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The Coal Reality That Western Policy Ignores

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The Issue

One outcome from the disruption in oil and gas markets caused by the war against Iran has been a renewed appreciation for the foundational importance of coal in meeting global energy demand. As Asia was forced to reduce its reliance on liquid natural gas (LNG) following the closure of the Strait of Hormuz, thermal coal markets responded. Bangladesh, Japan, the Philippines, South Korea, Taiwan, Vietnam, and others—all capable of shifting from LNG to coal for reliable power generation—recorded an increase in coal imports.[1] Europe, too, increased coal use to bolster energy security.[2]

Even prior to the war, global coal demand had reached record levels of about 9 billion metric tons in 2025, with thermal coal trade measured at well over 1 billion metric tons (Bt) annually.[3]

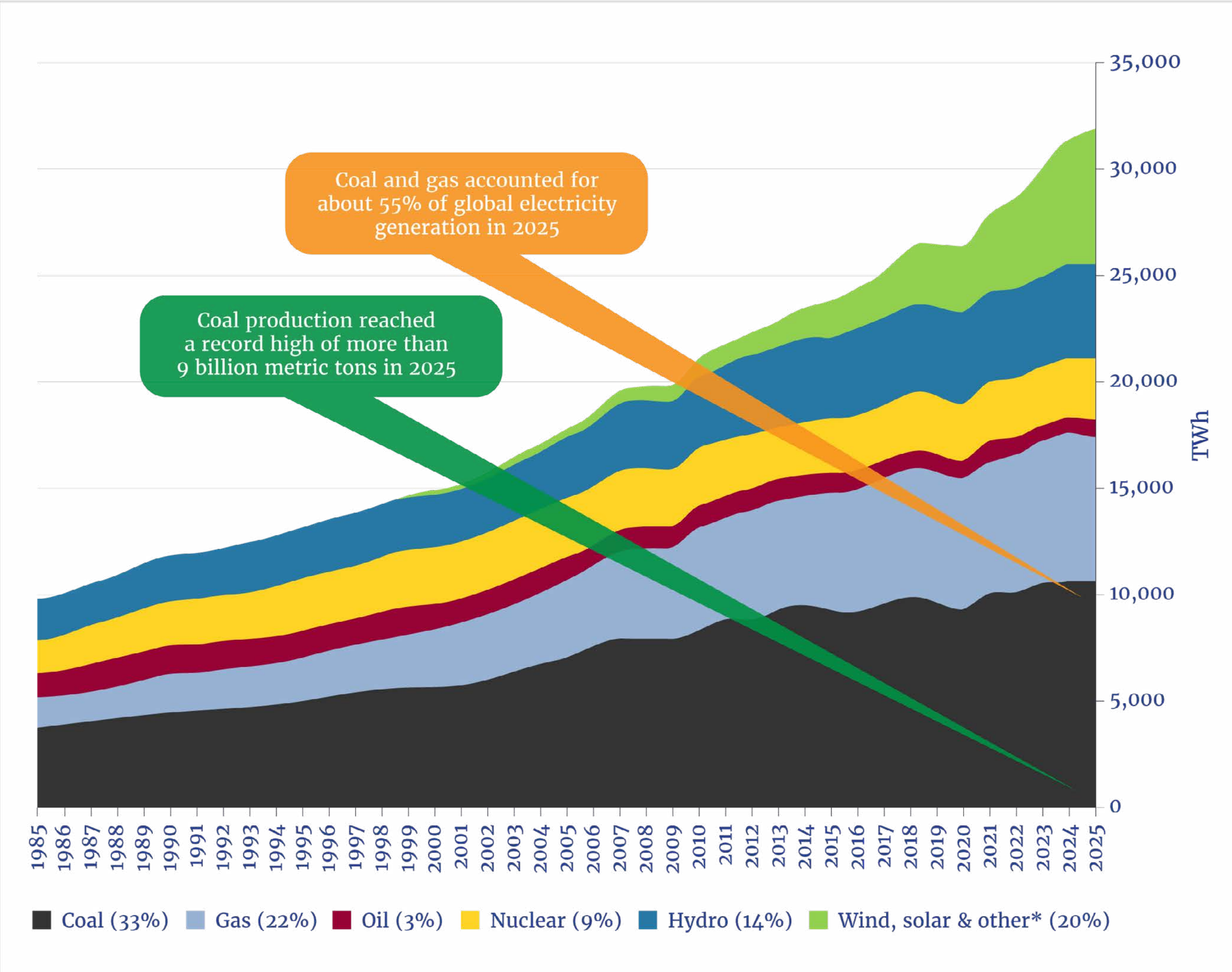
Despite coal's persistent rise in global energy supply—accounting for over one-third of all electricity generation (see **figure 1**)—Western energy policies continue to assume its structural decline, seeking to marginalize its role through regulation and financing constraints. Markets, however, treat coal as a critical fuel and essential industrial input. In 2024, a report by the Association of Southeast Asian Nations (ASEAN) Centre for Energy declared that "coal currently outperforms other energy sources in terms of supply security, reliability, affordability and—to some extent—sustainability in ASEAN's power generation," while adding that any "strategic shift from coal should be implemented at the right time as soon as economic and environmentally friendly alternatives at the grid scale become available."[4]

Given its cost competitiveness and wide availability, markets indicate that coal will not be possible to replace in the foreseeable future, especially (but not only) for critical industrial applications. Last year, the International Energy Agency (IEA) forecast—under its Net Zero Emissions by 2050 Scenario—a decline in coal demand of about 35% by 2035.[5]

In May 2026, the IEA acknowledged that "coal remains critical to meet growing electricity demand and fulfil key power system needs" but continued advocating for rapid phaseouts, even in Southeast Asia.[6] Yet the data indicate sustained or growing reliance on coal in emerging markets, and persistent global instability suggests that the same might hold true for the developed world—for decades to come. Those seeking a lower-coal future may need to recognize the counterintuitive value of targeted investment in coal to prevent power disruptions, higher costs, and unintended environmental or reliability consequences.

Figure 1.

There Is No Transition, Only Addition



**Other* includes geothermal, biomass, and other sources of renewable energy such as biofuels.

Sources: Adapted from Lars Schernikau, "Coal Keeps the Lights On . . . Are We Experiencing a 'New' Renaissance of Coal?," *The Unpopular Truth* (blog), March 18, 2026. Data from Energy Institute, *2025 Statistical Review of World Energy*, 74th ed. (Energy Institute, 2025); and "Electricity Data Explorer," Ember, accessed June 22, 2026, https://ember-energy.org/data/electricity-data-explorer.

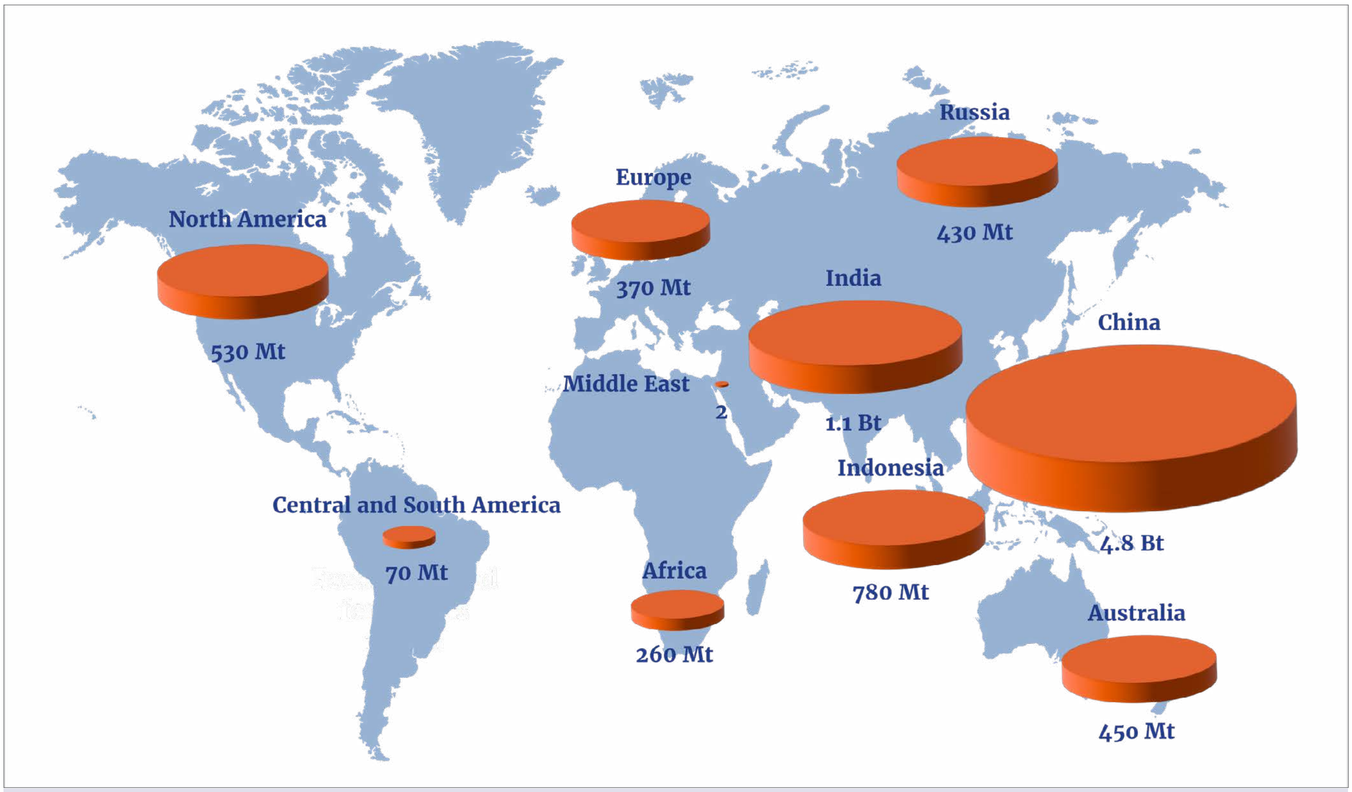
The Reality

Electricity, industry, trade, fertilizer production, and energy security all depend on coal to varying degrees. Coal serves as the most important fuel and chemical reductant for producing key materials of modern civilization, central to supply chains for steel, cement, metals, fertilizers, consumer goods, electronics, and energy infrastructure itself. Like oil and gas, coal is the material basis for thousands of everyday products beyond its utility as an energy source.

When Western countries offshored heavy industry, production shifted to regions where coal remains dominant. Global coal consumption has risen from just over 6 Bt in 2008 to almost 9 Bt in 2025 (see **figure 2**).[7] Seaborne coal trade (thermal and metallurgical) grew from about 800 million metric tons (Mt) to roughly 1.5 Bt in the same time frame, making it one of the world's largest material flows. Coal accounts for almost 10% of all globally extracted mineral resources.[8] Meanwhile, air quality has improved significantly worldwide.[9]

Figure 2.

Global Coal Production



Note: Totals exceed 9 Bt. *Bt* denotes billion metric tons, and *Mt* denotes million metric tons.

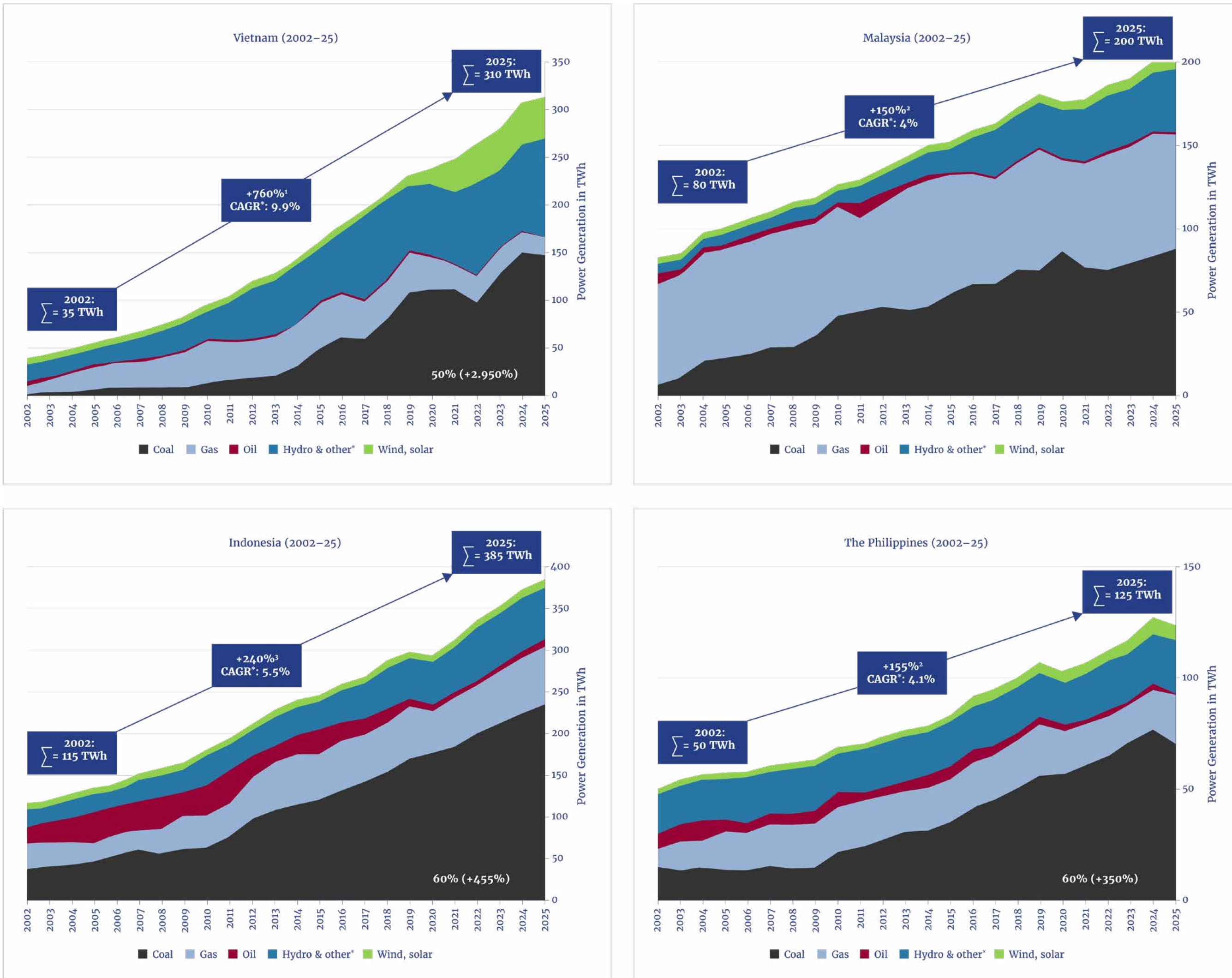
Sources: Adapted from Lars Schernikau, "Coal Keeps the Lights On . . . Are We Experiencing a 'New' Renaissance of Coal?," *The Unpopular Truth* (blog), March 18, 2026. Data from International Energy Agency (IEA), "Demand," in *Coal 2025—Analysis and Forecast to 2030* (IEA, 2025), 12–42; and Schernikau's independent research and analysis.

Asia has driven this growth. In 2025 alone, China commissioned about 80 GW of new coal-fired capacity—equivalent to roughly 70% of Europe's remaining coal fleet.[10] China's coal capacity is likely to continue expanding for grid stability, even as utilization rates adjust downward due to increases in wind and solar power.[11] India, too, plans substantial increases, with coal consumption projected to rise from about 1.2 Bt today to roughly 2.6 Bt by 2047 and about 100 GW of new coal plants planned within the next decade.[12]

Other Asian countries have seen dramatic growth (see **figure 3**). Vietnam's coal consumption has increased 750% in the last two decades. Malaysia, Indonesia, and the Philippines have more than doubled or tripled their consumption since the beginning of the millennium. All told, coal-fired thermal plants produce over one-third of the world's electricity.

Figure 3.

Electricity Generation in Select Southeast Asian Countries



* *Other* includes geothermal, biomass, and other sources of renewable energy such as biofuels.

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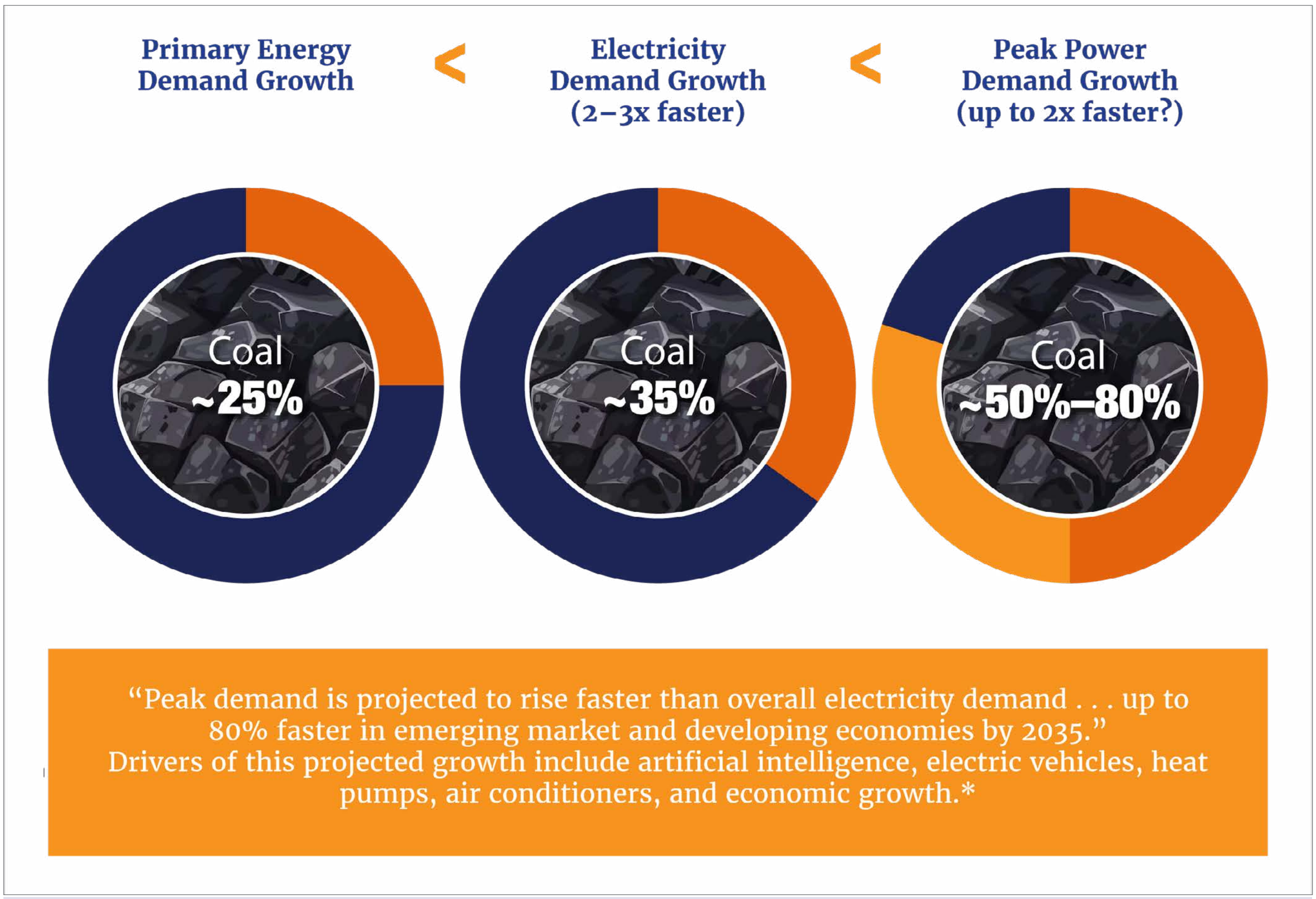
Keeping Lights On and Powering Industry

Energy systems operate in three interconnected tiers: primary energy, electricity, and peak power demand (see **figure 4**). While all have grown alongside population and economic development, electricity demand has outpaced primary energy growth. Peak demand has grown fastest—in some regions, twice as fast as electricity. Coal dominates the energy sources capable of meeting both baseload and peak power demand and, perhaps surprisingly, is most critical in meeting peak power demand. Coal's share of generation increases when grids face stress, as seen in the U.S. and many parts of Asia and Europe.

Figure 4.

A Three-Tiered Energy System



Sources: Adapted from Lars Schernikau, "Electricity for Data Centers . . . Is AI the Driving Force?," *The Unpopular Truth* (blog), January 24, 2025. Data from Schernikau's independent research and analysis.

* International Energy Agency (IEA), *World Energy Outlook 2024* (IEA, 2024), 43.

Coal-fueled thermal power plants play a critical role in the physical stability of electrical grids.[13] For fundamental physical reasons, large rotating synchronous machines (found in coal, gas, hydro, biomass, and nuclear power plants) are needed to ensure grid firmness and frequency stability. By contrast, wind and solar are not just intermittent—they deliver power through inverters, producing what is termed *digital power*. Digital power means that they are inherently based on power electronics that provide none of the vital grid characteristics that rotating, heavy-mass, synchronous machines with inertia provide.[14] Utility-scale batteries also provide digital power. When sudden supply or demand disruptions occur, thermal plants with inertia are vital for keeping the grid stable and preventing cascading failures. The central trigger of the massive April 2025 Iberian Peninsula blackout—which affected some 50 million people—was the absence of that inertia on a grid that had been over-reliant on digital power, primarily solar.[15]

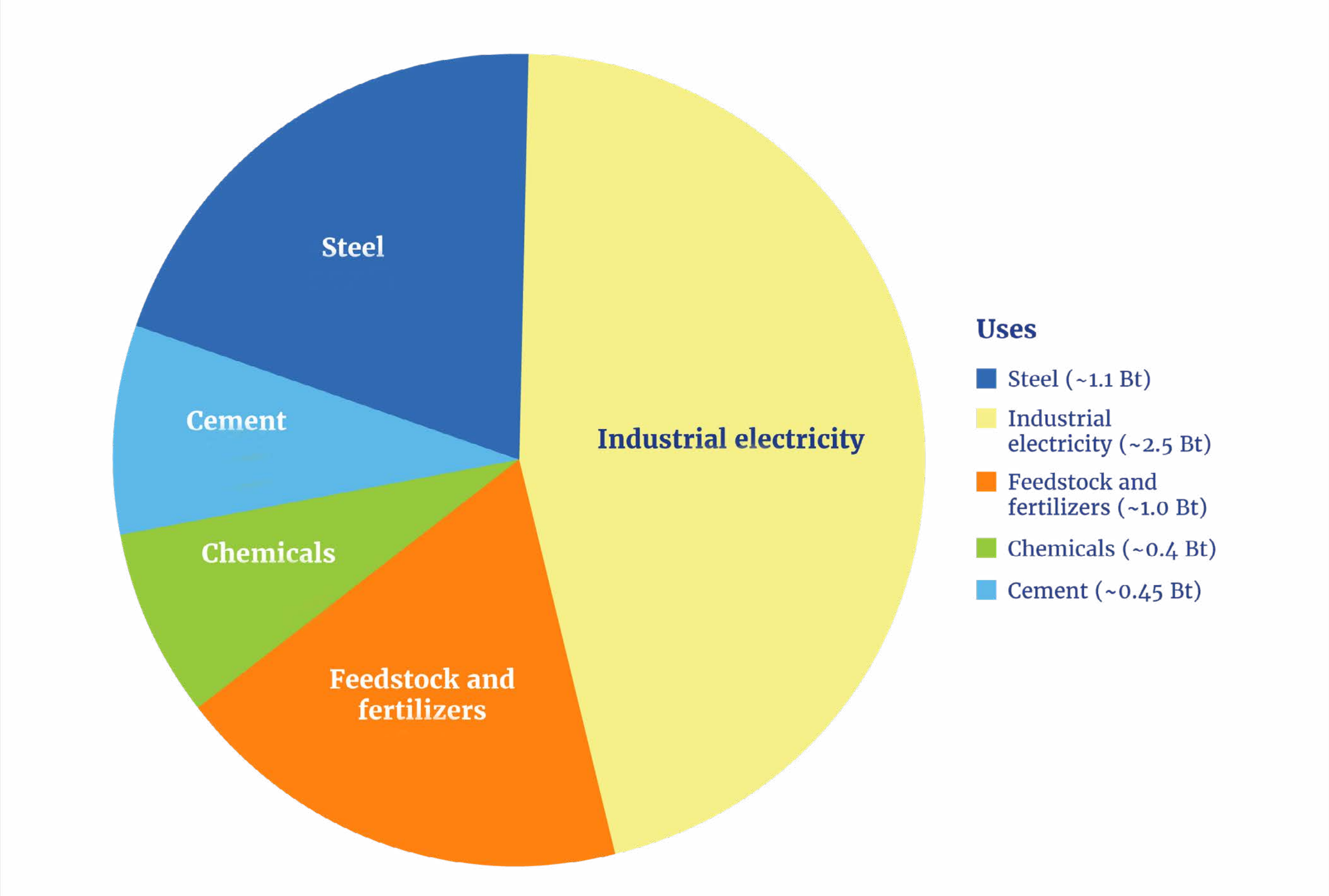
In addition to grid reliability and stability, coal offers strong energy security and affordability. Coal is cheaper than nuclear and gas (especially LNG) in most of the world, and months' worth can easily and inexpensively be stored near power stations to meet sudden increases in demand. Countries with substantial domestic reserves—such as China, Colombia, India, Indonesia, Russia, South Africa, and the U.S.—benefit from regional sourcing and stockpiling to deliver reliable electricity at competitive cost, especially compared with European countries that significantly rely on imported LNG or weather-dependent renewables. Germany's 2026 discussions on reactivating reserve coal capacity to manage costs amid LNG price spikes underscore coal's critical role in diversified energy systems.[16]

Then there are the industrial uses for coal that remain stubbornly irreplaceable. Of the estimated 9 Bt of coal consumed in 2025, well over half directly or indirectly supports industrial activity: steel, cement, chemicals, metals, manufacturing, and electricity for industrial processes such as smelting (see **figure 5**). Many industrial applications require sustained high temperatures (about 1,100–2,200 degrees Fahrenheit, or 600–1,200 degrees Celsius) and continuous operation, rendering intermittent solar and wind unsuitable and natural gas noncompetitive in most regions. (Some advanced nuclear designs promise suitable temperatures but remain largely aspirational.) Modern metallurgy depends on coal-derived carbon as a reductant to convert metal oxides into metals. Metallurgical coal produces coke for blast furnaces to turn iron ore into steel; refines other critical minerals; and reduces high-purity silica sand to silicon for solar panels, semiconductors, and computer hardware. Metallurgical coal accounts for about a quarter of seaborne coal trade.[17]

Global coal use continues to grow alongside increased demand for infrastructure, steel, and electricity, even as Europe shuttered 13 GW[18] of coal generation in 2025—including the modern Moorburg power station in Hamburg, an approximately 1.6-GW plant that cost 3 billion euros to build and operated for only five years before its early closure and demolition.[19] Meanwhile, coal-to-liquids production—a geopolitical hedge against diesel fuel and gasoline imports—is rising across Asia.[20]

Figure 5.

Global Industrial Uses of Coal



Note: Total global industrial uses of coal are approximately 5.5 Bt per year. *Bt* denotes billion metric tons.

Source: Data from Schernikau's independent research and analysis.

Fertilizer, Food Security, and Poverty Reduction

The nitrogen in fertilizers comes principally from the Earth's atmosphere, which comprises 78% nitrogen (N_2). Plants cannot use N_2 directly. The Haber–Bosch process converts atmospheric nitrogen and hydrogen into ammonia (NH_3), the foundation of nitrogen fertilizers.[21]

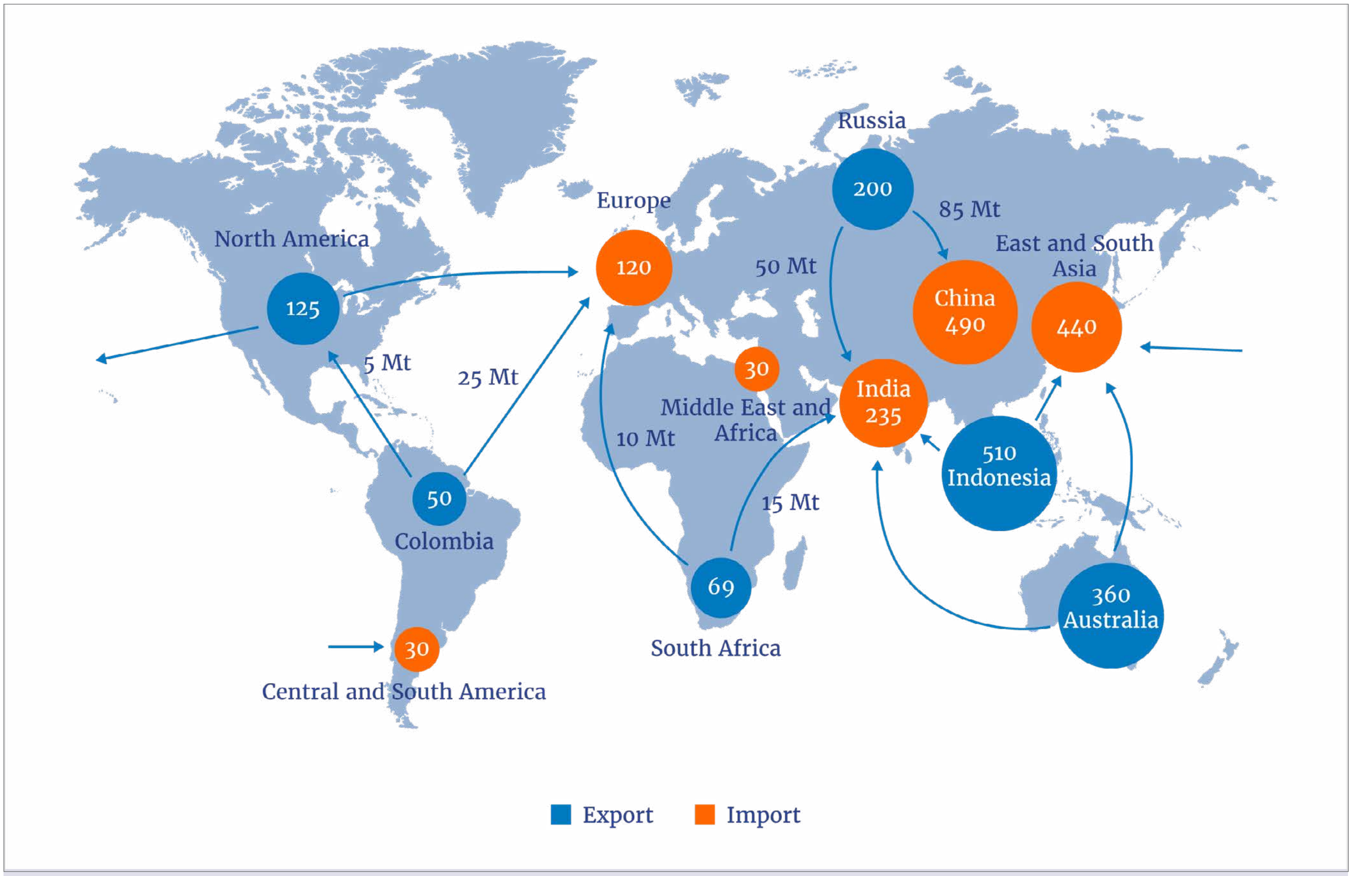
Coal supplies roughly 20% of global hydrogen for ammonia production and an even larger share of the feedstock for nitrogen fertilizers (urea, ammonium nitrate, ammonium sulfate), on which about 50% of the world's population depends for food. Coal-based ammonia represents about a quarter of global output. In China, over 75% of hydrogen—the feedstock for ammonia—is coal-derived, which consumes about 100 Mt of coal annually. Globally, natural gas is used to produce about 70% of hydrogen feedstock, coal about 20%, and oil about 10%.[22]

A Major Trade and Supply-Chain Reality

Markets provide a clear lens into the criticality of a commodity. Zooming out from coal's roles in electricity, industry, and food production, global seaborne activity underscores its importance across regions (see **figure 6**). Of the more than 12 Bt of goods transported by sea annually, 5.5 Bt are energy commodities; coal alone accounts for 1.5 Bt of that total.[23] On average, about 70% of seaborne coal trade is thermal coal for power plants.[24]

Figure 6.

Global Coal Exports and Imports



Note: This figure shows approximate coal movement in 2025, totaling approximately 1.5 Bt. *Bt* denotes billion metric tons, and *Mt* denotes million metric tons. *East and South Asia* includes Japan, South Korea, Brunei Darussalam, Cambodia, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Vietnam.

Sources: Adapted from Lars Schernikau, "Coal Keeps the Lights On . . . Are We Experiencing a 'New' Renaissance of Coal?," *The Unpopular Truth* (blog), March 18, 2026. Data from International Energy Agency (IEA), "Demand," in *Coal 2025—Analysis and Forecast to 2030* (IEA, 2025), 12–42; and additional calculations from Schernikau's research and analysis, including HMS Bergbau AG demand and supply estimates.

Indonesia remains the leading seaborne coal exporter, shipping about 500 Mt annually, followed by Australia at about 360 Mt, and Russia at 200 Mt. The U.S., South Africa, and Colombia trail as smaller players in the seaborne market. Mongolia has emerged as the dominant overland exporter; it delivers about 90 Mt annually, mostly to China. The country may soon become the second-largest exporter of metallurgical coal in the world.[25]

Supply reliability is generally strong. Occasional disruptions arise from government policy (for example, temporary export bans in Indonesia) or weather-related issues in Australia and South Africa (floods and cyclones). These cause short-term dents in the supply chain but rarely threaten global supply meaningfully. The most recent significant disruption occurred when Western sanctions on Russian coal following the Ukraine invasion forced a major reshuffling of trade flows. Under normal market conditions, thermal coal prices tend to track power generation economics and are heavily influenced by competing fuel prices, particularly natural gas.

In 2025, China led seaborne coal imports with roughly 550 Mt, followed by India at about 240 Mt. ASEAN countries imported about 180 Mt, Japan about 140 Mt, and South Korea about 100 Mt. The EU imported roughly 120 Mt.[26]

Global supply-demand balances result from complex interactions between domestic production and consumption on the one hand, and trade on the other. In major players such as China, India, Indonesia, the U.S., and South Africa, internal shifts heavily influence prices and volumes available for seaborne trade. Domestic consumption outpacing production turned China from a net coal exporter into the world's leading importer beginning in 2009.

Thousands of Years in Reserves

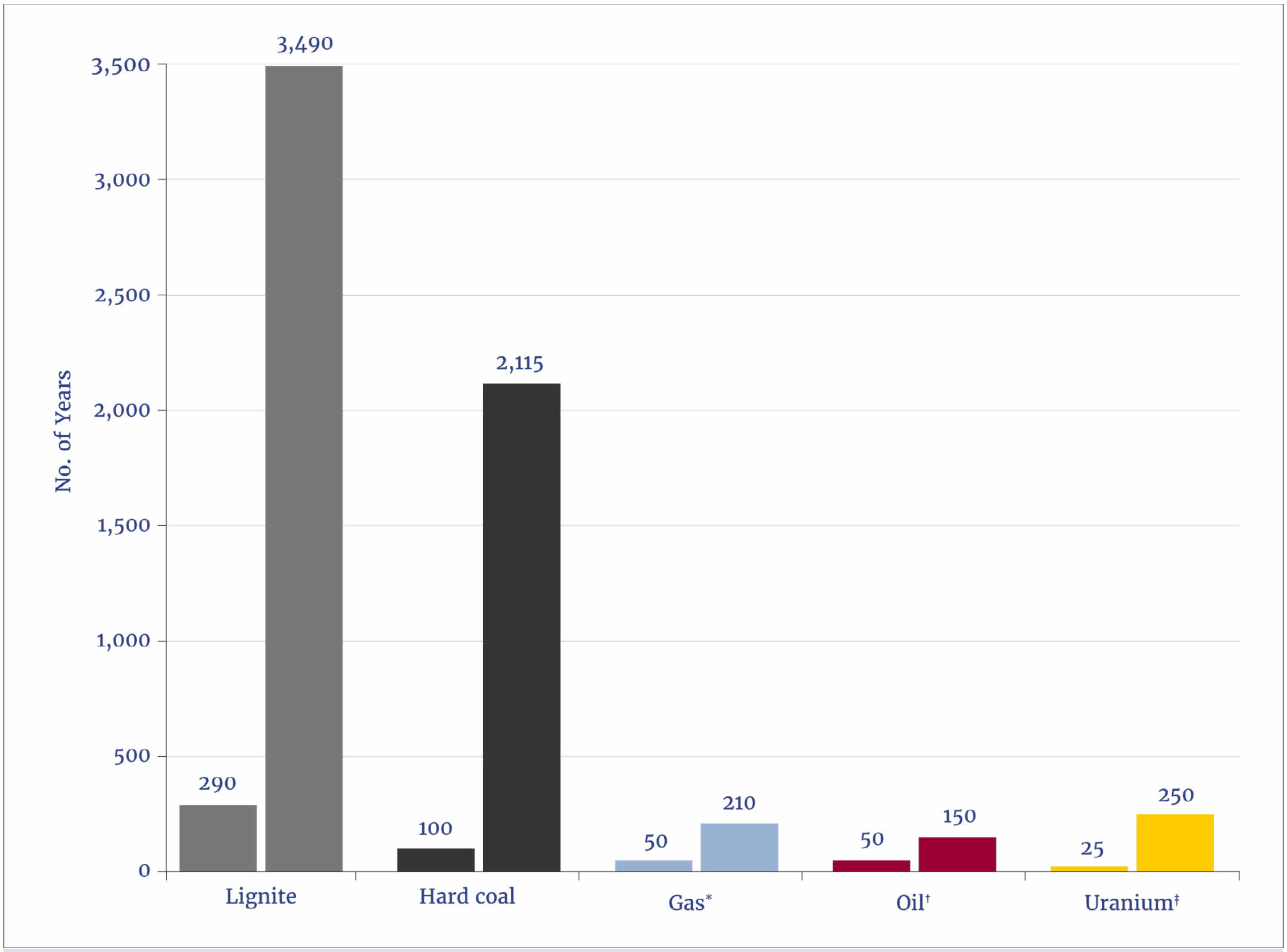
Coal stands out for its geological abundance relative to current production rates. Total remaining coal reserves are estimated to last some 2,000 years for hard coal (anthracite and bituminous) and more than 3,000 years for lignite at today's consumption levels.[27] Even counting only proven reserves (quantities economically recoverable with today's technologies), global coal supplies should last 130–150 years.

By comparison, proven reserves of oil provide about 50–60 years of consumption; natural gas, about 50–55 years; and uranium, 50–100 years in known deposits for conventional reactors—with advanced technologies extending this significantly (see **figure 7**).[28]

Most importantly, coal deposits are widely distributed across many countries and continents. This geographical dispersion insulates the fuel from shipping chokepoints, pipeline dependencies, and geopolitical risks.

Figure 7.

Reserves of Fossil Fuels—Primarily Coal—Are Enormous



Note: This figure uses 2023 data. Remaining potential equals reserves plus resources, and oil and gas include both conventional and unconventional reserves and resources. The left bars show the reserve/production ratio, and the right bars show the remaining potential/production ratio.

* Shows conventional and unconventional gas total.

† Shows conventional and unconventional oil total.

‡ Remaining potential includes only economically recoverable resources (<$80/kg).

Sources: Adapted from Lars Schernikau, "Coal Keeps the Lights On . . . Are We Experiencing a 'New' Renaissance of Coal?," *The Unpopular Truth* (blog), March 18, 2026. Data from Bundesanstalt für Geowissenschaften und Rohstoffe (BGR), *Energy Data 2024: German and Global Energy Supplies* (BGR, 2025), consulted in the original German; and Schernikau's independent research and analysis.

Technology and Pollution

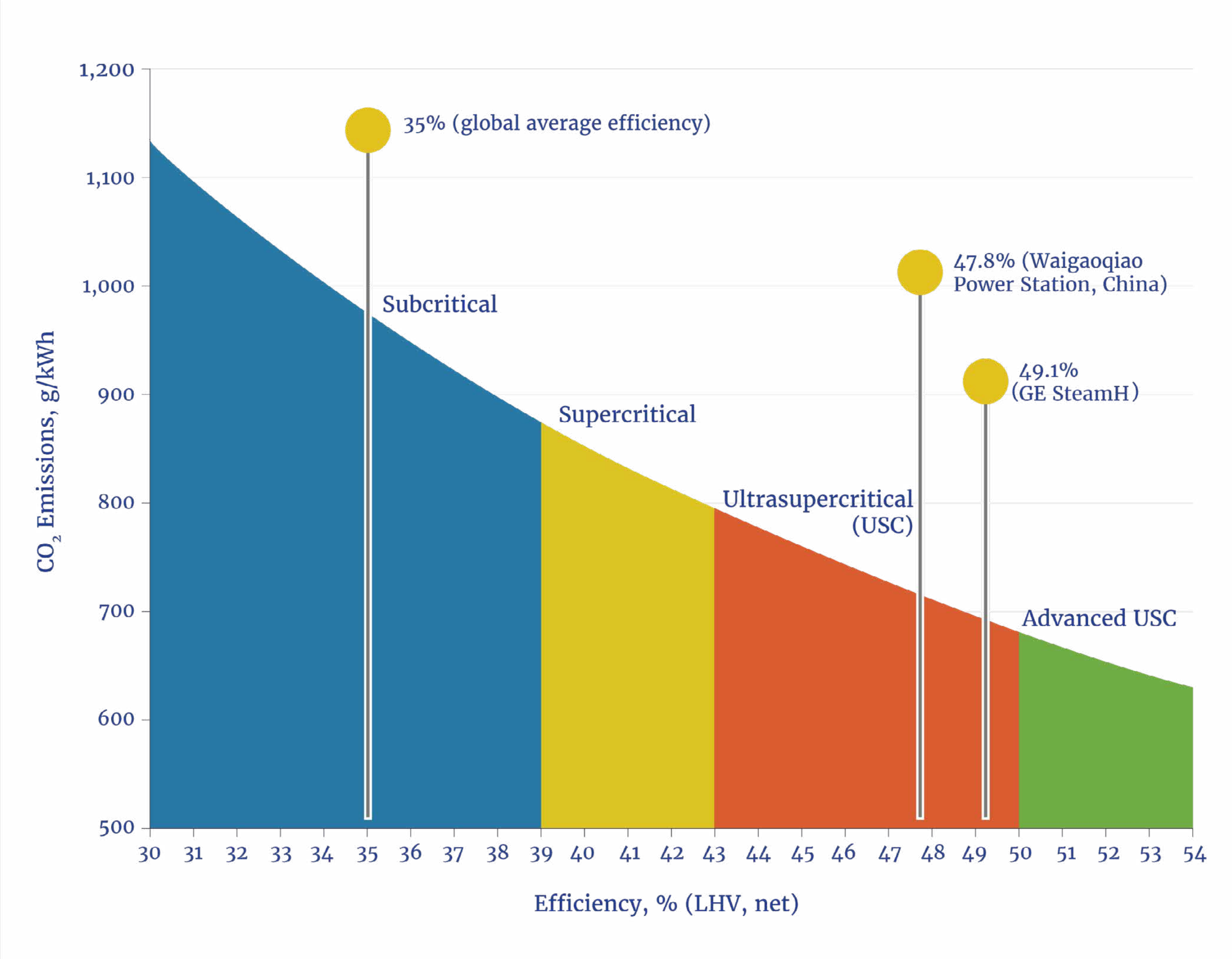
Twenty years ago in Beijing, gray skies were common and face masks were part of everyday life. Today, official statistics indicate that Beijing could be considered pollution-free on about 95% of days in 2025.[29]

Following the launch of its war on pollution in 2013, China reported nearly 50% reductions in key urban air pollutants (including fine particulate matter pollution [$PM_{2.5}$] declines of 50%–55% in Beijing and major cities by the mid-2020s) even as total coal consumption climbed to record levels. By replacing old coal plants with modern ones, installing advanced flue-gas controls, and relocating heavy industry away from population centers, China improved environmental outcomes while combusting ever more coal.

Modern coal-fired plants differ markedly from their predecessors (see **figure 8**). Compared with uncontrolled or twentieth-century technology, today's state-of-the-art plants achieve emissions reductions of 99% for particulate matter,[30] 95%–99% for sulfur oxides, and 80%–90% for nitrogen oxides[31] through electrostatic precipitators, flue-gas desulfurization, and selective catalytic reduction. In fact, through tall stacks and effective dispersion, a well-controlled modern coal plant can produce lower near-field ground-level particulate concentrations than a busy urban intersection.

Figure 8.

Lowest-Cost Efficiency Pathway for Coal-Fired Power Plants



Source: Adapted from Lesley Sloss, *Technology Readiness of Advanced Coal-Based Power Generation Systems*, CCC/292 (IEA Clean Coal Centre, 2019), 18, figure 3.

All combustion technologies emit CO_2, a gas with no direct toxicological harm to humans at ambient levels, which serves as essential plant food, acting as a powerful natural fertilizer by enhancing photosynthesis and water-use efficiency.[32] Unlike traditional criteria pollutants, CO_2 is fundamentally beneficial to plant life. Its primary environmental concern stems from its role in the atmospheric greenhouse effect. Global civilization measurably increases greenhouse gas concentrations. The magnitude and net consequences of future warming, climate sensitivity, and optimal policy responses remain subjects of active scientific and economic debate.[33]

Regardless of one's views on long-term climate goals or the willingness of markets to pay for carbon capture and storage, real-world energy trade-offs persist.[34]

Arguments for disproportionately penalizing coal's CO_2 emissions relative to natural gas or other energy sources must account for the full life cycle, natural carbon uptake, system-wide emissions, reliability considerations, and non-CO_2 greenhouse gases such as methane.[35]

Waste Streams

Global coal combustion produces roughly 1 Bt of coal ash and related residues annually. This is a large but relatively inert mineral waste stream (primarily silicon, aluminum, iron oxides) that is often reused in cement, concrete, and construction. By comparison, mineral extraction and processing required for wind, solar, and battery technologies generate smaller volumes of waste per unit of energy over time but can involve more chemically complex and potentially much more toxic tailings (see **table 1**). Many of these supply chains also rely heavily on coal-powered manufacturing.[36]

Table 1.

Relative Toxicity of Waste Streams

Waste Type	Approximate Annual Volume*	Main Materials	Toxicity Risk	Recyclability	Environmental Impact (If Mismanaged)
Municipal Solid waste	~2 Bt	Mixed household waste	Moderate–high	~20%–25% recycled	Methane emissions, plastics pollution
Coal ash	~1 Bt	Mostly mineral (silica, alumina, calcium)	Low–moderate	~50%–60% reused (cement, concrete)	Groundwater contamination, if poorly stored
Wind, solar, and battery waste†	~0.1 Bt	Glass, composites, metals, chemicals	Moderate–high, depending on component	Currently low for blades, photovoltaics	Composite landfill buildup, battery-chemical risks

* *Bt* denotes billion metric tons.

† *Wind, solar, and battery waste* was estimated for the year 2050.

Sources: Adapted from Lars Schernikau, "Coal Keeps the Lights On . . . Are We Experiencing a 'New' Renaissance of Coal?," *The Unpopular Truth* (blog), March 18, 2026. Data from Schernikau's estimates.

High-efficiency, low-emissions (HELE) technologies such as advanced ultrasupercritical plants improve thermal efficiency by reducing fuel consumption and emissions per kWh (see **figure 8**). China's fleet upgrades demonstrate how retrofits and new plant construction can improve local air quality while expanding reliable baseload capacity. If older, low-efficiency plants worldwide were replaced overnight with state-of-the-art HELE units, global coal consumption could fall by nearly one-third while cutting criteria pollutants emissions by well over 90%.[37]

Perspective

Europe illustrates the risks of energy policies that prioritize environmental goals over energy security and affordability. With the notable exception of Poland, most EU countries have significantly displaced the use of domestic coal (and, in some cases, nuclear) in favor of imported natural gas and have increased the use of intermittent solar and wind. Following Russia's invasion of Ukraine in 2022, several nations temporarily reactivated or extended the operation of lignite and coal plants to safeguard grid stability amid Russian gas-supply disruptions.[38] Although U.S. LNG has become the dominant source—now accounting for nearly two-thirds of the EU's LNG imports and growing[39]—European energy systems remain vulnerable to global gas market volatility and geopolitical unrest. Russia still supplied about 14% of the EU's total natural gas in 2025, though this share continues to decline under phaseout measures.[40] Germany, for example, decommissioned its highly efficient Moorburg coal plant (one of Europe's most advanced coal facilities when built) as part of its coal phaseout,[41] yet has periodically considered extending coal use during energy crises for cost and security reasons using older, less efficient coal plants.[42] Many EU nations are coming to recognize the practical trade-offs of high reliance on intermittent wind and solar technologies.[43]

In the U.S., the Trump administration has moved to support domestic coal production through regulatory relief, federal land access, and technological development.[44] This push is driven by surging electricity demand from data centers, AI infrastructure, and industrial reshoring, alongside a revived interest in energy security, reliability, and affordability. In 2025–26, the U.S. saw announcements and advancements of new coal projects and extensions; coal expansion is likewise underway in Australia, China (on a massive scale), India, Kazakhstan, Mongolia, Montenegro, and other countries. Nuclear and gas alone cannot meet the surging power demands of AI infrastructure. Terra Energy Center, which is developing a proposed coal plant in Alaska, is unlikely to remain the only North American data-center company turning to coal-fired power.[45]

Effective energy policy must balance real-world trade-offs across security, affordability, reliability, and environmental performance. While coal's environmental impacts are real—as with all industrial-scale energy systems—the focus should be on technological improvements (clean coal via HELE and emissions controls) rather than premature elimination.

Coal remains foundational to modern civilization: Steel, cement, concrete, and most metals depend on it directly or indirectly in their supply chains. Without affordable, reliable baseload sources such as coal, energy costs rise, industrial capacity can become constrained, and broader economic outcomes may suffer[46]—especially today, with Western nations having offshored so much heavy industry to coal-reliant Asia.

This issue brief expands upon original research by coauthor Lars Schernikau published in "Coal Keeps the Lights On . . . Are We Experiencing a 'New' Renaissance of Coal?," The Unpopular Truth *(blog), March 18, 2026.*

Notes

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Lars Schernikau has over two decades' experience in the global energy and commodities industry. He began his career with the Boston Consulting Group in the U.S. and Germany, and he also managed a wind farm in Germany for three years. Schernikau studied finance at New York University; received his MBA from INSEAD in France; and earned his doctoral degree in economics with a focus on energy, commodities, and coal at the Technical University of Berlin in Germany.

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Schernikau is the author of several books, including his most recent, *The Unpopular Truth About Electricity and the Future of Energy*, which examines the economic realities of the transition from oil, coal, and gas to wind, solar, storage, and hydrogen. His energy blog, *The Unpopular Truth*, discusses all aspects of energy from nuclear and hydro power to utility-scale batteries. Schernikau has also written extensively on coking and thermal coal, contributing data-driven insights to the global energy conversation.

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