Coal renaissance is bad news for greenhouse gas mitigation efforts

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A coal power plant in Datteln, Germany, that transforms chemical energy into 36%-48% electricity and the remaining 52%-64% into waste heat. Image credit: Arnold Paul. Wikimedia Commons.

(Phys.org)—A trio of researchers in Germany has found that because developing nations have increasing energy needs, they are turning to coal because it is the cheapest option available. In their paper published in *Proceedings of the National Academy of Sciences*, Jan Christoph Steckel, Ottmar Edenhofer and Michael Jakob describe their study of emerging countries and what they found regarding the reasons many of them have for using coal instead of oil or other energy producing options.

Over the past decade, emissions from coal fired power plants have leveled off in the North America, Europe and Australia, due mostly to worries about greenhouse gas emissions causing global warming. But using coal as a power source has not slowed in other parts of the world, particularly Asia, the researchers note. They undertook a study to find out why and to learn if there might be ways to head off the trend.

To better understand coal's place on a global scale the researchers broke down emissions into four main categories: per capita income, population, carbon dioxide created per unit of energy and the proportion of energy usage to gross domestic product. That allowed them to look at energy usage country by country and the factors that led to the type of energy sources used.

In looking at the data they had amassed, the researchers concluded that the world is experiencing a renaissance in coal use as an energy source—as developing countries grow, the demand for energy grows, and for the majority of them, coal is the cheapest option, making it the preferred choice. That, the researchers point out, is leading to an increase in greenhouse gas emissions. Thus, mitigation efforts being put in place by already developed countries are being offset by increases in multiple developing countries, most particularly those in Asia—a troublesome development, the researchers note, particularly in light of exploding GDPs.

Current policies put in place by global organizations to nudge developing countries into using less coal is not working, the trio report, because they do not address the root problem—coal is the cheapest option available. If more developed nations want to stem the tide of increasing coal burning, they will need to provide a cheaper option to people living in still developing nations.

More information: Drivers for the renaissance of coal, *Proceedings of*

the National Academy of Sciences, Jan Christoph Steckel, DOI: 10.1073/pnas.1422722112

Abstract

Coal was central to the industrial revolution, but in the 20th century it increasingly was superseded by oil and gas. However, in recent years coal again has become the predominant source of global carbon emissions. We show that this trend of rapidly increasing coal-based emissions is not restricted to a few individual countries such as China. Rather, we are witnessing a global renaissance of coal majorly driven by poor, fast-growing countries that increasingly rely on coal to satisfy their growing energy demand. The low price of coal relative to gas and oil has played an important role in accelerating coal consumption since the end of the 1990s. In this article, we show that in the increasingly integrated global coal market the availability of a domestic coal resource does not have a statistically significant impact on the use of coal and related emissions. These findings have important implications for climate change mitigation: If future economic growth of poor countries is fueled mainly by coal, ambitious mitigation targets very likely will become infeasible. Building new coal power plant capacities will lead to lock-in effects for the next few decades. If that lock-in is to be avoided, international climate policy must find ways to offer viable alternatives to coal for developing countries.