David Schwartzman's critique of "The Capitalocene: Permanent Capitalist Counter Revolution", Socialist Register 2019
December 28, 2019

This contribution (Altvater and Mahnkopf 2019) repeats much of the same arguments as the coauthor in Mahnkopf (2019) regarding the challenges facing a renewable energy transition, resource availability etc. I find little to disagree with the case made that the capitalist physical and political economies are facing huge obstacles regarding this energy transition, and are unsustainable. However, I find the analysis too pessimistic with this statement standing out: "it is highly unlikely that the industries based on fossil fuels (defence and military industries in particular) or the major financial interests will be weakened via political decisions rapidly enough, whether in the US, Europe, China, or India." (p.95). Fundamentally, radical changes in both the physical and political economies are imperative, as I argued in my SR2017 contribution. The role of class struggle to make this possible is strongly understated in this article. That is the biggest challenge of the left. Rather than the acceptance of defeat implied in "Permanent Capitalist Counter Revolution", we must fight like hell for future generations while there is still a window of opportunity to prevent the hell of catastrophic climate change.

A growing renewable energy infrastructure can greatly facilitate recycling (e.g., Nd), reducing extraction from mining, alternative technologies not using rare elements are being developed and implemented, e.g., Na-S batteries, recently in the UAE, instead of lithium. Most wind turbines now don't even use Nd. I acknowledge there is a valuable discussion the potential of recycling on p.96 but a shift to alternative technologies needs to be a complement. There is vigorous R&D towards this end even now.

Finally, the critical importance of the thermodynamics of wind/solar energy (see my abstract below) is neglected in this article. I find misleading and inaccurate statements such as note 18 on p.98; see Brockway et al. (2019) with their abstract given below. Further, it is irrelevant whether the EROI ratio of fossil fuels is higher than wind/solar so long as the latter ratios are sufficient for a complete transition, as we have shown in our 2011 report and 2019 book.

Raising the issue of meeting the challenge of providing fresh water in a solar energy transition is very well-taken, along with the scarcity of rare metals. The fresh water challenge facing the prospect of China's renewable energy transition is highlighted. But not mentioned is the significant use now of fresh water as a coolant to China's coal plants (see e.g., https://www.water.ox.ac.uk/water-use-in-chinas-thermoelectric-power-sector/) which must be terminated in this transition.

Here is how I previously addressed the water issue:
https://climateandcapitalism.com/2019/10/14/when-will-the-worlds-wells-run-out-of-water/
My comment:
David Schwartzman October 15, 2019 at 10:01 am This post identifies a big challenge, but there are solutions. Fresh water is not really a depletable resource like fossil fuels, recognizing that most of the latter must be left in the crust to keep warming below 1.5 deg C. To be sure water in aquifers can be depleted when extraction exceeds recharge. The solution to this depletion as well as ensuring a supply of fresh water to arid regions in the future is found in the nuclear reactor 93

million miles away, the fusion reactor in the core of the Sun. Solar radiation drives the global water cycle, supplying fresh water as rain to land areas, and can supply all of humanity's future needs for energy, including what is required for desalination of seawater. Even if hopefully warming can be kept below 1.5 deg C, the impact of another 0.5 deg C of warming will generate more rain in some regions, less in others. Recharge of groundwater in the former will be potentially increased, and desalination can supply fresh water to the latter regions. In addition, agricultural practices that conserve fresh water must be implemented in a shift to agroecologies/permaculture including farming crops in brackish water.

On the metal challenge entailed in a solar transition, besides the points previously made, here is a relevant selection from Schwartzman and Engel Di Mauro (2019):

"The misconception of ecological processes is commensurate with a mischaracterisation of ecosocialist growth and associated material and energy throughputs. In an ecosocialist transition, as at least we envision it, the plan would not be simply for degrowth, but for a complete phasing out of the Military- Industrial Complex (MIC). The disappearance of MIC would liberate vast quantities of materials, especially metals, for the creation of a global wind and solar power infrastructure. Likewise, the process would enable the conversion of the automobile-roadways complex to electrified rail and public transit powered by wind-solar energy sources. The land footprint for even a doubling of global energy provided by wind-solar power can be less than the present impact of fossil fuels and nuclear power (see discussion in Schwartzman 2017; Schwartzman and Schwartzman 2019). Furthermore, recycling and industrial ecologies powered by wind/solar power should greatly reduce the need for mining. Recycling rates of the rare earth metals, including neodymium used in wind turbines, is currently very low, less than 1 percent (Reck and Graedel 2012, 691). Increasing these rates, as well as implementing alternative technologies, could greatly reduce mining for these and other metals used in modern technologies. Hence, a transition to a post- extractivist future is possible, accompanied by a wind-solar transition (Schwartzman 2017; Schwartzman and Schwartzman 2019)." (p.42-43)

To summarize, unless militarized fossil capital is checked and then terminated there will be a nightmare ahead of us. That is the big challenge facing the left today, but I refuse to accept defeat and neither should humanity. The Global Green New Deal is the only plausible strategy that offers hope. With the dissolution of MIC and the growth of wind/solar energy capacity the supply of minerals, metals, land or water (fresh) is possible for a complete solar transition, by recycling and the use of commoner substitutes for rare metals.

References cited

Altvater E, Mahnkopf B (2019) The Capitalocene: Permanent Capitalist Counter Revolution. In: *A World Turned Upside Down?, Socialist Register 2019*, edited by L. Panitch and G. Albo, pp. 79-99, London: Merlin.

Brockway et al. (2019) Estimation of global final-stage energy-return- on-investment for fossil fuels with comparison to renewable energy sources. *Nature Energy* 4: 612-621. doi: 10.1038/s41560-019-0425-z.

Mahnkopf B (2019) The '4th wave of industrial revolution' – a promise blind to social consequences, power and ecological impact in the era of 'digital capitalism' Discussion Paper No. 01/2019**,** euromemo.eu.

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Abstracts cited:

Thermodynamics of Communism
David Schwartzman
HM 2019, London November, 2019
Abstract Rethinking 21st century communism requires consideration of the quality and quantity of the energy supply for global civilization, i.e., the thermodynamics of communism. In this context, we must confront the ever-narrowing window of opportunity to prevent the onset of catastrophic climate change (C3). The three critical material requirements for preventing C3 and achieving a communist future are global demilitarization, a transition of the current mode of agriculture to agroecologies, and solarization of the global energy infrastructure with a greater capacity than the present level. The science of thermodynamics demonstrates that a solar energy source is fundamental to truly green growth, industrial ecologies and phaseout of extractive mining. The ecosocialist movement should critique the misleading spectre of entropy, drawn from Georgescu- Roegen's fallacious 4th law of thermodynamics which has had strong influence on the Degrowth movement. Likewise the argument that "perpetual growth on a finite planet leads inexorably to environmental calamity" (Monbiot, 2019) fails to deconstruct the qualitative aspects of growth, what is growing, what should degrow, under what energy regime? The current use of fossil fuels and nuclear fission power to drive the economy can be transcended in our open Earth system by sufficient creation of a high-efficiency collection of the solar flux to Earth. Global solar power will then pay its "entropic debt" to space as non-incremental waste heat, without driving us to tipping points towards even more catastrophic climate change than has happened over the past few decades, Coming out of this transition, which will need to be ecosocialist, a steady-state biophysical economy can emerge in a global solar communist society (Schwartzman, 1996; Schwartzman and Schwartzman, 2019).
References cited Monbiot, George. 2019. "The Problem is Capitalism." https://www.monbiot.com/2019/04/30/the- problem-is-capitalism. Schwartzman, David. 1996. "Solar Communism." *Science & Society* 60 (3): 307–331. Schwartzman, Peter. and Schwartzman, David. 2019. *The Earth is Not for Sale: A Path Out of Fossil Capitalism to the Other World That is Still Possible*. Singapore: World Scientific.

Brockway et al. (2019):

Abstract Under many scenarios, fossil fuels are projected to remain the dominant energy source until at least 2050. However, harder-to- reach fossil fuels require more energy to extract and, hence, are coming at an increasing 'energy cost'. Associated declines in fossil fuel energy-return-on-investment ratios at first appear of little concern, given that published estimates for oil, coal and gas are typically above 25:1. However, such ratios are measured at the primary energy stage and should instead be estimated at the final stage where energy enters the economy (for

example, electricity and petrol). Here, we calculate global time series (1995–2011) energy-return-on-investment ratios for fossil fuels at both primary and final energy stages. We concur with com- mon primary-stage estimates (~30:1), but find very low ratios at the final stage: around 6:1 and declining. This implies that fossil fuel energy-return-on-investment ratios may be much closer to those of renewables than previously expected and that they could decline precipitously in the near future.