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Making Retirement Easy: A Plan for Aging Coal Plants

Josh Freed & Sam Hodas

Upgrading or replacing the oldest and least efficient segments of our energy system—including aging coal plants—will reduce harmful pollution, ease our transition to clean energy, and help the United States recapture its lead in the global clean energy market.

The first coal fired power plant was built in the United States in 1882.¹ That year, Chester A. Arthur was elected president, the telegraph was the dominant form of long-distance communication, and the transcontinental railroad had only recently connected the coasts. Today, while everything else in our economy seems to modernize in real time (we are already on the iPhone 4!), we are still generating 48% of our electricity largely the way we did it 125 years ago. Most of the coal plants still in operation in the United States are more than 40 years old, and ten plants still burning coal were built in the 1920s.

Coal isn't going away as an energy source anytime soon—it is too plentiful and too cheap. So we must find ways to transform coal into a 21st century power source. The challenge, particularly in the absence of a price on carbon, has been to motivate the private sector to take up these enormous changes in the way we burn coal. That is why Third Way proposes a new system to shut down or modernize our nation's oldest coal plants so we can have cleaner, more efficient electricity generation.

THE PROBLEM

There are no incentives to scrap or modernize old coal plants

In the absence of a carbon price, there are no incentives for utilities to part ways with or upgrade the oldest, least efficient coal plants in their fleets. Coal has provided affordable electricity for generations. The low cost of buying coal and running old plants in perpetuity and the expense of upgrading or replacing ancient coal plants have discouraged adoption of more efficient coal technologies or replacement of coal plants with cleaner power sources.

Today, there are many technologies that allow coal plants to run more cleanly and efficiently. For instance, ultra-supercritical boilers are able to operate at much higher temperatures than conventional boilers, increasing coal plant efficiency by 35%.² Higher efficiency means that more energy can be generated by each piece of coal, which results in fewer pollutants and emissions. Similarly, coal gasification plants (IGCC) are able to reach high levels of efficiency and more cleanly burn coal by first turning it into gas that contains fewer pollutants.³ When these and other technologies are installed on coal plants, it is possible to reduce carbon emissions by 25% and sulfur dioxide and nitrogen oxide pollution by 90%.⁴

So in cases in which utilities are not in a position to switch to a cleaner fuel (like renewables or nuclear power), it is in America's interest for industry to use the most efficient, cleanest coal-burning technology possible. Unfortunately, many current government policies point them in the wrong direction.

Most of our coal plants are old, and many are dangerous

Almost 60% of the 1,445 coal power plants operating in the United States are more than 40 years old, including 118 that were built prior to 1950 (Chart 1).⁵ Because they were grandfathered exemptions from pollution controls, many of these plants emit not only a large amount of greenhouse gasses, but also a number of other pollutants that are harmful to human health. This includes particulate matter, sulfur dioxide, and nitrogen oxides that cause asthma⁶ and cardiovascular problems,⁷ and mercury that causes brain damage.⁸ Each year, this results in 20,000 deaths and \$160 billion in medical costs.⁹

Chart 1: Existing Coal Generating Units by Age

Year Built	Number of Units	Total MW Capacity
2005-2009	15	4,239
2000-2004	12	1,366
1995-1999	24	4,372
1990-1994	65	8,575
1985-1989	103	23,911
1980-1984	117	56,260
1975-1979	125	56,119
1970-1974	135	66,517
1965-1969	158	41,637
1960-1964	158	25,357
1955-1959	207	28,845
1950-1954	208	17,375
1940-1949	89	2,534
1930-1939	19	125
1920-1929	10	69
Total	1,445	337,301

Incentives for Old Coal Are Slowing Innovation

The reason that utilities hang on to their coal plants for so long isn't hard to divine—it's because it is very cost-effective to do so. Our nation's fleet of coal plants has a median age of 44, so most have been fully paid for.¹⁰ This allows coal to provide cheaper power than most clean energy sources, including nuclear, solar and wind, and it offers utilities little financial reason to replace their out-of-date coal plants or bring them into the 21st century. Without a price on carbon or other incentives or mandates, utilities will continue to run old coal plants, preventing new or cleaner technologies from being purchased at a scale that will make them cost competitive.

New Source Review presents a Catch-22

In the Clean Air Act, Congress requires that major stationary sources of pollution—coal plants, for example—put in place the best available technology to control any increased emissions resulting from a major modification to a plant.¹¹ This process, known as New Source Review, can add millions of dollars in costs to the operation of a coal plant and reduce its efficiency, making it cost more per hour to run while generating less electricity to sell to customers.¹² Indeed, just modernizing the pollution scrubbers on coal plants nationwide would cost at least \$10 billion.¹³

The New Source Review requirement has done much to reduce pollution on plants that had to be expanded or upgraded.¹⁴ But it has unintentionally locked in the use of inefficient, ancient plants by encouraging many plant owners to delay major modifications due to the costly requirements of putting in place the best available pollution controls.¹⁵

THE SOLUTION

Incentivize utilities to close or modernize ancient coal plants

The United States can take significant steps to transition to clean energy by accelerating the closure of our nation's oldest coal power plants and/or the transformation of other dirty plants. This should include both financial incentives and regulatory reforms that will ease utilities' transition to clean energy without placing unnecessary costs on them or their ratepayers. Taking such action could reduce our carbon emissions from the electricity sector by 20%¹⁶ and radically reduce other air pollution, and it can be done at a de minimis cost to the federal government by using regulatory tools.

Two Ways to Shutter or Modernize Coal Plants

There are many ways for Congress to spur the decommissioning or modernizing of ancient coal plants. Here are two:

1. Incentivize voluntary plant shut down. To target the worst of the ancient coal plants, Congress should require state regulators and industry leaders to review plant efficiency, cost, and reliability and generate a closure list. Utilities would be encouraged to submit an aggressive demand response and energy efficiency plan for each facility to be shuttered, along with plans for fuel and energy source-switching. To ensure that states act, those that fail to participate could lose a portion of their Drinking Water State Revolving Loan Fund grants.

To incentivize the transition, the federal government could provide utilities that chose to shutter old plants with grants to fund energy efficiency programs for homeowners and businesses to reduce their energy bills and a Clean Energy Integration Tax credit to recover the costs of bringing on line new generation facilities for nuclear, natural gas, carbon capture and sequestration and renewable energy technologies. Worker training programs could also be put in place to retrain any workers displaced by the closing of a coal plant. To encourage new clean energy economic development, a Clean Energy Business Zone program, modeled off of the successful Empowerment Zones, could be established.

These investments could be funded through a modest fee on fossil fuel electricity, also called a wires fee. In fact, every \$0.59 increase in consumer costs per month from a wires fee generates \$1 billion per year in funding.¹⁷ Alternatively, funding could be obtained by redirecting just some of the existing subsidies for fossil fuels.

2. Tighten emissions requirements and offer decommissioning incentives. Another approach is to focus attention on limiting the emissions of harmful pollutants from all coal plants. By tightening the allowable amount of carbon dioxide, sulfur dioxide, nitrogen oxide and mercury that can be emitted, older coal plants will have a mandate to modernize, switch to cleaner fuels, or close down. This approach would both advance the implementation of cleaner energy technologies, and improve the air for the roughly 175 million people living with unhealthy levels of emissions.¹⁸

Once tighter standards are in place, for those utilities that choose to close inefficient plants on their own (without a state requirement), Congress should authorize that they receive a period of regulatory relief for their emissions for the time leading up to their closure. This would provide a break from the new costs of compliance for plants that have a finite horizon for operation.

New technologies can make modernizing old coal plants possible

Shuttering old plants is one solution to the problem, but with U.S. and global reliance on coal high and rising, it cannot be the only one. The global demand for coal is growing, with no signs of abating. Consumption increases in China and India are staggering. Today, China is the world's largest coal consumer, burning 2.8 billion tons per year, a 100% increase in only 10 years.¹⁹ The story is similar in India, which today is the third largest coal consumer in the world.²⁰ These countries are developing rapidly, and the increased demand from economic growth and expanded electrification is necessary to lift hundreds of millions out of poverty. As a result, these countries are actively seeking technologies that will allow for cleaner, more efficient, coal use that will already be in use in the United States.

The U.S. can be a world leader in the emerging technologies to make coal use better, cleaner and safer. Technologies such as fluidized bed combustion, oxi-fuel combustion, supercritical and ultra-supercritical boilers, and gasification can dramatically increase efficiency and reduce emissions from coal plants. The Obama administration has also invested heavily in the development and deployment of Carbon Capture and Storage (CCS), which will eliminate emissions from new coal plants when it comes to market. In recent years, the federal government has invested \$3.4 billion in developing CCS technology,²¹ and sought to complete the first ever commercial-scale coal plant able to capture and store carbon.²² In addition, frameworks exist to provide up to \$10 billion to fund large scale CCS research through a very modest wires fee.²³ These efforts need to continue to help ensure that coal can continue to play a large role in meeting our energy needs, and address the rapidly growing energy needs of developing nations.

A strong U.S. commitment to CCS commercialization is also necessary to make sure that coal remains a viable fuel source. Today, natural gas is the only immediate replacement for old coal plants that can provide reliable power and reduced emissions. Third Way supports the increased use of natural gas,²⁴ but understands that low natural gas prices are essential to the success of our domestic manufacturers. Increasing the use of natural gas in other areas of our economy should be done in conjunction with policies that promote further production of natural gas and accelerate development of other clean energy sources, such as CCS technologies.

CRITIQUES & RESPONSES

It's too expensive for taxpayers and ratepayers.

Incentivizing old coal plants to shut down by providing regulatory relief through rule changes and incentives comes at little cost to taxpayers. Our nation's oldest coal plants are also among the least efficient and provide a relatively small amount of electricity while generating huge emissions. Much of this power can be offset by efficiency upgrades that benefit consumers of renewable energy and natural gas, which is less expensive to build than new coal plants. By contrast, taxpayers bear many of the costs from the burning of coal in old inefficient plants. The particulate emissions from coal plants results in tens of thousands²⁵ of hospital visits per year and \$160 billion²⁶ in medical expenses. Closing our oldest coal plants and replacing them with cleaner, more efficient facilities, increasing capacity at modern coal plants and expanding use of nuclear and renewable energy would mitigate these costs.

It will cost jobs.

Right now, approximately 60,000 ²⁷ people are employed in 600 coal fired power plants nationwide. ²⁸ Our proposal would impact only a small number of those plants, and it would provide worker training to those who are adversely impacted. At the same time, it would stimulate job growth through investments in energy efficiency and the construction and operation of new clean energy facilities. It will require workers for energy efficiency retrofits at homes and factories, the construction of new nuclear and natural gas plants, and building a modern electric grid. This will require the skills of engineers, architects, construction workers, electricians, machinists, and other workers along production and supply lines.

It picks winners and losers.

This proposal takes an “all of the above” approach to clean energy. Old coal plants can be modernized or, if it is more cost effective, replaced by other clean energy technologies. It will remain up to each utility to determine how to meet the energy demands of their customers. In many areas, that could mean providing homeowners and businesses with energy efficiency assistance to reduce demand. In states that have abundant wind or solar resources, renewable energy will be able to help meet demand. For those areas where renewables are not readily available, natural gas, waste-to-energy, and nuclear power could provide the answer.

We are turning away from a domestic source of energy.

The United States is commonly referred to as the “Saudi Arabia of coal.” Our domestic coal reserves contain enough energy to last us 200 years. ²⁹ Coal will clearly play a role in powering our economy for decades to come. Even when including the costs of addressing inefficiencies and emissions from old coal plants, coal would still remain an inexpensive fuel source. ³⁰ By pursuing policies to retire or modernize old coal plants, we are ensuring that we use this resource as efficiently as possible, in order to maximize its usefulness while reducing its harmful emissions.

Stricter emission standards will be enough to close old coal plants.

There are currently 105 gigawatts of coal-fired electricity capacity in the United States that are not equipped with pollution scrubbers. Under new emission standards being proposed by the EPA, however only 20 to 40 gigawatts of coal electricity will be shutdown. ³¹ That would result in between 65 and 85 gigawatts of old, inefficient coal generation that remain intact. That is the equivalent of over 475 coal generation units of at least 40 years of age. ³² Other policies will be needed to encourage the modernization or retirement of these remaining coal plants.

The United States should be moving away from coal entirely.

China, India and other nations are rapidly expanding their coal use. This will increase the international market for coal to \$36 billion over the next twenty years.³³ The result will either be the use of inefficient, older technologies that have high emissions or the creation of new export opportunities for U.S. coal technologies that dramatically reduce or eliminate pollution, including carbon pollution. We risk not only missing out on the opportunity to reduce pollution at foreign coal plants, but also of forfeiting potential economic growth if we do not provide the proper assistance and incentives to U.S. companies to export cleaner energy technologies abroad.

ENDNOTES



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