



POWER THE FUTURE

MADE IN CHINA

Biden-Harris Energy Plan Will Lead
To China Dominance





POWER THE FUTURE

CONTENTS

I. Introduction	3
II. China Dominates Manufacturing of Green Energy Technology	4
III. The Biden-Harris Campaign Proposals	9
IV. Conclusion	11

I. INTRODUCTION

In our previous study, *Power The Future* outlined China's monopoly of Rare Earth Elements (REEs) – those materials crucial to the functioning of modern technologies in defense, aerospace, telecommunications, and green energy. With upwards of 90% of REEs currently supplied by China, *Power The Future* raised the alarm on America forming a dangerous dependence on our adversary. The study highlights their efforts to use medical equipment and pharmaceuticals as a bargaining chip in trade negotiations during the ongoing COVID-19 pandemic – a clear demonstration of their willingness to use leverage in a hostile manner. Should America continue to trust China as our virtually sole supplier of REEs, we are once again forfeiting a significant amount of power and putting ourselves at risk.

However, with regards to the green energy industry, the Chinese monopoly is two-fold. The following study will demonstrate that China not only supplies the vast majority of REEs, but also manufactures most of the world's green energy technology. While American defense- and aerospace-related projects may use Chinese REEs, the manufacturing is done domestically for national security reasons – that is not the case with green energy technologies.

The United States is the world leader in oil and natural gas production¹ and has coal reserves that will last for 332 years² (at the 2019 rate of annual coal consumption). There are enough natural resources to power all of America with domestic energy.

Yet, the problem of Chinese dominance will become exponentially worse if America transitions its electricity generation from domestic fossil fuels to green energy technology. Increasing our dependence on green energy means even further increasing our dependence on China, now with REEs and the manufacturing of green energy technologies. America's leaders must discontinue efforts to pursue a green agenda if our country

...the problem of Chinese dominance will become exponentially worse if America transitions its electricity generation from domestic fossil fuels to green energy technology.

wants to avoid this dual threat. America cannot risk giving China the power to quite literally turn off the lights.

The following study will highlight the Biden-Harris campaign policy proposals to pursue a green agenda and determine, where possible, the costs to the national economy. We will consider part of the "green agenda" those pledges (called "investments" by the Biden-Harris campaign) which are quantifiable: wind turbines, solar panels, batteries, and electric vehicles (EVs). These considerations will exclude, as a matter of economic practicality, the many unquantifiable aspects of their larger green agenda as well as the national security concerns.

1 <https://www.energyindepth.org/u-s-breaks-records-to-become-global-leader-in-oil-and-natural-gas-production/>

2 <https://www.eia.gov/energyexplained/coal/how-much-coal-is-left.php>



II. CHINA DOMINATES MANUFACTURING OF GREEN ENERGY TECHNOLOGY

A. Solar Power Manufacturing

By 2008³, China had become the world's leading solar panel manufacturer.⁴ According to a 2016 *Scientific American* report, China's central government "was willing to chip in as much as \$47 billion to help build its solar manufacturing into what it calls a 'strategic industry' to make China the most dominant solar manufacturer in the world. The actions of the communist nation,

panel workers. Inexpensive, mass-produced solar panels from China have, according to proponents, been a benefit to the American economy.

By 2019, China produced more than 60 percent of the world's solar panels. Of the top 10 largest solar panel manufacturers, six are Chinese⁷. Of the remaining four, only one company is American: SunPower Corporation based in California⁸. SunPower boasts the most efficient⁹ solar panels in the world, but even the sole American manufacturer makes its products in China. In 2017, SunPower partnered¹⁰ with Dongfang Electric Company, which is based in Chengdu, China¹¹. This partnership allowed them to move¹² much of their manufacturing to China.

Similar to China's use of the demand for pharmaceutical supplies during the initial COVID-19 outbreak, a monopoly over green technology may be withheld as a bargaining chip in international disputes.

coupled with an enormous, inexpensive labor force, 'dropped world prices by 80 percent, a stunning achievement.'"⁵

The U.S. Department of Energy speaks glowingly of the success of the solar market⁶, citing a 35-fold increase in solar installations and a 160 percent increase in jobs with more than 240,000 solar

SunPower may be based in California, but, if it makes its products in China, it is a no more reliable source of solar panels than a Chinese company. The production and distribution of its goods are, and will be, subject to the communist nation's

political whims. Similar to China's use of the demand for pharmaceutical supplies during the initial COVID-19 outbreak, a monopoly over green technology may be withheld as a bargaining chip in international disputes.

China dominates the REE market and holds a potential monopoly over the manufacturing of energy supplies. China's simultaneous control

3 http://www.earth-policy.org/datacenter/xls/indicator12_2013_2.xlsx

4 <https://www.scientificamerican.com/article/why-china-is-dominating-the-solar-industry/>

5 <https://www.scientificamerican.com/article/why-china-is-dominating-the-solar-industry/>

6 <https://www.energy.gov/eere/solarpoweringamerica/solar-energy-united-states>

7 <https://solarpowernerd.com/top-solar-panel-manufacturers/>

8 <https://www.bloomberg.com/profile/company/SPWR:US>

9 <https://us.sunpower.com/home-solar/solar-cell-technology-solutions>

10 <https://www.pv-tech.org/news/sunpower-enters-major-china-manufacturing-jv-for-p-series-solar-modules>

11 <https://www.bloomberg.com/profile/company/DFEGCZ:CH>

12 <https://www.solarquotes.com.au/blog/sunpower-sma-choose-discreetly-manufacture-china/>

over these supplies presents three central threats to the economy and national security:

1. The creation of green energy technology in China, where there is no government regulation or oversight regarding manufacturing, will do more harm than using the domestic energy resources that America currently possesses.
2. The creation of these technologies will involve a variety of human rights abuses, as their manufacturing process is not subject to any government, labor-related oversight.
3. The “black swan” effect of China flooding the market with cheap solar panels and strategically rationing or regulating the product once they have established dependency.

How can America maintain its national security and economic future when China dominates this industry in both primary source materials and production?

B. Wind Power Manufacturing

In 2015, China’s Xinjiang Goldwind Science and Technology Company (more commonly called “Goldwind”)¹³ overtook the American company General Electric (GE) to become the world’s largest wind turbine manufacturer¹⁴. In 2016, Goldwind purchased the Rattlesnake wind project in Texas¹⁵. By the end of 2019, six of the top ten offshore wind turbine manufacturers were Chinese¹⁶. Although the largest wind turbine manufacturer remains the Danish company Vestas¹⁷, the Chinese companies Goldwind, Envision¹⁸, Ming Yang¹⁹, Windey²⁰, Shanghai Electric²¹, and CSIC²² account for almost half of gigawatts produced from wind²³.

As China continues to grow its wind power production, the nation has remained closed to international markets. In a 6-gigawatt auction for wind power, Vestas, GE, and Siemens, all non-Chinese manufacturers, were shut out of the process²⁴. Chinese wind turbine companies are certainly trying to involve themselves in America, though. Sen. Ted Cruz (R-TX) questioned²⁵ why Goldwind is building a wind farm in his state. This comes after a Chinese state-owned company had been caught stealing American intellectual

13 <https://www.reuters.com/companies/2208.HK>

14 <https://www.scientificamerican.com/article/chinese-wind-turbine-maker-is-now-world-s-largest/>

15 <https://oilprice.com/Alternative-Energy/Wind-Power/China-Moves-Into-US-Wind-Sector.html>

16 <https://seatitan.eu/six-chinese-companies-already-in-the-top-10-global-marine-wind-turbine-manufacturers/>

17 <https://www.renewableenergyworld.com/2020/02/20/vestas-tops-bloombergnefs-list-of-top-wind-turbine-manufacturers-by-installations/#gref>

18 <https://www.bloomberg.com/profile/company/0211179D:CH>

19 <https://www.bloomberg.com/profile/company/MY:US>

20 <https://www.bloomberg.com/profile/company/300772:CH>

21 <https://www.bloomberg.com/profile/company/601727:CH>

22 <https://www.bloomberg.com/profile/company/4072885Z:CN>

23 <https://www.renewableenergyworld.com/2020/02/20/vestas-tops-bloombergnefs-list-of-top-wind-turbine-manufacturers-by-installations/#gref>

24 <https://www.greentechmedia.com/articles/read/the-challenging-path-forward-for-western-turbine-oems-in-china#gs.g862ne>

25 <https://www.wind-watch.org/news/2020/03/05/cruz-calls-out-chinese-owned-wind-farms-near-laughlin-air-force-base/>

property in the wind turbine technology²⁶.

In terms of U.S. domestic wind energy production, GE dominates the market. According to the Energy Information Agency, GE provides over 40% of America's turbines.²⁷ Vestas and Siemens account for another 50%. It's encouraging that upwards of 90% of America's wind energy production is generated from either an American company or one from an allied nation.

Yet, wind power ownership and installation is only part of the issue. There is still the issue of China's monopoly over REEs, as well as their significant control over manufacturing. GE owns blade factories in multiple countries: America, France, Brazil and, among a few others, China²⁸. Similarly, Vestas and Siemens manufacture parts in multiple countries including China²⁹.

On the other hand, no Chinese company manufactures outside of its homeland. With its doors closed to foreign competition, and its foreign competition manufacturing, at least in some part, within its borders, and still maintaining the more than 90% market share dominance of REEs, it is safe to say China is playing a long game that will put everyone else out of business. If we don't change course and shift away from a radical agenda, it's only a matter of time.

C. Electric Vehicle and Charging Station Manufacturing

In 2019, Americans purchased³⁰ more than 17 million vehicles for personal use, of which 320,000 (1.9%) were EVs. Additionally, American businesses purchased nearly 13 million vehicles for commercial purposes. With many countries banning³¹ the combustion engine, EVs will inevitably become a larger mix of the global vehicle market. However, a 2018 report by JPMorgan highlights a decade of the EV market falling short of expectations and tapers³² market growth for two main reasons: abundance of fossil fuels from fracking and China's monopoly of REEs.

Hidetoshi Kadota, the head of Nissan Motors division in China, stated³³ "Production of EVs without Chinese-made parts is no longer possible." Kadota was part of the Nissan team which pioneered the world's first mass-produced EV, the *Leaf*, in 2010. "At that time, all parts were made in Japan." This is a dramatic shift in only 10 years.

As in the wind and solar industry, the communist nation made a concerted effort to manufacture EVs domestically. An analysis by the Paulson Institute in Chicago notes "EV firms will want to concentrate close to integrated supply chains"³⁴ and global competitors are lured to manufacture their vehicles in China. Land Rover, Jaguar, Volkswagen, Volvo, and SAAB all manufacture EVs in China which are sold under their respective

26 <https://money.cnn.com/2018/01/25/technology/china-us-sinovel-theft-conviction/index.html>

27 <https://www.eia.gov/todayinenergy/detail.php?id=28912>

28 <https://www.ge.com/news/press-releases/ge-renewable-energy-hire-more-200-employees-its-wind-turbine-blade-factory-cherbourg>

29 https://www.vestas.com/#!grid_0_content_1_Container

30 <https://www.cnbc.com/2020/01/06/us-auto-sales-down-in-2019-but-still-top-17-million.html>

31 <https://www.cnet.com/roadshow/news/denmark-eu-ban-gas-diesel-cars/>

32 <https://www.jpmorgan.com/jpmpdf/1320745238375.pdf>

33 <https://asia.nikkei.com/Business/China-tech/Made-in-China-2025-forges-ahead-with-EV-dominance-in-sight>

34 <https://macropolo.org/analysis/china-electric-vehicle-ev-industry/>

brand³⁵. It is not just foreign car companies: American luxury brand Cadillac has a plug-in hybrid model CT6 which is made in China³⁶.

The largest US auto maker³⁷, Tesla, began manufacturing in China, doubling production and even dropping prices of the car. But, an increase of EVs in China only serves to further help them.³⁸

Due to fossil fuel scarcity, China should encourage its citizens to use EVs.

Currently, China is the world's largest oil importer of fossil fuels with more than 10 million barrels per day³⁹. This transfer of wealth and dependence on a foreign fuel source should have Beijing concerned for the nation's long-term economic vision.

China sees energy dependence as a weakness and is aggressively pursuing a plan to overcome it. For those same reasons, America should see energy independence as her great strength and exploit it. As of right now, that does not seem to be the case.

EVs are only part of the equation of the electric future. Charging stations are essential. Here, too, China dominates the industry. The world's largest

charging station firm, ChargePoint, is based in California, but it has manufacturing plants in Mexico, India, and, China⁴⁰.

China sees energy dependence as a weakness and is aggressively pursuing a plan to overcome it. For those same reasons, America should see energy independence as her great strength and exploit it. As of right now, that does not seem to be the case.

The second largest EV charging station firm is the Swiss firm ABB. It, too, manufactures in China⁴¹ where it employs 19,000 people. BP, the third largest company, builds its charging stations in partnership with Chinese company PowerShare⁴².

Building out a large charging station infrastructure is essential to the success of the EV industry. China has a vast charging station network⁴³. According to Qiyu Liu, an associate with eco-group Rocky Mountain Institute and former employee of China's Ministry of Environmental Protection, "The need for serious investment in charging infrastructure never has been more obvious."

Certainly, for EVs to increase market share in America, a buildup of charging station

35 <https://www.globalfleet.com/fr/connected-manufacturers/asia-pacific/analysis/finally-list-chinese-ev-manufacturers?a=YHE11&t%5B0%5D=China&t%5B1%5D=Electrification&t%5B2%5D=BYD&t%5B3%5D=Geely&t%5B4%5D=Chery&t%5B5%5D=BJEV&t%5B6%5D=SAIC&curl=1>

36 <https://cars.usnews.com/cars-trucks/cars-made-in-china>

37 <https://www.marketwatch.com/story/tesla-becomes-the-largest-us-car-maker-by-enterprise-value-2020-02-04>

38 <https://www.bloomberg.com/news/articles/2020-01-07/tesla-opens-chinese-plant-as-era-of-real-competition-begins>

39 <https://www.eia.gov/todayinenergy/detail.php?id=43216>

40 <https://www.chargepoint.com/about/opportunities/>

41 <https://new.abb.com/docs/librariesprovider46/abb-in-china/abb-in-china-overview-en.pdf?sfvrsn=4>

42 <https://www.bp.com/en/global/corporate/news-and-insights/press-releases/bp-invests-in-powershare-china-ev-charging-platform.html>

43 <https://www.greenbiz.com/article/look-inside-chinas-timely-charging-infrastructure-plan>

infrastructure is necessary. The real question is this: with the REEs and the manufacturing dominated by China, and with China's most glaring weakness being their lack of fossil fuels, is this an industry we want to see grow in America?

D. Battery Storage Manufacturing

With the intermittency of green energy technology, something California⁴⁴ has experienced in recent weeks, elected officials are desperate to find ways to ensure the viability of the electric grid (when the wind doesn't blow and/or the sun does not shine). Battery storage has become the preferred solution.

With the help of government subsidies, China dominates the market. Today, more than 70% of the lithium ion battery storage manufacturing happens in China. America accounts for only 12% of production⁴⁵.

American green energy companies that specialize in battery storage do not readily disclose the origins of their products. One such example is TerraGen, an American company based in New York City⁴⁶, which states its role as a "developer that operates over 1.3 GW of wind, solar, and geothermal facilities"⁴⁷ but does not disclose

where its products are manufactured.

TerraGen is one of several companies awarded contracts from Southern California Edison, one of the state's utility companies, which is aggressively pursuing 770mw of electricity storage. The cost of this procurement was not disclosed⁴⁸.

Another company, Southern Power, has teamed up with esVolta⁴⁹, an apparently American firm, that has partnered with Powin Energy Corporation,⁵⁰ which manufactures batteries in China⁵¹.

Tesla is a notable exception. Its battery manufacturing facility, Gigafactory, is located in Nevada⁵². According to a 2019 study by The Manhattan Institute, the Gigafactory has enough storage to power America for only three minutes⁵³.

The study also notes the tremendous amount of minerals and REEs needed to create these batteries. The required mining, excavation and refining processes, and the fossil fuels they use, could have one wonder if the green intentions behind battery production is accomplishing the environmental offset it pretends.

In addition to being almost entirely manufactured in China, these batteries have a lifespan of 3-6 years,⁵⁴ meaning they need be constantly

44 https://www.realclearenergy.org/articles/2020/08/27/californias_blackouts_expose_biden-harris_and_the_green_new_deal_575131.html

45 <https://www.forbes.com/sites/rpapier/2019/08/04/why-china-is-dominating-lithium-ion-battery-production/#1228b4aa3786>

46 <https://www.terra-gen.com/contact>

47 <https://www.terra-gen.com>

48 <https://www.enr.com/articles/49384-california-utility-is-set-to-build-giant-770-mw-energy-battery-storage>

49 https://www.southernpowercompany.com/content/dam/southernpower/pdfs/fact-sheets/Millikan_Energy_Storage_factsheet.pdf

50 <https://www.esvolta.com/about>

51 <https://www.advancedbatteriesresearch.com/articles/18631/powin-energy>

52 <https://www.tesla.com/gigafactory>

53 <https://www.manhattan-institute.org/green-energy-revolution-near-impossible>

54 https://batteryuniversity.com/learn/article/how_to_prolong_lithium_based_batteries

replaced, and the expired ones need proper disposal because of their toxicity⁵⁵.

reserves, America has lowered its CO2 emissions at a greater rate than many European nations⁵⁶.

Summary

Solar, wind, EVs, and battery storage are industries dominated by China. They are in constant need of replacement and upkeep, meaning power companies which utilize must rely on China for replacements. Combined with China's REE monopoly, there is a real vulnerability in America pursuing a green energy agenda in this current climate.



III. THE BIDEN-HARRIS CAMPAIGN PROPOSALS

China's dominance of green energy manufacturing and the REE market would not be a concern if America pursued an agenda based on its domestic energy resources. As the world's leader in oil and gas production, and with centuries of coal

The Biden-Harris environmental agenda would undermine America's energy dominance and give China an advantage.

However, the green energy movement often ignores these facts. Leading green advocate Sen. Bernie Sanders (I-VT) calls their pursuit a moral imperative⁵⁷. The phrase "just transition" from fossil fuels to green energy isn't about science: the Just Transition Alliance calls it "a vision-led, unifying and place-based set of principles, processes, and practices that build economic and political power to shift."⁵⁸ Perhaps environmental activist, billionaire, and former presidential candidate Tom Steyer summed up the green energy movement best: a chance to make a lot of money.⁵⁹

The Biden-Harris environmental agenda would undermine America's energy dominance and give China an advantage.

A. The Electric Grid

*"Move ambitiously to generate clean, American-made electricity to achieve a carbon pollution-free power sector by 2035. This will enable us to meet the existential threat of climate change"*⁶⁰

-Biden Campaign Website

55 <https://www.forbes.com/sites/rpapier/2020/01/19/environmental-implications-of-lead-acid-and-lithium-ion-batteries/#33bc83e47bf5>

56 <https://www.washingtonexaminer.com/opinion/op-eds/unlike-in-europe-the-us-approach-to-climate-change-is-actually-working>

57 <https://www.businessinsider.com/bernie-sanders-16-trillion-climate-change-plan-most-expensive-yet-2019-8>

58 <https://climatejusticealliance.org/just-transition/>

59 <https://freebeacon.com/issues/tom-steyer-listed-as-manager-of-green-energy-investment-firm/>

60 <https://joebiden.com/clean-energy/>

According to the U.S. Energy and Information Agency, in 2019, America generated approximately 90% of its electricity⁶¹ from energy sources that can be classified as “domestic.”:

Fossil Fuel Power	62.7%
Nuclear Power	19.7%
Hydro Power	6.6%
Biomass Power	1.4%
Geothermal Power	0.4%

The remaining ~9% of our electricity is generated from green energy technologies:

Wind Power	7.3%
Solar Power	1.8%

The materials for these technologies are manufactured primarily in China. There is no reason for America to cede even 9% of its electricity generation to a foreign competitor.

B. Manufacturing: Made in America

The Biden-Harris campaign promises to “ensure the future is ‘made in all of America’ by all of America’s workers.”⁶² This includes:

1. MAKE IT IN AMERICA.

Retool and Revitalize American Manufacturers,

2. INNOVATE IN AMERICA.

Make a New \$300 Billion Investment in Research and Development (R&D) and Breakthrough Technologies — from electric vehicle technology

3. SUPPLY AMERICA.

Bring Back Critical Supply Chains to America so we aren’t dependent on China or

any other country for the production of critical goods in a crisis.

When it comes to manufacturing, the Biden-Harris campaign pledged to “Take action against our competitors when they refuse to honor trade agreements.”⁶³ This would be welcome news in the green energy trade, but only if China is recognized as a “competitor” and not a geopolitical adversary. “Biden will hold our competitors accountable when it comes to trading in raw materials, giving our manufacturers the right to purchase critical materials at the same price as foreign companies.”⁶⁴ It is unclear what this means: if China holds 90% of the REEs, it is not a matter of American manufacturers having “the right to purchase” them at a specific price point. It is a matter of China withholding them altogether.

C. Electric Vehicles (EVs)

The Biden-Harris campaign pledged to “speed the transition to electric vehicles”⁶⁵. To accomplish this, they will “remove today’s biggest barriers to their use, easing concerns about price, range, and access to charging stations...ensure that the U.S. Department of Energy invests \$5 billion over five years in battery and energy storage technology, to spur breakthroughs that can boost the range and slash the price of electric cars...And, he will enact policies to promote domestic manufacturing of electric vehicles.” These policies are either not realistic or allow China too much leverage over our nation’s energy.

D. Power

The Biden-Harris campaign pledges to make “a historic investment in energy and climate research and innovation,” along with “the rapid

61 <https://www.eia.gov/tools/faqs/faq.php?id=427&t=3>

62 <https://joebiden.com/madeinamerica/>

63 <https://joebiden.com/supplychains/>

64 <https://joebiden.com/supplychains/>

65 <https://joebiden.com/infrastructure/>

deployment of clean energy innovations across the economy.”⁶⁶ Although we haven’t been provided the details, it is hard to imagine this means anything other than an enormous blank check to China.

IV. CONCLUSION

2020 has been a remarkable year in the ongoing US-China relationship, with many truths about the communist nation’s adversarial nature coming to light.

- Chinese government threatened retaliation⁶⁷ against several American legislators, including Sens. Tom Cotton (R-AR) and Josh Hawley (R-MO), for their comments criticizing Chinese indifference at the onset of the global COVID-19 pandemic.
- A bipartisan Senate investigation highlighted⁶⁸ concerns for China’s state-owned companies’ efforts to operate U.S. telecommunications systems.
- President Trump by executive order proposed a 45-day review period with the threat of banning Chinese social media app TikTok⁶⁹. This comes after major concerns that the communist nation was using the seemingly innocuous app as a front for more nefarious actions namely data harvesting and spying.⁷⁰

America cannot risk being left in the dark and dependent on an adversary for the components and manufacturing of those products which power our nation.

- China threatened to sanction⁷¹ Sens. Marco Rubio (R-FL) and Ted Cruz (R-TX) for criticizing their hostile actions against freedom fighters in Hong Kong.
- The U.S. State Department designated⁷² China’s state-sponsored propaganda efforts, called Confucius Centers, as diplomatic missions limiting their reach within U.S. educational programs. Secretary of State Mike Pompeo stated China “has taken advantage of America’s openness to undertake large-scale and well-funded propaganda efforts and influence operations in this country.”

These activities taken as a whole are nothing compared to the risk of turning over our electric grid and our national power supply to China. Power is indispensable to our nation: agriculture, industry, defense, communications, transportation, literally everything depends on power.

America cannot risk being left in the dark and dependent on an adversary for the components and manufacturing of those products which power our nation.

Fossil fuels are not perfect. They are, however, reliable, abundant, inexpensive, and available

66 <https://joebiden.com/climate/>

67 <https://www.usnews.com/news/world-report/articles/2020-05-14/china-threatens-to-sanction-us-politicians-for-coronavirus-criticism>

68 https://www.hsgac.senate.gov/subcommittees/investigations/hearings/majority-and-minority-staff-report_-threats-to-us-networks-oversight-of-chinese-government-owned-carriers

69 <https://www.whitehouse.gov/presidential-actions/executive-order-addressing-threat-posed-tiktok/>

70 <https://www.the-sun.com/lifestyle/tech/460873/tiktok-links-to-china-put-every-user-at-risk-of-spying-and-censorship-experts-warn/>

71 <https://www.bbc.com/news/world-asia-china-53722811>

72 <https://www.nytimes.com/2020/08/13/us/politics/state-department-confucius-institutes.html>

domestically. China is the dominant force in manufacturing green technologies and producing REE that are critical for those technologies. America has achieved monumental steps towards ensuring the long-promised notion of energy independence. Policy proposals from the Biden-Harris campaign would undermine that hard work and deliver a massive economic victory to China.