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Why it's premature to declare coal dead

By Karin Kirk on Aug 8, 2019

Domestic use of U.S. coal has dropped sharply, but China still burns on a monumental scale. (Second of a two-

part series exploring the future of coal use)

By Karin Kirk

Wednesday, August 28, 2019

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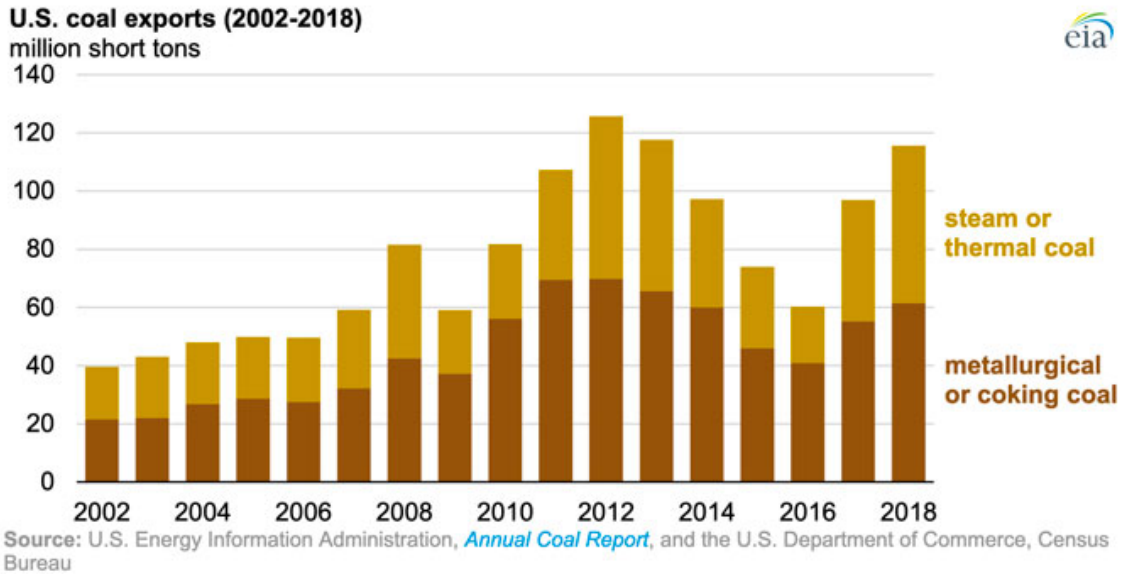
Coal's story across the world is a study in contrasts: up sharply in some places and down in others. From a climate perspective, there is no simple characterization of the global status of coal, other than to say that overall, the world is still burning far too much of it. A few indicators point to a global slowdown in coal, but it's unclear whether that can happen fast enough to meet global climate change emissions targets.

A recent post at this site covered the downturn of the American coal market as a result of cheaper and cleaner alternatives. Although the U.S. is a major player in global energy, trends in American coal do not necessarily dictate or match what's happening elsewhere in the world. It's premature to say, as some do, that coal is dead.

Read on for highlights, distilled into eight data-rich graphics. Some of them may be surprising.

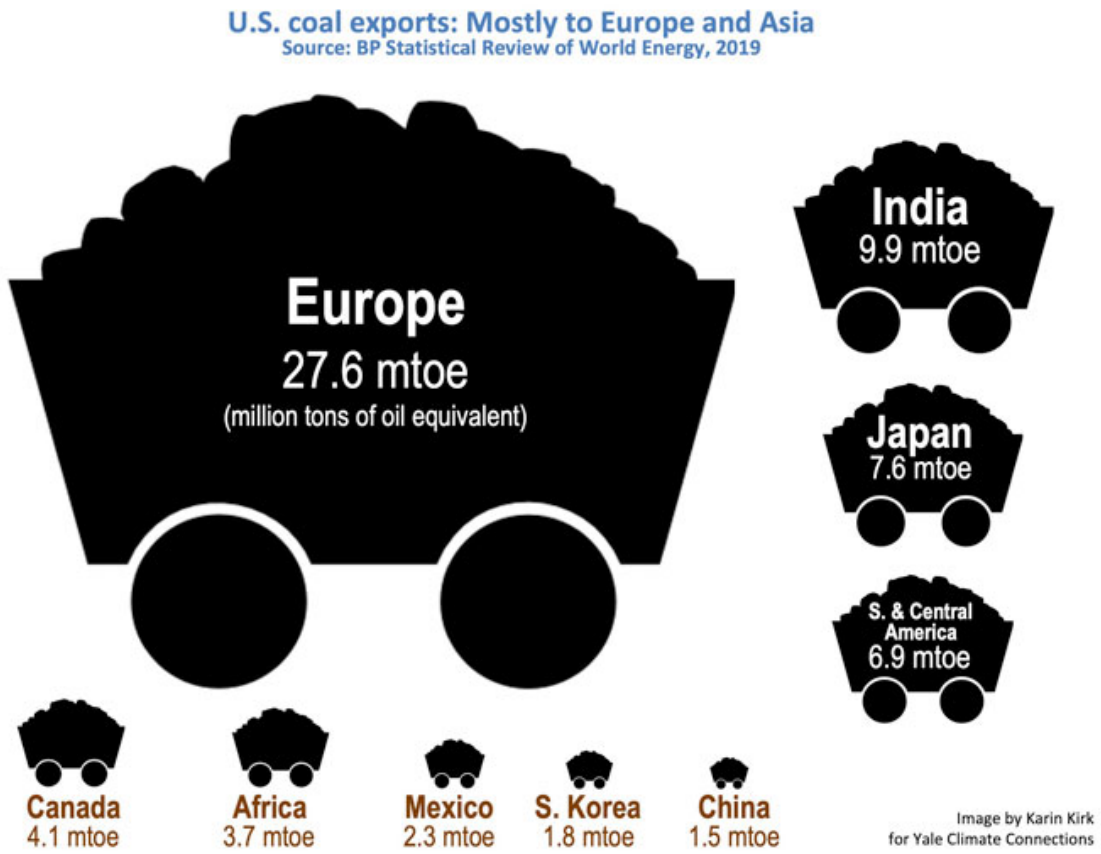
1. American coal exports are on the rise



American coal exports are on an upward trend. Steam coal is used for electricity generation, and metallurgical coal is used in steelmaking. (Source: U.S. Energy Information Administration)

Domestic use of coal for electricity generation has dropped sharply, but American coal exports are up. Growing international demand for coal has boosted prices and made coal exports an attractive economic prospect. About 15% of America's total coal production is exported.

2. American coal exports go mostly to Europe and Asia



Europe is the #1 buyer of American coal, while China is only a minor coal market for the U.S.

The United States has the world's largest coal reserves and exports coal all over the world. Europe is the primary recipient of U.S. coal, with Asia next in line. China is not a major market for U.S. coal. China sits on the world's third-largest coal reserves, and it produces most of the coal it burns. Nonetheless, China is such an enormous consumer of coal that even the relatively minor fraction of its imported coal is so massive that the country is still the world's No. 1 importer of coal. In other words, China's coal imports are like a small slice of a huge pie, and that slice amounts to more pie than anywhere else in the world. Most of China's imported coal comes from Australia, Indonesia, Mongolia, and Russia.

3. Worldwide coal use is rising, but remains slightly below the all-time peak of 2013.

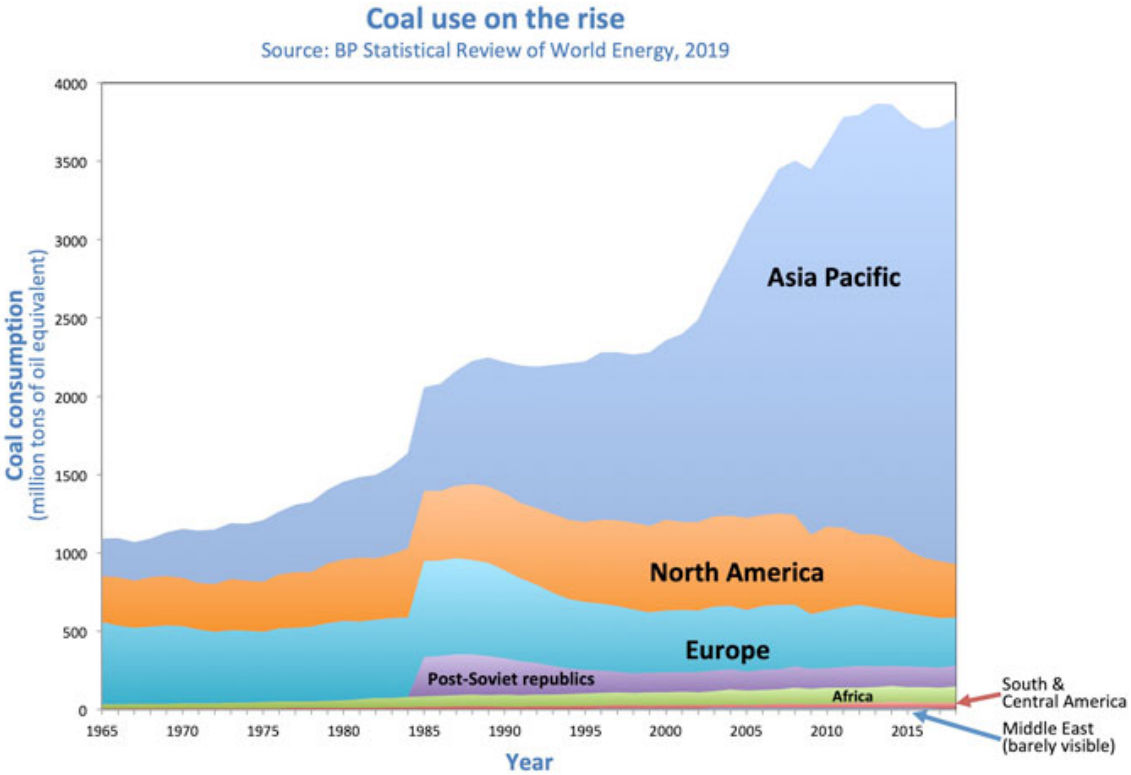
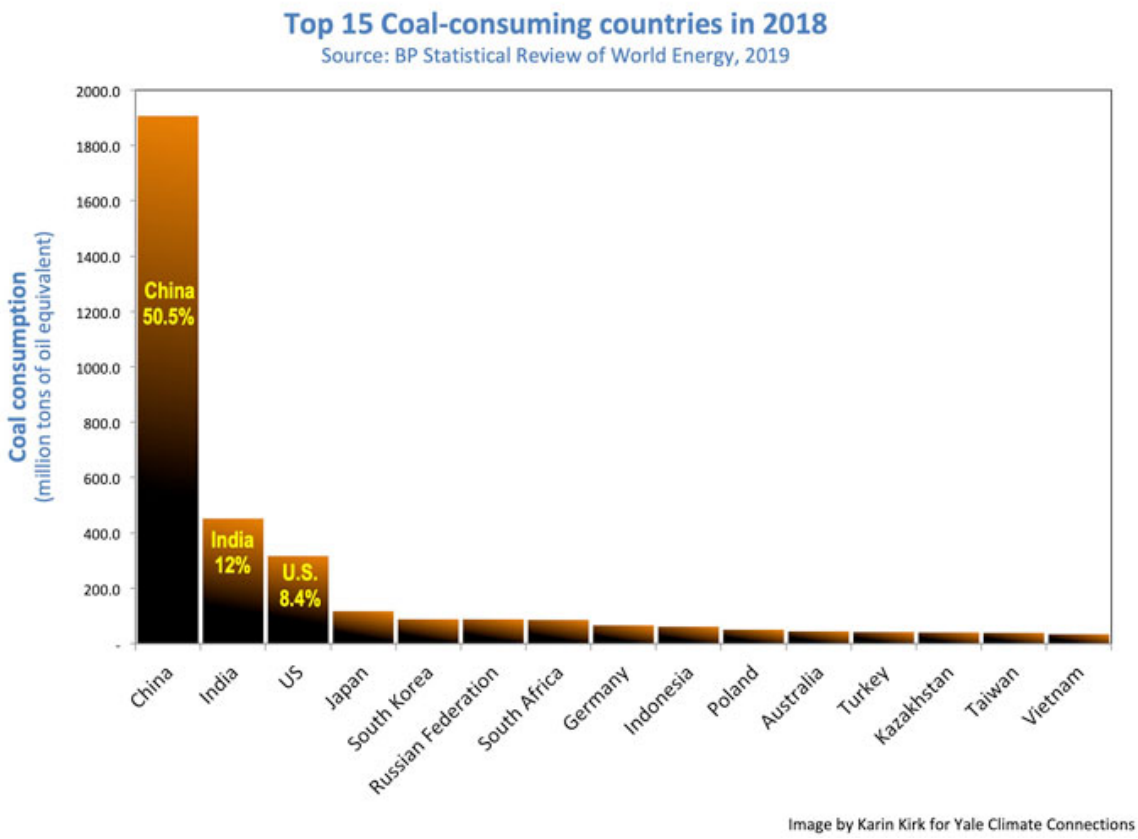


Image by Karin Kirk for Yale Climate Connections

Coal consumption is far from dead.

North America and Europe are leading the world in moving away from coal, but China and India are driving a surge in coal use. Increases in the Asia-Pacific region moved global coal consumption upward about 0.5% in 2017 and 1.4% again in 2018. The all-time global peak in coal use was in 2013, but the world once again is approaching that peak.

4. Just three countries use 71% of the world's coal.

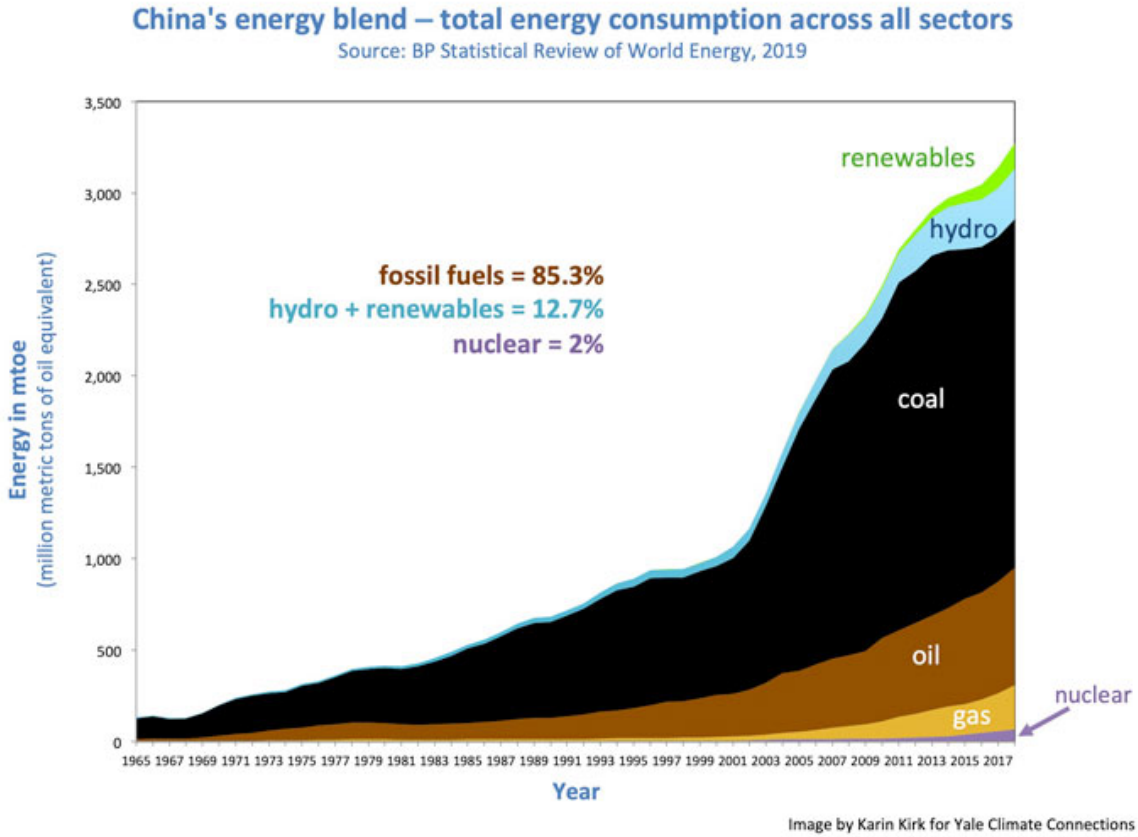


The big three coal users: China, India, and the U.S.

Coal use is dominated by a handful of nations. China accounts for more than half of worldwide coal consumption, and then come India and the United States. Together, these three countries burn 71% of all coal. It's interesting to note that even though U.S. coal use is declining, the country is still the third-largest coal consumer in the world.

5. China is the world's largest user of coal *and* the world's biggest generator of renewable energy.

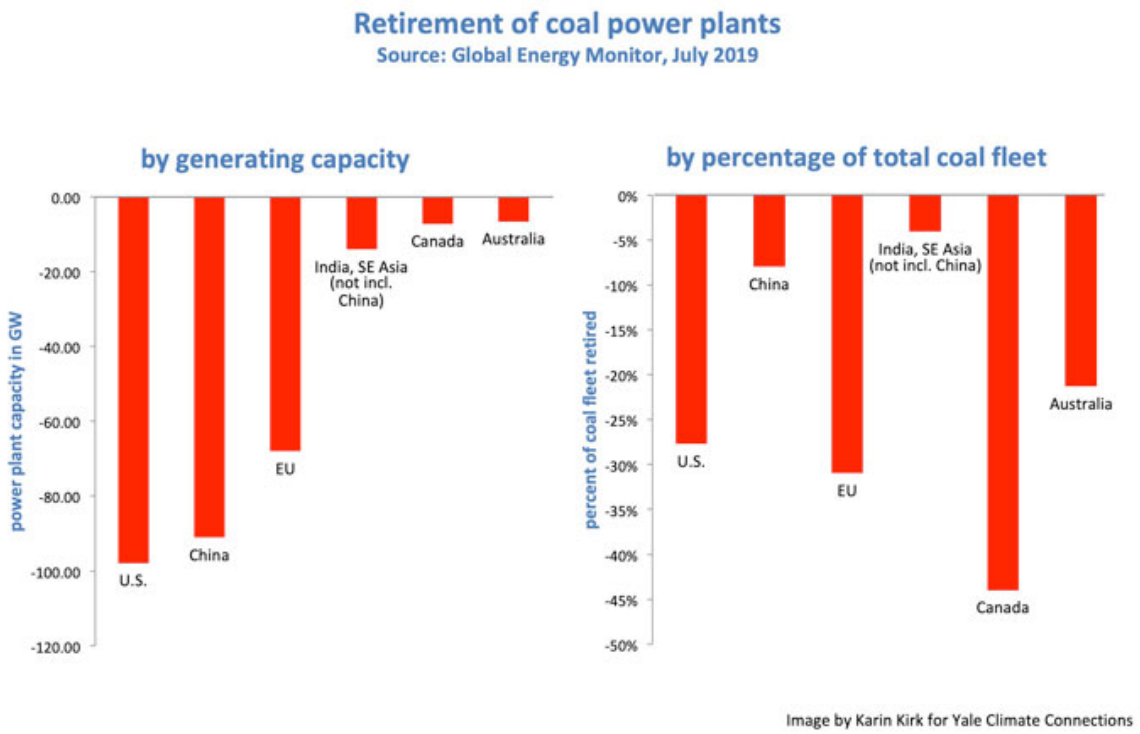
As the world's most populous country, whatever China does, it does on a monumental scale. This is ever more true when China's economy is expanding rapidly. Advocates of renewable energy take some comfort in graphs of China's wind and solar energy generation plotted in satisfyingly steep upward curves. But it's essential to juxtapose China's progress on renewables with its reliance on coal. Scale matters.



China's progress on renewable energy is dwarfed by its reliance on fossil fuels.

Even with China's impressive deployment of renewables, clean energy is a soberingly small slice of the country's overall energy use. Coal accounts for 58% of the nation's total energy use; add in oil and gas and the proportion of fossil fuels rises to 85%. Meanwhile, renewables and hydro together add up to almost 13%. Renewables are growing quickly: Solar grew by 51% last year, and coal "only" expanded by 1.8%. But coal is still growing nonetheless, hand in hand with oil and gas.

6. North America and Europe are making headway at retiring coal plants



North American and European countries are making progress in reducing coal use.

The U.S., China, and the European Union have shuttered the most coal-fired energy when measured in total generating capacity. But when viewed as a percentage of the total fleet of coal-burning plants, China's tally recedes. Moreover, China has replaced older plants with new ones, while the United States has not built a major new coal plant since 2015.

This data could be used to bolster a common misconception about greenhouse emissions – that the U.S. has cleaned up its act and now it's all up to China. That statement seems plausible because China's emissions are massive. But don't forget that the U.S. is still responsible for more of the greenhouse gases already in the atmosphere than any other country, suggesting that the U.S. bears the largest responsibility for dealing with the climate change problem.

Furthermore, a big part of China's emissions result from its manufacturing of so many of the goods destined for U.S. markets. The U.S. has outsourced much of its manufacturing emissions to China while simultaneously blaming China for its burgeoning energy use. If CO2 emissions were adjusted to account for trade, U.S. emissions would be 7% higher and China's 13% lower (based on 2014 numbers). The best path forward is to continue to lower U.S. emissions while also negotiating with other nations to encourage them to bend their emissions downward as soon as possible. Ultimately, the atmosphere doesn't care which country greenhouse gases come from; we will all bear the consequences together.

7. Overall coal capacity is still growing – although more slowly

To avoid exceeding 1.5 degrees Celsius of climate warming, the IPCC has concluded that emissions must reach net zero by around 2050. It's hard to imagine how that could be possible given that the pendulum is still swinging toward fossil fuels. Is it possible?

To answer that question, one needs to peek into the future of energy. A way to do that is to look at the construction of new power plants compared to the retirements of old ones, which can give a sense of the overall direction of the industry. New coal burning power plants are still being built, which is concerning given the decades-long lifespan of a power plant. But on the other hand, old plants are going dark at a good clip, too. On balance, the world's generating capacity for coal burning is still increasing (the blue line on the graph is above zero), but coal's growth is slowing, and has been on a particularly steep downward slope since 2015.

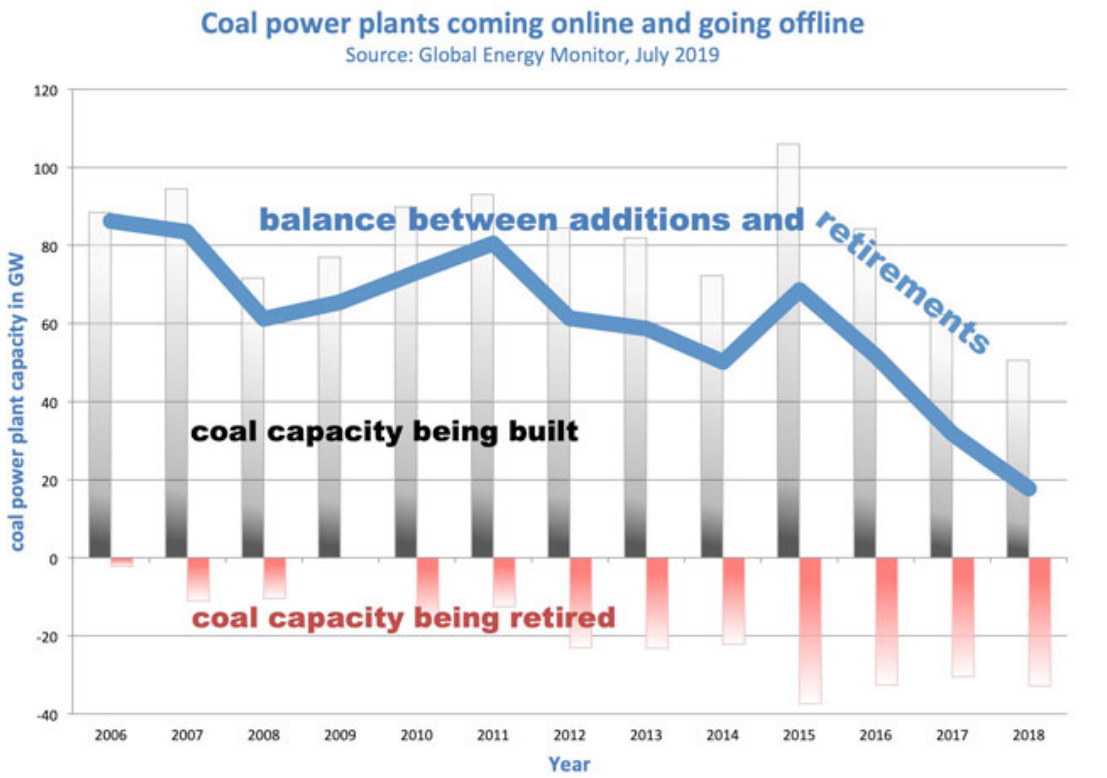
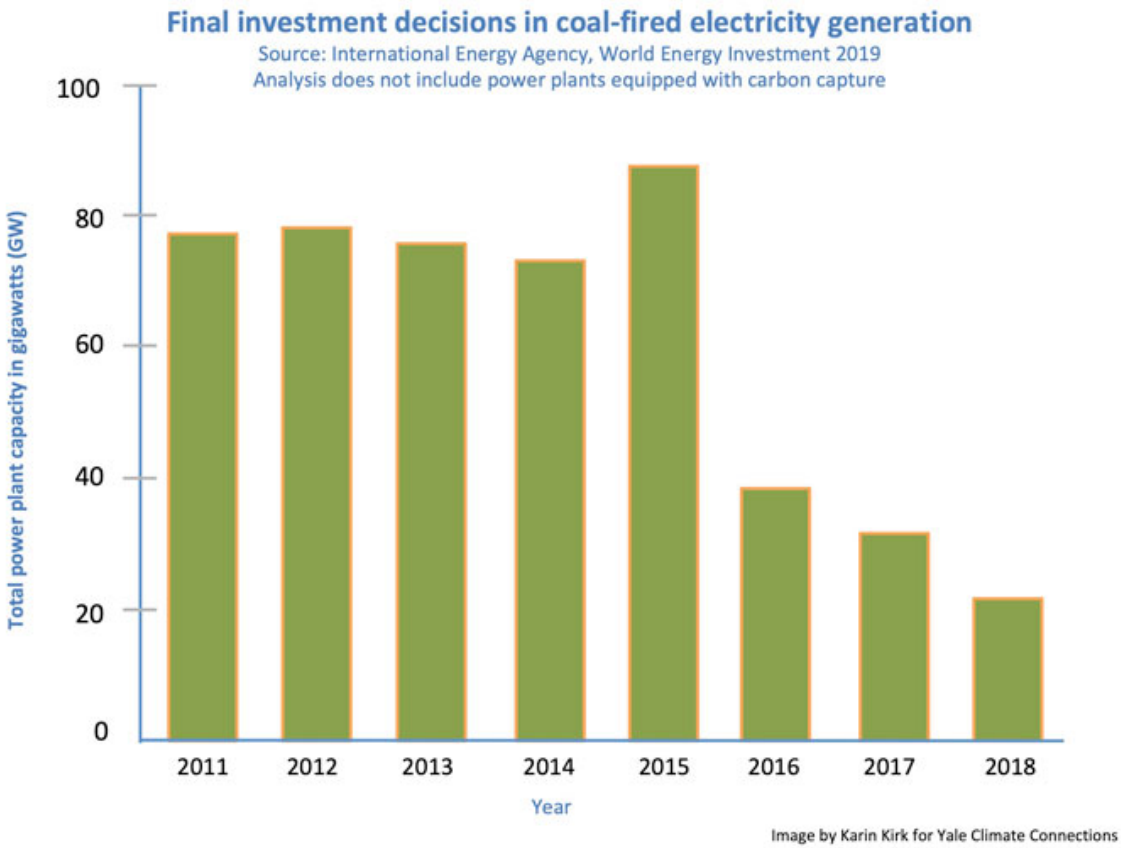


Image by Karin Kirk for Yale Climate Connections

More coal plants are being built than are being retired, but at least the balance between the two is approaching zero.

But no declaring victory quite yet. A recent – and preliminary – report concludes that the lifetime emissions from existing fossil fuel infrastructure are already on course to take the world all the way to 1.5 degrees C. In essence, the planet is committed to 1.5 degrees of warming given the power plants, vehicles, and industrial users of fossil fuels already up and running. Adding any new fossil fuel burning capacity will push the world beyond the threshold. The analysis says the only way to stay below the 1.5-degree target is to retire power plants before their typical lifespan or to deploy large-scale carbon capture and sequestration.

8. Follow the money: Worldwide investments in coal-fired electricity generation are declining



There have been steep declines in coal investments worldwide over the past three years.

Another way to get a glimpse of what lies ahead for coal is to look at its financing. Years before the first trainload of coal is burned in a new power plant, the money to build it is allocated. According to the International Energy Agency's 2019 World Energy Investment report, investments in new coal power plants have declined 75% in just the past three years. When investors are no longer willing to back coal-fired plants, coal use will inevitably taper off. China is part of this trend, with a 60% decline in spending on new coal-fired power plants since 2015. Meanwhile, investments in low-carbon power and grids add up to nearly 85% of total spending in the global electrical power sector. So while the pendulum is still swinging toward coal, it appears likely to change course in the near future.

While coal's flame doggedly burns ever-brighter, signs point toward a global slowdown in coal use, but a big question still remains: Given what the scientific community has found to be the urgent challenges posed by a warming climate, can Earth's over-reliance on fossil fuels end fast enough?

Filed under: Karin Kirk

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