest share of Glencore's \$16 billion profits in 2018.¹

But the common theme at work is that **coal is finding it harder to secure a long-term future in the world's energy mix.** Since the signature of the Paris Agreement, coal is facing increasing pressure. The Powering Past Coal Alliance now includes 80 members that have committed to phase out unabated coal by 2030.² Net capacity additions to the global coal fleet shrunk to only 19 GW in 2018. While announcing strong results, Glencore also announced that it would cap its annual coal output around its current capacity. The group says it is taking the step to help mitigate climate change, following engagement with the investor signatories of the Climate Action 100+ initiative. Market trends and support to steam coal prices have likely played a role too. In February 2019, an Australian court ruled that a coal mine development couldn't go ahead, citing the impact from greenhouse gas (GHG) emissions that would be created. Environmental legal group Client Earth, has taken legal action against Polish utility Enea over its planned 1-GW Ostrołęka C power station, saying the project poses unjustifiable financial risks to shareholders.

The recently concluded IPCC Special Report on 1.5°C found that net-zero CO₂ emissions must be reached by 2050 globally if warming is to be limited to this level.³ The goal is very challenging considering that today 80% of energy demand is met by fossil fuels. **In the power sector,** a

1. Glencore, "Preliminary Results 2018", 20 February 2019, available at: www.glencore.com.

2. Initially, the alliance, initiated by the UK and Canada in November 2017, included 19 countries as well as several Canadian provinces and US states. The group has expanded and included 80 members as of December 2018, including 30 national governments, 22 subnational governments and 28 businesses. See: <https://poweringpastcoal.org>.

3. Intergovernmental Panel on Climate Change (IPCC), *Special Report Global Warming of 1.5 °C*, October 2018, available at: www.ipcc.ch.

diverse set of low-carbon technologies is available to produce electricity, making **coal the most vulnerable fossil fuel in the move towards a decarbonized energy sector.**

Despite the rapid deployment of renewables, coal still accounts for 64% of power generation in China, 76% in India and, more generally 50% in Asia. Unlike several OECD countries, governments in emerging Asia have not announced plans to phase out coal from their power mix; their coal fleet is young and still rising. Associated with other decarbonization options, CCS could therefore facilitate the just transition to a fully decarbonized electricity system. However, with only two large-scale carbon capture power units in operation at the end of 2018, CCS in the coal power sector remains well off-track to reach the goals of the Paris Agreement. In addition, its implementation in the coal power sector remains far from certain.⁴

Against this backdrop, this report reviews recent global and regional coal market trends and policy developments. It analyses coal demand by the power sector in the main consuming countries/regions: China, India and other Asian nations, the US, the EU and MENA. It also offers some longer term perspectives in terms of investments and demand uncertainties. An associated report reviews the role CCS could play in the coal power sector.⁵

4. S. Cornot-Gandolphe, "Carbon Capture, Storage and Utilization to the Rescue of Coal? Global Perspectives and Focus on China and the United States", *Études de l'Ifri*, Ifri, June 2019, available at: www.ifri.org.

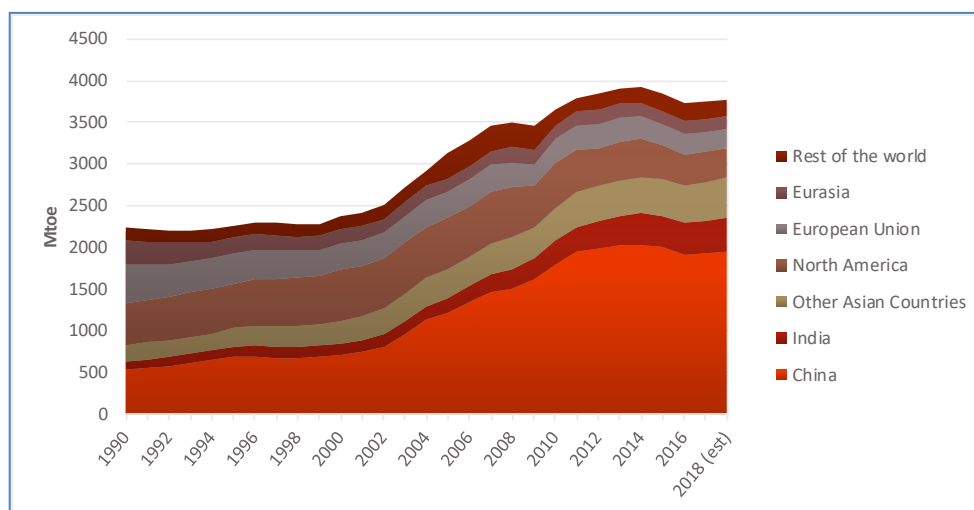
5. *Ibid.*

Recent global coal market trends and policy developments: resistance to policy aspiration

Global coal demand rose by 0.7% in 2018

In 2018, global coal demand rose for the second year in a row. After an increase of 1% in 2017, global coal demand rose by 0.7% to 3,778 million tonnes oil equivalent (Mtoe).⁶ These increases follow two years of decline. Thus, despite recent increases, global coal demand remains below its peak of 3,927 Mtoe reached in 2014.

Graph 1: Global coal consumption by major region/country (1990-2018E)



Source: IEA⁷, 2018: estimated.

6. IEA (2019a), *Global Energy & CO₂ Status Report*, March 2019, available at: <https://webstore.iea.org>.

7. IEA (2018a), *Coal Information*, August 2018, available at: <https://webstore.iea.org>.

Coal accounted for 26% of global primary energy consumption, maintaining its position as the second-largest energy source after crude oil, and the first for electricity generation with 38% of global power generation. The increase in coal demand in 2018 was again driven by an increase in coal-fired electricity generation in Asia, mainly in China, India and Southeast Asia, while coal demand declined in North America and Europe. Stronger global economic growth in 2018 and a heat wave in Asia in summer 2018 drove coal use in power generation. China accounts for half of global coal use, while the share of the growing Indian market is 11%. The US's share of global coal demand declined to 8.4% in 2018 and that of the EU is now 6%. Overall, the coal market continues its **shift to Asia**, which accounts for three quarters of global coal demand, while this share was 47% in 2000.

After three years of flat emissions globally, **global energy-related CO2 emissions rose in 2018 for the second year in a row**. Driven by higher energy demand (+2.3%), global energy-related CO2 emissions rose by 1.7% in 2018 to a historic high of 33.1 giga tonnes (Gt) CO2.⁸ China, India, and the US accounted for 85% of the net increase in emissions. While emissions from all fossil fuels increased, the power sector accounted for nearly two-thirds of emissions growth. Coal-fired power plants were the single largest contributor to the growth, with an increase of 2.9%, or 280 Mt, compared with 2017 levels, exceeding 10 Gt for the first time. As a result, **coal-fired electricity generation accounted for 30% of global CO2 emissions**.

Global coal production in tonnage rose by 3.4%

Preliminary data indicate a growth in global production (in tonnage) of 3.4% to 8 Gt in 2018. In the six major producing countries (China, India, the US, Indonesia, Australia and Russia, which generate 83% of world production), production was up except in the US. World coal production is now only 3.4% lower than its peak reached in 2013 (8.2 Gt).

8. IEA (2019a), *op. cit.*

Table 1: World coal production (2013-2018E)

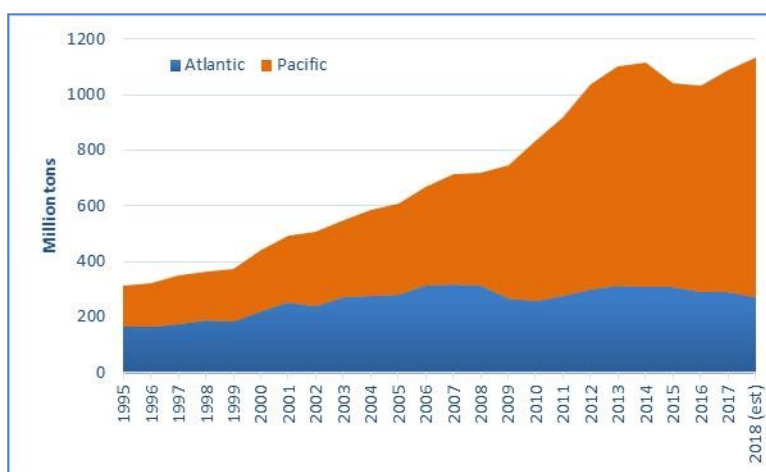
| (in million tons) | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 (est) | % change 2018/2017 |
|---------------------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------------|
| China | 3974 | 3874 | 3747 | 3411 | 3523 | 3680 | 4.5% |
| India | 609 | 657 | 683 | 712 | 730 | 781 | 7.0% |
| United States | 893 | 918 | 814 | 661 | 703 | 684 | -2.7% |
| Indonesia | 475 | 488 | 455 | 464 | 488 | 532 | 9.0% |
| Australia | 473 | 489 | 512 | 500 | 501 | 520 | 3.8% |
| Russia | 355 | 357 | 373 | 387 | 411 | 435 | 5.8% |
| Total six major producers | 6779 | 6784 | 6583 | 6134 | 6356 | 6632 | 4.3% |
| WORLD | 8271 | 8196 | 7954 | 7492 | 7727 | 7994 | 3.4% |

Source: BP, IEA, EIA, NBS, estimates⁹.

International steam coal trade at record high

After a modest increase in 2016, the **international coal trade has picked up again over the last two years**. According to preliminary estimates, international seaborne and over land coal exports (steam and coking coals) amounted to 1,475 million tonnes (Mt) in 2018, an increase of 4.2% over 2017. Steam coal trade increased by 4.1% to 1,133 Mt, that of coking coal by 4.5% to 342 Mt. The increase in steam coal imports is driven by the Pacific Basin, which now accounts for more than three-quarters of global steam coal imports. Atlantic Basin imports slightly declined.

Graph 2: Steam coal imports by Basin (1995-2018E)

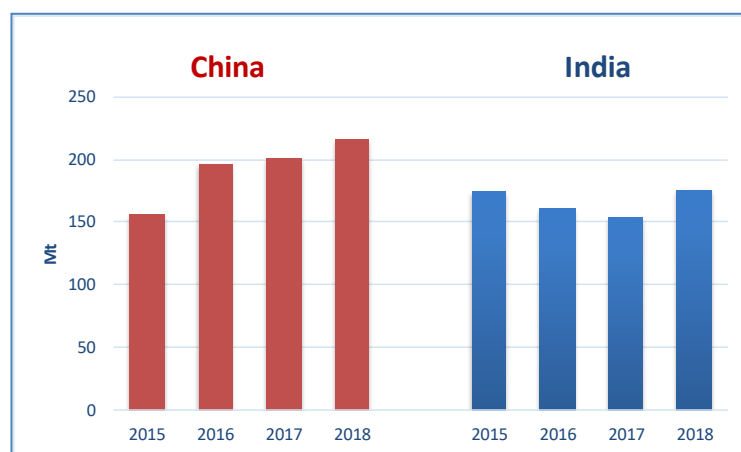


Source: Historical data: IEA (2018a), 2018: estimated.

9. BP, *Statistical review of world energy 2018*, June 2018, available at: www.bp.com; IEA (2018a), *op. cit.*; Energy Information Administration (EIA) (2019a), *Short-Term Energy Outlook (STEO) February 2019*, 12 February 2019, available at: www.eia.gov; National Bureau of Statistics of China (NBS) (2019), "Statistical communiqué of the People's Republic of China on the 2018 national economic and social development", 28 February 2019, available at: www.stats.gov.cn.

In 2018, **China continued to maintain its position as the world's largest coal importer** and a leading factor in the global coal market. China increased its imports by 3.9% in 2018 to 281 Mt, although the increase is modest compared to previous years (+6% in 2017 and +25% in 2016). But the devil is in the detail: while **China** has reduced its imports of coking coal and anthracite, those of **steam coal and lignite have grown by 7.2% and 14% respectively**, responding to strong demand by power utilities. In addition, India and Southeast Asian countries have also increased their steam coal imports strongly. **India's steam coal imports rose sharply in 2018, while they had been declining since 2015**. Thus, in 2018, not only China weighted on the international market and steam coal prices, but **India also contributed to rising prices**, and supported them at the end of the year, when China reduced its imports drastically.

Graph 3: China and India steam coal and lignite imports (2015-2018E)



Sources: China Customs, India's Ministry of Commerce.

Another new trend in 2018 is the significant rise in steam coal exports. **Exporters' response to rising prices is beginning to be felt**, even though there is no significant investment in new steam coal mines, unlike what happens in the coking coal market, where mining companies are re-investing. Increase in steam coal production mainly comes from optimization and expansion of existing mines.

Large producers/exporters such as Peabody and Glencore benefited from high prices and demand, and Peabody's share price soared by nearly 30% last year.

Box 1: Steam coal exports ramp-up

Exports from **Indonesia**, the world's largest exporter of coal, rose by 10% in 2018 to nearly 430 Mt (steam coal and lignite).¹⁰ Indonesia's role has been crucial in balancing the market in 2018. Indonesian exports are price-sensitive, and production can rise rapidly when prices are attractive. In 2018, high prices encouraged Indonesian mining companies to increase their production and exports. The rise in Indonesian exports responded to increasing imports of steam coal and lignite by China, India and Southeast Asian countries. In particular, China sourced most of its lignite imports from Indonesia and has increased its lignite imports by 14% in 2018. Low-sulphur (and low-cost) lignite is used in blending with domestic coal.

In 2019, Indonesian exports could fall. The government has capped production at 480 Mt in 2019, compared to 485 Mt in 2018 (a cap which was revised upwards to 507 Mt in September 2018). Above all, the government intends to enforce the obligation for producers to supply the domestic market (Demand Market Obligation or DMO) with 25% of their production. Indonesia's consumption exceeded 100 Mt in 2018 and is expected to continue growing with the launch of new coal-fired power plants in 2019 and 2020. If this were the case (domestic consumption has never achieved the government targets), Indonesian exports would be restrained.

Australia is now the world's second largest exporter of coal (386 Mt exported in 2018, all coals combined). Its steam coal exports increased by 3.7% in 2018. If investment has returned in coking coal mines in Australia, this is not yet the case for steam coal. Export growth results mainly from productivity improvements and expansions of existing mines. However, in late November 2018, the Indian giant group Adani announced that funding for its **Carmichael mine development project** was finalized.¹¹ The project, located in the Galilee Basin, is one of the most controversial mining developments and it has experienced many obstacles over the past ten years. In the new, smaller version of the project, Adani is self-financing the development of the mine and the associated railway line. Production is expected to start at the end of 2020 to reach 10 to 15 million tonnes per annum (Mtpa) initially (27.5 Mtpa at full capacity). If the project succeeds, it will be the first substantial investment in a steam coal mine since coal exit is on the agenda in many countries.

10. SSY, "Indonesia Coal Exports in December", 11 February 2019, available at: www.ssyonline.com.

11. CNBC, "UPDATE 2-India's Adani says to fully fund its troubled Australia coal project", 29 November 2018, available at: www.cnbc.com.

Russian coal exports (all coals combined) increased by 3.2% in 2018 to 191 Mt, supported by Asian demand, but also imports in northwest Europe.¹² Exports remain hampered by insufficient railway capacity, but the situation is improving. Russia is rehabilitating its key railway infrastructure, namely the Baikal-Amur Mainline (known as BAM) and the trans-Siberian rail network. These two networks have led to the expansion of exports to Asian markets. Russia is also expanding its port capacity. It will open a new coal terminal on the Black Sea at Taman port and is increasing the capacity of the Ust-Luga terminal, near Saint Petersburg, and that of the Vostochny terminal in the east of the country.

Colombian exports declined further in 2018 with coal production falling by 7.4% from the previous year as heavy rains disrupted operations at major mines. Colombia exports mainly to Europe and the Mediterranean countries, as well as to Latin American countries. Its exports to Europe declined last year as Colombia could hardly compete with cheaper Russian coal. The country is seeking to diversify its markets and is now exporting to Asia, India in particular.

The decline of **South Africa's** steam coal exports continued in 2018 (68 Mt of steam coal exported). Lack of investment is limiting coal production. The production of coal mines in the province of Mpumalanga, which accounts for nearly 80% of current production, has entered a declining phase. As a result, mining activities are progressively moving to the northern province of Limpopo, on the border with Mozambique. But investment remains insufficient and South Africa's production is expected to decline after 2020.

After doubling in 2017, **US** exports of steam coal increased by 30% in 2018 to 49 Mt, boosted by international high prices. The sustainability of these export levels is however not ensured as the US has to compete with lower-cost suppliers. US mines have high costs (especially transportation costs to export ports), which makes the US a swing producer. But US producers have signed long-term contracts with Asian buyers, eager to diversify and secure their supplies, which should allow them to maintain a certain level of exports. The Energy Information Administration (EIA) forecasts a decline in steam coal exports of 12% in 2019 and 11% in 2020.¹³

12. P. De Wilde, "Russia's 2018 coal export, production volumes reach multiyear highs: ministry", Platts, 10 January 2019, available at: www.spglobal.com.

13. EIA (2019a), *op. cit.*

In 2018, steam coal prices returned to 2011 high levels, but have collapsed since then

After their plunge in the period 2011-2015, **international steam coal prices have risen sharply since July 2016**. In 2016, the price of steam coal exported from Australia (FOB Newcastle) doubled from \$50/t in January to \$100/t in November (monthly averages). The rise was mainly due to the sudden rise of Chinese imports to compensate for falling domestic production. Chinese production fell sharply after the government set restrictions on the number of working days in coal mines. The restrictions were relaxed in November 2016 and the market expected a price drop in 2017, anticipating a reduction in Chinese coal imports. But China again increased its imports, notably at the end of 2017 to compensate gas shortages. Australian prices soared to more than \$100/t in December 2017, and close to \$110/t in January 2018 as demand for imported coal was strong. They only cooled down at the end of the winter period and for a short time. Prices have once again been buoyant in the summer of 2018, following an increase in Asian as well as European imports, to cope with an exceptional heat wave. As a result, prices peaked in July 2018: the Australian price reached \$120/t, its highest level since 2011 and the European price (CIF ARA) climbed to \$100. Prices fell in autumn 2018 and remained relatively moderate at the beginning of winter 2018-19 compared to their levels during summer 2018 (\$101 for the Australian price and \$87 in Europe in December 2018). The market was more relaxed in November and December 2018 as Chinese imports fell sharply. Imports were reduced by new import quotas set by the Chinese government in mid-November.

On average, **the FOB price of Australian steam coal jumped by 21% to \$107/t in 2018** (\$88.4 in 2017). On the **European market**, the price of imported steam coal followed the same trends, influenced by the Asian price, but the increase was more moderate: **+9.4% to \$92.4 in 2018** (\$84.4 in 2017). The Asian price premium reached \$14.6 on average in 2018, while it had shrunk in 2017 (\$4). Reduced coal demand in Europe could thus have a lasting effect on Atlantic prices. In May 2019, they settled below \$60/t, while the Asian price was \$82.

Graph 4: Prices of imported steam coal into Europe and Asia (Jan 2011-May 2019)



Sources: World Bank, Globalcoal.com¹⁴.

Despite the recent decline in steam coal prices, there are wide uncertainties about their level in the near term. The decline in coal prices is mainly driven by expectations of lower Chinese imports, weighing on the international price. But the supply/balance may be tight in the short term. India's steam coal imports are rising although the rise may be temporary as the country plans to increase its production strongly in the mid-term (see below). More countries in emerging Asia (Pakistan, Southeast Asia) build coal-fired power plants that rely on imported coal. On the supply side, Glencore's announcement of a cap on its production may keep the seaborne market tight and prices elevated. Glencore has a market share of nearly 25% in the seaborne trade. It also has a dominant position in the premium thermal coal segment. But overall, the main factor affecting the seaborne market will be China's policy, which remains complex and complicated by trade issues. If the government discontinues its stringent import restrictions, coal users in the southeastern coastal areas may increase their coal imports due to consideration of cost, price and coal type. At the opposite, **restrictions on Australian coal imports** as it has been observed since the end of January 2019, officially due to environmental reasons,¹⁵ would reduce China's total coal imports as

14. World Bank, "Commodity prices", available at: www.worldbank.org; GlobalCOAL, "Coal prices", available at: www.globalcoal.com.

15. Unofficially Australian media report that the restrictions are due to political tensions between the two countries after the adoption by the Australian parliament of a package of new laws aimed

it would be difficult for China to substitute Australian coal altogether with other overseas coal.

Box 2: Restrictions on coal imports from Australia in major Chinese ports

Since the end of January 2019, **restrictions on Australian coal imports** has been observed in major Chinese coal import terminals. At the time of writing, an increasing number of Chinese ports are holding up Australian coal shipments.¹⁶ In late February 2019, Chinese port officials implemented curbs on Australian coal cargoes at five northeastern ports of Dalian Bay, Bayuquan, Panjin Port, Dandong, and Beiliang Port. At the beginning of March, the port of Fangcheng in Guangxi province in south China implemented stricter screening procedures for Australian coal. The whole screening and custom clearance process can take about 2 to 3 months, thus discouraging Chinese buyers to import Australian coal. This also pushes Australian coal exporters to find alternative markets, such as India and South Korea. But China is Australia's biggest trading partner and its top coal export destination. Australia is therefore very much concerned about the development of the current restrictions on Australian coal.

Slowing coal imports, despite the higher quality of the product, would drive up demand for Chinese domestic coal and help rebalancing the market. However, so far, the restrictions are only related to Australian coal. If a "ban" on Australian coal imports was established, the impact on the Chinese and global markets would be quite different from the situation that arose from the trade war between the US and China. The US only played a marginal role on China's coal supplies (3.2 Mt exported in 2017, i.e. 1% of Chinese coal imports). This is not the case for Australia which provided about 30% of Chinese coal imports (all coals combined) in 2018. A long-term ban on Australian coal would have enormous implications for both countries, making it highly improbable. Australia is the world's top exporter of coking coal with a share of 60% of global exports. Its high-quality coking coal could not be replaced, with a high impact on Chinese steel makers. The situation is different for steam coal, which could be replaced by other overseas coal or by domestic coal. The issue is also related to ongoing negotiations between China and the US, which are expected to conclude trade agreements in May 2019, including on US energy exports to China. However, even if an agreement on coal exports

at preventing foreign interference in the country. But officials from both countries dismiss the claims, while some say the policies are a way to protect the domestic Chinese coal market.

16. H. M. Lee, "More Chinese ports delaying Australian thermal coal imports: sources", Platts, 20 March 2019, available at: www.spglobal.com.

were reached, the US is not in a position to substitute Australian coal at scale.

More than ever, thermal coal prices depend on China. China's restrictions on Australian coal imports have already pushed international steam coal prices down from record highs and they may continue to fall.

Key trends in major markets

Peak coal demand in China

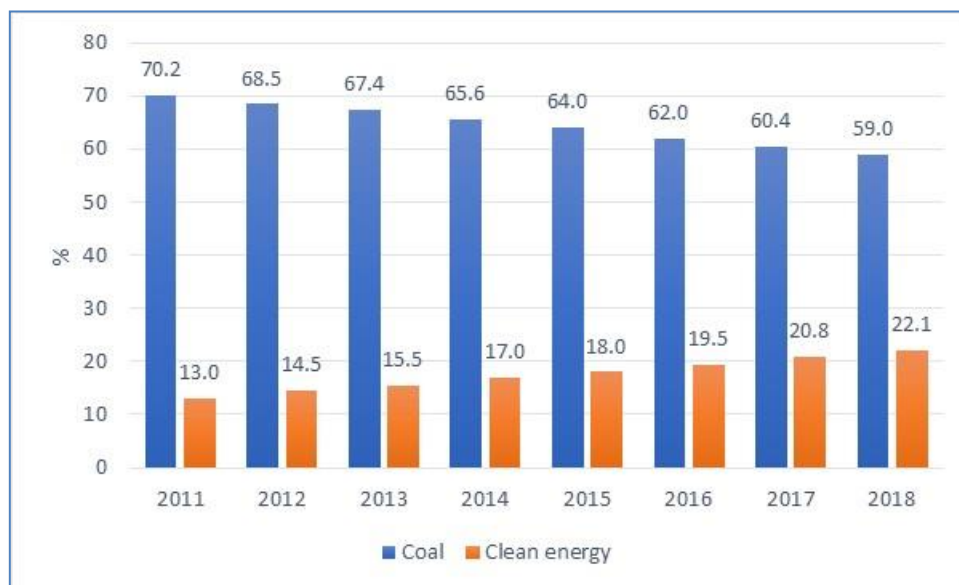
Current efforts by China's government to shift the economy from heavy industries towards the services sector, combined with policies and measures to prevent and control air pollution as well as the continued push to develop RES and other clean energy sources, are altering the Chinese coal market profoundly. **China's coal demand reached a peak of 4.24 Gt in 2013.** From 2014 to 2016, coal consumption declined for three consecutive years. From 2017 to 2018, China's coal consumption resumed growth, with a year-on-year increase of 0.4% in 2017 (in energy terms) and an increase of 1% in 2018, according to official data¹⁷ (the growth is higher in physical terms: apparent coal consumption rose by 4.4% to 3.95 Gt). The growth of coal demand in the power sector is the most important factor in the recovery of China's coal consumption. In 2018, electricity demand rose strongly (+8.5%), requiring higher coal generation as the growth in clean generation was not sufficient to cover rising electricity needs.

However, it is important to note that the share of coal in primary energy consumption is continuously declining. In 2018, coal accounted for 59% of China's primary energy consumption, down 1.4 percentage points from 2017. Since 2011, the share of coal has been reduced by more than 11 percentage points. The Five-Year (2016-2020) Plan for Coal, published in December 2016, caps coal consumption at a maximum of 4.1 Gt in 2020.¹⁸ **The share of coal in the energy mix is projected to decrease to less than 58% by 2020.**

17. NBS (2019), *op. cit.*

18. National Energy Administration (NEA), *Five-year plan for coal* (in Chinese), 30 December 2016, available at: www.nea.gov.cn.

Graph 5: Share of coal and clean energy in China's energy mix (2011-2018)



Clean energy: natural gas, nuclear and renewables.

Source: NBS¹⁹.

The fight against pollution has become a priority of the central government and air quality is a key driver of the reduction of the share of coal in the energy mix. The government issued a new action plan in July 2018. The Three-year Action Plan for Winning the Blue Sky War (2018-20) covers more cities than the Action Plan for Air Pollution Prevention and Control adopted in September 2013 for the period 2013-2017. It indicates that **China's management of air pollution and climate change are coming together**. The plan **speeds up the adjustment of the energy structure** to build a clean, low-carbon and efficient energy system and promotes **coal-to-gas switching**. The main target of the policy action is to reduce direct coal use in small boilers for residential heating, as well as in the commercial and industrial sectors. In December 2017, the government also set targets for clean winter heating in Beijing, Tianjin and 26 other cities and announced medium-term targets for the whole of northern China (**Winter clean heating plan for northern China [2017-2021]**). According to the plan, half of northern China will have converted to clean heating by 2019, reducing bulk coal burning by 74 Mt. That reduction should reach 150 Mt by 2021 when 70% of northern China would have converted to clean heating. At present, heating in northern China is primarily coal-based. The continued push for cleaner sources of

19. NBS (2018), *China Statistical Yearbook 2018*, available at: www.stats.gov.cn; NBS (2019), *op. cit.*

heat has a huge impact on gas demand, which is surging, but also on electricity demand. The amount of electricity generated from coal is increasing (+6.5% in 2018), which is not contradictory with Beijing's policy, since emissions of local pollutants from large coal power plants are much easier to control than dispersed emissions from small coal boilers. The coal-based thermal power industry is the country's largest coal consumer. In 2018, it consumed 2.1 Gt of coal, accounting for 53% of total Chinese coal consumption.

Cement, steel and small power plants are also targeted by China's air-quality campaign. **Outdated coal-fired power stations under 300 MW** that cannot meet environmental and efficiency standards have to close—this may represent as much as 100 GW of capacity—though they can be replaced by new ultra-low emission coal plants.

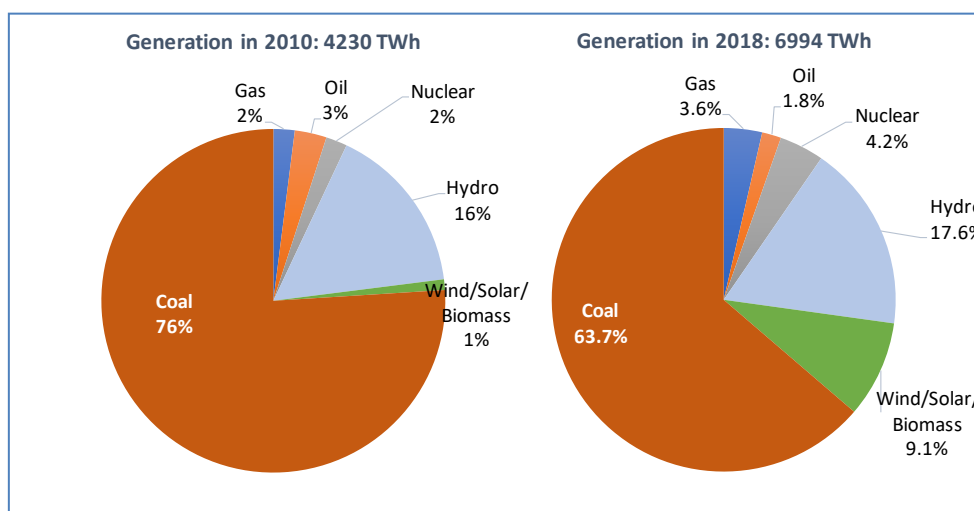
The strong push towards RES, nuclear and natural gas has already altered the electricity mix profoundly. **The share of coal in electricity generation has fallen from 76% in 2010 to less than 64% in 2018**, while the share of RES is now 26.5%.²⁰ The country's total installed power generation capacity reached 1,900 GW at the end of 2018, according to the China Electricity Council (CEC). Coal accounted for 53% of installed power capacity (1,010 GW). The net increase in coal-fired power capacity was 29 GW, the lowest level since 2004 as the central government controls new capacity to limit over-capacity in the power sector.²¹ The utilization factor of coal plants increased from 48.2% in 2017 to 49.8% in 2018 (although still very low). In 2018, China dominated global investment in renewables and added 21 GW of wind capacity and 45 GW of solar capacity. Under the 13th Five-Year Plan (2016-20) on Energy Development, total coal power capacity should remain below 1,100 GW by 2020; and after 2020, coal consumption in the coal power sector should reduce and the long-term declining trend should continue. However, a March 2019 report by the CEC

20. China Energy Portal, "2018 electricity & other energy statistics", 25 January 2019, available at: <https://chinaenergyportal.org>. The breakdown of thermal electricity from gas and oil is estimated by the author based on natural gas demand.

21. The effectiveness of this control is challenged by Global Energy Monitor (formerly CoalSwarm) which estimates that 46.7 GW of new and restarted coal-fired power construction is visible based on satellite imagery supplied. The coal-fired power plants are either generating power or will soon be operational. If all the plants reach completion they would increase China's coal-fired power capacity by 4%. The recent increase in electricity demand has resulted in a loosening of policy-level restrictions on the coal power sector in some provinces where power demand has outstripped supply (Shandong, Henan, Hunan, Hubei and Zhejiang provinces). In May 2018 the National Energy Administration permitted Shaanxi, Hubei, Jiangxi and Anhui to restart construction of coal-fired power stations. Restrictions were also relaxed to some degree in four other provinces. See: C. Shearer, A. Yu, T. Nace, "Tsunami Warning: Can China's Central Authorities Stop a Massive Surge in New Coal Plants Caused by Provincial Overpermitting?", CoalSwarm, September 2018, available at: <https://endcoal.org>.

proposed capping the country's coal power at 1,300 GW in 2030, signalling that the industry body representing China's power sector is pushing for a large expansion of the country's coal fleet.²² The proposal is under consideration. The 14th Five Year Plan (2021-2025) is expected to better inform how China is going to move to clean generation and solve its coal power development issues.

Graph 6: Electricity generation in China (2010 vs. 2018)



Source: China Energy Portal, estimates.

The Chinese government is strongly committed to clean coal generation. China has been a model in championing the transition towards supercritical and ultra-supercritical technologies, as well as deploying ultra-low emissions technology to reduce or eliminate the release of pollutants, such as oxides of sulphur and nitrogen as well as particulate and trace elements. China has implemented the most stringent norms in the world for local pollutants. The government has also established norms for coal savings (300 g of coal/kWh by 2020). **Chinese coal plants are also subject to CO₂ emissions standards.** In November 2016, the State Council issued the 13th Five-Year Plan on Control of Greenhouse Gas Emissions Program.²³ The plan establishes **carbon intensity for coal generation** (865 g/kWh) and ambitious targets for large power generation enterprises (China Energy, Huaneng Group, China Datang Corporation, China Huadian Corporation, and the State Power Investment Corporation (SPIC)): **550 g/kWh by the end of 2020.** These standards

22. Global Energy Monitor, Sierra Club, Greenpeace, *Boom and Bust 2019 – Tracking the global coal plant pipeline*, March 2019, available at: <https://endcoal.org>.

23. State Council, *The 13th FYP on Control of Greenhouse Gas Emissions Program* (in Chinese), available at: www.gov.cn.

require Chinese power companies to improve the efficiency of coal generation, invest in low-carbon generation or both.

On the supply side, China has continued its **structural reform of the coal mining sector to reduce coal production overcapacity**. The reform aims to eliminate excess and inefficient capacities (small mines, unsafe mines, or using outdated technologies), while developing new modern production capacities concentrated in 14 large production bases.²⁴ China eliminated more than 600 Mtpa of coal capacity over the period 2016-18. However, there is still some obsolete production capacity that has not been phased out and the de-capacity policy will continue. At the same time, China is developing new mines. China approved more than 45 billion yuan (\$6.64 billion) of new coal mining projects in 2018, much more than in 2017.

After its drop in 2016 due to restrictions on working days in coal mines, China's coal production has increased again since 2017 and rose by 4.5% in 2018 to 3.68 Gt. The rising trend is expected to continue in 2019 with new mines coming onstream. As China's coal consumption is expected to remain basically stable in 2019, the balance of the coal market should ease, and China is expected to reduce its coal imports.

The supply-side reform was also aimed at **stopping the collapse of coal prices on the domestic market to help miners to repay their debts**. The first goal has been achieved, but not the second. The sharp increase in domestic coal prices since 2016 has allowed Chinese mining companies to maintain profits for the third consecutive year.²⁵ But the debt of Chinese coal miners is still huge. The asset-liability ratio of large coal enterprises fell by 2 percentage points in 2018, but still reached a high of 65.7%. To better control coal price variations, the Chinese government has implemented a mechanism to keep domestic steam coal prices in the range of 500-570 yuan/t (around \$80-90/t, based on 5,500 kcal/kg), also known as the "green zone". It has also encouraged power utilities to sign medium and long-term contracts (more than 2 years) with coal suppliers. The medium and long-term contract price of thermal coal in 2018 was in the green zone, with an average annual price of 558.5 yuan/t (\$83.2/t). But the rise in coal prices is causing financial difficulties to power utilities, which cannot pass the cost increase to their customers, and whose electricity mix is still largely dependent on coal. To tackle the situation, the government

24. See: Oxford Institute for Energy Studies (OIES) (2014), *China's Coal Market: Can Beijing Tame "King Coal"?*, CL 1, December 2014, available at: www.oxfordenergy.org.

25. sxcoal.com, "The coal industry maintained profit growth for the third consecutive year but the asset-liability ratio remained as high as 65%", 26 January 2019, available at: www.sxcoal.com.

encourages the merger of coal and power companies, while continuing its electricity market reform.

Although China has deployed enormous efforts to clean up its environment by cutting dependence on coal, its companies are making up for lost business at home by expanding overseas. In recent years, Chinese banks have become the lenders of last resort for coal projects in South Asia, Africa and the Balkans that the World Bank, other international financial institutions and commercial banks have stopped funding in their move away from coal (see also Box 3). **A survey of international coal financing by state-owned policy banks finds China is by far the largest supporter of future coal plants abroad with 44 GW of capacity, followed by South Korea with 14 GW and Japan with 10 GW.**²⁶ Of all coal plants under development outside China (399 GW as of July 2018), Chinese financial institutions and corporations have committed or offered funding for over one-quarter of them (102 GW, or 26%). To date \$21.3 billion have been committed to over 30 GW of projects across thirteen countries. An additional \$14.6 billion has been proposed in funding for over 71 GW of projects across 23 countries. Most of this funding comes from the Belt and Road Initiative (BRI), which was under the spotlight at the second Belt and Road forum, in Beijing at the end of April 2019.²⁷ Amid criticism on investment in coal in BRI countries, President Xi Jinping highlighted high-quality and green BRI investments, which are yet to materialize.

A sign that things are moving in China too is the announcement by State Development & Investment Corp (SDIC) that **the state investment company will stop investment in new coal-fired plants.**²⁸

India's coal demand and imports grew significantly in 2018

India became the world's second largest consumer of coal in 2015 and the second largest producer in 2016 (on a tonnage basis), ahead of the US. **India's demand increased by around 8% in 2018 to nearly 1 Gt.** The growth was driven by demand from the electricity sector, but also from steel, aluminium and cement producers. The growth was much higher than

26. Institute for Energy Economics and Financial Analysis (IEEFA), "China at a Crossroads: Continued Support for Coal Power Erodes Country's Clean Energy Leadership", January 2019, available at: <http://ieefa.org>. See also <https://endcoal.org/finance-tracker/>.

27. *The Guardian*, "Belt and Road summit puts spotlight on Chinese coal funding", 25 April 2019, available at: www.theguardian.com.

28. *Bloomberg*, "China State Fund Joins Shift From Coal Power Investments", 20 March 2019, available at: www.bloomberg.com.

in previous years and led to a surge in steam coal imports. Thus, **India played a major role in the international market in 2018**. Its imports increased by 14.7% to 227 Mt (all coals combined).²⁹ Contrary to past trends, imports of steam coal also increased in 2018 and strongly (+14.5% to nearly 176 Mt), whereas so far only imports of coking coal, which India lacks, have increased. Domestic production increased by 7% to 780 Mt (coal and lignite). But state-owned Coal India Ltd (CIL), which produces about 80% of the country's coal production, favoured demand from public power plants to other consumers. The latter were forced to turn to the international market. Logistic constraints also played in favour of rising imports. Coal imports have weighted on India's trade balance and represent an additional burden on the country's finances. India is far from the initial vision of the Modi government, which, in 2014, intended to stop steam coal imports altogether within three years. Similarly, the government's target of a coal production of 1,500 Mt by 2020, of which 1,000 Mt produced by CIL and nearly 500 Mt by private and public coal miners will not be reached by 2020, even though CIL production is growing steadily (an estimated 600 Mt in 2018, up 6.4% from 2017 and a leap from the 462 Mt produced in 2014). The target has now been moved to 2026, keeping in mind the economics and the ability of newly launched production sites to ramp up production, as well as local opposition to new coal mines. But the policy preference for domestic coal remains firmly in place, and further efforts are being made to this end.

The opening of coal mines to the private sector was delayed but finally approved by the Cabinet Committee on Economic Affairs (CCEA) in February 2018.³⁰ The CCEA approved the rules for the allocation of new mines to the private sector through auctions. This puts an end to CIL monopoly on coal production and marketing, which lasted 45 years. The commercial exploitation of new mines by private companies will be possible without any price or end-use restriction as has been the case so far. With this reform, the government aims to increase competition, and raises productivity and technological innovation through private sector investment. **But auctions for commercial coal mining may not take place soon** as the reform has met resistance from the trade unions operating in the coal sector and India is now entering the election period. In addition, the administrative burden, the time required to obtain permits, and bottlenecks in coal transportation could continue to limit

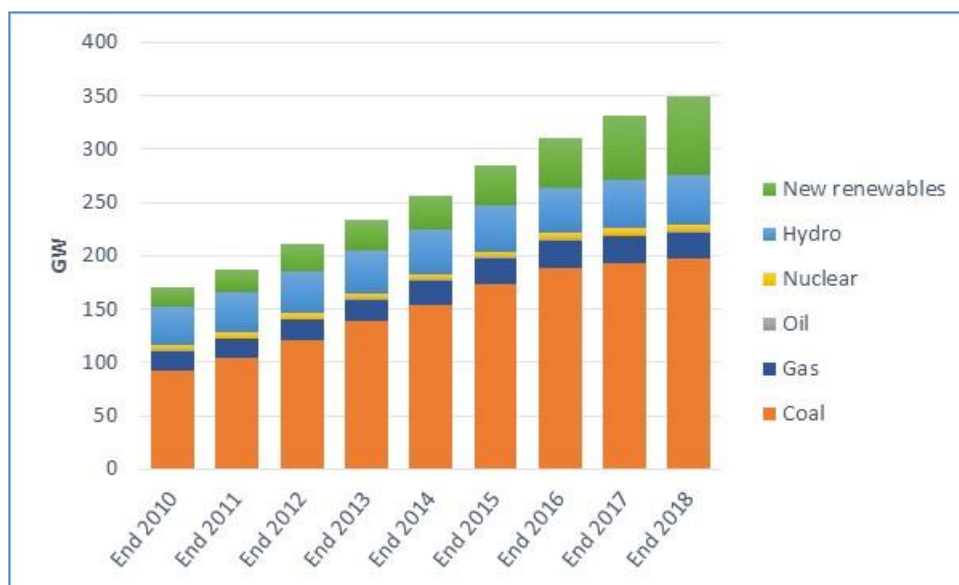
29. Ministry of Commerce of India, "Trade data, 2019", available at: <http://commerce.gov.in>.

30. *Nikkei Asian Review*, "India opens up coal mining to private sector", 23 February 2018, available at: <https://asia.nikkei.com>.

production growth. Thus, a further rise in steam coal imports is expected. According to the Indian group Adani, these could increase by 10% in 2019.

Coal supplies most of the country's electricity generation (73% in 2017) but the rapid development of RES (and the decrease in their cost) has begun to erode the share of coal in electricity generation, although in 2018 it increased slightly due to the strong increase in electricity demand (+6%) and despite a rise from new RES³¹ generation of 27%. The coal power fleet developed rapidly until 2016, but this trend has stopped. India is now building more electricity capacity based on new RES (+14 GW in 2018) than coal capacity (+4 GW of net additions in 2018). The installed capacity of the country was 350 GW at the end of 2018, of which 197 GW (57%) was coal-based, while RES (including large hydro) capacity was 120 GW (34%).³² Coal plants have operated at relatively low load factors over the last few years. Utilisation of the coal-fired fleet dropped from above 70% in 2010 to around 60% in 2018 (although it rose by 1 over 2017), largely because capacity additions ran ahead of actual demand growth and due to the inability of distribution companies to pay electricity suppliers.

Graph 7: India's installed power capacity (2010-2018)



Excludes captive power plants (52 GW).

Source: Central Electricity Authority (CEA).

31. "New renewables" excludes large-scale hydro.

32. Central Electricity Authority (CEA), "Executive Summary on Power Sector", December 2018, available at: www.cea.nic.in.

The majority of India's coal-fired power plants is still based on subcritical technology with efficiencies of 31-33%, although the share of power plants based on supercritical technology is increasing rapidly (28% at the end of 2018). In its National Determined Contribution (NDC), India committed to improve the efficiency of the nation's coal fleet. Already, all new, large coal-based power plants have been mandated to use the ultra-supercritical technology. In addition, in 2015, India adopted a legislation on **new emissions limits for local pollutants**. The legislation defines minimum performance standards for new coal-fired power plants but also for existing plants, which had to be retrofitted with emissions controls, or closed by December 2017. But the deadline has been missed as power utilities, which cannot pass the cost of depollution equipment to customers, have been reluctant to invest in depollution equipment. The government has now postponed the deadline to 2022, to ensure uninterrupted power supply in the country.³³ The retrofit of coal-fired power plants, which are responsible for air pollution and premature deaths, is crucial to enable them to continue operating.

India's newest power-sector blueprint, the National Electricity Plan 2018 (NEP 2018), which runs through fiscal year 2017 (FY2017), was published at the beginning of 2018.³⁴ The NEP 2018 updates CEA's draft plan of 2016. It reinforces the government's commitment to transforming the Indian electricity sector, retaining a core target of 175 GW of new renewables by FY2022 and 275 GW by FY2027 (74 GW at the end of 2018). The balance capacity (after considering the committed capacity addition from hydro, nuclear, gas and new renewables) to meet the projected power production and demand (2,047 TWh of gross electricity generation in FY2027) is met from coal-based power plants. **The NEP 2018 includes a new target for closure of 48.3 GW of coal plants.**³⁵ Taking these retirements into account, the NEP 2018 sees India's coal power capacity at 238 GW in FY2027,³⁶ and plans new construction totalling 94.3 GW over the ten-year period of the plan (i.e. net additions of 4.6 GW annually). **The coal capacity in FY2027 is 11 GW lower than the 2016 forecast.** With accelerated coal plant closures, and an

33. *Mining Weekly*, "Indian coal-fired power plants likely to miss new emission control norms deadline", 23 August 2018, available at: www.miningweekly.com.

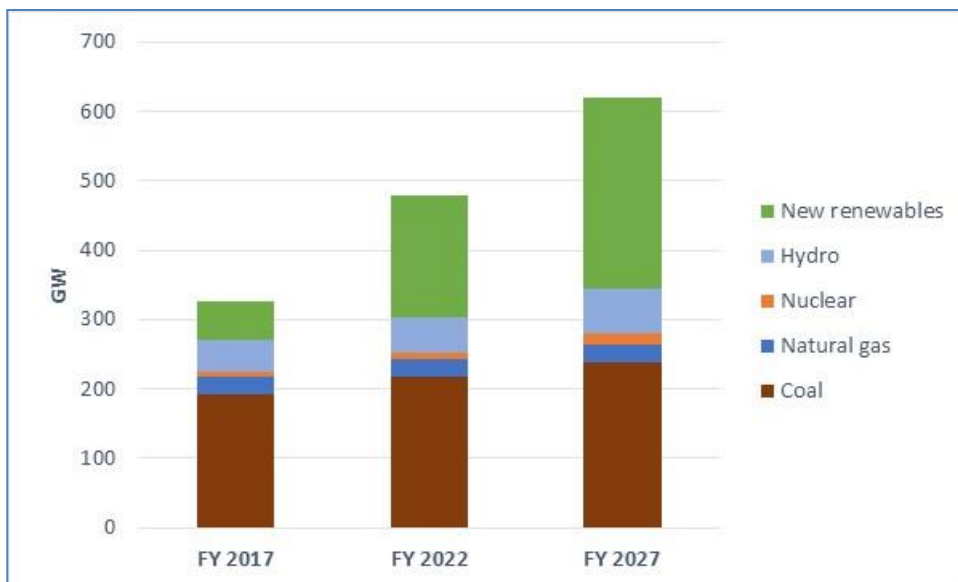
34. Central Electricity Authority (CEA), "National Electricity Plan. Volume 1, Generation", January 2018, available at: www.cea.nic.in.

35. Specifically, the plan forecasts 22.7 GW of coal power plant closures over the five years from FY2017 to FY2022. This includes 5.9 GW of normal end-of-life retirements and 16.8 GW of closures due to inadequate space for flue gas desulfurization equipment. An additional 25.6 GW of coal capacity is slated for retirement in the five years to FY2027.

36. This does not include capacity of captive plants.

anticipated surge in renewables, coal will account for only 38% of installed capacity by FY2027, down from 59% in FY2017.

Graph 8: India's installed power capacity, NEP 2018



Source: CEA.

In terms of electricity generation, coal generation is projected to increase from 952 TWh in FY2017 to 1,072 TWh in FY2022 and 1259 TWh in FY2027, accounting for **61.5% of total electricity generation, compared with 73% in FY2017**.³⁷ Coal plants have a low plant load factor over the plan's period, suggesting that any delay in new investments in RES would be offset by higher utilization of coal plants.

The recovery of US coal production did not last long

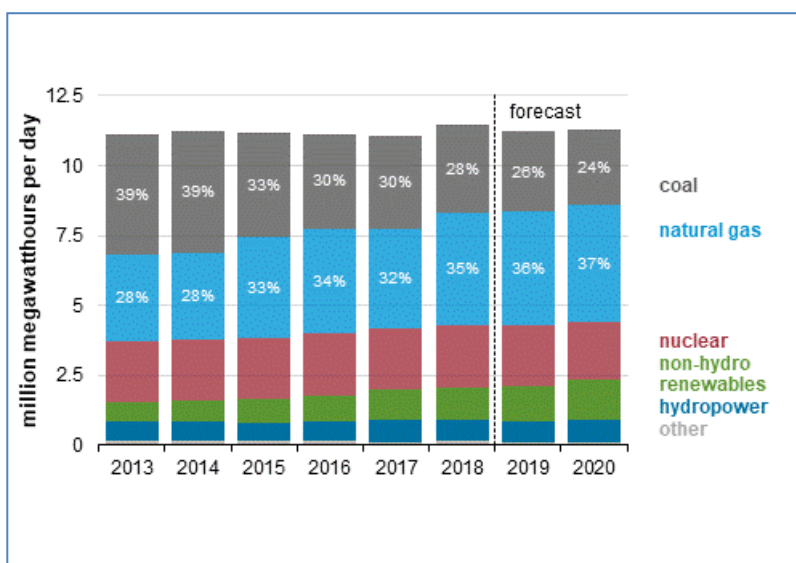
After its recovery in 2017, US coal production fell by 2.7% in 2018 to 684 Mt.³⁸ Coal exports (all coals combined) increased by almost 20% in 2018 but this was not sufficient to offset the decline in US demand (-3.8% to 625 Mt in 2018). Coal demand by the power sector continues to shrink despite President Trump's efforts to promote coal (exit from the Paris agreement; repeal of the Clean Power Plan; relaxed regulations on some environmental discharges (not necessarily followed at state level); duties on steel favouring domestic production and thus the production of coking coal; proposal, rejected by the regulatory authority, for a "Grid Resiliency Pricing Rule", to subsidize coal and nuclear power plants).

37. This does not include power generation from captive plants.

38. EIA (2019a), *op. cit.*

Since 2010, US coal demand has collapsed, declining by a third (300 Mt) over the period 2010-2018. About 90% of domestic coal consumption is in the power sector. The drop in 2018 is again due to falling demand by power utilities, which are more and more turning to natural gas and RES. Low natural gas prices and increasing penetration of renewable electricity generation have resulted in lower wholesale electricity prices, changes in utilization rates, and operating losses for a large number of baseload coal (and nuclear) generators. In 2018, coal accounted for only 28% of electricity generation (39% in 2013) compared to 35% for natural gas (28% in 2013). In 2018, 13 GW of coal-fired thermal capacity were retired, twice as much as in 2017. In 2018, the US power generation capacity from combined-cycle gas turbine (CCGT) power plants surpassed that from coal-fired plants and became the technology with the largest power capacity in the US in 2018.³⁹ As of January 2019, the CCGT installed capacity totalled 264 GW, compared with 243 GW for coal-fired power capacity. Since 2015, about 40 GW of coal-fired power capacity have been retired, no new coal capacity has been commissioned, whereas the total CCGT capacity has increased by about 30 GW.

Graph 9: US electricity generation by fuel



Source: EIA⁴⁰.

The latest effort to stop the shrinkage of the coal fleet is the **proposed Affordable Clean Energy (ACE) plan** released by the Environmental Protection Agency (EPA) in August 2018 to replace the Clean Power Plan.⁴¹

39. EIA, “U.S. natural gas-fired combined-cycle capacity surpasses coal-fired capacity”, 10 April 2019, Today in Energy, available at: www.eia.gov.

40. EIA (2019a), *op. cit.*

41. EPA, available at: www.epa.gov.

The ACE would establish emission guidelines for states to develop plans to address GHG emissions from existing coal-fired power plants. The ACE rule has several components: a determination of the best system of emission reduction (BSER) for GHG emissions from coal-fired power plants, a list of “candidate technologies” states can use when developing their plans, a new preliminary applicability test for determining whether a physical or operational change made to a power plant may be a “major modification” triggering New Source Review (NSR), and new implementation regulations for emission guidelines under the Clean Air Act.

The proposed plan aims to **reduce emissions by relying largely on efficiency improvements** that can be made to the existing fleet of coal units. To alleviate concern around some of these efficiency improvements triggering NSR rules, EPA has proposed permitting changes to the NSR permitting program.⁴² The new rules would significantly curtail the applicability of NSR permitting to power plants. For example, EPA has proposed to use an hourly emissions rate to determine if an increase in emissions has occurred as part of a change to a power plant. In doing so it would weaken the trigger for the addition of modern pollution controls under the NSR program, allowing older coal-fired power plants to potentially extend their life and utilization without the added cost burden of modern pollution controls.⁴³

In addition, in December 2018, EPA proposed to **revise the New Source Performance Standards (NSPS)** for GHG emissions from new, modified, and reconstructed fossil fuel-fired power plants.⁴⁴ EPA proposes to determine that the BSER for newly constructed coal-fired units is the most efficient demonstrated steam cycle in combination with the best operating practices.⁴⁵ This proposed BSER would replace current NSPS for coal plants that require new generators to emit no more than 1,400 pounds of CO₂ per megawatt-hour on a gross output basis (lb CO₂/MWh-gross),

42. National Coal Council (NCC), “Power Reset: Optimizing the Existing U.S. Coal Fleet to Ensure a Reliable and Resilient Power Grid”, October 2018, available at: www.nationalcoalcouncil.org.

43. Harvard Law School Environmental & Energy Law Program, “Memorandum on EPA’s Proposed Changes to New Source Review in ACE”, 29 October 2018, available at: <http://eelp.law.harvard.edu>.

44. EPA, “Proposal: NSPS for GHG Emissions from New, Modified, and Reconstructed EGUs”, available at: www.epa.gov.

45. For large units, the BSER is proposed to be supercritical steam conditions, and if revised, the emission rate will be 1,900 lb CO₂/MWh-gross (862 g/MWh). For small units, the BSER is proposed to be subcritical steam conditions, and if revised, the emission rate will be 2,000 lb CO₂/MWh-gross (907 g/MWh). EPA too is proposing separate standards of performance for newly constructed and reconstructed coal refuse-fired units. For these units, the BSER is best available subcritical steam conditions, and if finalized, the emission rate for these sources will be 2,200 lb CO₂/MWh-gross (998 g/MWh), regardless of the size of the unit.

equivalent to 635 g/MWh, a level that could not be achieved without partial CCS. According to the EPA, the primary reason for this proposed revision is the high costs and limited geographic availability of CCS. This reason seems in contradiction with the recent legislation (the Future Act), expanding the corporate income tax credit for CCS and carbon capture, utilisation and storage (CCUS)⁴⁶.

Utilities, analysts and EPA's own analysis of the NSPS rollback say that **new US coal plants are unlikely** due to competition from cheaper resources, despite the loosening of multiple environmental regulations.⁴⁷ However, the proposed ACE plan **could allow coal plants to stay open longer — if operators choose them over cleaner technologies. As seen above, the rate of coal plant retirements does indicate that this is not the case.** In December 2018, Xcel Energy added to that trend, committing to eliminate its carbon emissions from power generation by 2050 as it moves to replace coal with wind and solar resources across its eight-state service area.⁴⁸ That followed an announcement from the Northern Indiana Public Service Co. that it could save customers \$4 billion by retiring its coal fleet years early and replacing them largely with renewables.

Despite Trump's administration's efforts to revive the coal industry, the future for US coal is bleak. Another major contraction of the US coal demand is likely in the next few years as competition from natural gas, the growing uptake of solar- and wind-powered generation, and little growth in electricity demand will continue to reduce the market share for coal power generation. According to the EIA Short Term Energy Outlook (STEO) of February 2019, coal demand would be only 544 Mt in 2020 (it totalled 950 Mt in 2010). In the longer term, generation from coal is expected to decline in all scenarios of the EIA's Annual Energy Outlook 2019 (AEO2019).⁴⁹ In the Reference case, from a 28% share in 2018, coal generation drops to 17% of total generation by 2050. Some 101 GW (or 42% of existing coal-fired capacity) are projected to retire by 2050 as a result of competitively priced natural gas and increasing from RES generation. The variations in coal generation and capacity mainly depend on gas prices. For instance, higher natural gas prices in the Low Oil and Gas Resource and Technology case slow the pace of coal power plant retirements by approximately 30 GW in 2035 compared with the Reference case.

46. See S. Cornot-Gandolphe, "Carbon Capture, Storage and Utilization to the Rescue of Coal? Global Perspectives and Focus on China and the United States", *op. cit.*

47. Utility Dive, "EPA moves to rescind Obama-era carbon limits on new coal plants", 6 December 2018, available at: www.utilitydive.com.

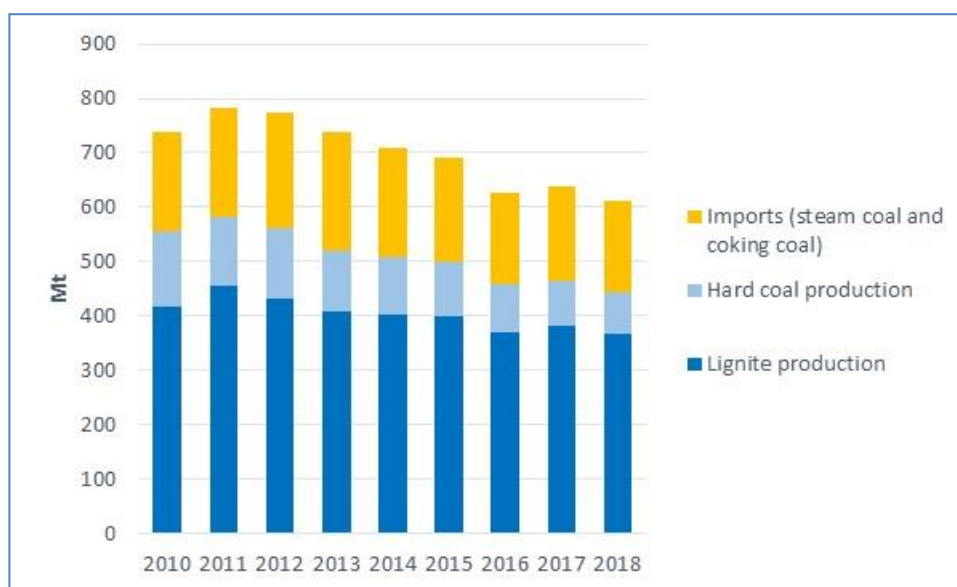
48. *Ibid.*

49. EIA (2019b), *Annual Energy Outlook 2019*, 24 January 2019, available at: www.eia.gov.

EU coal demand continued its long structural decline

The EU is the fourth-largest consumer of coal in the world, but far behind the first three markets, accounting for 6% of global coal demand in 2018. **EU coal demand has been on a long structural decline**, except for a brief recovery in 2011 and 2012, and again in 2017 (that year due to cyclical factors linked to weather-related events). In 2018, coal resumed its structural decline. Based on preliminary data, EU coal demand fell by 4% to 612 Mt (all coals combined), of which some 444 Mt produced in the European Economic Community (EEC). **Hard coal production continued its downward trend.** Subsidized hard coal mines are closing due to the end of subsidies to hard coal by the end of 2018, as mandated by EU regulation. In Germany, hard coal mining has ceased with the closure of the Bottrop coal mine, the latest hard coal mine in the Ruhr area. In Spain, 25 of the 26 coal mining units ceased operation by 31 December 2018. This was made possible through a just transition deal the Spanish government struck with the regions. Poland's hard coal production continued its sharp decline, forcing the country to turn to the overseas market. EU imports declined by 3% in 2018, but import levels varied strongly among EU countries. German steam coal imports fell by 17% to only 30 Mt, while Poland's imports increased by 47% to 14.7 Mt.

Graph 10: Evolution of EU coal demand (2010-2018E)



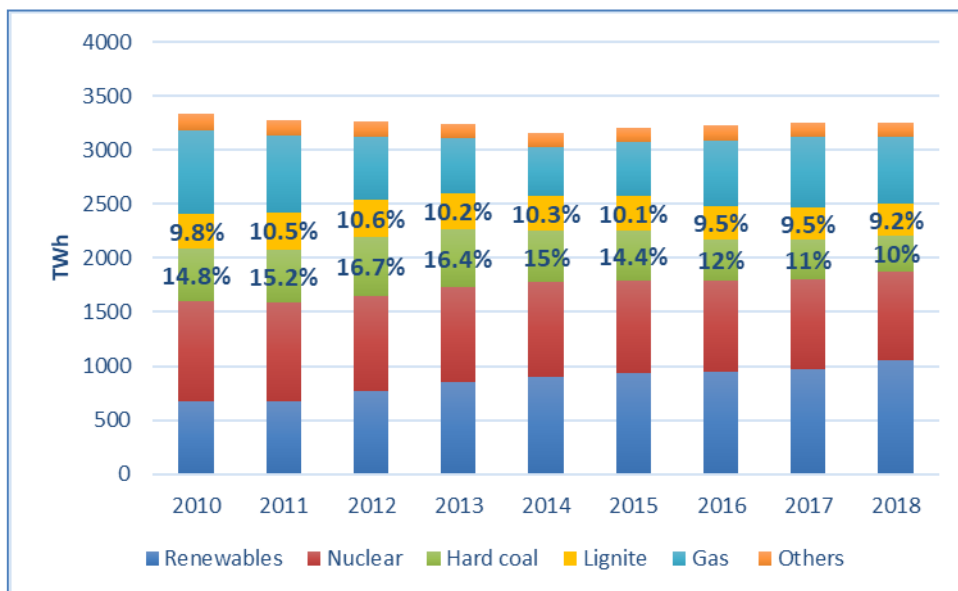
Source: Euracoal, Eurostat,⁵⁰ 2018: estimated.

50. Euracoal (2018), "Coal and lignite production and imports in Europe", available at: <https://euracoal.eu>; Eurostat, "Energy database", available at: <http://ec.europa.eu>.

The decline in coal demand is due to reduced demand by power utilities as RES erode the share of thermal generation and coal is losing its competitiveness against natural gas. The increase in carbon prices in 2018 has reinforced this trend. **Electricity generation from coal (hard coal and lignite) fell by 6% in 2018 and was 30% below 2012 levels.**⁵¹ Coal accounted for 19.2% of EU electricity generation (20.4% in 2017). Hard coal generation fell by 9.4% in 2018 and is now 40% lower than in 2012. Lignite generation was more resilient, with a decline of 2.7% in 2018. The reduction in coal generation is mainly due to the strong increase in the contribution of RES - which now represent 32.3% of EU electricity generation - since the contribution of natural gas also decreased in 2018 to 18.9% compared to 19.9% in 2017.

For the first time, the fuel and carbon costs alone for coal and gas plants were on a par with the full cost of wind and solar (although this comparison does not take into account the value for the electricity grid of the dispatchability of coal and gas).⁵² Coal and gas generation costs rose in 2018: coal price rose by 15%, gas rose by 30%, and the CO₂ price rose by 170%. Consequently, electricity prices rose to €45–60/MWh in Europe. This is the level at which the latest wind and solar auctions cleared in Germany.

Graph 11: EU gross electricity generation by source (2010-2018)



Source: Agora Energiewende and Sandbag.

51. Agora Energiewende and Sandbag (2019), “The European Power Sector in 2018. Up-to-date Analysis on the Electricity Transition”, January 2019, available at: www.agora-energiewende.de.
 52. *Ibid.*

In 2019, the competition between coal and gas will be reinforced. Despite the collapse of coal prices since the end of January 2019, the even sharper collapse of European spot gas prices and the high price of CO₂ reinforce the competitiveness of gas generation against coal generation. This will accelerate the coal phase-out in Western European markets.

The EU coal market remains divided between Western European markets and Central-Eastern European markets (including Germany and Greece). In most Western European markets, coal use is on its way out. Coal production has almost ceased, and coal demand is covered by imports. In Central-Eastern Europe, however, dependence on coal remains high: this region comprises five of the six EU member states where coal provided 30% or more of power generation in 2018.⁵³ This is because of sizeable coal deposits (including lignite) in several parts of this region, which support the production of affordable electricity, reduce the need for energy imports, and maintain employment in the mining sector. To facilitate the transition away from coal, in 2017, the European Commission created the “Coal Regions in Transition Platform”.⁵⁴ Its aim is to facilitate the development of projects and long-term strategies in coal regions. It is designed to boost the clean energy transition in these regions by bringing more focus to social fairness, structural transformation and new skills and by promoting investment in new technologies and creating new jobs.

As a part of the “Clean Energy for All Europeans” package, **new 2030 targets that will profoundly alter the role of coal in the EU power mix were adopted in 2018**: 32% of gross final consumption for RES and 32.5% below the baseline for energy efficiency. A revised Emission Trading System (ETS) entered into force in 2018, reinforcing the Market Stability Reserve (MSR) mechanism, to support a 43% reduction in ETS CO₂ emissions by 2030 compared with 2005. The European Commission also published a Decarbonization Strategy to 2050, which shows pathways to reach net-zero emissions at EU level by 2050.

Plans to phase out coal power have been adopted in 15 EU countries, which have joined the Powering Past Coal alliance,⁵⁵ and

53. Bulgaria (43%), Czech Republic (47%), Germany (35.4%), Greece (31.4%) and Poland (76.5%). Coal's contribution in Slovenia (included in this list last year) declined to 29.3% in 2018. The Netherlands (30% in 2018), is the sixth EU country where coal has a share of 30% or above in total power generation.

54. European Commission, “No region left behind: launch of the Platform for Coal Regions in Transition”, 11 December 2017, available at: <http://europa.eu>.

55. Fifteen European countries have signed on to the Alliance: Austria, Belgium, Denmark, Finland, France, Great Britain, Ireland, Italy, Latvia, Liechtenstein, Luxembourg, the Netherlands, Portugal, Sweden, and Switzerland.

pledged to phase out coal power by 2030. They have been joined by major energy utilities (EDF, ENGIE, Iberdrola, Orsted, Scottish Power). All in all, there are 7 countries in Europe that do not use coal in their power mix or have already closed their latest coal power plants, such as Belgium, and this will grow to at least 17 by 2030. Ten countries have announced that they will eliminate coal from their power mix: the UK, which was the first European country to announce a coal phase-out and confirmed in January 2018 the phase out of unabated coal use by October 2025, Austria (2025, considering bringing forward the end date to 2020), Denmark (2030), Finland (where legislation on a ban on the use of coal in power generation after May 2029 was adopted in February 2019), France (2022), Ireland (2025), Italy (2025), the Netherlands (end of 2029, the phase-out includes three power plants inaugurated in 2015 and 2016), Portugal (2030) and Sweden (2022).⁵⁶ In addition, Hungary, Slovakia and Spain have phase-out plans under discussion. Notably, in November 2018, Spain's government published a new draft climate plan that targets an electricity system running 100% on RES by 2050, and confirmed plans to phase out coal (and nuclear) power plants.⁵⁷ Nine of Spain's 14 coal plants will close in June 2020, as they will not meet EU rules on heavy polluters, and the other five are expected to close by 2030.

But the most expected plan was the **German plan announced by the Commission on Growth, structural change and employment at the end of January 2019**.⁵⁸ The Commission says coal-fired power generation should **end in 2038**. If conditions allow, this could be brought forward to 2035. The decommissioning roadmap is divided into periods. For the period 2018 to 2022, the Commission says that by 2022 both lignite and hard coal capacity should fall to 15 GW respectively. This would amount to a reduction by nearly 5 GW in lignite and 7.5 GW in hard coal capacity compared to 2017. The Commission also recommends switching Germany's "grid reserve" capacity, currently at 2.3 GW, from coal to gas. For the period 2023-2030, the Commission says that coal-fired power capacity should fall to a maximum of 9 GW for lignite and 8 GW for hard coal. This would require the closure of an additional 13 GW by 2030 compared with 2022 (6 GW of lignite capacity and 7 GW of hard coal capacity).

56. See Europe Beyond Coal (2019), "Overview: National coal phase-out announcements in Europe. Status as of March 2019", available at: <https://beyond-coal.eu>.

57. S. Morgan, "Spain to nix nuclear and coal power by 2030", *Euractiv*, 15 November 2018, available at: www.euractiv.com.

58. P. Hannen, "Germany considers closing coal-fired power plants by 2038", *PV Magazine*, 28 January 2019, available at: www.pv-magazine.com.

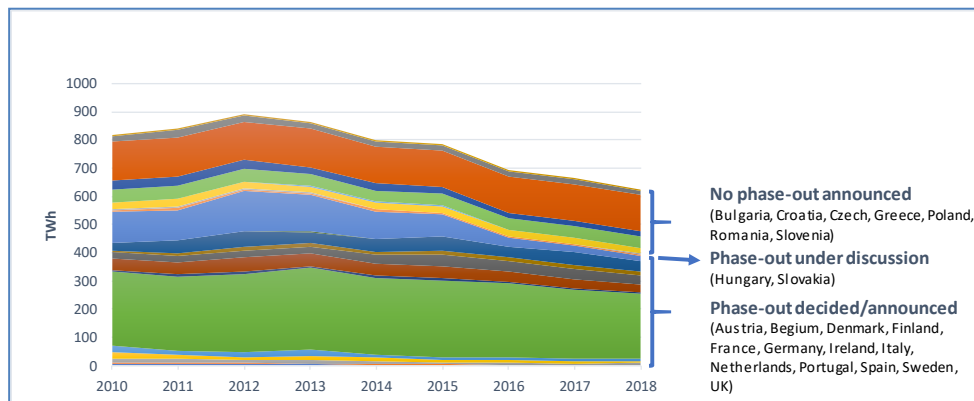
For each of the years 2023, 2026 and 2029, an assessment of the measures implemented will be carried out to consider security of supply, the electricity price level, climate protection, further development of EU state aid law and structural development in the areas affected. In 2032, the commission and coal plant operators will decide if the remaining capacity can be phased out by 2035, rather than 2038.

German states with coal mining regions would receive a total of €40 billion from the federal government over 20 years for structural change under the terms of the Coal Commission’s proposal, while operators of coal-fired plants would receive compensation.

The conclusions of the Commission are only advisory for Germany’s government and the actual implementation of measures may ultimately deviate from what the commission recommends. However, the government is widely expected to follow the proposals. The phase-out plan will have a significant impact on gas demand to the detriment of coal demand.

With the announced phase-out plan in Germany and the draft Climate Plan in Spain, **this is now the equivalent of 62% of 2018 EU coal generation which will be phased out by 2038 at the latest, and before in most countries.** This represents 12% of EU gross electricity production in 2018 (almost 390 TWh). However, in countries where no phase-out has been announced, in particular in **Poland**, coal generation is only decreasing slowly and has remained at 230-250 TWh in the past five years. Poland still relies on coal for almost 77% of its electricity generation. The new draft Polish energy plan released in November 2018 keeps **the coal option opened** and projects coal to contribute for 60% of electricity generation by 2030. Poland even broke ground on a new 1 GW coal plant, Ostrołęka C, in 2018.

Graph 12: EU coal generation and phase-out policies



Source: Agora Energiewende and Sandbag, *Europe Beyond Coal*, author.

In summary, **coal phase-out policies are spreading fast in the EU and the trend is irreversible**. Coal demand by the power sector is expected to decline dramatically by 2030. According to the IEA's World Energy Outlook 2018 (WEO 2018) New Policies Scenario, coal demand by the power sector should fall from 171 Mtoe in 2017 to 64 Mtoe in 2030.⁵⁹ CO₂ emissions from coal power plants should drop from 733 Mt in 2017 to 272 Mt in 2030.

Stable coal demand in Japan, South Korea and Taiwan

Japan, South Korea and Taiwan are the traditional coal importers in the Pacific Basin. These countries, which do not produce coal, import about 300 Mtpa of steam coal, with no major change from year to year. After a rather exceptional increase of more than 6% in 2017, their imports of steam coal increased marginally in 2018 (+1%). The trends are contrasted among the three countries. In Japan and Korea, coal demand posted a small decline in 2018, a change from the substantial growth in demand in 2017. In Japan, the reopening of nine nuclear reactors since 2015 to this date (of which five in 2018) has enabled the country to reduce its thermal electricity production, although the impact has been fairly modest in the case of coal. South Korea also slightly reduced its coal demand, after its exceptional increase in 2017 due to the entry into service of new coal-fired power plants. Only Taiwan has increased its imports, after the country commissioned new coal capacity in 2017 and 2018.

If Japan has not officially changed its position on coal, **coal exit campaigns are starting to make an impact on overseas investments by major Japanese groups**. Japan has cancelled a large number of coal-fired power plant investment plans, and Japanese investment institutions are also abandoning investment in coal projects, and instead seek to invest in renewable energy projects in Asia. Mitsubishi has sold its assets in Australian steam coal mines. Itochu announced that the group would no longer finance development of steam coal mines and new coal-fired power plants, and the group will sell its assets in steam coal mines in Australia and Indonesia.

On the domestic market, of the 50 projects for new coal power units launched since 2012, nine have failed, and more are running into challenges. Idemitsu Kosan, Kyushu Electric Power and Tokyo Gas recently decided to cancel their project to build a 2-GW coal power plant in Chiba,

59. IEA (2018b), *World Energy Outlook 2018 (WEO 2018)*, November 2018, available at: www.iea.org.

due to poor economics, and instead to study an LNG-fired power plant.⁶⁰ This followed announcement by Chugoku Electric Power and steel manufacturer JFE Steel to scrap the development of a 1,070-MW coal-fired power plant, also in Chiba. Marubeni Corporation announced that the group would no longer build coal-fired power plants and would reduce its coal capacity to 3,000 MW by 2030. According to Global Coal Plant Tracker, a total of 11 coal-fired power units at 8 locations have been cancelled in Japan since 2017 for a total of 7.1 GW – including 2.3 GW cancelled in 2018. In March 2019, Japan’s environment minister announced he would “in principle” oppose any new plans to build or expand coal-fired power stations.⁶¹

In South Korea, the government has announced changes to steam coal and LNG taxes to discourage the use of inefficient coal plants and improve air quality. In a first step towards rectifying distorted prices of electricity-generating fuels, the tax that South Korea places on steam coal will increase from 36 won to 46 won per kilogram starting from April 2019, while the tax on LNG will be cut sharply from 91.4 won to 23 won (\$1=1,130.62 won).⁶² The reversal in the tax burden on steam coal and LNG is insufficient to completely reverse the merit order in which coal and LNG are supplied to the grid, but it will increase the utilization of high-efficiency LNG plants. Moving forward, there are plans to reflect other environmental costs (carbon price) in the price of electricity-generating fuels.⁶³

Southeast Asian coal demand is surging

The trend is different in Southeast Asia, where **coal imports and demand are growing, strongly** driven by the increase in electricity demand and the reliance on coal for power generation. With coal generation growing faster than power generation, the coal’s share in the power mix increased in 2018.⁶⁴

Regional coal imports reached almost 110 Mt in 2018, more than double their 2010 levels. Vietnam, which became a net importer in 2015, increased its coal imports (all coals combined) by 54% in 2018.

60. *Renew Economy*, “Japan scraps another coal-fired power plant”, 7 February 2019, available at: <https://reneweconomy.com.au>.

61. *The Guardian*, “Japan to oppose new or expanded coal-fired power plants in blow to Australian exports”, 31 March 2019, available at: www.theguardian.com.

62. *Hani.co.kr*, “South Korean government to increase tax on bituminous coal to reduce fine dust pollution”, 20 March 2019, available at: <http://english.hani.co.kr>.

63. See S. Cornot-Gandolphe, “South Korea’s New Electricity Plan. Cosmetic Changes or a Breakthrough for the Climate?”, *Edito Energie*, Ifri, February 2018, available at: www.ifri.org.

64. IEA (2019a), *op. cit.*

Graph 13: Southeast Asian coal imports (2010-2018E)

Source: 2010-2017: IEA (2018a), 2018: estimated.

Coal imports are fuelling newly built coal plants to meet surging electricity needs. Regional coal-fired capacity increased from 62 GW at the end of 2015 to 74 GW at the end of 2018. In this, Southeast Asian countries are helped by countries wishing to export their coal-fired power plant technologies, China and Japan (until recently) in the lead. Currently, nearly 30 GW of coal-fired power capacity is under construction in the region, including 13 GW in Indonesia and 10 GW in Vietnam. The exit from coal is not on the agenda, but, affected by the rise in imported steam coal prices, importing countries in the region are trying to limit coal contribution to the future growth of their electricity demand and are speeding the development of renewable sources, still little exploited in the region (except for hydro).⁶⁵ It remains to be seen how the collapse of imported steam coal prices (-30% between July 2018 and May 2019) will impact these policies.

New coal power plants in the Middle East and Africa

In the Middle East, several countries plan to start using imported coal in power generation. Construction of new coal-fired power plants has already started in the United Arab Emirates, Iran and Jordan. Oman plans to build its first coal-fired power plant in Duqm to diversify its power generation mix.

65. See ASEAN Centre for Energy, "Renewable Energy", available at: www.aseanenergy.org.

In Africa, consumption remains modest (3% of global demand). But coal remains an option, facilitated by Chinese investments and loans from the African Development Bank. Unlike other international financial institutions, the African Development Bank continues to finance coal power plants as part of its strategy to help the continent achieve universal electricity access by 2025, which is being increasingly criticized. Today, 600 million people in Sub-Saharan Africa still do not have access to electricity.

The installed capacity of coal-fired power plants in Africa reached 47 GW in 2018, dominated by South Africa. Projects currently under construction (8 GW) or planned (35 GW) could almost double this capacity. Outside of South Africa, most of them are based on coal imports (with one notable exception, Nigeria). The IEA predicts that coal capacity will increase to 55 GW in 2025 before starting to decline. Since the beginning of the decade, many coal power projects have been built, most often financed by Chinese public or private enterprises. However, the growth of RES and natural gas as well as local opposition to coal projects have resulted in the cancellation of a significant number of projects.

But North Africa is increasing its coal thermal capacity. Morocco commissioned the Safi coal-fired power plant in December 2018 (2 units totalling 1,386 MW of installed capacity). It is the first ultra-supercritical thermal power plant in Africa. The commissioning of a coal power plant may seem surprising in a country that rapidly deploys its solar capacity, but it should be remembered that the investment decision dates back to 2008. It is not the same for Egypt. While today, the country does not have any coal power plants, projects are underway to develop nearly 10 GW of coal capacity by 2025. Two large projects have been announced. In June 2018, a consortium including Shanghai Electric, Dongfang Electric and Hassan Allam Construction was selected to build a six-unit complex with a total capacity of 6,000 MW in Hamrawein Harbor on the Red Sea. A 2,640 MW plant will also be built at Ayoun Moussa in the Sinai, developed by the Emirates investment company Al Nowais with the Egyptian power company.

Longer term perspectives

Global coal power investment is drying up

Installed coal-based capacity reached 2,015 GW at the beginning of 2019,⁶⁶ accounting for 30% of global installed electricity capacity. Most of these coal plants are located in China (974 GW), the US (259 GW), India (221 GW), the EU (152 GW) and Japan/Korea/Taiwan (102 GW).⁶⁷ But as stated by the IEA, **the story of coal is a tale of two worlds** with climate action policies and economic forces leading to closing coal power plants in some countries, while coal continues to play a part in securing access to affordable energy in others.⁶⁸

In last year's report, we highlighted that global coal power investment passed an all-time peak in 2015.⁶⁹ In 2018, investment in new coal capacity again shrunk with only 50 GW of new capacity, mainly in China and India. Global power investment has clearly shifted towards RES (171 GW installed in 2018). Also, retirements of ageing and inefficient coal plants have accelerated in many countries. Global retirements exceeded 30 GW in 2018. Most of the capacity retired was in the US, China, India and the EU. Therefore, **global net additions to coal capacity were only of 19 GW in 2018**. With declining deployment and high levels of retirement, and provided that current trends continue, **by 2022 yearly retirements will exceed new capacity and the global coal fleet will begin to shrink**.⁷⁰

66. Global Coal Plant Tracker, "Coal plants by country", January 2019, available at: <https://endcoal.org>.

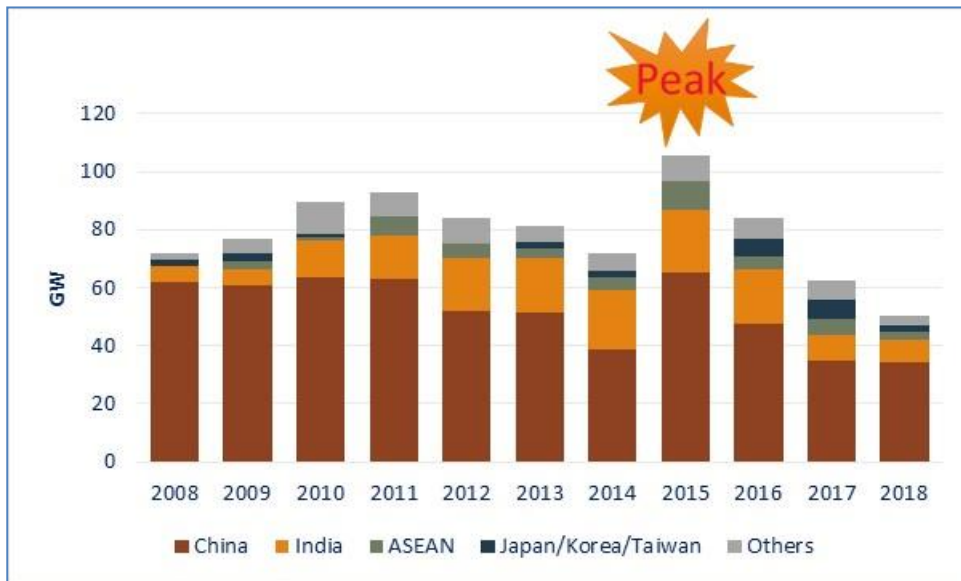
67. Please note that data from Global Coal Plant Tracker differ slightly from national data presented in the previous section (for instance CEC estimates China's coal fleet at 1,010 GW at the beginning of 2019, compared with 974 GW estimated by Global Coal Plant Tracker. The difference is due to the fact that CEC data include units smaller than 30 MW). In the case of India, the CEA data (197 GW) don't include captive plants, which explains the difference with Global Coal Plant Tracker.

68. IEA (2018c), "Coal 2018, Analysis and Forecasts to 2023", December 2018, available at: www.iea.org.

69. S. Cornot-Gandolphe, "Coal Exit or Coal Expansion? A Review of Coal Market Trends and Policies in 2017", *Etudes de l'Ifri*, Ifri, May 2018, available at: www.ifri.org.

70. Coal Swarm/Sierra Club/Greenpeace (2018), "Boom and Burst 2018, Tracking the Global Coal Plant Pipeline", March 2018, available at: <https://endcoal.org>.

Graph 14: Newly operating coal plants by year (2008-2018)

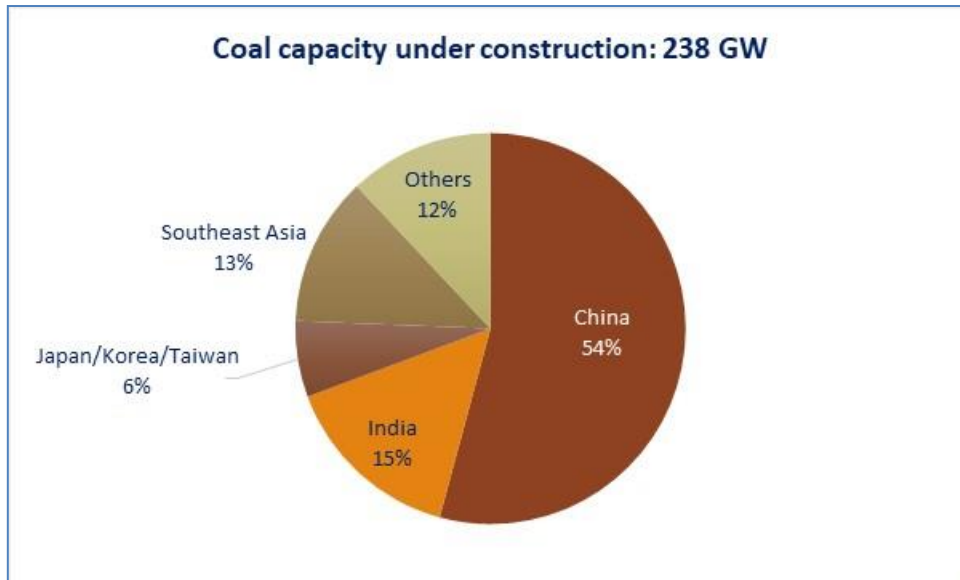


Source: Global Coal Plant Tracker.

It remains that **the coal fleet is young**. Half of the current coal fleet was built during the past 13 years. Without any policy change, most of these plants will still be in operation in 2050. Coal phase-out policies are spreading in a growing number of countries but not in Asia, which concentrates 66% of global coal capacity and where the average age of the coal fleet is less than 15 years.

Despite growing pressure to phase out coal, there is still a significant pipeline of coal power plants under construction and planned in the world. **Globally, 238 GW of new coal power capacity are under construction, 70% of them in China and India.** But some of these plants are expected to be delayed and this new capacity is expected to replace older, non-efficient coal plants.

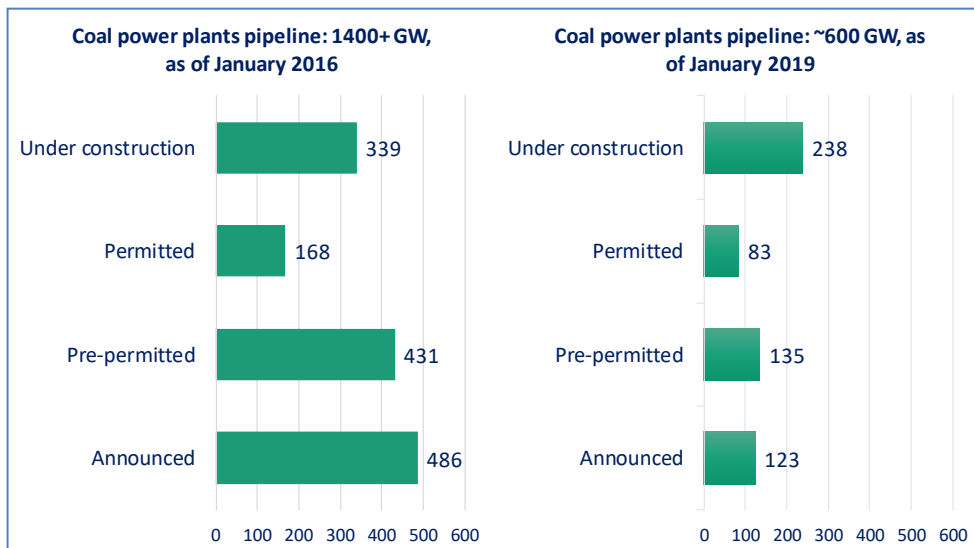
Graph 15: Coal power capacity under construction in the world at the beginning of 2019



Source: Global Coal Plant Tracker.

In addition, **another 218 GW of coal capacity are permitted or pre-permitted and 123 GW have been announced.** However, the pipeline of coal power plants under construction and proposed has shrunk over the past three years with more than 800 GW of capacity shelved.

Graph 16: Coal power plants under construction and planned in the world, January 2016 vs. January 2019



Source: Global Coal Plant Tracker.

Despite the reduction of the coal power plant pipeline, CO₂ emissions from existing, under construction and pre-construction coal plants already **exceed global carbon budgets**, requiring stronger policy measures to reach the goal of the Paris Agreement.

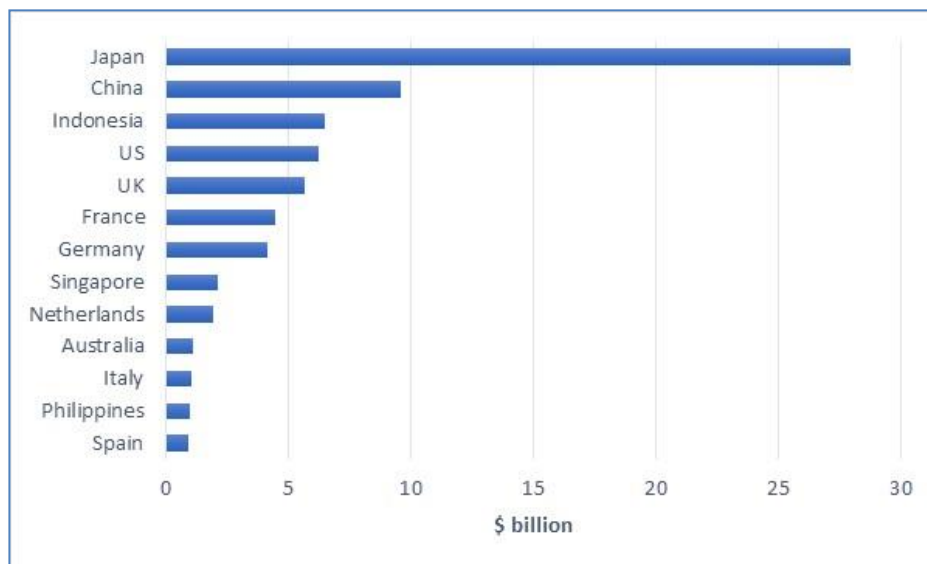
Faced with this challenge, in recent years, environmental concerns and mounting pressures against coal have prompted several international financial institutions, private banks and insurance companies to impose restrictions on or even a complete stop to financing coal plant development or mine projects (see last year's report and the following Box).

Box 3: Financing of coal power plants

During the UN Climate Summit in Katowice, Urgewald, BankTrack and 26 NGO partners released new research identifying the banks and investors backing the pipeline of new coal projects.⁷¹ According to this research, since the Paris Agreement was signed, coal-fired capacity has grown by over 92 GW and coal plants totalling over 670 GW are still in the pipeline (these data refer to the situation mid-2018 and are updated in graphs 14 and 16). Urgewald's and BankTrack's research examined lending, underwriting and institutional investments in the top 120 coal plant developers, which are responsible for over 68% of new coal-fired capacity in the pipeline. According to the NGOs' data, the finance industry invested over US\$ 478 billion in the world's top 120 coal plant developers between January 2016 and September 2018. Since January 2016, 235 commercial banks provided over US\$ 101 billion in direct loans to the 120 top coal plant developers. Among them, the top 30 banks by lending lend \$72.5 billion, dominated by Japanese, Chinese, Indonesian and US banks. The largest lenders to coal plant developers are the Japanese banks Mizuho Financial and Mitsubishi UFJ Financial with US\$ 12.8 billion and US\$ 9.9 billion respectively. As mentioned previously, Japanese investment institutions are now abandoning investment in coal projects, and instead seek to invest in renewable energy projects in Asia. Lending by European banks as a whole accounted for 25% of the total, although many banks have adopted policies restricting coal financing. The new research reveals that the bulk of the lending to coal plant developers is in the form of corporate loans, and this type of lending is often not addressed by bank policies. This shows that banks' coal policies are still full of loopholes that need to be addressed.

⁷¹ BankTrack, Urgewald, "COP24: New research reveals the banks and investors financing the expansion of the global coal plant fleet", 5 December 2018, available at: https://www.banktrack.org/article/cop24_new_research_reveals_the_banks_and_investors_financing_the_expansion_of_the_global_coal_plant_fleet.

Graph 17 : Top 30 banks by lending to coal power plants, by country (2016-September 2018)



Source: Urgewald, BankTrack.

One key update from last year's report is the **growing number of lawsuits against governments and corporations** on the basis of air pollution due to coal combustion and its impact on citizens' health.

The UN Special Rapporteur on human rights and the environment has recently declared that **failing to ensure clean air constituted a violation of the fundamental human right to a healthy environment**, a right that is legally recognised by 155 States and should be so globally.⁷² The Special Rapporteur emphasised that air pollution was a preventable problem. He called on States to abide by their legal obligations to ensure clean air, which is essential for fulfilling the rights to life, health, water and sanitation, adequate housing, and a healthy environment. This is a strong message sent to governments when they set up their electricity plans and the potential role of coal, one major cause of air pollution.

There is currently a surge in lawsuits around the world that are asking courts to order actions by governments or the fossil fuel industry in response to climate change or air pollution.⁷³ In the coal sector, the most famous one is a case involving a Peruvian farmer suing German RWE over its GHG emissions. The farmer is claiming that the company's contribution to climate change is threatening his home and is asking RWE to take on

72. UN Human Rights, "Air pollution: The silent killer that claims 7 million lives each year", 4 March 2019, available at: www.ohchr.org.

73. DW, "Four climate change lawsuits to watch in 2018", available at: www.dw.com.

financial responsibility for the damage. That case is unique in that it considers climate impacts far from the source of the emissions, and that the German court has agreed to hear it. A second case in the coal power sector is the recent climate lawsuit against Polish utility Enea started by the NGO ClientEarth, over the planned €1.2 billion coal plant in north-east Poland.⁷⁴ ClientEarth argues the 1 GW Ostrołęka C power station poses an “indefensible” financial risk, as rising EU carbon prices and cheap RES threaten the project’s profitability. The NGO bought a small number of shares in the company to give itself a legal avenue to challenge the project.

Multiple factors are ending the era of coal power expansion and may signal the beginning of a global reduction of the coal fleet. However, as analysed in the next section, **changes in policies and trajectories for coal demand still differ widely across the world.**

Wide uncertainty about future coal demand

The outlook for future coal demand differs widely in the short-medium term and long term and according to scenarios. In the short-medium term, according to the IEA 2018 Coal Report, which looks at trends in coal markets **over the period 2018-2023, coal demand will remain stable** over the period as strong growth in India and Southeast Asia is offset by declines in Europe and North America.⁷⁵ Coal's contribution to the global energy mix will fall to 25%, as most of the growth in energy demand comes from renewables and natural gas.

The long-term future of coal is much more uncertain. The IEA World Energy Outlook 2018 (WEO 2018) scenarios illustrate these uncertainties.⁷⁶ In the **New Policies Scenario (NPS)**, global coal demand broadly stagnates around the current level (around 3,800 Mtoe) over the period 2017-2040 as strong growth in India and other emerging Asian economies is offset by declines in China, North America and Europe. The share of coal in the energy mix is of 22% in 2040.

Global coal-fired electricity generation increases by less than 5% from 9,858 TWh in 2017 to 10,335 TWh in 2040, in stark contrast to the doubling over the last 25 years. In turn, coal’s share of global electricity supply tumbles from 38% in 2018 to 26% in 2040. The amount of coal consumed in the sector declines by 1.6% by 2040 to **2353**

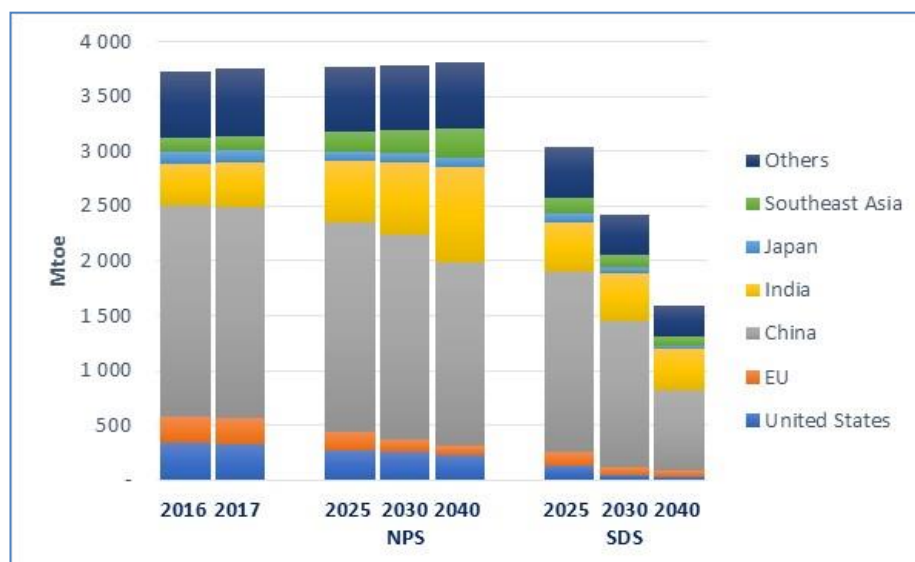
74. *Climate Home News*, “Polish utility sued over financial risk of €1.2bn coal plant”, 29 October 2018, available at: www.climatechangenews.com.

75. IEA (2018c), *op. cit.*

76. IEA (2018b), *op. cit.*

Mtoe, reflecting the increasing contribution of more efficient supercritical and advanced technologies. The fleet of coal-fired power plants reaches a plateau in the early 2020s and remains flat at some 2,200 GW up to 2040. The expansion of coal-fired power is concentrated in China, India and Southeast Asia. In 2040, Asia holds more than 80% of coal capacity and accounts for 82% of global coal-fired electricity generation. In this scenario, CO₂ emissions from coal power remain basically flat at some 9.5 Gt over the period 2017-2040 (10 Gt in 2018) and total energy-related emissions rise to 35.9 Gt in 2040.

Graph 18: Total coal demand in the IEA’s WEO 2018 New Policies Scenario (NPS) and Sustainable Development Scenario (SDS)



Source: IEA (2018b).

The **Sustainable Development Scenario (SDS)**, a new Scenario developed by the IEA in WEO 2017, **reflects the energy components of the UN Sustainable Development process**. It starts with a vision of where the energy sector needs to stand in 2040 to achieve three policy goals – urgent action on climate change consistent with the Paris Agreement target, achieving universal access to modern energy by 2030 and significantly reducing air pollution – and then maps **how to achieve them**. The CO₂ emissions trajectory of the Sustainable Development Scenario is lower than most published decarbonisation scenarios aiming for a temperature rise of well below 2°C (but not those of the IPCC limiting global warming at 1.5°C). The scenario implies a profound and rapid shift on both the demand and supply sides of the energy sector, with the result that CO₂ emissions peak soon and then decline rapidly on a course towards net-zero emissions by 2070.

The Sustainable Development Scenario offers a very different outlook for the coal and electricity sectors from the New Policies Scenario, among others.⁷⁷ With a rising proportion of electricity in final energy use, the power sector plays an increasingly critical role in delivering the access, air pollution and climate outcomes. Power generation is mostly decarbonised by 2040: 85% of global generation comes from low-carbon sources, compared with 51% in the New Policies Scenario, and 35% today. One of the drivers of this profound change is the introduction of a CO₂ price that increases to \$140/t CO₂ in 2040 in advanced economies and to \$125/t CO₂ in 2040 in many developing economies.

The goals of the Sustainable Development Scenario are not compatible with unabated coal use, and thus **global coal demand falls by 2.6% per year on average**, over the period 2017-2040 to **1,600 Mtoe in 2040**. Coal demand peaks before 2020. About 90% of the decline in coal use in 2040 occurs in the power sector alone. In this scenario, **global coal-fired electricity generation decreases by 80% to 2040 compared to 2017 to some 2,000 TWh**. In 2040, coal accounts for only **5% of the global electricity generation** and 65% is from plants fitted with carbon capture, utilisation and storage (CCUS), mostly in China and the US. Unabated coal plants operate far less often, providing power primarily when low-carbon sources (e.g. wind and solar PV) are not available. High load factors of 60-70% are confined to plants equipped with CCUS.

In the Sustainable Development Scenario, **CO₂ emissions from coal power are reduced to 1.2 Gt by 2040**, helping total energy-related emissions to drop to 18.3 Gt in 2040. Emissions from coal-fired power fall by 90% to account for only 5% of total GHG emissions.

Phasing out the use of unabated coal-fired power generation is a key feature of the power sector transition in the Sustainable Development Scenario. The coal fleet sharply reduces after 2025 and **coal capacity is only 1,120 GW in 2040**. In 2040, Asia holds 86% of coal capacity and accounts for 85% of global coal-fired electricity generation.

CCUS is one of the essential components of action to deliver the goals incorporated in this Scenario, which sees some 210 GW of coal plants worldwide being fitted with CCUS by 2040 (20% of the coal fleet).

77. Energy efficiency is the most important factor for reaching the Sustainable Development Goals most closely related to energy, and considerable efforts on energy efficiency temper electricity demand growth in this scenario. As a result, total electricity demand is around 7% lower than in the New Policies Scenario by 2040.

Conclusion

Three years after the Paris Agreement, the attitude towards coal still differs across regions according to the role of coal in their electricity mix, their rate of economic development and power needs. One key conclusion is the acceleration of efforts to reduce coal demand, as illustrated by new policies in the EU, China and India. The slight rise in global coal demand in 2017 and 2018 does not call into question some fundamental trends. Investment in the global coal power sector has declined dramatically and passed an all-time high in 2015. This will reduce coal demand in the medium term. But a second key conclusion is that the world is still divided about the role of coal.

- Phase-out policies are spreading in more and more OECD countries to reduce CO₂ emissions rapidly in line with the goal of the Paris Agreement. The EU is a sterling illustration of these policies. There are now 17 EU countries which will not use any coal in their power mix by 2030 or earlier. The coal phase-out roadmap in Germany was a landmark announcement at the beginning of 2019. In heavy coal-dependent countries (China, India), the fast development of renewables reduces the share of coal in the power sector, although both countries have not yet reached the point where their coal power generation decreases. In China, despite the fast deployment of renewables and other low-carbon sources of electricity, these sources cannot yet fully keep up with rising power needs, requiring an increase in the use of coal in the power sector. But Chinese total coal demand peaked in 2013 due to strong policies and measures against air pollution, a switch away from coal and the shift of the economy from heavy industries towards the services sector. These fundamental trends are not called into question by the increase in coal demand in the short term. In India, despite the pronounced rate of increase in gas demand in 2018, new coal construction activity plunged for the second year in a row. The ambitious goals to raise the share of renewables in the power mix, combined with ongoing efforts to increase coal power plants' efficiency and retire highly polluting and inefficient coal plants, will limit the growth of coal demand in the medium term. Demand for coal by the US power sector continues to shrink despite efforts by the Trump's administration to reverse the situation. US power utilities are transitioning towards renewables and natural gas. And no new commercial investment in coal generation is expected in the country.

- On the contrary, several emerging countries in Asia, but also in Africa, are still relying upon coal to fuel their economic development and the rising power needs of a growing population. Despite their willingness to move to a cleaner energy mix, they still view coal as an economic and secure solution to their economic and social development, a trend that can only be reversed if alternative solutions, at the same scale and with the same attributes, are promoted.

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