How degrowthers underestimate how much energy humanity needs

David Schwartzman, July 22, 2022

Degrowthers commonly advocate for the goal of a "satisfactory" quality of life for most of humanity living in the global South, in contrast to a higher standard for many in the global North, instead of demanding and mapping out a path to the highest state-of-the-science life expectancy/quality of life achievable for all children in their lifetime (e.g., O'Neill et al., 2018 and Millward-Hopkins et al., 2020; see critique in Schwartzman 2021a, 2022). It is important to recognize that numerous factors depress the life expectancy in countries even with higher energy consumption levels than this minimum, e.g., income inequality and of course the level of air pollution from burning fossil fuel (Steinberger et al., 2020).

The present *primary* energy consumption level consistent with the highest achievable life expectancy is at minimum 3 kW/person (e.g., Italy with 3.07 kW/person in 2020, ranking 7th globally in life expectancy; https://ourworldindata.org/energy/country/Italy; https://worldpopulationreview.com/countries/life-expectancy, United Nations: National Accounts Main Aggregates Database). The primary energy consumption level in Cuba corresponds to 1.096 kW/person (latest data available, 2019, https://ourworldindata.org/energy/country/cuba).

Referring to Rao and Min's (2018) definition of decent standard of living (DSL), Cubans have it, with their life expectancy very close to the U.S. (In 2022, Cuba's life expectancy corresponds to 79.082 years, ranking 49th in the world, with the U.S. just behind at 50th at 79.05 years (https://worldpopulationreview.com/countries/life-expectancy, United Nations: National Accounts Main Aggregates Database).

Note:
"All these characteristics of a healthy society are well represented by average life expectancy, which is the primary measure of health in poverty measures, such as the HDI, and the more recent SPI...On this basis, we propose that societies require a minimum health expenditure, to sustain average life expectancy of 70–75 years" (Rao and Min, 2018, p.239)

Indeed, prominent degrowthers point to Cuba's low GDP as a goal for achieving satisfactory standard of living (Schwartzman, 2021b). In any case Cuba suffers from energy poverty, more precisely consumes significantly less energy per capita than is necessary to achieve the highest world standard life expectancy. Commonly degrowthers advocate for the goal of a "satisfactory" quality of life or "DSL" (Rao and Min, 2018; Millward-Hopkins et al., 2020; Kikstra et al., 2021) for most of humanity living in the global South, in contrast to a higher standard for many in the global North, instead of demanding and mapping out a path to the highest state-of-the-science life expectancy/quality of life achievable for all children in their lifetime, which is a goal we have proposed.

Indeed much lower energy demand (itself lower than the primary energy consumption) is necessary for achieving "wellbeing", which I take as a DSL, which is significantly lower than consumed presently by countries with the highest life expectancies in the world.

Further, Kikstra et al. (2021) project for after 2040 to be 156 EJ yr−1 for the global population (equal to 4.33 x 10^4 TWhr. They assume a global population of 9.2 billion by 2050, so the global energy consumption level for a DSL corresponds to 0.54 kW/person. We take this as the energy demand, not the primary energy consumption per person as previously provided, e.g. 3 kW/person. Note, that Kikstra et al. (2021) in their abstract "estimate the cumulative energy needs for building out new infrastructure to support DLS provision for all by 2040 to be about 290 EJ, which amounts to less than three-quarters of current annual global energy demand, at the final energy level." The present *primary* energy consumption level corresponds to 19 TW, or in one year equal to 600 EJ. Three-quarters equals 450 EJ, or 1.55 times 290 EJ, hence it is clear that the reference to 290 EJ is to final energy demand, not to the present global primary energy consumption level. If the ratio of highest world standard/DSL energy demand/person is the same as now (i.e., 3/1.3, which assumes a constant primary to energy demand ratio) then the future energy demand needed for the highest achievable life expectancy in 2050 would correspond to 1.25 kW/person, with the primary energy consumption being about 1.8 kW/person. Schwartzman and Schwartzman (2021) project a level of 2.1 kW/person assuming an energy saving of 30% to do the same work, a level sufficient to reach the highest life expectancy. But this estimate does not take into account the impacts of ongoing climatic warming even meeting the 1.5 deg C warming target, with the greatest burden shared by the global South, where Kikstra et al. (2021) focus their attention to achieve a DSL. In particular the impact of heat stress in the global South will be likely much worse than now, a challenge needing a significant energy investment. Kistra et al. (2021) apparently recognize this issue:
"Moreover, our energy need pathways could be improved by accounting for changing energy needs for different climate futures. For instance, the DLE [decent living energy] need for thermal comfort would be affected by different climate projections." (p.10)

However, the incremental energy needs to effectively address climate mitigation and the full array of adaptation are not addressed in Kistra et al. (2021). Indeed. Schwartzman and Schwartzman (2021) projected the global energy requirement to 2050 taking account population growth and growing efficiency in doing work using less energy and get 19 trillion watts, but then adding the incremental needs must increase this level to address climate mitigation/adaptation (in addition to cleanup from the legacy of the military industrial complex pollution of our planet and other challenges). For the present global population of 7.9 billion x 3 kilowatt/person = 23.7 trillion watts. This is 1.25 times the present global consumption level, but of course recognizing that a robust solar transition will reduce the energy needed per person to achieve the world standard level.

We also take note of the very important research coming out of the Jacobson Lab at Stanford University, in particular, Jacobson et al. (2017, 2022). Jacobson et al. (2017) projections of renewable energy supplies for 2050 were found to be too low to eliminate energy poverty, e.g., in India as well as have the capacity to address climate mitigation and adaptation (p. 90, Schwartzman and Schwartzman, 2019). The Jacobson Lab's new study (Jacobson et al., 2022) projects even lower end use energy for 2050. Assuming the population projections for 2050 from Wikipedia (2022), their end use energy consumption per capita (kW per capita) for China is 2.04, India 0.73 and the U.S. 3.46, with the global population being 9.4 billion corresponding to 0.94. These results lead to the same conclusions made by Schwartzman and Schwartzman (2019), again illustrating the unequal consumption of energy of the global North versus the global South.

In particular, even if the IPCC warming target of 1.5 deg C is met, India will suffer even more heat stress than now. Assuming an average global end use energy consumption of 2 kW per capita would require a global end use capacity corresponding to 19 TW, with the primary energy consumption being greater, not including the additional capacity needed for climate mitigation and adaptation.

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