

Technologies for a Degrowth Transition -- A Faustian Bargain?

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"Neither tales of progress nor of ruin tell us
how to think about collaborative survival."

-- Anna Tsing

Summary: In this talk I'll focus on two aspects of the transition debate: first I'll give an analysis of limits that the narratives of sustainable development, green growth and eco-capitalism face, all of which I understand to fall into the long lineage of dominant techno-developmental doxa. Second, I'll try to indicate what are reasonable take-aways for a degrowth position from that analysis, cautioning against an all-too-facile cherry-picking of technology in a degrowth narrative. I'll finish by proposing some elements of strategy that might after all be reasonable to adopt in a degrowth transition.

Technologies and environmental crisis

[Technologies and environmental crisis] **[Footprint]** The recent string of record-setting hikes in global temperature due to climate change, which as of July stands at 1.3 C above preindustrial levels, the yearly overshoot of Earth's bioreproductive capacity by a factor of 1.6 and the uneven distribution of environmental stresses reproducing the global North/South and class divisions have been all catalyzed by the growing productivity of our technologies. In the progressivist world-view, technoscience is regarded as a single most important factor in human development. Advances in health, lifespan, nutrition, housing, mobility, communication, education, and material abundance are all cursorily attributed to scientific and technological development to the disregard of other factors such as political struggles, social institutions, language or play.

[Technodevelopmentalism] As Lewis Mumford contended half a century ago, there's a bias to view human evolution as an evolution of a uniquely tool-making and tool-wielding species. The human is

understood primarily as *homo faber*. As there are other animals that make and wield tools, this view overlooks the truly unique human capacity of combining and amplifying tools with social and symbolic structures, foremost spoken language. [capitalocene] And yet, what we'll call for the purposes of our analysis techno-developmentalism has remained unperturbed to this day by the fact that the gains in productivity it has enabled have presided over an unprecedented planetary environmental crisis and, [class war] after the initial contribution to prosperity, now contribute to growing economic inequality.

Technology is thus a part of the problem. Yet, the techno-developmentalism, a cornerstone of contemporary common sense, now greenwashed in various variants of green growth narrative, would have us believe that technology is the solution. Leaving thus the structural interdependence of technological systems and capitalist socio-metabolism fully unexamined, while putting a policy gag on discussion of systemic change as utopian or politically inoperable. And this is where the degrowth comes into picture as both a critical re-assessment and a practical redress.

The limits to techno-developmentalism

[Limits to techno-developmentalism] But before we examine problems of a degrowth-oriented technological strategy, we need to look at the other side of the debate. [green capitalism & techno-developmentalism] Narratives of green growth, green innovation and eco-capitalism share the assumption that the technological innovation, by creating technologies that are more efficient, resource saving, recyclable, helping adaptation and mitigation, will lead us out of the environmental predicament, while bringing us on path of sustainable development. This assumption is dubious for several reasons, of which I'll draw out four.

[I. conjuncture] Firstly, there seem to be *conjunctural limits to techno-developmentalism*. Our technologies are not productive enough to maintain levels of growth at the scale of world economy. [Brenner, Balakrishnan] If we are to go by assessments of economic historians Robert Brenner and Gopal Balakrishnan, since the 1970s global economic system has been experiencing a big slow-down. Technological advances in containerization, computerization or management of natural resources have allowed capitalism to relocate production overseas and thus to increase the productivity of capital. [falling rate of profit] Yet, these technologies have failed to reproduce the levels of growth and profit that were brought about by the general purpose technologies of the immediate post-war period.

At the same time, low-wage Asian economies, in spite of high rates of growth achieved there, are not rich enough to reproduce for the world economy growth in aggregate volumes that were achieved in the capitalist West couple of decades earlier. [Finance] For several decades this was compensated by the expansion of private credit and finance.

Yet, with the onset of Long Depression, crediting production and consumption no longer seems a viable option for capital. At this moment capital prefers to keep US\$13.4tn parked in negative yielding bonds. Instead of investing to achieve returns, capital is rather paying interest to trustworthy borrowers to keep its money safe.

[turbulence] All this signals that the capitalist world-system might be approaching a turbulent steady-state on its own, a conjuncture which altogether might prove conducive for public advocacy of a degrowth transition to prevent it from spiraling, as Serge Latouche has cautioned, into barbarism.

[II. unevenness] Secondly, sustainable development premised on technologies might not be achievable due to *limits of unevenness of development*. [Arghiri, Hornborg] With global asymmetries of wage and purchasing power between national economies deviating by orders of magnitude, global free trade facilitates an exchange between unequal economic zones. This allows more developed countries to siphon off the products of labor and natural resources from less developed countries at knockdown prices. What is seemingly a symmetric relation of trade, an exchange of goods for money, the magic of -- as Alf Hornborg would have it -- conversion of unequal physical units for equivalent symbolic units, provides economies with a higher purchasing power with an easy way to externalize their environmental costs onto those with a smaller purchasing power.

[Arghiri] As the originator of unequal exchange theory, Emmanuel Arghiri, has demonstrated in his discussion of appropriate technologies, the less developed countries, for reasons that they sell products of labor and natural resources cheaply and buy commodity and capital goods dearly, are locked in place while trying to catch-up. In developmental terms there are no technologies appropriate to their level of economic development other than the most productive and hence most expensive. So they remain destined to obsolete technologies.

[developmentalism] Unevenness of development is thus self-reinforcing and facilitated by the varying levels of productivity of technologies in use. Labor and resources are extracted with inferior and inefficient technologies. If more developed economies would internalize the cost of uneven development by subsidizing wages to an equal level as theirs and technologies to the same standard as theirs, the economic expansion and development altogether would likely grind to a halt. The consequence is that the developmentalist framework is purchased only at a price of unevenness, inefficient technologies and environmental injustice. Contrary to what green growth boosterism pointing to a shiny example of Germany would like us to believe, green capitalism in one country maybe can work, but green capitalism at the global scale probably can't.

[III. environment] Thirdly, there are extensive debates if and what are the *environmental limits to techno-developmentalism*. The big slow-down can also be attributed to the fact that the four cheap natures -- food, energy, raw materials and human life -- are increasingly becoming more expensive to extract and secure. [Jason W. Moore] As Jason W. Moore develops in his account of the capitalocene, capitalism has been able to appropriate by extra-economic means -- conquest, slavery, plunder, uneven development -- large values that it has been able to keep off its accounts. Colonialism, imperialism and neo-colonialism have thus provided a spatial fix to some of the inner contradictions and crises of maturing capitalism. In the process they have transformed pre-capitalist regions around the world into an integrated capitalist world-system and planetary world-ecology that is now going through a fundamental shift.

[N. Georgescu-Roegen] Furthermore, viewed from the framework of bioeconomics, initially developed Nicholas Georgescu-Roegen, all economic processes can be understood as entropic. The economic production transforms low entropy inputs of human labor, fuel and raw materials into high entropy outputs of commodity, heat and emissions. Given Earth's limited capacity of regeneration, this sets rigid biophysical limits on growth. The green capitalism hopes to transcend those in a foreseeable future with a chiliastic promise of transition to a decarbonized and dematerialized economy. [time-window] Yet, considering that the efforts to reduce carbon emissions are failing and that the extraction of energy and minerals is not abating, the time-bomb is ticking away too quickly. While probably not physically impossible, the substitution is daunting for the short time-window available to us before we enter the period of non-linear change of planetary systems.

[IV. socio-technological] Lastly, there are specifically *socio-technological limits to techno-*

developmentalism. Technological innovation is a complex socio-technological process, requiring synergy of technologists, regulators, financiers, enterprises and institutions. On the technological side, technological systems depend on other technological systems for their operation. [Th. P. Hughes] In fact, if we follow the influential historian of technologies Thomas P. Hughes, much of the technological innovation principally reacts to critical problems in existing technological systems and optimization of their operation. On the social side, technological innovation is driven by critical problems of capital, military and regulation and supported by institutions, financiers and governments to that end.

[technological systems depend on technological systems] While this does support the hopes of the green growth that technologies can be invented through a coordinated effort to reduce the energy and material throughput, much to its chagrin this also entails that desirable technological systems cannot be easily decoupled from other technological systems on which they depend for operation, and that it is unlikely that an innovation will go down smoothly if it is disruptive to the operation of current energetically and materially intensive systems and social groups whose interest depends on those technologies.

All this leads to conclusion that narratives of sustainable development, green growth and green capitalisms depend on a number of techno-developmental assumptions that bank on ignorance or denial. There's a number of social, environmental, developmental and technological limits that indicate that we're living beyond our common planetary means and that we cannot hope to geo-engineer our way out of predicament.

Degrowth and transitional technologies

[Degrowth and transitional tech] Degrowth is advocating a systemic change. But it is also leading by example, proposing and devising a number of pre-figurative and trans-formative concrete utopias that start from the present social metabolism. [Autonomous...] A more frugal, localized and mutualist socio-economic system that degrowth envisions calls for a re-functioning of existing relations of production, modes of distribution, currency systems and, relevant to us here, technologies. Autonomous, distributed, localized, energy saving, resource efficient, non-obsolescent, recyclable are just some of the qualities that degrowth seeks in technologies it deems either appropriate or appropriable. [Citizen...] Citizen energy co-ops, organic food production, micro-production, resource-sharing digital platforms, free software, distributed computer systems,

digital commons, open patent pools, cryptocurrencies are all part of that strategic vision.

[tech sys in capitalist sys] While supporting the emancipatory and strategic aspects of these technologies, caution is warranted against laying hopes in this or any specific mix of technologies. As was just discussed, technologies are namely imbricated with their socio-economic ambient milieu. Our technological systems have largely co-evolved with the capitalist world-system. The integration and functioning of that world-system is only made possible by the existing technological configuration. Globe-spanning and interlocking complex of computerization, containerization and management of natural resources is essential for its continued reproduction. In return, technological systems are build for the scale of material and energy flows and intensity of capital investments that it requires.

This comes with at least three risks. **[I. scale-down]** Firstly, we cannot de-couple technologies from the capitalist system of production, its scale of throughput and its capital intensity, and assume that they will continue to function as we experience them now. Substituting these with existing or new technologies will likely entail a potential scale-down and loss of social utility.

[II. maintenance] Secondly, the contraction entails de-intensification of flows and investments into the existing large technological infrastructure, forcing the transitional process to search for different ways of dealing with the problem of maintenance. Even in a scenario where elements of the present mode of production are gradually replaced by various alternatives, this still continues to pose a problem as not all infrastructures can be localized and executed in convivial way.

[uncertainty of innovation] Thirdly, the transitional process will be under pressure to innovate substitutions for technologies that will go defunct or become too expensive due to depletion of raw materials that go into them. However, critical problems of technological systems do not always get solved and that means that sometimes technological systems need to be phased out.

[degrowth cannot be tech driven] These risks, however, do not entail that technologies listed above do not matter for a transitional strategy, but rather that their development and deployment have to go hand in hand with broader social, economical and political proposals, in the context of which these technologies could secure food, energy and tools needed for the virtuous reproduction of transition. We are moving into the zone of uncertainty of what will work and what will fail. If a society -- or, more plausibly, a municipality -- decides to pursue a path of degrowth transition, the

interdependence of technological systems and inability to secure operation of basic infrastructure might push it and lock it back to a growth-oriented path.

Elements of a degrowth technological strategy

[Degrowth tech strategy] Technologies will necessarily be a part of transitional processes and practices. We we will continue to live in a technological world. Regardless of the fact that we should not put all our eggs into the technology basket, it is reasonable to think strategically what technologies and what priorities of technological development *might* prove useful and maintainable in and after the transition.

[V. Kostakis] Building on the work of Vasilis Kostakis and Michel Bauwens, who have developed a model of transition revolving around the networked collaborative economy, we can perhaps allow ourselves to envision certain priorities that might provide a more general strategy toward creating technologies conducive to a degrowth transition. These include:

- **[technological]** technological development processes that balance self-determination of producer and user communities and priorities of decarbonization, dematerialization and maintenance;
- global cooperation in research and development, creating open pools of innovation that are focused, in particular, on smaller-scale production technologies;
- protection of such innovations with intellectual property licenses that are free for any solidary production, while non-free otherwise to prevent corporate free riding and generate revenues that can be reinvested into development;
- **[prioritization]** prioritization of energy and resource saving over substitution with renewables and recyclables;
- communal and public financial support for technologically advanced forms of local and smaller-scale cooperative production, particularly in agriculture, electricity and micro-production;
- trans-local networks of exchange for goods that cannot be produced locally, based on principles of solidary economy and accounting in alternative currencies that transcend the problem of unequal purchasing power;
- **[communal]** communal control of public sector services and infrastructure, harnessing the

leverage of public utility companies in driving the development of technologies that are needed for a degrowth transition.

[local production, trans-local development] By reducing the geographic scale and intensity of production on the one hand, and by scaling up and trans-localizing the work on research and innovation on the other, these measures are tailored to lower the dependence of both socio-metabolic processes and processes of technological innovation on the global systems of commodity production and circulation. However, the feasibility of these measures hinges on their insertion into the strategies of anti-systemic movements that are able to self-organize production and/or can influence the policies on various levels of the political system. [semi-periphery] They particularly suited for the troubled (semi-)periphery, where social movements and organized labor have a degree of know-how, some financial means to pursue them and a historic chance to articulate an alternative trajectory of social development. They are not the silver bullet, but they are a potential fall-back should the post-capitalist morrow dawn. If social and political movements fail to understand that technology conditions the transition, and that a cautious reconfiguration of our technological systems should be part of their strategic register, judging by the experience of real existing socialisms, the day after the transition will increasingly start to revert back to the day before.