America's Green New Deal needs copper but is there enough?

FT

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The plan's requirement for so much metal shows that it is not based on material reality

Political sponsors of the US Green New Deal (GND) insist it is still a work in progress, despite the Senate Republicans' demand for a vote on the sponsors' resolution before the end of March. Most of the public debate about the GND has been on its supposed financial costs and redistributive effects compared to its benefits in reducing carbon emissions. Econometric or financial analyses based on the existing structure of the economy are pretty much beside the point anyway, since those rely on tweaks to inputs or outputs that eventually lead to a new imaginary equilibrium.

I have read and re-read the GND resolution. While it does not directly appropriate money, impose taxes or otherwise require US citizens to do things, it is a 10-year plan to mobilise the economy and population that is explicitly grounded in wartime precedents. Any debate over its finances or economics will be based on rhetorical points rather than analysis, since the GND's implementation is not specific. However, even if you accept the need to urgently respond to human-caused climate change, and accept the redistribution of wealth and social priorities, the GND is not based on material reality.

Specifically, there are not enough available metals to carry it out. Clean energy may be "net-zero" in terms of carbon emission but it is enormously more metals-intensive. For example, electric vehicles (EV) require copper not only for motors and batteries but for their charging infrastructure and the reinforcement of the electric transmission and distribution grid.

The GND advocates are for the most part not forthcoming about their plan's metal-intensiveness. I did, however, obtain one estimate for the copper requirements just for the EV component of a net-zero economy from Paul Bledsoe of the Progressive Policy Institute, a green-energy advocate. According to the figures he uses, EVs require between 17kg and 50kg more copper per vehicle than fossil-fuelled internal combustion engines. Let us assume we could replace all 275m motor vehicles in the US with EVs and that we could recycle all the copper in the junked fossil-fuelled cars. The US would still require more than 4.6m tonnes of copper at the low end of the estimated net requirement, and 13m tonnes at the high end of the requirement. That means at least a third of all present US copper output, and as much as all of it, would go to building EVs. Some metals industry analysts believe these numbers underestimate the challenge. Paul Gait, a metals and mining industry analyst with Bernstein Research, says his base case for EV demand is 109kg per vehicle, or roughly five times as much as is now required by vehicles powered by internal combustion engines.

The GND also explicitly incorporates a goal of rebuilding the transmission and distribution grid to accommodate the additional requirements for wider adaptation of wind, solar, and other renewables. It also aspires to a rebuilding of the US housing stock and the greening, that is, electrification, of the rail system. The increases in energy efficiency in the net-zero plans require more efficient electric motors throughout the economy. However, improving such motors means increasing their proportional copper content. That is just physics at work, not greedy banks. Finally, this is to be done, in the words of the GND resolution, "by enacting and enforcing trade rules, procurement standards, and border adjustments with strong labour and environmental protections . . . to stop the transfer of pollution and jobs overseas and to grow domestic manufacturing in the United States".

So the copper could not be imported. Existing mines would have to be expanded and new ones developed, quickly, to exploit known and estimated US resources. The good news about copper, for American GND advocates, is that the US produces a lot of it, though not all its present requirement. The country does not produce appreciable amounts of nickel or cobalt nor is it self-sufficient in aluminium. Apart from the increase in the price of cobalt in the past several years, the world's metals markets have not been reflecting future increases in

demand that would be generated by the US GND, or for that matter GNDs in the rest of the world. According to Mr Gait, replacing the world's fossil-fuelled cars with EVs by 2050 would require three-and-a-half times the known nickel reserves, 125 per cent of cobalt reserves, and most of the known copper reserves.

At several points in the GND resolution there is the qualification "as much as is technologically feasible". This phrasing skates over the truth. The issue is not what is "technologically feasible", which suggests that more research could change the metals requirements. The issue is what material resources are available to supply the standard green alternatives to fossil fuel (and nuclear) power. Briefly, there are not enough metals to do the job. So we had better rethink the problem rather than commit to solutions that give wartime powers to state structures, or superprofits to suppliers.