



Written by [Selwyn Duke](#) on February 13, 2023

Geological Study Refutes Green Energy Agenda: Not Enough Metals to Replace Oil

Many points are made when discussing the green energy agenda's infeasibility. It has been noted that wind and solar can't provide our energy needs, that powering the United States with wind would require an area three times California's size. It has further been asserted that electric-car production and use actually cause more pollution than the gasoline status quo. It's not just that electric vehicles' manufacture creates massive releases of CO₂ (*not* a pollutant, mind you), either; it's also that the mining of the metals and minerals required for their production [causes environmental damage](#). Yet there's a kicker here, too, a point seldom made:



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Even if we could more cleanly and efficiently mine the materials in question, there simply *aren't enough of them to make green energy a reality*.

That's the conclusion of a geological study that, not surprisingly, hasn't gotten the attention it deserves. CounterPunch has reported on it, however, [writing](#) that the research

puts a damper on the prospects of phasing out fossil fuels in favor of renewables. More to the point, a phase out of fossil fuels by mid century looks to be a nearly impossible Sisyphean task. It's all about quantities of minerals/metals contained in Mother Earth. There aren't enough.

Simon Michaux, PhD, Geological Survey Finland[,] has done a [detailed study](#) of what's required to phase out fossil fuels in favor of renewables, to wit:

"The quantity of metal required to make just one generation of renewable tech units to replace fossil fuels is much larger than first thought. Current mining production of these metals is not even close to meeting demand. Current reported mineral reserves are also not enough in size. Most concerning is copper as one of the flagged shortfalls. Exploration for more at required volumes will be difficult, with this seminar addressing these issues." (Source: Simon P. Michaux, Associate Research Professor of Geometallurgy Unit Minerals Processing and Materials Research, Geological Survey of Finland, August 18, 2022 — Seminar: *What Would It Take To Replace The Existing Fossil Fuel System?*)

Michaux's "comprehensive study found that the current estimated metal reserves are woefully deficient in almost every category," American Thinker's Robert A. Bishop [added on Saturday](#). "The table below lists base and rare earth metals requirements to build the new grid and E.V.s. Deficits are yellow-highlighted. For example, copper is an integral part of a high-voltage grid system, coming up short by a



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shocking 3.7 billion tons. Can we dig enough open mile-deep ore pits to meet that shortfall? Improbable.”

Metal Source: USGS	Total metal required produce one generation of technology units to phase out fossil fuels	Reported Global Reserves 2022	Global Reserves as a proportion of metals required to phase out fossil fuels	Number of generations of technology units that can be produced from global reserves
	(tonnes)	(tonnes)	(%)	
Copper	4 575 523 674	880 000 000	19,23 %	7,0
Zinc	35 703 918	250 000 000		
Manganese	227 889 504	1 500 000 000		6,6
Nickel	940 578 114	95 000 000	10,10 %	
Lithium	944 150 293	22 000 000	2,33 %	
Cobalt	218 396 990	7 600 000	3,48 %	
Graphite (natural flake)	8 973 640 257	320 000 000	3,57 %	
Silicon (Metallurgical)	49 571 460	-		
Silver	145 579	530 000		3,6
Vanadium	681 865 986	24 000 000	3,52 %	
Zirconium	2 614 126	70 000 000		26,8

Bishop continues, writing that below “is the study’s table estimating the years to produce the required metals at the current production rates. For example, lithium would take almost 10 millennia to achieve. In addition, these scarce minerals must be mined, transported, and processed, relying exclusively on fossil fuels, which would create more carbon emissions and deplete hydrocarbon reserves.”

Metal	Element	Total metal required produce one generation of technology units to phase out fossil fuels	Global Metal Production 2019	Years to produce metal at 2019 rates of production
		(tonnes)	(tonnes)	(years)
Copper	Cu	4 575 523 674	24 200 000	189,1
Nickel	Ni	940 578 114	2 350 142	400,2
Lithium	Li	944 150 293	95 170 *	9920,7
Cobalt	Co	218 396 990	126 019	1733,0
Graphite (natural flake)	C	8 973 640 257	1 156 300 ♦	3287,9
Graphite (synthetic)	C	-	1 573 000 ♦	-
Silicon (Metallurgical)	Si	49 571 460	8 410 000	5,9
Vanadium	V	681 865 986	96 021 *	7101,2
Rare Earth Metals				
Neodymium	Nd	965 183	23 900	40,4
Germanium	Ge	4 163 162	143	29113,0
Lanthanum	La	5 970 738	35 800	166,8
Praseodymium	Pr	235 387	7 500	31,4
Dysprosium	Dy	196 207	1 000	196,2
Terbium	Tb	16 771	280	59,9

“Petrochemicals from oil and natural gas make over 6,000 everyday products indispensable to modern society,” Bishop also points out. “There are no known alternative substitutes for hydrocarbons. Yet the climate change fanboys catastrophically ignore petrochemicals that provide many indispensable [sic] goods.”

Reality has a way of intervening, however (it’s just a matter of how much pain is required to penetrate deaf ears). As to this, the Ukraine war has had at least one positive byproduct. That is, “Europe’s embargo of Russian oil and natural gas, along with the terroristic sabotage of the Nord Stream pipelines, is exposing the myth of green energy,” Bishop further states. “As a result, Germany, the poster child for green energy, has resorted to heresy by reactivating its mothballed coal-fired power



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plants.”

“The math doesn’t support the net zero activist movement’s rhetoric,” Bishop concludes. “Eliminating indispensable fossil fuels, as Germany is experiencing at an accelerating rate, without replacing it with the equivalent of alternative energy, would quickly collapse modern society. Think of it as the ‘Jonestown Massacre’ on a global scale.”

Far from an exaggeration, this alarm has been sounded before. For example, former Greenpeace figure Patrick Moore [warned in 2019](#) that if the Green New Deal were instituted globally, it could “result in the death of nearly all humans on Earth.” But before they met their miserable end, he pointed out, they’d cut down every tree for fuel and kill every animal for food.

That trying to artificially transform a worldwide economy with a big-government cudgel would have a devastating effect is not surprising: It has happened before. For example, in the 20th century, communist dictators such as the Soviet Union’s [Joseph Stalin](#), China’s [Mao Zedong](#), and Cambodia’s [Pol Pot](#) instituted agricultural collectivization schemes that caused the deaths of more than 60 million people.

The lesson is simple, too: If the market doesn’t justify a program or course of action, be more than hesitant to pursue it. This isn’t because the market is perfect (hey, it gives us the Kardashians!), but because it’s democracy as applied to economics; that is, every time hundreds of millions of people make purchases, they’re casting “votes” on what goods and services will prevail.

Echoing what Winston Churchill famously said about political democracy, the market is the worst system in the world, too — except for all the rest. It certainly was a better guide than Stalin, Mao, Pol Pot and their brain trusts. And what of today’s would-be economy-steering oligarchs, climate kid Greta Thunberg, [extraterrestrial John Kerry](#), software-glitch-man Bill Gates, et al.? Do you want to bet they’ll be history’s first economic puppeteers whose collective wisdom will surpass that of the market’s invisible hand?



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