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POLICY BRIEF



Summary

- Eliminating fossil fuels and nuclear power would require millions of new wind turbines, billions of solar panels, and several billion batteries.
- Relying on renewable energy sources would cause a massive worldwide increase in mining for raw materials.
- Current mining operations to supply materials for today's comparatively small amount of renewable power technology are already causing supply difficulties, serious problems for the environment, and substantial harm on the men, women, and children who work in these industries.

How the Green New Deal's Renewable Energy Mining Would Harm Humans and the Environment

By Paul Driessen

Executive Summary

The Green New Deal (GND)—promoted by Sen. Bernie Sanders (I-VT), Rep. Alexandria Ocasio-Cortez (D-NY), and several other prominent elected officials—aims to replace all fossil fuels and nuclear energy with so-called “renewable” energy sources, primarily wind and solar.

The justification for this extreme policy proposal is based primarily on the fear that carbon dioxide (CO₂) emissions from oil, natural gas, and coal will cause catastrophic global warming, as well as concerns about the alleged dangers of nuclear power sources.

The scientific case that manmade global warming poses an “existential threat” to humanity is highly questionable, according to many scientists, and the safety record for nuclear power in this country thoroughly belies the claims against it.

However, what is beyond dispute is that eliminating fossil fuels and nuclear power would require literally millions of wind turbines, billions of solar panels, and several billion batteries like the half-ton power sources used in Tesla vehicles. This, in turn, would require a massive worldwide increase in mining for lithium, cobalt, copper, iron, aluminum, and numerous other raw materials.

Current mining operations to supply materials for today’s comparatively small amount of renewable power technology—plus batteries for laptop computers, smartphones, and electric cars—are already causing supply difficulties and serious problems for the environment. These mining operations are also imposing substantial harm on the men, women, and children who work in battery- and renewable energy-related mines, processing plants and factories in other countries.

As this paper shows, expanding mining on the scale needed to meet the renewable energy requirements contained in the Green New Deal and other proposed renewable energy mandates would cause unimaginable harm to the environment, wildlife, and humans.

This *Policy Brief* addresses the following topics:

1. The Green New Deal’s Need for Metals and Minerals

The solar panels, wind turbines, and batteries needed to replace fossil fuels and nuclear energy over a 10-year period to produce the 8.2 billion megawatt hours of power for America’s annual electricity-equivalent needs under the GND would require an unprecedented increase in mining for raw materials.

2. Ruinous Rare Earth Elements

The largest proven reserves of rare earth elements like indium, tellurium, dysprosium, and neodymium are found in China’s Inner Mongolia province. Current mining operations there have created toxic wastelands and lifeless rivers. Workers are sickened by the toxic substances they mine and process. The increase in mining to meet GND goals would inflict magnitudes more damage on environments and to people throughout China and other parts of the world.

“AS THIS PAPER SHOWS, EXPANDING MINING ON THE SCALE NEEDED TO MEET THE RENEWABLE ENERGY REQUIREMENTS CONTAINED IN THE GREEN NEW DEAL AND OTHER PROPOSED RENEWABLE ENERGY MANDATES WOULD CAUSE UNIMAGINABLE HARM TO THE ENVIRONMENT, WILDLIFE, AND HUMANS.”

3. Lethal Lithium

In Argentina, Chile, and Tibet, citizens are increasingly angry about the environmental degradation caused by current levels of lithium mining. Producing enough lithium to build the two billion batteries necessary to

meet GND goals, as well as for other technologies, would further degrade lands, habitats, water, livestock, and human health.

4. Killer Cobalt

The cobalt required for renewable technologies and batteries in laptops, smartphones, electric cars, and backup batteries is primarily mined in the Democratic Republic of Congo. It is well documented that these mining operations foul local lands and waters and inflict widespread

harm on the people that live near and work in these mines. It is estimated that some 40,000 Congolese children work alongside their parents and suffer under inhumane working conditions while digging for this cobalt. The mining required under the GND would dramatically expand demand for cobalt and would therefore exacerbate this tragedy.

5. Copper Complexities

The GND would require vastly more mining for copper, which is essential in wind turbines, solar panels, batteries, transmission lines, and electric vehicles. Environmental groups oppose the expansion of almost any mining, especially in the United States, even as they promote GND energy sources that cannot exist without the products of such mining operations.

6. Green New Deal Mining Hypocrisies

In the United States, mining for the minerals needed for GND technologies could be done in a safer manner and with stronger protections for wildlife and workers than in many other nations. For example, Alaska and many Western states have enormous potential for GND-required metals and minerals. However, American environmentalists have convinced state policymakers and federal government officials to prohibit exploration and mining in the vast majority of these areas. This means that meeting GND needs would increase our reliance on foreign countries, putting a heavy and unfair burden on adult and child laborers in low-income and developing countries around the world.

1. The Green New Deal's Need for Metals and Minerals

The Green New Deal seeks to replace nuclear power and virtually all fossil fuels—coal, oil, and natural gas—with so-called “renewable” energy sources, principally solar and wind, and it aims to accomplish this goal over a 10-year period. Fossil fuels and nuclear currently generate about 8.2 billion megawatt-hours (MWhr) of electricity and electricity-equivalent power for America’s industrial, commercial, residential, and transportation sectors.¹

To replace all energy generated by these sources with power from solar panels—which now generate just 1.5 percent of the country’s electricity—plus a week’s worth of backup power, would require nearly 19 billion solar panels, blanketing an area the size of New York and Vermont.² To replace that energy using onshore wind turbines—which currently generate about 7 percent of the nation’s electricity—would necessitate more than two million massive towers covering an area equal to the land in Arizona, California, Nevada, Oregon, and one-quarter of Washington State.³

These figures are likely very conservative, because they are based on current production figures. Today, renewable energy facilities are typically built in ideal locations, but the more panels and turbines that are installed, the more they will need to be placed in less-than-optimal sites, requiring far more of them.

Moreover, since the sun doesn’t always shine and the wind doesn’t always blow, some two billion batteries similar to those used in Tesla

electric cars would be needed to store a week's worth of electrical power to prevent America from grinding to a halt for hours or days at a time.⁴

Regardless of the mix of solar and wind, the raw materials required for these technologies to meet GND goals would necessitate an unprecedented worldwide expansion in mining. And those mining operations would rely primarily on fossil-fuel-powered heavy equipment, since battery-powered equipment for enormous industrial operations does not exist.

British science writer and member of Parliament Matt Ridley estimates that wind turbines “need about 200 times as much material per unit of capacity as a modern combined cycle gas turbine.”⁵

The mining operations required to build wind and solar facilities would involve removing and crushing hundreds of billions of tons of rock and ore, causing major habitat losses and widespread pollution. It would also create serious human health impacts, especially in countries that do not have modern equipment and health and safety protections.

Even if such operations could be quickly and effectively started, the world would be hard-pressed to mine and process enough materials to meet GND demand.

2. Ruinous Rare Earth Elements

GND technologies require rare earth elements (REEs), including indium and tellurium in photovoltaic solar panels and dysprosium and neodymium in wind turbines. A single 1.5-MW turbine requires about 500 pounds of REEs, while a 3-MW turbine needs nearly two tons of rare earth elements.⁶



“CURRENTLY, MORE THAN 70 PERCENT OF THESE RARE EARTH MINERALS ARE MINED IN CHINA OR BY COMPANIES UNDER CHINESE CONTROL ...”

Currently, more than 70 percent of these rare earth minerals are mined in China or by companies under Chinese control, with much of China's production coming from areas north of Baotou, Inner Mongolia, though there are substantial reserves in other parts of the world.^{7,8}

Not long ago, the Inner Mongolia region included massive tracts of fertile farmland. However, it has

become a vast toxic wasteland, where virtually nothing grows and few wildlife or humans can live. “There's not one step of the rare earth mining process that is not disastrous for the environment,” notes Jamie Choi at Greenpeace China. “Ores are being extracted by pumping acid into the ground, and then they are processed using more acids and chemicals.”⁹ About 85 percent of that processing takes place in China.

Producing one ton of REEs releases up to 420,000 cubic feet of toxic gases, 2,600 cubic feet of acidic wastewater, and one ton of

radioactive waste.¹⁰ The resulting black sludge is then piped into what has become a foul, acrid, lifeless “lake.” Its toxic, carcinogenic, acidic, and radioactive contents are seeping into groundwater and some of the country’s waterways.¹¹

As retired Chinese farmer Su Bairen explained, “Anything we planted just withered, then our animals started to sicken and die.”

The harm is not limited to crops and livestock, either. Two journalists investigating the situation noted, “Dalhai villagers say their teeth began to fall out, their hair turned white at unusually young ages, and they suffered from severe skin and respiratory diseases.

Children were born with soft bones, and cancer rates rocketed.”¹²

Miners and other workers labor for long hours under health, safety, and environmental conditions that would be intolerable in Western, industrialized countries. Filthy processing plants receive little or no regular maintenance, cleaning, or repair, which results in serious illnesses. The massive mining expansion that would be required to meet GND demand would further pollute lands and sicken human populations.

3. Lethal Lithium

Lithium is used primarily in batteries, for

everything from laptop computers and smartphones to electric cars. To store a week’s worth of power for those periods when solar panels or wind turbines are not generating power would require nearly two billion half-ton battery packs similar to those used in Tesla automobiles.¹³ Producing such a large number of batteries would necessitate enormous quantities of lithium, cobalt, and other materials.

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Tesla batteries weigh 1,000 to 1,200 pounds and vary in capacity. The 70-kilowatt-hour (kWhr) and 85-kWhr batteries contain about 26 pounds and 32 pounds of lithium, respectively.¹⁴ The new 100-kWhr batteries will contain higher amounts.

Each battery also contains cobalt, graphite, copper, aluminum, steel, petroleum-based plastics, and other materials.¹⁵

Mining for lithium in less-developed countries for today’s cell phones, laptops, and automobiles already inflicts extensive harm on local environments and their human, livestock, and wildlife inhabitants. In 2016, protesters in the Tibetan town of Tagong threw dead, toxic fish into the streets after pulling the fish out of the Liqi River, which was polluted by the Ganzizhou Rongda lithium mine. Carcasses of cows and yaks were also found floating in the Liqi River’s poisoned waters.¹⁶

Serious environmental problems are also found in the Argentina-Bolivia-

Chile “lithium triangle.” According to environmental group Friends of the Earth, “lithium extraction inevitably harms the soil and causes air contamination.” In Argentina’s Salar de Hombre Muerto (“salty basin of the dead man”), locals say lithium operations have contaminated streams used for human drinking, livestock, and crop irrigation water.

In Chile, clashes have erupted between mining companies and local communities, whose inhabitants say lithium mining is leaving the landscape marred by mountains of discarded salt and canals filled with contaminated water that features an unnatural blue hue.¹⁷

University of Chile lithium battery expert Guillermo Gonzalez said, “Like any mining process, [lithium mining] is invasive, it scars the landscape, it destroys the water table, and it pollutes the earth and the local wells. This isn’t a green solution—it’s not a solution at all.”¹⁸

Further, it’s important to remember that wind turbines and solar panels—not just their batteries—also require lithium, so vastly more mining would be needed than what has been discussed in this section to meet the enormous demand that would result from the GND.

4. Killer Cobalt

Used in catalysts, electroplating, and metal alloys, cobalt is an essential component in rechargeable lithium-cobalt batteries for cell phones, laptop computers, electric and hybrid cars, and wind and solar backup systems. Additionally, it is an integral component in the powerful permanent magnets that permit wind turbines to run at low wind speeds while still producing electricity.¹⁹

Ongoing mining for this vital element underscores the scope of the horrific ecological damage and human rights abuses that would result from meeting the GND’s so-called “clean, renewable, sustainable, eco-friendly and ethical” technology goals.

“FURTHER, IT’S IMPORTANT TO REMEMBER THAT WIND TURBINES AND SOLAR PANELS—NOT JUST THEIR BATTERIES—ALSO REQUIRE LITHIUM, SO VASTLY MORE MINING WOULD BE NEEDED THAN WHAT HAS BEEN DISCUSSED IN THIS SECTION TO MEET THE ENORMOUS DEMAND THAT WOULD RESULT FROM THE GND.”

The Democratic Republic of Congo in Central Africa produces more than two-thirds of the world’s annual output of cobalt and controls about half of the world’s cobalt reserves.²⁰ Each year, a substantial proportion of that cobalt passes through the Congo Dongfang International Mining Company, on its way to manufacturers in China.²¹

Entire families—fathers, mothers, and children—work for extremely low wages in mines, from sunrise to sundown, six or even seven days a week, to meet the constantly growing demand for this critically important metal.

More than 40,000 Congolese children, as young as four-years-old, work alongside their parents, often in mine tunnels too narrow for adults, say UNICEF, Amnesty International, and other investigators. They use picks, shovels, pails, and bags to excavate deep holes and vast pits, in search of valuable ores. The risk of cave-ins and mud slides is ever-present. Depending on the weather, they work in dust or muck, exposing themselves constantly to filthy, toxic, radioactive mud, dust, water, and air. Dangerous levels of cobalt, lead, uranium, and other heavy metals build up steadily in their body tissues, blood, and organs. Many have died as a result of their work under these horrible conditions.²²

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Gloves, facemasks, protective clothing, and showers to wash the toxic dirt off their bodies at the end of the day are typically not available. Broken bones, suffocation, blood and respiratory diseases, birth defects, cancer, and paralysis are commonplace.²³

The amount of additional cobalt that would be required to satisfy the mandates in the Green New Deal would significantly expand these human rights catastrophes.

5. Copper Complexities

In 2019, some 20,000 tons of copper were mined, and world reserves stood at about

870,000 tons.²⁴ As with many other natural resources, the demand for copper would dramatically increase if the Green New Deal were to become the law of the land.

Three times more copper is needed in electric vehicles than in their gasoline-powered counterparts, and renewable energy systems consume approximately five times more copper than conventional power generation systems.²⁵

Wind turbines necessitate roughly 3.6 tons of copper for every megawatt of electricity generated, and every megawatt of photovoltaic capacity requires four to five tons of copper. Backup batteries, transformers, smart grid

control systems, and the thousands of miles of additional transmission lines required under the GND would also add to the huge rise in demand for copper.

It’s more than a little strange that many of the environmentalists, legislators, regulators, and activists who insist the entire world become dependent on wind and solar energy also routinely demand that U.S. businesses keep as many natural resources in the ground as possible. Any mining operation—including operations for mining copper—requires digging out, crushing, heating, and processing enormous quantities of rock.

On average, ore contains 0.8 percent copper (a typical or average ore quality for many copper and other metal deposits), which

means some 125,000 tons of ore would have to be mined, crushed, and refined for every 1,000 tons of finished copper. And that does not include the tremendous amount of overburden and surrounding rock that would need to be removed just to reach the copper and other important natural resources, such as iron, cadmium, lithium, neodymium, and dysprosium.²⁶

Yet, environmentalists have opposed the expansion of copper mining needed to meet current demands, never mind the huge amounts of copper that would be required to fulfill the mandates in the Green New Deal. The end result would be the elimination of fossil fuels, a near-absence of GND replacement technologies, and the collapse of U.S. factories, industries, businesses, hospitals, jobs, living standards, and health.

6. Green New Deal Mining Hypocrisies

Some of the environmental and human damage, including the use of child labor, from mining in Congo, Inner Mongolia, and other less-developed countries to meet GND goals might be mitigated by more mining in the United States, which has stricter labor and environmental protections. However, in recent decades, companies have often been barred from exploring for or mining these vital strategic metals in the United States, often to satisfy demands by environmentalists

for zero habitat or scenic impacts, zero pollution, and zero mining.

Exploration and mining have been effectively prohibited in most of Alaska and many Western states, even though these places are likely to contain major deposits. For example, the Pebble Mine deposit in Alaska has very high-grade ore and is estimated to contain up to 35 million tons of copper, 2.8 million tons of molybdenum, more than 15,900 tons of silver, and more than

3,300 tons of gold—all of which would be vital to any Green New Deal energy transformation.²⁷ But, despite the tremendous amount of resources available, environmentalists adamantly oppose mining in the region.

The decision to ban mining in many mineral-rich areas in America by the U.S. Congress, state legislatures, courts, and regulatory agencies have closed or severely limited access to hundreds of millions of acres of public lands.

In fact, in the Western United States and Alaska, exploration and mining have been blocked on 390 million acres of public lands, an area equivalent to the combined land of 25 of the 26 states east of the Mississippi River (Wisconsin excluded).

Further, mining activities have *effectively* been blocked on additional lands across the country by regulatory and permitting actions. These areas contain deposits of cobalt, lithium, copper, iron, and many other metals and minerals needed for Green New Deal technology.²⁸

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If the GND were to become law, these restrictions would force U.S. energy facilities to be heavily dependent on China and other countries that regularly disregard workplace safety, child labor concerns, land reclamation, and pollution controls.

This issue isn't merely theoretical. Politicians who say they care deeply about "saving the planet" have already shown—quite callously, in some cases—that they value their renewable energy goals more than basic human rights. In 2019, California legislators voted down Assembly Bill 735, which would have required that "zero emission" electric vehicles sold within the state be free of any materials or components associated with child labor.²⁹

Rather than stand up for human rights, the legislators said the issue is complicated and the provision would be too difficult to enforce. Further, they claimed it would imperil state climate goals and that because other states have ignored child labor concerns, California lawmakers ought to also look the other way while children in the developing world suffer.³⁰

Conclusion

Wind and sunshine are certainly clean and renewable energy sources but, as this analysis demonstrates, the technologies required to harness these intermittent, weather-dependent energies to benefit humanity require raw materials and

mining operations that are anything but clean, "green," renewable, sustainable, or ethical.

This fundamental reality can no longer be ignored. GND technologies rely heavily on mineral extraction in someone else's backyard, often in less-developed countries, where other people and their children do the dirty, dangerous work of providing essential raw materials while suffering from environmental and human degradation.

In America, environmentalists often demand that businesses only produce goods that are sourced with fair trade, environmental, and human rights standards firmly in place. Will Green New Deal advocates hold to such principles when sourcing *all* metals and minerals needed for their renewable technologies? They've yet to do so, and even if they were to try, it's likely that would only make their already nearly-impossible-to-meet goals even costlier and further out of reach.

The issues highlighted in this *Policy Brief* must be carefully considered and thoroughly debated before America adopts policies that even remotely resemble those contained in the Green New Deal. Every aspect of every proposed energy source must be evaluated for its potential impact on land use, animal habitats, and human welfare, as well as a variety of other environmental and economic factors.

Safeguarding our planet, protecting human rights, and ensuring true justice for people everywhere demands nothing less.

“EVERY ASPECT OF EVERY PROPOSED ENERGY SOURCE MUST BE EVALUATED FOR ITS POTENTIAL IMPACT ON LAND USE, ANIMAL HABITATS, AND HUMAN WELFARE, AS WELL AS A VARIETY OF OTHER ENVIRONMENTAL AND ECONOMIC FACTORS.”

Endnotes

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