ST.GALLEN SYMPOSIUM

Global Essay Competition 2024

Title: **From Hubris to Humility: Rethinking Energy Transition for a Sustainable World**

Essay:

Introduction

Humility is the scarce yet indispensable technology that humanity so desperately needs in today's crisis-ridden world. Defining technology in ideational (as an enabler) and material (as an artefact) terms, the essay contrasts the technologies of hubris and humility through the case of energy transition efforts to mitigate climate change. The hubris, evident in our unwavering faith in science and technology's omnipotence, dismisses the social, the unknown, and the unpredictable. Our faltering response to climate change, predominantly reliant on technological fixes for energy transition, epitomises this hubris. However, humility offers a counterbalance, advocating for caution and reverence in the face of risks and uncertainties. In analysing humility's potential within energy transition strategies, the scarcity of humility is interconnected with the scarcity of clean energy. The essay argues that integrating humility into human efforts is crucial for creating a more just, equitable, and sustainable future.

Rethinking Uncertainty in the Anthropocene

The advent of modernity has been marked by the ability of humans to enhance their mastery over nature through systematised scientific knowledge practically applied as different technologies of control. The triumph of natural sciences over the order of the Church in establishing itself as the primary centre of knowledge production concerning the natural world elevated the role of rationality in human endeavours. Within the paradigm of natural sciences, the creation and legitimisation of knowledge came to be systematised through rigorous practices of controlled experiments, observations, and verification. The act of observing the unknown and transforming it into reproducible knowledge of certainty lies at the heart of any scientific endeavour. The descent of the unknown from the sacred to the profane radically altered our perception of the unknown and the uncertain.

In this age of "disenchantment" heralded by the "intellectual process of rationalization through science and science-based technology" (Weber, 2004, p. 12), the unknown came to be a black box that is yet to be investigated and made sense of by science. This perception underlies

Heidegger's (1977) identification of the essence of technology as "enframing" (p. 24), a way of being in the world that reveals the natural world to be a stockpile of resources that has to be utilised and exploited for the betterment of humankind. Under the sway of capitalism and individualism, this enframing mindset has entrenched itself, reshaping our relationships with each other and the world around us into a relentless pursuit of domination and profit. Meanwhile, science also came to be tied up with progress, which is perceived as a linear path leading to the perfectibility of the human condition. However, the perfectibility remains asymptotic.

We are living in the age of the Anthropocene, where human activities since the Industrial Revolution have drastically altered the fundamental patterns of the Earth system, leading to climate change, mass extinction, and the disturbance of global biogeochemical cycles. A scientifically informed consensus has been achieved by the Paris Agreement 2015, under which 196 countries agreed to limit the earth's warming to 2°C, with the pre-industrial level as the baseline. This is proving to be a fool's errand, as 2023 concluded to be 1.4°C hotter than the pre-industrial era, and the desirable threshold of 1.5°C is expected to be crossed in the next five years (Climate Central, 2024; Lamboll et al., 2023).

As the urgency of addressing climate change is acknowledged, we are once again turning towards technology for solutions without understanding the fundamental flaw in technological posture towards the world- it lacks humility towards the uncertainties and the unknowns. Without this humility, any technological fixture shall emerge half-baked, leading to unintended consequences and new challenges.

A Case for Technologies of Humility

The concept of 'technologies of humility' was developed by Jasanoff (2003) in an article that closely examines the decision-making within the technological system and the need for more participation and open deliberation amongst decision-makers, experts and citizens in the management of technology. The binary model of thinking that pervades the technological system allows choices based on a future of knowable outcomes (Jasanoff, 2007). The arrogance of technological systems lies in their dismissal of the partial nature of scientific knowledge, as life rarely unfolds as foreseeable binaries.

The hamartia in 'technologies of hubris' (Jasanoff, 2003) is overlooking potential risks and uncertainties. For instance, intensive agriculture and fossil fuel extraction may seem like viable options in the short term, but they have catastrophic consequences for the planet in the long run. The literature on technological disasters is replete with instances showcasing the outcomes of the arrogance embedded in the design and implementation of technologies. In contrast, inculcating and nurturing humility in the technological system allows the actors to acknowledge the limitations of science and account for uncertainties.

Humility, inherently, acts as a technology, an enabler, in paving the way for responsible innovations that are cognizant of their limitations. From this cognisance, the space is carved within the technological system for discussions on the socio-political and ethical implications of technological artefacts. This fosters a culture of collaboration and participation in the management of technology, where diverse perspectives and expertise are valued and integrated. However, the strategies for addressing climate change are marked by its continuing allegiance to technologies of hubris rather than humility.

A central pillar of climate change mitigation strategies is the shift to various forms of renewable energies such as solar, wind, geothermal, hydropower and biomass. Phasing out fossil fuels by adopting renewable energies and alternatives like nuclear energy forms the crux of decarbonisation strategies. Globally, the growing population and rising prosperity (despite vast inequalities in the distribution of wealth) have resulted in a persistent ascent of energy consumption and need. Pursuing unending economic growth through adopting carbon-free or low-carbon technologies without carefully considering potential risks and trade-offs perpetuates a dangerous form of technological hubris. Through an analysis of risks associated with these measures, the following section demonstrates that this approach fails to recognise the complex interconnectedness of environmental, social, and economic systems and the potential unintended consequences of technological interventions.

Sustainability or Technological Solutionism?

According to the International Energy Agency (2024), there was a remarkable surge in global renewable energy capacity in 2023, with a nearly 50% increase to almost 510 gigawatts (GW). The report anticipates a substantial addition of renewable capacity, projecting about 3,700 GW to be integrated between 2023 and 2028, signalling a significant upswing in renewable energy technologies. Despite these astronomical rates, the goal set by the 28th Conference of the Parties

(COP28) to triple global capacity for renewable energy by 2030 demands even greater numbers. However, on the posters calling for such rapid transformation, the asterisk (*) beside the policy statements demands discreet attention. Such discretion will tell a different story. The urgent pursuit of this massive transformation within a short time frame heightens the risk of overlooking potential downsides and trade-offs of renewable energy technologies. These risks include glossing over the inequalities in the energy transition trajectories, the increased demand for critical minerals and the geopolitical risks they pose, the ecological challenges that the use of alternative energy sources entails, and the unviability of radical transitions in the absence of a social consensus.

Energy inequality is as pervasive as the inequality and unfairness in the distribution of climate vulnerabilities. Developed nations possess a notable edge over developing counterparts in energy transition due to their established infrastructure, technological prowess, and financial means. Tankwaa and Barbrook-Johnson's (2023) thorough examination of the levelized cost of electricity (LCOE) for onshore wind and solar photovoltaics across time underscores this advantage. Wealthier nations benefit from lower technological costs driven by robust demand, competitive manufacturing, export capabilities, and market-driven policy mechanisms. Conversely, countries in the Global South, such as those in Africa, Asia, and South America, with lower historical emissions face the brunt of elevated costs despite the significant global decrease in the average costs of these technologies.

The critical minerals associated with a low carbon economy, such as copper, cobalt, nickel, lithium, graphite, silver, uranium and rare earth elements, have rightly been labelled ‘green conflict minerals’ (Church & Crawford, 2018) due to their close association with conflict, land theft, human rights abuse, and environmental degradation. Reminiscent of the scramble for Africa, the scramble for these resources in states like the Democratic Republic of Congo (de Koning, 2011) exudes violence, instability, and the reinforcement of authoritarian regimes. The colonial ghost continues to haunt the lives of people as foreign actors perpetuate these issues while exacerbating ecological damage through biodiversity loss, deforestation, and habitat contamination. Reports reveal the grim aftermath of extraction in northern Myanmar (Global Witness, 2022; Chinkaka et al., 2023; Kang et al., 2022), where rare earth minerals are mined in a polluting process, peppering land with chemical pools and toxic air, enriching military dictatorships and multinational corporations at the expense of human and environmental well-being. The Amazon rainforest, the Lithium Triangle, the nickel mines of

Indonesia, the deep seas, and the Arctic are some other hotspots of ecological damage caused by green mineral extraction, as paradoxical as this phrasing is.

On another note, the dominant role in critical mineral supply chains offers China geopolitical advantages that could be used to exert economic pressure on other countries (Berdichevsky, 2023). Finally, the radical transition of this scale cannot be an absolutely bureaucratic top-down exercise. Yet, building a social consensus on energy transition is absent from most policy endeavours. Despite the increasing literature on social acceptance of renewable energy technologies (Batel, 2020; Ellis et al., 2023), they are primarily retrospective and not since the incipient stage.

How can incorporating technologies of humility eliminate these blatant expressions of arrogance that indicate technological solutionism rather than sustainability? An attempt is made to answer this using the four focal points around which Jasanoff (2007) crafted the practices of technologies of humility.

1. *Framing*: The imperative for clean energy should be framed as a social problem that demands more than a technological fixture. This necessitates the decoupling of sustainability from technological solutionism in policy imagination. Sustainable practices require a paradigmatic transformation across all facets of society, challenging entrenched beliefs in perpetual economic growth and redefining individual values that conflate luxuries with necessities.

2. *Vulnerability:* Respecting the partial nature of scientific knowledge and the inadequacy of technology to resolve current crises fosters more sensitive risk assessments. Ecological, ethical and social implications of technologies shall be duly considered and deliberated upon. Sustainable practices of energy transition should not only earmark the transition rate but also ensure responsible sourcing practices and greater accountability in mineral supply chains.

3. *Distribution:* Embracing vulnerability involves viewing people not as passive recipients of technology but as active participants embedded in their context, with values and perspectives, significantly influencing the outcomes of technological interventions. Therefore, it is paramount that experts, decision-makers, and citizens alike play active

roles in shaping and governing the technological landscape. This inclusive approach must extend beyond token participation; civil society organisations, environmental activists, and diverse stakeholders must be integrated into the fabric of technological design and innovation processes, ensuring their voices resonate from the inception to the implementation phases.

4. *Learning*: Finally, it is significant to critically examine the underlying assumptions behind what is 'correct,' along with identifying the correct or better response. This shall ensure that the discourse of 'energy transition' shall not be used to justify exploitative mineral and water extraction, deforestation, local pollution, or habitat contamination. In addition, no technologies shall be transplanted from one social context to another without due assessment.

In sum, adopting the framework of humility shall make energy transition more humane and truly sustainable by approaching the complexities of our world with greater caution and reverence.

Conclusion

Technology has played a pivotal role in shaping human history, but as we face the urgent threat of climate change, we must reject the arrogant belief that technology alone can save us while we continue to indulge our greed. Instead, we must embrace a framework of humility that recognises the complexities of the social world and the need for caution in addressing the climate crisis. The transition to low/zero carbon energy is imperative, and technology is a crucial part of the solution. Still, we must approach these solutions with humility, carefully assessing risks and ensuring we do not cause further ecological harm. This is particularly crucial for emerging technologies like solar geoengineering, where unintended consequences could be severe. The fate of Icarus awaits technologies of hubris. To strive for more or to thrive with less is a context-based choice, but exercising humility in decision-making is the key to a sustainable future.

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