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## II. Economics & Science

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# Clean Coal Can Electrify the World

by Richard Freeman

### Twenty-five thousand clean coal and nuclear plants will defeat Prince Charles' 'Great Reset.'

July 28—The “Great Reset” of Prince Charles and the City of London-Wall Street financial powers, presented full force at President Joseph Biden’s April 22-23 world leaders’ Climate Summit, will devastate manufacturing, agriculture, and infrastructure; will harshly slash living standards, tear down civilization, and build a \$50 trillion green speculative bubble administered through a central bankers’ dictatorship. This is the core agenda for discussion and implementation at the COP-26 climate conference to be hosted and supervised by Great Britain from Nov. 1-12, 2021 and other similar conferences.

The imperial Great Reset/Green New Deal’s objective, first, is seeking to greatly diminish or dismantle the use of heat-powered machines, which launched the Industrial Revolution, increased population, expanded man’s knowledge and fed the anti-entropic development of the physical economy. The heat powered machine has been dependent on fossil-fuels or fossil-fuel generated electricity, with the beneficial addition of nuclear. It was conceived of by Denis Papin (1647-1713), during the period 1680-1705. Papin was the collaborator and correspondent of the great scientist Gottfried Wilhelm Leibniz (1646-1716). Leibniz made the maximum-minimum principle of the power of the heat-powered-machine the principle for his breakthrough development of the science of physical economy, which concept drove the Industrial Revolution, and the emergence of America.

Second, the Reset’s plan is to take down electricity generation and transmission, the foundation of modern economy, depriving the world of electricity. Electricity, the conveyance of Promethean fire, is the incandescent invention of a series of discoveries by scientists Benja-

min Franklin (1706-1790), Hans Christian Ørsted (1777-1851), André-Marie Ampère (1775-1836), Wilhelm Eduard Weber (1804-1891), with input from Joseph Henry (1797-1878) and Michael Faraday (1791-1867). Electricity was commercialized and began to spread through the economy during the last quarter of the nineteenth century, setting off economic surges.

Why is the British Empire’s entire eco-fascist movement single-mindedly going after coal, slandering it as dirty, polluting, the source of global warming, the cause of poor health? For the past two decades, coal-fired plants are using advanced Clean Coal technology. It is far more efficient, as measured by output of electricity per unit of coal, cheaper than it had been, and as its name implies, *clean*, i.e., significantly below stringent U.S. Environmental Protection Agency agencies’ standards for most of the designated greenhouse and/or pollutant gases. In 2020, the U.S. Department of Energy’s National Energy Technology Laboratory (NETL) reported: “Coal-fired electricity generation is cleaner than ever. NETL’s research shows that a new coal plant with pollution controls reduces nitrogen oxides by 83%, sulfur dioxide by 98%, and particulate matter by 99.8% compared to plants without controls.”

Of the three primary fossil-fuel sources for power plant electricity generation (coal, gas, and oil), coal is the most dependable, and the plants can be built relatively quickly. Witness the mid-February 2021 Texas cold snap, during which non-functional wind and solar panel generated electricity immediately gave up the ghost, and even some gas-fired plants froze, but coal-fired plants kept chugging along, performing, despite any amount of cold.

*The real reason for the attack on coal-fired plants is that they can produce large volumes of necessary electricity for the advanced sector; but especially for the developing sector; which has an immense electricity deficit; the plants can be based upon clean coal technology anywhere in the world.*

## LaRouche's Energy Flux Density vs. Extinction

Physical economist and statesman Lyndon LaRouche stated in a Sept. 30, 2011 webcast, "Mankind's existence is based on the fact that mankind is the only species of which we know, which has the willful power to increase the energy flux-density of life as a whole, on our planet Earth and beyond."

The introduction of electricity a century and a half ago created a new higher level of energy-flux density, a new technological leap, discontinuous with the pre-electricity age. Consider the physical-economic platform that uses electricity. A machine tool, fully electric, can perform work that is 10-50 times more powerful than a machine tool from the pre-electric age. But the economic platform provided by electricity now allows new technologies, from high-speed electrified rail, superconductivity, and laser and coherent energy beams, to inter-spatial communications, and magnetic resonance imaging (MRI) and CT scans, none of which could have existed in a pre-electric age. These interconnected technologies together produce a more powerful, more efficient system as a whole.

If electricity is removed, one does not simply get one or two minor features that do not function; instead, the whole system falls off a cliff into an accelerating hyperbolic collapse. This is detailed in The LaRouche Organization's pamphlet report, *The Great Leap Backward: LaRouche Crushes the Green New Deal*.

The deliberate denial of electricity to the developing world will mean that it will never know all the technological features of an electricity-based, high energy-flux density economy, which is the potential of human civilization today.

The developing world faces an immediate crisis: Stalking famine since the pandemic; a vastly inadequate health system and profoundly inadequate supply of COVID-19 vaccines to combat the disease; greatly insufficient capabilities for modern agriculture.

Helga Zepp-LaRouche, the President of the Schiller Institute, has called for building a global modern health and hospital system. On May 8, Mrs. LaRouche in her keynote address to a Schiller Institute conference said:

Given the pandemic, the only way to stop that and future pandemics, is to create a world health system, which means a modern health system in every single country. Because if you don't stop the pandemic in even the poorest country on the

planet, it will come back; there will be new variants, new strains, which eventually could make obsolete the vaccines which already have been distributed. So, we are in a race against time.

We should do in every single country what was done in Wuhan when the pandemic broke out. Build hospitals! This can be done with the Army Corps of Engineers, with aid organizations. In one week, one can build a hospital for 1,000 people. Then, these modern hospitals need well-educated doctors, nurses. You need lots of clean water; two billion people in the world have no access to clean water. You need lots of electricity; this cannot be done without infrastructure. So, the building of a modern health system in every country can and must be the beginning of overcoming the underdevelopment of the developing countries for good.

But every one of those elements, like clean water and infrastructure, requires electricity. If electricity is denied to Africa, as the British are doing now, there will be massive new deaths, a holocaust. This cannot be allowed to happen. This behavior, which London officials and royals lie is necessary to reduce CO<sub>2</sub> emissions in order to keep the temperature from increasing 1.5 degrees Celsius, is transparently evil.

Raj Kumar Singh, India's Energy Minister, told an International Energy Agency (IEA) conference in April that "You have 800 million people who don't have access to electricity. You can't say that they have to go to net zero. They have the right to develop, they want to build skyscrapers and have a higher standard of living; you can't stop it."

## Electrification of the Developing World

What is the volume of electricity consumption the developing world does need to overcome its enforced enormous deficit? We can select the U.S. annual electricity consumption level, of 11,731 kWh *per capita*, as a world standard. *Per capita* consumption is not the consumption of each individual of electricity as such, but the total consumption of the society—agriculture, industry, infrastructure, residential—divided by the number of people. It measures of the *per capita* power of the economy.

For Africa as a whole, **Figure 1**, the average annual electricity consumption per capita is 559 kWh, *which is one-twentieth of the American level*, a level of electric-

FIGURE 1

### The Enormous Deficit of Electricity Consumption of the Developing World

(Electricity Consumption, in Kilowatt-hours, Per Person, Per Year)

**Proposed Standard:** USA: 11,731

**Current Actual Level of Consumption:**

<b>Africa</b>	559
Mali	153
Sierra Leone	42
Chad	12
<b>Ibero-America</b>	2,096
Peru	1,398
Guatemala	589
Haiti	37
<b>Asia (except Japan)</b>	2,540
Indonesia	799
Myanmar	269
Yemen	123

Source: EIR; U.S. Department of Energy, Energy Information Agency; International Energy Agency (IEA)

ity starvation. But even that understates the problem, because of the enormous disparities among the different countries of the continent. The average includes countries like South Africa, which have a relatively far higher level of energy consumption. Consider Mali which has 153 kWh of electricity consumption *per capita*; Sierra Leone which has 42 kWh, and Chad with 12 kWh. The level of Chad is one-thousandth the U.S. level.

In Ibero-America, the average annual electricity consumption *per capita* is 2,096 kWh, one-sixth the U.S. level; the average across the continent of Asia is 2,540 kWh, less than one-fourth the U.S. level. In

FIGURE 2

### The Developing World Requires 57.4 Quadrillion Watt-Hours of Increased Electricity Consumption, a Five-Fold Increase

Continent	Current Net Electricity Consumption (Trillion Watt-Hours)	Increased Level of Net Consumption Needed to Bring to U.S. Standard (Trillion Watt-Hours)
<b>Africa</b>	638	13,768
<b>Ibero-America</b>	1,315	6,108
<b>Asia (except Japan)</b>	10,219	37,485
<b>TOTAL Developing World</b>	<b>12,217</b>	<b>57,361</b>

Source: EIR; U.S. Dept. of Energy, Energy Information Agency; China's National Bureau of Statistics; International Energy Agency.

FIGURE 3

### The Energy Density of Fuels

Fuel Source	Energy Density (Joules/gram)
Combustion of Bituminous Coal	$2.7 \times 10^4$
Typical Nuclear Fuel	$3.7 \times 10^9$
Deuterium-Tritium Fusion	$3.2 \times 10^{11}$

Source: EIR; 21st Century Science & Technology

Yemen, in Southwest Asia, the electricity consumption is 123 kWh.

Knowing this deficit determines a plan for action. EIR determined the annual electricity consumption needing to be added for each nation. For Chad, for example, to reach the U.S. standard, the country would require an additional 11,708 kWh of electricity per person multiplied by the number of citizens in Chad. The same would be done for every developing world nation. Hence, as **Figure 2** shows, the developing world as a whole needs 57.4 trillion kilowatt hours of combined annual increased electricity consumption. This electricity must be produced: the developing world needs to *quintuple* its electricity production.

This means constructing in the developing world, 9.96 trillion watts (terawatts) of new installed electricity generating capacity. To produce 9.96 trillion watts of installed electricity capacity, the developing world will need the construction of 19,910 new electricity generating stations, spread across every developing country in a mix of coal, nuclear, and gas, over the next 15 -20 years.

To put this immense undertaking into perspective, the developing sector will require more *new* installed electricity generating capacity than all the capacity now existing on Earth. This is no ordinary undertaking. It will require the creation and full mobilization of a new Bretton Woods international credit system, based on Lyndon LaRouche's principles, and the Belt and Road Initiative. It could not be done by an individual nation. It must involve the coordinated productive capacities of the United States, China, Russia, India, Japan, Germany, South Korea, and the nations of the developing world themselves. This electricity will run a

global modern health system in every country, but also desalinate and/or purify water, power electrified rail systems, and so forth. It will generate economic development both in the developing world, and in the “formerly industrialized” world.

This requires coal, and secondarily, natural gas. As **Figure 3** shows, nuclear fission and fusion have far higher energy densities than coal, by 5-7 orders of magnitude. These are the electricity-generating technologies the economy must move to. But, at the moment, fusion power does not produce electricity, and nuclear is burdened by punitive environmental restrictions, and the lack of factory mass production. Nuclear plant construction takes 7-10 years, and only 10-12 nuclear plants are built each year globally. By contrast, coal-fired plants can be built within 3-5 years, and already between 75 and 150 are built per year, and this could be more than doubled. The world needs a crash mobilization to move into a fission-fusion based economy. But in the crucial next 15–20-year transition period, where massive amounts of electricity are urgently demanded to build hospitals and a universal health system and other essentials in the developing and developed world, coal is the best option. Without this, Africa, Ibero-America, and sections of Asia will not survive.

To do this one must cut through and defeat the hate-filled propaganda and lies against coal spread by the City of London-Wall Street’s Green New Deal.

To do that, the reader must know what clean coal is, the science and technology behind it, its advantages for the Schiller Institute’s vision of development. We take this up now.

### **The Success of Clean Coal**

For thirty years, Clean Coal coal-fired electricity generation technologies have been transforming the way that coal-fired plants operate. They incorporate scientific-technological changes which range from technical improvements to revolutionary transformations. First, they reduce emissions of greenhouse gases and pollutants to levels below stringent U.S. Environmental Protection Agency standards. Second, they have increased the thermal efficiencies of coal power plants—the electricity generation output relative to the heat potential of the input coal—by 40-50% over the past 10-15 years. This is a development that you have most likely never heard about.

Two of the clean coal processes are based on locating and taking advantage of anomalies in physics. A

further method, the *magnetohydrodynamics* (MHD) process, makes a technological leap that eliminates the standard coal-fired plant process of the past century-plus.

This clean coal technology must be mass constructed and spread worldwide, especially in the developing world, over the opposition of elite-controlled eco-fascists.

In a chunk of coal, one can see the development of earth’s geology and life for the last few hundred million years. Coal began the process of its formation 300 million years ago. Giant ferns, reeds, and mosses—living in swampy waters in forests—died. The dead rotting plants covered each other in successive layers. Heat and pressure produced chemical and physical changes, so that after millions of years, this material became coal. Coal is not a mineral, as is commonly thought, but an organic compound. It contains more than 50% carbon, but also oxygen, hydrogen, nitrogen, and sulfur. It is combustible: In the combustion process coal releases thermal energy, which can be transformed into motion and work.

We will first discuss the basic workings of a coal-fired power plant, against which to judge the improvements of clean coal. **Figure 4** shows that coal enters a combustion chamber, where it is burned to produce energy that boils water. The steam, under tremendous pressure, flows into a turbine, spinning the turbine at 1600 rpm or more. A shaft connected to the spinning turbine sets the generator spinning. A generator consists of a stationary magnetic field (stator) in which the spinning electromagnet (armature) produces electrical current.

Electricity is portable: it can be transmitted by transmission lines to local neighborhoods, manufacturing plants, or other parts of the country.

We’ll explain three of the leading, most promising clean coal technologies: Supercritical and ultra-supercritical coal power plants; fluidized bed combustion; and magnetohydrodynamics. The first two of these are already well established around the world. For each, we will show the extent to which the technology increases efficiency of electricity generation, and simultaneously cuts pollutants.

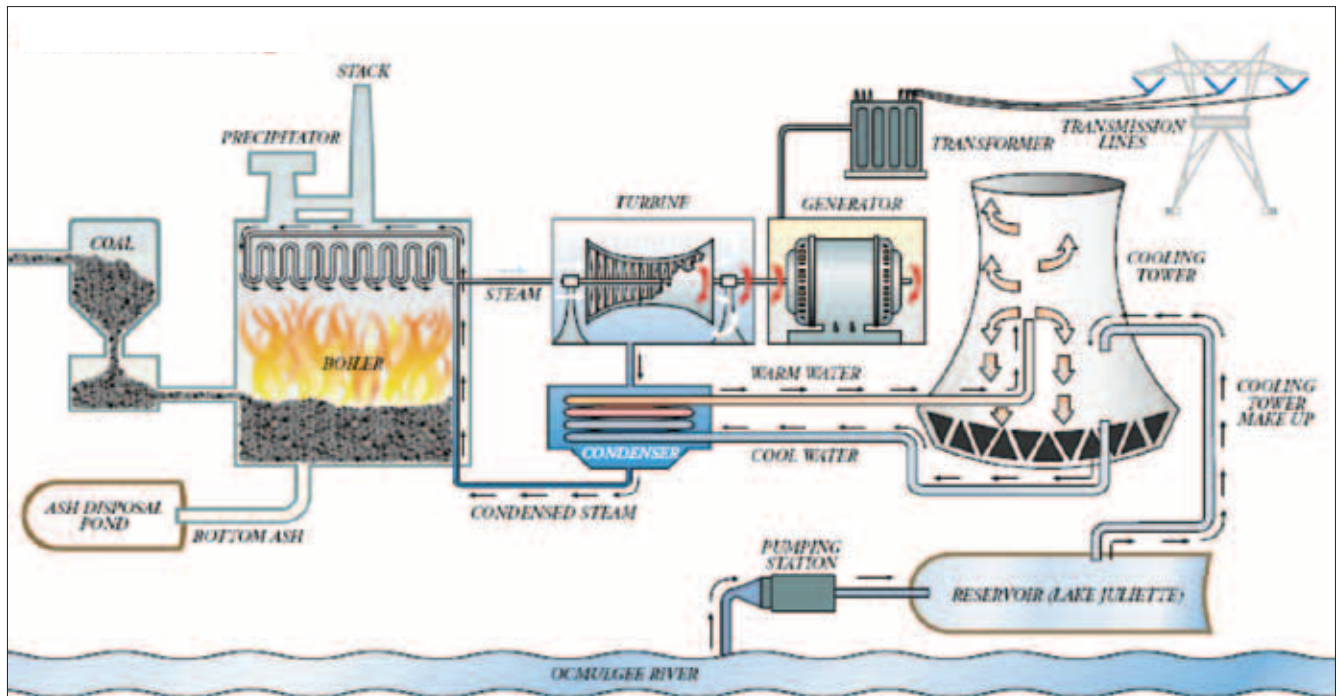
### **Supercritical and Ultra-Supercritical Coal Plants**

The supercritical technology is based on taking advantage of an anomaly offered by the *critical point* in



FIGURE 4

**Coal-Fired Electric Generating Plant**



Georgia Power handout

physics. The great chemist Dmitri Mendeleev both made discoveries about it and gave it its name in the 1860s. Many substances have a critical point where critical temperature and critical pressure join. When the substance goes beyond the critical point, usually through increased pressure, it becomes supercritical, manifesting unique properties. Water, for example, reaches its critical point at a temperature of 374 degrees Celsius (705 degrees Fahrenheit), and 217 atmospheres of pressure. Beyond that, it is supercritical water. Each substance has its own critical point, with its own critical temperature and critical pressure.

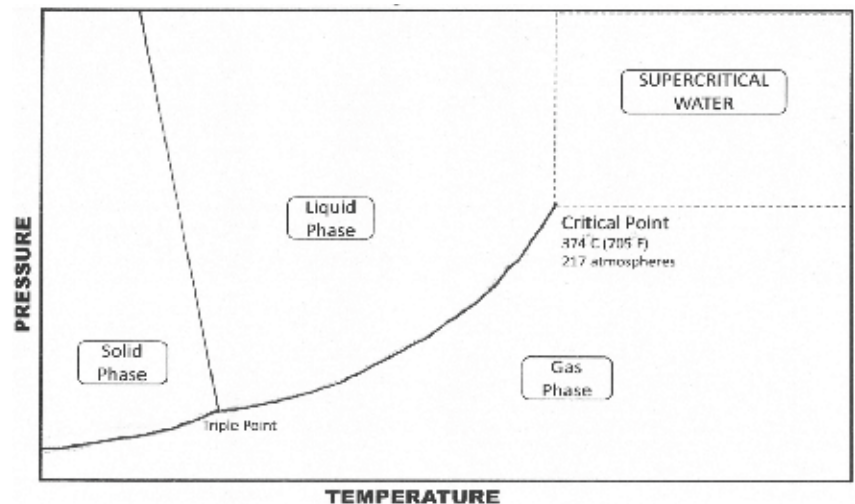
The supercritical clean coal technology's aim is to use supercritical water in the turbine process. This is shown in **Figure 5**, which is merely a representation of real underlying physical processes. One can see water's distinct phases—solid, liquid, and gas. Also represented is water in its supercritical fluid stage. In that stage, supercritical water is neither liquid nor gas.

Water in the supercritical stage incorporates some features of the liquid and some of the gaseous state; it also has some unique properties of its own.

The supercritical water, in its steam form, has a higher density than the density of the steam from normal water in a conventional coal-fired plant. The denser supercritical steam turns the turbine at a much more rapid

FIGURE 5

**Phase Diagram of Water**



EIR

rate (about 3200 revolutions per minute versus 1600 rpm for conventional), which results in greater generated power for the same input.

Second, as a liquid approaches its critical point, its latent heat of vaporization (the heat needed to transform water from liquid to gas) begins to decrease until it reaches zero at the critical point. In other words, the amount of energy needed to change the water into steam becomes less and less, and eventually the water vaporizes instantly. Thus less coal is used to heat the same amount of water.

The combined effect of supercritical technology is spectacular. A conventional coal-fired plant's thermal efficiency is around 34%. Thermal efficiency expresses a ratio: the *output of work*, in this case electricity generation, relative to the potential heat-content of the input coal. It measures the efficiency of the process in capturing the heat-content locked up in the coal to do work. By contrast, the efficiency of super-critical coal-fired plants is around 43%. More advanced ultra-supercritical (USC) power plants have an efficiency of 47.5%. General Electric, which manufactures USC plants, announced on its website that its advanced USC Steam H plant is driving towards 50% efficiency. Some engineers are at work on designs to achieve 53-55% efficiency rates.

Compare this 43-plus percent efficiency to “renewable” solar panels, whose rated ability to convert solar energy into usable work (electricity generation), is 18-22%. Which is better: a super-critical coal-fired power station of 47.5% thermal efficiency, or a solar plant when the sun isn't shining?

The supercritical process above obliterates much of the anti-coal plant propaganda.

As for the effects of reducing pollution, coal-fired plants with the SC and USC processes may burn 18% less coal to achieve the same electricity generation output, thus producing 18% less greenhouse and pollutant emissions such as nitrous oxide, sulfur dioxide, and carbon dioxide.

Further reduction of the level of pollutants is achieved by supplemental technologies, discussed below.

### **Fluidized Bed Combustion of Coal**

Another effective clean coal technology, that exploits a different anomaly, is fluidized bed combustion (FBC). The FBC process creates the condition, through

technological changes, in which coal behaves like a fluid, but is still solid. This permits the FBC method to have much higher thermal efficiency than conventional coal-fired plant processes, and to reduce pollution.

In FCB, crushed coal is loaded into the bottom bed of the coal-fired plant's combustion chamber. Powerful streams of air, travelling at very high velocity, are pumped (through holes in the bed) from below into the crushed coal pile above, while the coal is simultaneously being burned. The injected air separates the coal particles, increasing the distance between them; they are *suspended* in an upward air jet stream above the bed. The separated particles move freely above, under, and around each other in this suspended air stream—the crushed particles are still solid, but together behave, in crucial respects, like a fluid. Videos reveal that the medium swirls and bubbles.

This suspended state exposes 75%-100% of each coal particle's surface area, while the heat is also swept upward by the air flow. The interaction of the more exposed sides of the coal particle and the more evenly distributed heat can burn much more of the surface area; more than 90% of the coal in the chamber is burned. The fluidized bed combustion heat transfer is ten times greater than in conventional processes.

As a consequence, the FBC power plant can and does function at a much lower initial ignition and operating combustion temperature: 750 degrees Celsius (1,382 degrees F) versus 850 degrees Celsius (1,562 degrees F) for a conventional coal power plant. Less energy is needed to run the plant, which means higher productivity. The FBC process's thermal efficiency rate is 42-43%, compared to conventional coal's 34%. Moreover, in some cases, the thermal efficiency approaches 46-50%.

FCB removes most pollution. It operates below the threshold temperature which oxygen and nitrogen require to form into the greenhouse gas nitrous oxide (NO<sub>2</sub>). If NO<sub>2</sub> is not produced, it cannot be emitted into the atmosphere. Second, at the start of the FBC combustion process, along with the coal, limestone is fed into the combustion chamber. The sulfur inhering in the coal combines with oxygen to form sulfur dioxide gas, SO<sub>2</sub>, a troublesome pollutant. However, the limestone combines with the SO<sub>2</sub>, producing as a reactant product, calcium sulfate (CaSO<sub>4</sub>) which is harmless. Very little SO<sub>2</sub> enters the atmosphere. Third, the FBC process, by using filtration equipment before the flue (vent)

gases reach the chimney, is very effective in removing coal ash (fly ash and bottom ash).

FBC is an incredible package, increasing thermal efficiency, and slashing what are called polluting and greenhouse gases. Most people in the United States and Europe are denied this knowledge.

Supercritical plants, as well as old-fashioned conventional coal-fired power plants, can get additional assistance in reducing pollutants. These supplemental pollution-reduction technologies are either housed in the main coal plant or in sub-plants nearby which are connected to the main power plants by vents and tubes.

For example, there is selective catalytic reduction (SCR), where the exhaust gas for a coal-fired plant containing nitrous oxide is passed through a large catalyst where the gas reacts with anhydrous ammonium and the catalyst, and is converted into simple harmless nitrogen and water. There is also flue gas desulfurization (FGD), which duplicates, with some modifications, what the fluidized bed combustion process does to eliminate sulfur dioxide (SO<sub>2</sub>) by combining it with limestone. Other processes can get rid of lead, mercury, etc.

Dry regenerable sorbents, and other types of sorbents can remove 25% or more of CO<sub>2</sub> from flue gas from coal combustion. But there is work to still be done using sorbents or solvents for CO<sub>2</sub> removal, which some industries are doing. This is to be distinguished from the hare-brained Green New Deal claim of removing the extremely slight amount of CO<sub>2</sub> out of the atmosphere.

## Magnetohydrodynamics

A magnetohydrodynamic (MHD) generator is a revolutionary leap in electricity generation. It produces a conducting fluid—in this case, a hot ionized gas, a plasma—which moves under and through a magnetic field. Plasmas are the most abundant conducting fluids in the universe. In MHD technology, coal is heated to very high temperatures, and turned into a current-conducting plasma fluid. The phase of electricity production which has been its main feature for 120 years, can now be superseded: Using high heat to boil water in a boiler, producing steam to turn a turbine, which turns a generator which produces electricity. Instead, MHD collects the positive and negative ions from the flowing ionized gas and con-

verts them directly into direct current (DC).

In MHD, the principal purpose of coal is to produce a plasma. Other energy sources—gas, oil, even nuclear—could be used for this purpose in MHD as well. Coal has an advantage that it is abundant and well-suited.

MHD is used in a variety of fields, including the medical field. But it is not, as of now, used for large-scale commercial electricity production. It is under experiment by the United States Department of Energy's National Energy Technology Laboratory; in India; and several other countries.

In the first phase of MHD, processed coal is fed into a furnace/combustion chamber, where it is heated at an extremely high 1250-2750 degrees Celsius (2,300-5,000 degrees F). It is converted into an ionized plasma. It passes through an expansion nozzle, so as to have high velocity; then the high-flow plasma passes through a channel kept in a magnetic field (at a strength of 5 Tesla or above) and the motion of the conducting plasma through this magnetic field *induces a voltage across the plasma*. All or most of the charged particles in the plasma are found to be freely moving.

In physics, current flows perpendicular to the magnetic field. That [process](#) generates an electromagnetic force that is perpendicular to the planes of the current and the magnetic field.

The plasma, moving past the magnets, induces a current in the moving plasma itself. If the magnet's poles are thought of as on either side of the plasma stream, this current is between electrodes “above and below” that stream. The cathode attracts the plasma's positive ions, and the anode attracts the plasma's negative ions. The ions are “collected/gathered” onto the electrodes. The MHD system converts the ions into DC electricity. Finally, an inverter converts the direct current electricity produced by the MHD process into alternating current (AC), for much more efficient, much longer long-distance transmission.

MHD today still has physical and technological features to surmount, but it has been found that it *could deliver efficiencies near 90%*.

## Clean Coal Will Change the World

The dedication to clean coal technology represents a fundamental policy that is dividing the world between those committed to high-technology, capital intensive development of the world, generating anti-entropic

FIGURE 6

**Nations Phased Out or Scheduling Phase Out of Coal-Fired Power Plants**

Nation	Date of Phase Out: Accomplished Or Planned
Belgium	2016
Austria	2020
Sweden	2020
Portugal	End of 2021
France	2022
United Kingdom	2024
Hungary	2025
Italy	2025
Ireland	2025
Greece	2025
Denmark	2028
Finland	2029
Netherlands	2029
Slovakia	2030
Germany	2038

growth globally, and those forces submitting to Prince Charles and the British oligarchy, who are tearing down coal-fired plants and forbidding nations, especially in the developing world, from building them.

This policy is signaling like a weathervane, the direction nations’ overall real economic growth policy will take. The nations erecting clean coal technology are also the ones adding new volumes of electricity needed for growth, building, or seeking new nuclear power plants, pushing for fusion power experimentation, adding new steel capacity, building new infrastructure and electrified railroads. It is recognized that the world is moving toward an infrastructure manifold of fission, fusion, plasma based MHD, superconductivity, etc., and that clean coal is a major stepping stone towards that manifold. Without clean coal technology the world will never get to this advanced manifold.

Figure 6 depicts the list of countries that have phased out or plan to phase out all coal-fired plants. These are European nations. There is significant agitation in Germany to phase out by 2025. The United States has shut half its coal fleet; it has not formally given a date that it will exit from coal, but under the Biden administration’s embrace of the Great Reset, and the extreme cowardice evidenced by layers of the Con-

FIGURE 7

**The Top Ten Nations With New Coal-fired Electricity Generating Capacity in the Pipeline— Either Under Construction or Planned**

	Capacity of Coal-Fired Plants in the Pipeline (Megawatts)	Share of the Coal-Fired Power Plants in Pipeline (percent)
China	205,886	41.2
India	66,025	13.2
Turkey	33,180	6.6
Indonesia	31,200	6.3
Vietnam	30,942	6.2
Bangladesh	22,984	4.6
Japan	11,881	2.4
South Africa	11,050	2.2
Philippines	10,536	2.1
South Korea	7,260	1.5

gress, and the population, it is as if such an exit date were in effect.

The nations exiting coal are largely those which are exiting from nuclear power, some with contracting populations; with health systems and steel production severely declining; several of them ranked in the world’s worst 25 for COVID-19 deaths per million people.

Figure 7 shows, as of approximately 2019, the top ten nations with new coal-fired electricity generating capacity in the pipeline. China leads the list, nine are either in Southeast or Southwest Asia; the remaining one is South Africa. Some of these nations have cut back on planned coal-fired construction under direct pressure from financial giants such as BlackRock, Inc. (in the case of the Philippines).

A comparison of China and the United States policy on clean coal technology policy makes the point clearly. China has one supercritical plant that has achieved 49.6 % thermal efficiency (the 1.35 GW Pingshan Phase 2 unit in Anhui province). China has embraced super-critical and ultra-supercritical clean coal as policy. It houses 48% of the world’s coal fired plant fleet; one out of every two coal-power plants operating the world, is located in China. It also has nearly half the world’s coal-fired plants in the pipeline, which are already under construction or committed for construction. This is a bulldozer effect, an integral part of the direction of China’s upward physical



economic growth for the 21st Century as against America's pronounced direction of contraction, leading to decay.

Moreover, in terms of output, China generated 62 % of all its electricity from coal in 2019 (4,553,800 GWh), and *almost every coal-fired plant built in China for the last several years has been a supercritical or ultra-supercritical clean coal plant*. China generated over 53% of the world's total coal-fired electricity, according to data released by the Ember research group.

At the 75th Session of the United Nations General Assembly on Sept. 22, 2020, Chinese President Xi Jinping stated that China was to achieve "carbon neutrality" by 2060, which environmentalists denounced as far too slow. China will be building coal-fired clean coal plants apparently at least through 2035, and perhaps decades after that.

But, equally important, it is China's international role in financing and building supercritical coal-fired plants in other countries, that is causing the British Empire conniptions. In the June 12, 2020 *India Climate Dialogue*, eco-fascist Rainforest Action Network leader Alison Kirsch reported that four huge Chinese banks—Bank of China, Industrial and Commercial Bank of China, Agricultural Bank of China, and China Construction Bank—together "make up 51% of financing to 30 top coal power [utility-electricity] companies globally from 2016-2019." *Quartz* magazine reported that of the coal-fired electricity plants being built outside of China, 72% are bankrolled by Chinese banks. *Quartz* complained that "60 new coal plants across Eurasia, South America, and Africa—totaling an additional 70.3 gigawatts—are financed almost exclusively by Chinese banks."

Meanwhile, India will overtake the United States during this year or next as the second-ranking country for megawatt hours of electricity produced with coal. 53% of India's electricity comes from coal. On Sept. 3, 2019, NTPC Ltd., one of India's largest power generating companies, announced it had commissioned the country's first ultra-supercritical (USC) coal-fired unit at the two-unit 1,320-MW Kharbone plant under construction in the state of Madhya Pradesh. In March of this year, India released a 28-page draft of the National Electricity Policy (NEP), which states that all future coal-based plants should only deploy "ultra-supercritical less-polluting technologies."

Russia, which gets most of its electric power from

abundant natural gas, nonetheless produces 18% of its electric power from coal. Russia consumes the fourth-most electricity of any nation in the world (997 billion kWh). In a March 2, 2021 speech to a meeting with the top leadership of the Russian government, Russian President Vladimir Putin stressed that the coal industry, "should really work to improve the well-being of people and create modern, comfortable living conditions."

But in the United States and Europe, it is different, under the direction of Prince Charles' green networks. Carbon Tracker is a leading anti-coal 'non-profit' shock troop, founded in London in 2011 by British asset fund speculator Mark Campanale. Campanale is under the policy thumb of Prince Charles. A leading campaigner for disinvestment from coal is the Ashden Trust, of which Prince Charles is the patron and controller; Carbon Tracker's Campanale is a member of the development board of the Ashden Trust under Charles' direction. Prince Charles is the Founding Patron of the Cambridge Institute for Sustainability Leadership at the University of Cambridge and is actively involved in its operations; Campanale is a Visiting Lecturer at the "Master's Course" of the Institute. Charles gave a video conference presentation at Guild Hall on Oct. 27, 2015, the official headquarters of the City of London, in which he called for kicking off a major campaign to disinvest from and shut down coal. Immediately after Charles finished speaking, Mark Campanale took the podium to praise the Prince's proposal.

The Biden administration, through the Great Reset, is following dutifully.

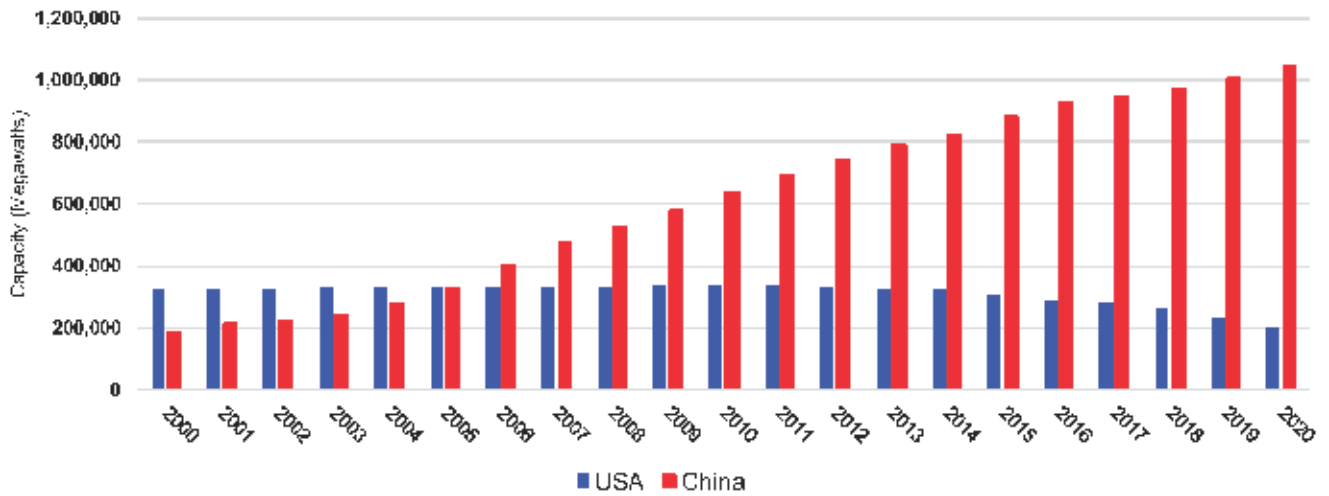
## The Consequences

The United States' 20 years' blind pursuit of British economic policies on coal, intensified under the last five years of the Great Reset/Great Rewiring, now shows in policy consequences crippling America as a nation. It radiates outward from policies on coal-generated electricity, to overall electricity consumption, to nuclear fission, to the interconnected production of steel. Economics starts with certain policy hypotheses, and bad hypotheses and good radiate through the whole economy.

**Figure 8** compares the United States and China in installed coal-fired electricity generating capacity. If a 1,000 MW installed capacity plant runs for one hour, it produces 1,000 megawatt-hours of electricity. One

FIGURE 8

**Installed Coal-Fired Plant Electricity Generating Capacity: China Quintuples United States' Capacity**



Source: EIR; U.S. Dept. of Energy, Energy Information Agency; China's National Bureau of Statistics; International Energy Agency; bp Statistical Review of World Energy 2014-2020

multiplies that coal-fired plant's installed capacity by the number of hours the plant is run during year to determine its output.

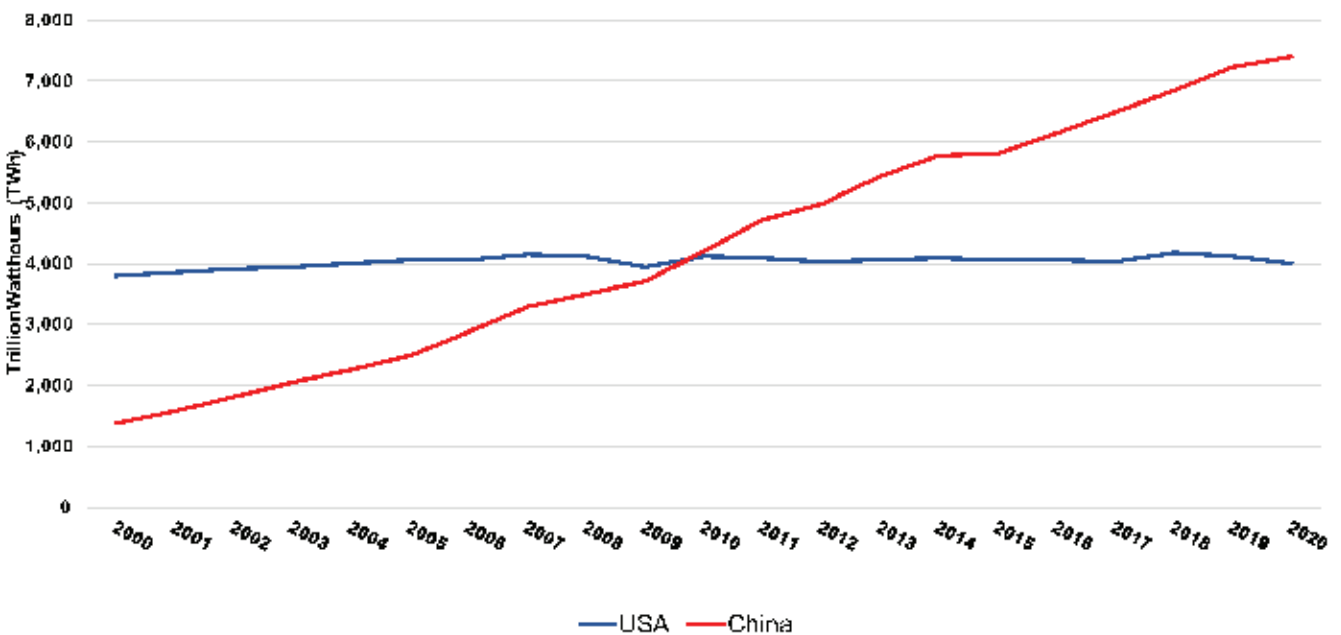
In 2000, the United States had 70% more installed coal-fired capacity than China. By 2020, the U.S. had 200,000 megawatts of installed capacity (40% less than the year 2000), while China's rocketed to

1,043,000 megawatts, giving China five times the installed coal-fired capacity of America. This was a policy decision.

Figure 9 shows a further consequence, the annual electricity generation and use from all sources during a year. In 2000, the United States had nearly three times the annual electricity generation of China. But during

FIGURE 9

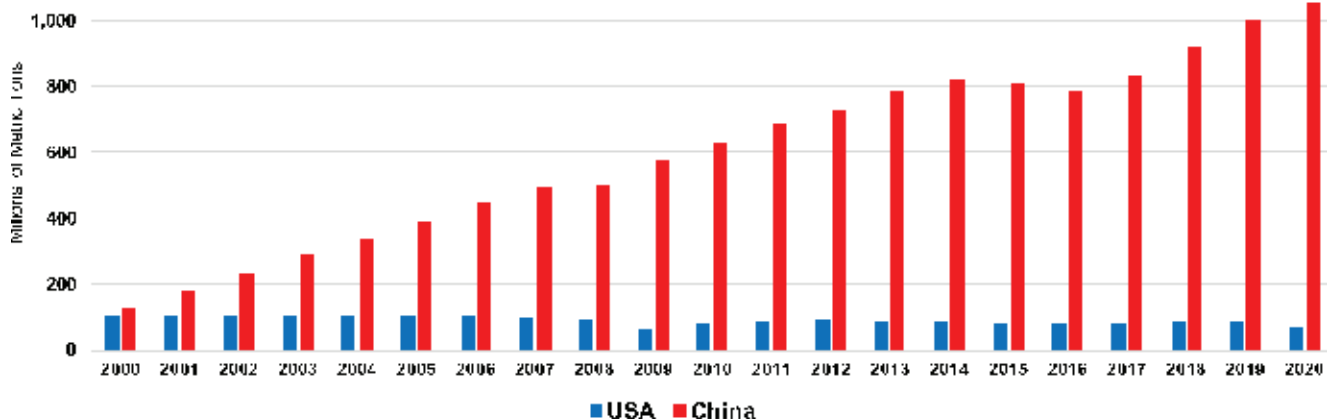
**Annual Electricity Generation: U.S. Stagnates; China Increases 5.5 Fold**



Source: EIR; U.S. Dept. of Energy, Energy Information Agency; China's National Bureau of Statistics; International Energy Agency.

FIGURE 10

**Annual Steel Production: China Outproduces USA 14.5 Fold**



Source: EIR; China's National Bureau of Statistics; American Iron and Steel Institute; World Steel Institute.

the period 2000-2020, America's electricity generation stagnated: it tore down coal plants, reduced nuclear plants, and built some "renewables." China, because it is so heavily dependent on coal, and added new coal-fired plants as well as some nuclear power plants, took off. From 2000-2020 its electricity generation increased 5.5-fold, and today China generates nearly twice the electricity of the United States annually. (Because China's population is four times America's, its electricity generation *per capita* is less than that of the United States, though China will likely overtake the United States in the next 10-15 years unless U.S. policy changes.)

In nuclear power, the United States is completely stagnant. U.S. nuclear power generation at 790,000 kWh in 2020, is down 2.3% since 2010. That's still 2.25 times China's 348,000 kWh, but China's nuclear energy generation rose by 18% in 2019 alone, and it has 11 new nuclear power plants under construction with a capacity of 10.8 gigawatts.

Encapsulating this process is steel production. **Figure 10** shows that in 2000 the United States and China were very close in steel production. By 2020, U.S. steel production had contracted 28% to 73 million tons, while China produces 14.5 times what the United States does. If one makes steel from scratch, one needs coking coal to make coke, which reduces iron oxide (removing the oxygen) in the steel-making process, to produce elemental iron; if one uses an electric arc furnace to essentially recycle steel scrap, one needs electricity (as well as other) to run the electric arc furnace. But it

comes back to the basic principle, that if a nation is committed to development, it will develop coal as well as steel, and not write either off as a dying industry. Coal is not the end-all and be-all, but reflects the thinking process governing transformation of the economy.

There is a deadly irony here. America's adherence to the British policy moves America toward breakdown while China advances. This causes the British influencers of U.S. policy to threaten nuclear war to "contain China." *The anti-growth economic policy is actually an impetus towards war.*

**Universal Health Care System**

The destructive cycle can be broken by defeating the Great Reset policy and its ideology, and shifting toward a new world economic order. The seed crystal for this will be the building of modern healthcare systems in every nation, as Schiller Institute President Helga Zepp-LaRouche proposes.

Every nation must be equipped with a system of multiple hospitals, possessing the latest medical technology for diagnostics, treatment, care, with a network of clinics, clean water and sanitation provision, and food supply. This demands the largest health and hospital infrastructure building program in history. The United States has a precedent for the world, the 1964 Hill-Burton Act (the Hospital Construction and Survey Act), that specified that roughly 4.5 hospital beds must be built and maintained at hospitals for every 1,000 community residents to guarantee health. This set off a hospital building boom in the United States, and the

U.S. achieved this goal during the 1980s

In light of the out-of-control COVID-19 crisis, and the acute need to prevent new pandemics, *EIR* estimates that this requires constructing 29,500 new hospitals with 10,000,000 staffed hospital beds.

Each hospital requires abundant water, steel, concrete, brick, advanced machinery and telemetry, and a sufficient supply of electricity, which is required for diagnostic and corrective equipment, (MRIs, CT scans, corrective robotics), powering the operating room, etc.

Electricity is indispensable not only for the hospitals, but for the city or rural town's associated new housing, its water system and transport systems. This will require 1.97 quadrillion *new* watt-hours of electricity consumption—and production. But valuable nuclear power plants take 7-10 years to build, and only 10-12 per year are added worldwide (work on factory mass production must be increased). “Renewables” represent an unreliable degradation of electric power. If this development is to be accomplished quickly to save lives, clean coal must be mobilized. Coal fired plants take 3-5 years to build and 75-150

are already added annually; this can be doubled through modular construction. The power supplied to this project over the next 15-20 years will be clean coal and nuclear, with transitional natural gas turbine plants.

This great mission of healthcare and public health development defines the core project of a new world economic system, and a new Bretton Woods system of international credit. It will require the cooperation of China, Russia, the United States, and India, to export massive amounts of machine tools and capital goods to build industries in developing countries. Those countries need first to build steel factories, then their own machine tools and heavy capital formation. This can produce self-reciprocating industrialization and agricultural development between the industrial and developing world.

Coal-electric power is one issue; but all critical economic processes are tied together. By making a stand with clean coal, and not giving in to the Green Malthusians' *diktat* to eliminate it, we move the world from a great leap backwards, to advancing development and peace. Our future depends on this.

## New EIR Offprint Special Report Now Available

### The Great Leap Backward: LaRouche Exposes the Green New Deal

*Executive Intelligence Review* has released this Special Report to warn of the extreme danger to mankind represented by the Green New Deal, also called “The Great Reset” by the leaders of the Davos World Economic Forum.

Already being implemented, this plan is taking over the direction of national economies from sovereign governments, using the power of central banks and the too-big-to-fail private financial institutions, cutting off credit to fossil fuel power generation and to industrial and agricultural enterprises claimed to emit too much carbon. Meanwhile it is creating a new huge bubble in the “sustainable fuel” sector, hoping to prop up the increasingly bankrupt financial system.

Stopping it by returning to a Hamiltonian American System credit policy, requires an understanding which is the purpose of this report.



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