TREND
FOSSIL FUELS

In a Recovering Economy, Asia Fans the Flames of the Fossil Fire

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Although progressively phased out in Europe and the United States by gas or renewable energy, coal-fired power plants have retained strong public support in Asia. In the future, fossil fuels will continue to be consumed.

DATA OVERVIEW

Despite a slowdown during the pandemic, coal use was quickly restored

2020 saw the greatest drop in energy-related CO_2 emissions since the World War II (-1.9 $GtCO_2$, i.e. a drop of 5%). The drop was 10% in the United States, 11% in the European Union (Germany: -9%, France: -11%), and 6% in India. In contrast, despite a sharp drop at the beginning of 2020, China's emissions ended the year up by 1.6%.[1] Then, 2021 started with the recovery of the economy, coupled with a major increase in emissions (**fig. 1**). The International Energy Agency (IEA) predicts that there will be a global increase in energy demand in 2021: this increase in energy-related emissions is on track for becoming the second highest ever recorded without exceeding 2019 levels.[2]

In 2020, oil and coal were not spared by the contraction in demand, with their primary demands dropping by 8.6% and 4% respectively.[3]

Globally, the demand for coal in 2021 is expected to reach a peak equalling the 2014 peak, with 80% of this increase concentrated in Asia, and over half of this being in China[2]. In fact, the construction of coal-fired power stations has not drawn to a halt during the pandemic. While the world capacity of coal-fired plants was reduced by 37 GW in 2020, a record decrease since 2015, an additional capacity of 50 GW was recorded, the lowest since 2006[4]. Therefore, coal-fired electricity production went up at a slower pace compared to what was observed in 2020, but it was still an increase all the same. In 2021, it is predicted that 45% of the increase in electricity demand will be supplied by fossil fuels[5].

The drop in electricity demand caused by the pandemic has led to a drop in production from coal-fired power plants and priority was given to renewable energies on the grid. Coal was also subject to structural competition due to a drop in prices of natural gas. This was a particularly clear trend in the United States, where the capacities of coal-fired power stations dropped by 114 GW between 2011 and 2020[6], and 11.3 GW in 2020. Europe also experienced this trend as there, coal-based electricity production has almost halved since 2015[7].

Over the course of recent years, coal has been increasingly substituted by gas (coal-to-gas). In the United States, 85% of coal-fired power stations[8] repurposed to burn other types of fuel between 2011 and 2019 were turned into gas power stations. Due to low prices, abundant offers and gas reserves being drained by a cold winter, this trend was accelerated and became entrenched in 2020. Although China, Europe and the United States had the biggest drops in gas demand over the course of the first few months of 2020, the decline wasn't as big as it was for coal[9]. According to the

FIGURE 1

THE EVOLUTION OF CO_2 EMISSIONS BY TYPE OF FUEL 1990-2021 (PROJECTION FOR 2021)

Source: IEA, 2021

Energy Information Administration (EIA), gas represents 36% of CO_2 emissions linked to energy in the USA. Nevertheless, the agency expects this percentage to be lower in 2021 with an increase in gas prices.[10] In Europe, natural gas consumption dropped in fifteen of the EU's member States, whereas it remained constant and even sometimes increased in the twelve other States.[11]

Like with coal, the Asia-Pacific region expected the highest rebound in gas demand. In fact, as the region's emerging and developed economies are gradually recovering from the crisis, a high demand in liquefied natural gas (LNG) is to be expected.

THE OBSERVATORY'S LENS

In competition with gas and renewables, coal remains a key part of Asia's energy mix

The dying embers in Europe and the United States

The popularity of the use of coal to produce electricity presents a contrasting picture on the global scale, with notable declines recorded in the United States and Europe. The combined consumption of coal in these two regions currently represents around 10% of the world total.[12] This decline in coal isn't necessarily due to voluntary policies, but rather due to market trends and notably, a loss in profitability of coal-fired power generation.

At the start of 2020, coal-fired plants representing 268 GW of capacity had already shut down across the United States and Europe since 2010, resulting in a net loss of 138 GW in capacity over the period.[13] In the United Stated, natural gas, which is extremely abundant and accessible, is used as a substitute for coal due to coal's loss of profitability. This was combined with a 30% drop in gas prices in 2019 in the United States,[13] and a reduction in electricity demand during the pandemic, which promoted a drop in the use of coal. In Europe, half of all coal-fired power stations have already been closed down, or there has been a commitment to shut them down between now and 2030.[14] This is the combined product of the market forces, the EU's environmental regulations and the pandemic. While the price of carbon on the European Union Emissions Trading Scheme (EU ETS) has long been capped at around €5/tonne since the creation of the scheme in 2005, it has soared since the end of 2020 to over €50/tonne from May 2021.[15] This was because of the anticipation of a quota restriction issued by the EU, which precipitated purchases and drove prices up.

There was also an additional incentive for the emissive industries to decarbonise[a] but in the context of increasing oil prices and tensions surrounding the Nord Stream 2 gas pipeline project, the gas and electricity prices paid by the consumer could also increase. In total, fourteen of the EU's member States have already stopped using coal, or will between now and 2030, but some have fixed objectives for a later date, such as Romania for 2032 or Germany for 2038.[16]

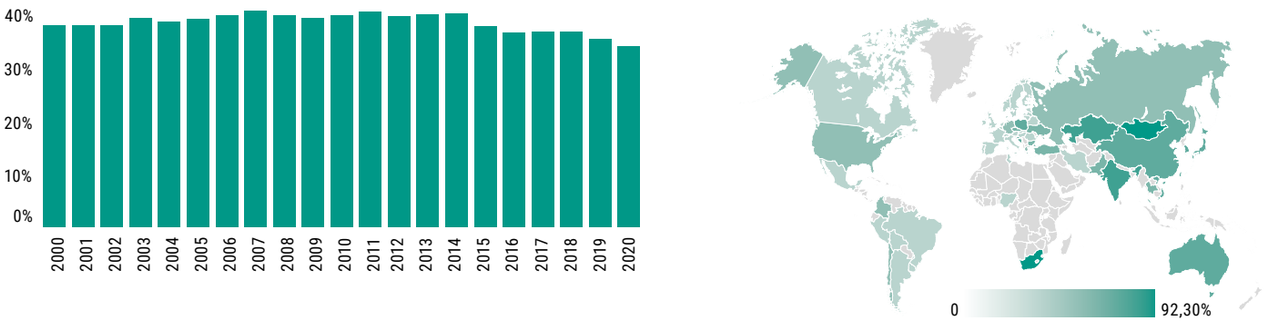
Germany is one of the three top consumers of coal in Europe – forming the "lignite triangle"[17] with Poland and the Czech Republic. This dependence generates criticism and concerns, under the pressure of climate objectives and the increase in

a In September 2019, the report from the High Commission on Coal Prices, directed by economists Joseph Stiglitz and Nicholas Stern, concluded that *"the unequivocal level of carbon prices compatible with achieving the temperature targets set by the Paris Agreement is at least 40 to 80 dollars per tonne of CO_2 for 2020 and 50 to 100 dollars per tonne for 2030, provided that the supporting favourable policies are implemented."*

FIGURE 2

SHARE OF COAL IN GLOBAL ELECTRICITY GENERATION, 2000 TO 2020; AND SHARE IN NATIONAL ELECTRICITY GENERATION, 2020

Climate Chance, based on data from Ember



coal prices. At the same time, the German private sector is working to gradually eliminate coal. The energy giant RWE, for example, has signed a public-law contract with the government to gradually stop using lignite. A coal-fired electricity plant has already been removed from the network and three others will be removed over the course of the year. RWE aims to have "carbon neutrality" by 2040.[18] The energy supplier Eins Energie also plans to cease all electricity and heat production generated by coal between now and 2023.[19]Germany and the Czech Republic have both progressed more rapidly than Poland, which has set the objective of closing its last coal mine between now and 2049. The government will nationalize non-profitable power plants, thus opposing market forces to ensure a "gradual and long-term" transformation of the electricity sector.[20]

In Spain, the evolution of coal is an example of the combined effects of the market's forces and regulations. In the past, coal was Spain's predominant energy source, but its decline began in the 1980s with competition from other sources of electricity production. There has been an accelerated transition in the past few years due to a drop in energy demand. This was exacerbated by the 2008 economic crisis, as well as the application of the EU's environmental standards.[21] More recently, the Spanish electricity company Endesa announced it would bring forward the closure of all of its coal-fired stations to 2021. Seven of the country's fifteen coal-fired power stations belonging to Naturgy, Endesa, Viesgo and Iberdrola, already closed in June 2020 and four others will soon follow suit. These closures have been precipitated by the low electricity demand during the pandemic,[22] with no coal exit plan ever formulated by the Spanish government.

Like the Czech Republic and Germany, Spain has set up an institute and its own strategy to ensure a Just Transition, to negotiate and ensure a coal exit which is fair for the workers who work in the regions where the power plants are closing. In order to achieve that and insofar as closing mines and power plants in regions that are dependent on coal, it is the unions that lead negotiations with the government. An agreement was signed in 2018 between the government and the Workers' Commissions (CCOO), the Unión General de los Trabajadores (UGT: the General Union of Workers), the Unión Sindical Obrera (USO: the Workers' Labour Union) and the Federación Nacional de Empresarios de Minas de Carbón (Carbounión, the National Federation of Coal Mine Entrepreneurs). This agreement plans to put 250 million euros of investments into the mining regions.[23] A second agreement, signed in 2020 by the government, the unions and EDP, now covers all the Spanish thermal power plants. It is presented as a "unique pact in the world" by the government and it notably plans to set up "fair transition conventions" on a cantonal level, which include employment transition plans and the maintenance of economic activity.[24]

Other European countries have accelerated their coal exit strategies. Since the closure of the Sines power plant (1,296 MW) by EDP in January 2021, Portugal no longer has a single thermal power plant running on coal.[25] Consequently, their exit from coal has been moved forwards from 2023 to late 2021, despite it generating a quarter of the country's electricity from 2017[26] Earlier, Austria shut down its last power plant in April 2020.[27]Although a slight resurgence in coal usage is predicted on a global scale in 2021, the viability of this fuel in the long-term seems fragile in Europe, whereas renewable energies are increasingly more readily available (**see PPA Trend**).

Asia fans the flames

The global demand for coal is mainly driven by China, India, and certain countries in South-East Asia. China produced over half of the world's electricity generated from coal in 2020, whereas renewable energies covered around half of its increase in electricity consumption. 38.4 GW of new coal capacities have been set up in China in 2020, accounting for almost 80% of the 50 GW of new global capacity created, despite promises to cut down on the use of coal and the Chinese State's commitment to aim for carbon neutrality by 2060[28]. In addition, China remains the main driving force behind international coal demand, even though this demand should stabilise between 2021 and 2025: the 14th five-year plan of the Chinese government promises to "*rationally control the scale and development pace of electricity produced from coal*"[13]. The recent introduction of an emissions trading scheme for electricity generation is expected to boost this momentum. As can be seen in **figure 2**, Asia, although not an isolated case, represents a strong concentration of States which have a high

share of coal in their electricity generation. While individual countries or regions have been progressively reducing the percentage of coal in their energy mix, the global percentage shows a more gradual decline over the years.

Other Southern and South-East Asian countries (notably India) are also set to increase their coal electricity production capacities in 2021. While the pandemic has slightly cooled down these projections, the prospects for coal in 2025 are now lower than those predicted in 2019.[13] In India, no new coal-fired electricity power plant was opened in 2020, and electricity production generated from coal dropped by 5%, bearing the entire weight of the lockdowns.[29] The government encouraged an increase in the extraction and production of coal, with potential additions to its coal production capacity in the near future, sending out contradictory messages relating to its energy transition objectives.[30]

The Indian government is looking to increase the efficiency and competitiveness of the coal sector, by introducing commercial mining. In November 2020, 50 million tonnes of annual coal extraction capacity were auctioned to the private sector, even if that only represented a small fraction of the country's production level, which is around 800 million tonnes a year[13]. In June 2021, a second phase of putting the capacity up for auction was announced: at a much more significant level with 36 billion tonnes of resources up for grabs[31]. Both points of view have been defended: on the one hand, this commercialisation would lock India into coal, and it would make coal cheaper and more readily available for electricity companies. On the other hand, it was also argued that this commercialisation would only reduce the country's coal imports, whilst responding to internal demand, and thus not contribute to an increase in emissions.[32] The Institute for Energy Economics and Financial Analysis (IEEFA) estimates that most of the 33 GW capacity coal-fired power plants being built and 29 GW capacity coal-fired power plants in the pre-construction stage in India, could end up being stranded as the price of coal struggles to keep up with the constantly declining prices of renewables.[33] The price increase observed from the start of 2021 relating to Australian thermal coal (+86%) and South African thermal coal (+44%), two major exporters of coal to Asia, seems to confirm this trend.[34]

Indonesia, a major producer and exporter of coal, protects its coal industry with subsidies for upstream investment in coal, with an argument to promote domestic enterprises. The country is now driving 75% of the planned coal-fired power projects in South-East Asia. In addition, the government has modified a legislation, allowing the coal industry greater control over mining permits.[35] By converting its coal-fired power stations to a combustion combined with biomass, the public electricity company PLN has attempted to begin the transition, but the feasibility and economic viability of this shift in Indonesia have been doubted, given the high prices of biomass with a high calorific value.[36]

More recently, PLN announced the full closure of all its coal-fired power plants between now and 2055. This sent out mixed signals, as the business also announced that no less than 117 power plants in construction would be operational over the course of the next few years. Although the announced

FIGURE 3

COAL INVESTMENT FLOWS IN SOUTHEAST ASIA

Source: Climate Analytics, 2021

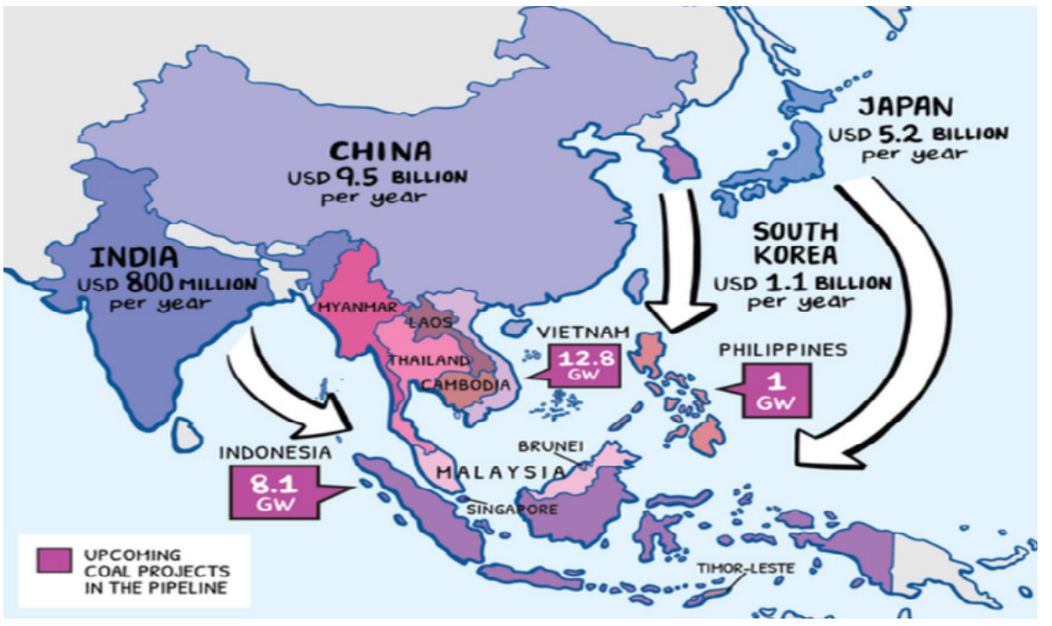
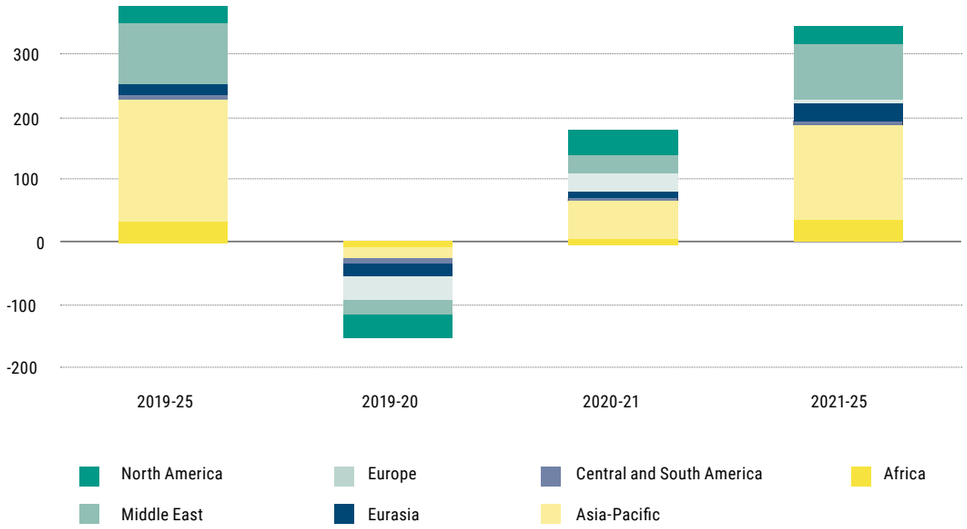


FIGURE 4

REGIONAL BREAKDOWN OF GAS DEMAND GROWTH, 2019-2025

Source: IEA, 2020.



closures were supported by activists, they were called into question by government officials and the industry.[37]

Adding to this are the concerns over projects financed by external funds, with Japanese, Chinese and Korean businesses investing in the region while their national markets have turned towards renewable energies.[38] The broader patterns from Southeast Asia, where state policies, industry control and external investments (**fig. 3**) are all helping coal survive as a fuel, have been identified as perpetuating the "myth of cheap coal" – contrary to market trends from around the world. The pursuit of public investments in coal infrastructures makes alternatives relatively more costly, which in turn delays the gradual elimination of coal.[39] At the same time, countries like Japan and Korea are committed to reducing the use of coal in the years to come. With the recent abandonment of their latest project for a coal-fired power plant, Japan is no longer planning to go ahead with any new constructions[40]. Although the State has the objective of closing 100 power stations deemed ineffective between now and the end of the decade, it is also planning to replace some of them with more efficient power plants with better performance[41]. Japan, along with the US, remain the two G7 countries stopping a full exit from coal for the group, with the former depending on coal to ensure energy security, and the latter caught in a conflict of political interests as the Democrats try to maintain their margin of majority in the Senate.[42,43]

Japan also announced that it would stop exporting coal-fired power stations and that it would only authorise the export of "high efficiency coal technologies", by supporting other countries with their "ultra super-critical power stations" to reduce the emissions of coal-fired power stations, to improve efficiency, to enable coal gasification, CCUS and coal recycling.[44] Two major Japanese banks, Sumitomo Mitsui Financial Group and Mizuho, are committed to decarbonising their investments and to no longer financing coal. However, several NGOs are worried that the loopholes in these commitments will allow banks to keep financing coal by indirect means[45]. The Malaysian bank CIMB has committed to stop asset level and general corporate financing for coal by 2040. CIMB has also declared that it expected electricity production businesses to put in place diversified strategies to reduce dependence on coal, an uncommon position with regards to the financing of coal in South-East Asia.[46]

South Korea has committed to cease the financing of coal abroad[47]. This commitment was added to the announcement made by G7 to cease the financing of electricity generation projects using coal by late 2021[48]. Moreover, whilst other countries like Vietnam and Bangladesh have committed to reducing coal development, the Philippines announced a moratorium on this fuel. The case of Vietnam is also exceptional in terms of its boom in solar PV (**see Vietnam case study**).

Natural gas: The final frontier

Whilst the governments and banks are trying to turn their backs on coal, gas is sometimes presented as the bridge fuel which must be used to make the transition go more smoothly. The G7 countries, with the exception of Japan, provided negligible funding for coal over the past few years. However, they are now relying a lot more on gas, which received 16 billion dollars of public financing between 2017 and 2019.[49]

In particular, the global trade of liquefied natural gas (LNG)[b] experienced an increase of 1.4 Mt in 2020, reaching 356.1 Mt. However, this increase was greatly hindered by the pandemic[50]. Japan, China, South Korea, and India are the biggest importers of LNG in the world, while Qatar and Australia dominate production. The pandemic has pulled back gas prices even more, which has benefitted Asian importers with their short-term purchases and their regasification capacities, particularly in China, India, Myanmar, and Bangladesh. On the contrary, the European markets have become tense under the effects of extended lockdowns, a slowdown of activity, and the increasing share of renewables in the energy mix[51].

The Asia-Pacific region will be the driving force behind the increase in demand and represent over half the increase in global gas consumption in the years to come[51] (**fig. 4**). The biggest rebound, especially expected by the hard-hit US LNG industry, is to be driven by China, though with stiff price resistance[52].

Contrary to coal, the demand for gas is set continue increasing well into the century, and reach its peak in 2037, thus becoming the fossil fuel with the longest growing demand. The demand for LNG, which is the main driving force behind the international gas trade, is set to grow even up until 2050[53]. This situation has attracted the attention of activists, who have now refocused their efforts on fighting against the gas industry. For example, the South-Korean SK *chaebol* (conglomerate) has recently faced a spirited reaction from activist groups for a major LNG contract in Australia, despite its promise to put an end to oil and gas investments abroad[54].

The financing of LNG projects in the electricity sector is often justified by its role as a bridge fuel. According to a study by the International Institute for Sustainable Development[55], gas projects in countries with low or middle income, receive four times the amount of financing received by solar power or wind projects. For example, Japan recently announced a public financing of 10 billion dollars for the ASEAN countries within the framework of the Asia Energy Transition Initiative (AETI), which also covers LNG projects in the transition process[56].

At the same time, Wood Mackenzie observed a push for "greener" LNG purchasing contracts in Asia, coupled with compensation credit for buyers. For example, in the agreements between Shell and several Asian buyers, offsets are carried for emissions right from upstream processes to end-use. In another example of an agreement between the Japanese utility JERA and an Indian buyer, only the downstream combustion was offset[57].

As international finance for coal declines, and Asian countries go through with their energy transitions, the demand for gas in these countries is set to increase – for industrial processes, and transport, as well as power generation. The simultaneous shift in Europe towards renewables and away from fossils, would thus render the Asian markets all-powerful in setting the global prices for gas.[58]

KEY TAKEAWAYS

The first months of the pandemic were marked by an unprecedented drop in energy demand and related emissions all over the world, with economic activity slowing down and lockdown measures imposed in several countries. Over the course of that period, coal, gas and oil experienced the greatest drops in demand, while renewable energies emerged as the star performers. As the world adapts to the pandemic and economies recover, the observed trend is not only one of continual expansion in terms of renewable energy, but also a resurgence in terms of coal and fossil fuel use. This resurgence, which is largely concentrated in Asia, is in juxtaposition with the current climate where increasing commitments are being made in favour of reducing emissions and implementing an energy transition strategy, as the unprofitability of coal increases.

Gas continues to experience a strong growth in demand, driven by Liquefied Natural Gas. At the same time, there is also increasing activism against its use, while renewable substitutes become increasingly accessible.

b Liquefied Natural Gas (LNG) is a gas which has been transformed into a liquid state, making it easier to store and transport, notably via ships, limiting the need to resort to pipelines. It can then be gasified or used again, or be directly used as a fuel for transport.

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