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Why we're seduced by climate tech and what it means for our happiness

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Introduction

Thinking about climate change can be depressing and distressing (Hrabok et al., 2020). The prevalence and severity of climate anxiety—especially among young people (Hornsey et al., 2016; Hickman et al., 2021)—have led to increasing calls to formally recognize it as a mental disorder (Clayton, 2020). Even if climate anxiety isn't classified as a mental disorder, its negative impact on affect can reduce sufferer's happiness, and may even play a causal role in depression and self-harm (Hrabok et al., 2020; Sampaio and Sequeira, 2022; Schwartz et al., 2022).

Several common features of human psychology are obstacles to individual and coordinated actions to mitigate and adapt to climate change and its potentially catastrophic effects. The relevant features include our inability to appropriately value future humans (Solow, 1993), weakness of will, and a failure of critical thinking encouraged by misguided socio-political ideology (Kysar, 2004; Hamilton, 2011; Bain et al., 2012; Kovaka, 2021).

Climate tech—technology designed to reduce our negative impact on the climate—is positioned by many as the solution to these features of human psychology. Fixing the climate with climate tech would relieve climate anxiety and the unhappiness it causes. Climate tech solutions could also circumvent the problem of human reluctance to change their behavior, by allowing them to continue with their lifestyle. We argue that, although climate tech is an important part of the solution, overzealous appeals to the abilities of climate tech may end up making us much less happy.

Climate tech

Research on dealing with climate anxiety argues that "problem-focused" coping mechanisms seem more conducive to alleviating climate anxiety and promoting long-term happiness than "emotion-focused" strategies (Clayton, 2020, p. 4). Dealing effectively with the root cause of climate anxiety indeed seems better than focussing on mitigating its symptoms. Ojala's (2012, 2015) research on young people found that trusting scientists and others to solve the climate crisis was among the most beneficial responses to climate anxiety—predicting higher happiness and lower negative affect. If we trust that science and technology will save us from climate disaster, then we can relax and focus on happily living our normal lives.

Indeed, the most reassuring part of this problem-focused coping mechanism might be that climate tech can fix the climate regardless of the uncritical, selfish, and myopic features of human psychology that brought on the problem in the first place. Many climate tech solutions don't require individuals to live their lives differently. They could also fit easily within the current globalized and largely free-market economy. Highlighting that climate

tech is an important kind of technological innovation has even been shown to appeal to people that deny human involvement in climate change, earning their support for funding some climate tech projects (Bain et al., 2012). So, climate tech seems to reduce climate anxiety and promote climate-friendly investing, allowing us to take a sigh of relief knowing that tech-based solutions to the climate crisis are just around the corner.

Carbon capture

Carbon capture technology is promoted by Bill Gates (2021) and many others (e.g., IPCC, 2022) as a key advance in combatting climate change—it may well be the main technology people have in mind when they envisage climate tech saving the day. Fortunately, private enterprise has heeded the call for carbon capture technology; by 2020 there were already 26 commercial projects in operation (globally), with over 30 more in development (C2ES, no date). The thought of CO_2 being funneled deep underground, instead of into the atmosphere, is potentially reassuring to those with climate anxiety and likely intriguing to energy companies intent on pushing up the last drops of oil from underground reservoirs. Wilberforce et al. (2019) discuss this and other advances in carbon capture technology, saying that they should be ready for global implementation soon.

There are a few issues to resolve before carbon capture should be rolled out. For example, photobioreactors with microalgae in them could be incorporated into CO_2 exhaust systems, but they don't deal so well with high temperatures or concentrations of CO_2 (Severo et al., 2019). Atmospheric carbon capture using novel sorbent materials can remove carbon from the atmosphere, but would be much more efficient if we could increase the concentration of CO_2 in the atmosphere first (Styring, 2015; Senthilkumaran and Mareeswaran, 2021). The aforementioned underground storage of CO_2 also has a couple of issues; the scarcity of geologically suitable (e.g., earthquake-free) areas and the considerable additional energy and financial requirements for the capturing and sequestering processes (Wilberforce et al., 2019).

There are many non-carbon capture climate technologies, such as energy generation from renewable sources, but they do not allow individuals and corporate entities to continue doing pretty much what they have been doing in the recent past. Carbon capture technologies require that (or work more effectively when) we keep burning fossil fuels. In this way, carbon capture climate tech seems well-positioned to deal with the uncritical, selfish, and myopic features of human psychology that contributed to the climate crisis by simply co-opting them.

Horizon bias

Climate tech is clearly an important part of a successful response to the climate crisis. However, overvaluing it may have counterproductive effects generally and on our happiness. A forthcoming book identifies and explores "horizon bias"—the modern propensity to believe that anything we can envisage accomplishing with technology is therefore imminently in reach (Agar, 2020; Agar et al., forthcoming). This tendency leads us to think that ambitious targets are closer than they really are. Horizon bias has a long history. It is a theme of the War on Cancer in which modest advances against the disease have prompted recurrent expectations of an imminent cure (Mukherjee, 2011). Horizon bias has become a booming industry among futurists, priming us to expect colonies on Mars by 2050 and brain implants that will grant us mind control over objects in our environments (while being safe from hackers).

The horizon bias applies to both present and future. It is rooted in a selective memory of our past. Technology's many headline successes—e.g., eradicating smallpox, sending humans to the moon—tend to dwell permanently in our collective memory. They offer strong inductive evidence for the power of human ingenuity. But we speedily forget the many times when promised advances—cures for cancer, flying cars, permanent settlements on the Moon—fail to arrive as scheduled.

Widespread, effective climate tech is exactly the kind of exciting innovation that feels like it is on the horizon. As such, all we have to do is sit back and wait because the rotation of the Earth will soon bring this solution to the climate crisis right to us. In this way, the horizon bias engenders a passive and (usually) unjustified hope that technology is just about to save the day. Hope is normally defined actively, with an emphasis on what an agent can do to achieve the object of their desire (Snyder, 2002). But Meirav (2009) views hope passively—as desire for something about which an external factor will determine the outcome. According to Day (1991) hope is epistemically justified when belief in the desired outcome occurring is well supported by evidence. And, according to Musschenga (2019), hope is unjustified (rather than "false") when belief in the desired outcome occurring lacks sufficient evidence.

The passive unjustified hope of the climate tech horizon bias creates perverse incentives. Companies vying for a larger share of new green investments and government subsidies have good reason to over-promise on what their technologies will be able to do and when they will be able to do it. And while some journalists, researchers, and activists may voice concerns about climate-related promises that sound too good to be true, the majority of people may not be motivated or equipped to question them. Enthusiastic belief in the proclamations of climate tech businesses helps most people deal with climate anxiety (by removing the root problem). And, as Hamilton (2011) suggests, it even fosters our pleasing collective self-image as world-makers—gods of the Anthropocene.

The real story

Unfortunately, carbon capture, and even an expanded climate tech industry, seems like it will not be able to prevent many of the harmful aspects of the climate crisis (IPCC, 2022). Organizations friendly to carbon capture technology estimate that it may only cover about 14% of the emissions we need to reduce by 2050 (C2ES, no date). Wilberforce et al. (2019) think the financial and energy costs of carbon capture may make it a worse option than green power alternatives. Economists have also argued that all climate tech collectively may only mitigate 13–20% of the damage from climate change in some sectors (Moscona and Sastry, 2023). Some might argue that these estimates are overly pessimistic, and that perhaps a Moore's Law for climate tech would

help governments plan their climate-related mitigation efforts (Rau et al., 2010). Planning for an exponential increase in the effectiveness of technology in the near future is the perfect example of horizon bias in action. The notion that the recent slow progress in dealing with climate change is acceptable because some law of techno-nature will inevitably result in fantastically fast progress in combatting climate change, is as dangerous as it is mathematically implausible (Yoo, 2015).

The likely inability of climate tech to prevent the looming climate catastrophe by itself, combined with the apparent allure of a climate-tech-focussed horizon bias, seems to be a serious problem. If most of us are lulled into climate complacency by some of the more optimistic climate tech promises, the long-term effects on human happiness will be overwhelmingly negative. Despite the threat to collective happiness posed by climate tech horizon bias, individuals may still embrace it because climate coping mechanisms based on denial seem to be effective in mitigating climate anxiety in the short term (Ojala, 2012; Clayton, 2020).

Climate tech horizon bias and individual happiness

For the most climate-anxious among us, it may even seem best to succumb to the climate tech horizon bias because of the short-term happiness benefits. However, recent research and personal experience are increasingly revealing that the climate catastrophe has already begun. Severe weather events, sea-level rise, and record-breaking heatwaves are impacting millions of people around the world, and doing so with increasing frequency (IPCC, 2023). In the face of this overwhelming evidence, nearly everyone (that doesn't already) should realize that climate tech is not a complete solution to the climate crisis. For those so in the grip of the climate tech horizon bias that they haven't done anything to help address climate change, the happiness impacts of being exposed to extreme weather events and other climate-change-related harms (Clayton, 2020) will include the extra sting of realizing that they had been seduced by the easy solace offered by over-hyped climate tech, and that they could have done more to prevent this affront to their and others' happiness.

Human selfishness, weakness of will, and uncritical thinking are the root problems. Climate tech is part of the solution but, thanks to the horizon bias, may exacerbate the climate problem and cause unhappiness if it is relied upon too heavily. Given the current climate crisis, some unhappiness seems unavoidable. In our view, the best solution is to keep acting in climate friendly ways as individuals, which includes joining with others to encourage governments and businesses to take immediate large-scale steps to reduce emissions as well as mitigate the ongoing effects of historical emissions. Schwartz et al. (2022) found that collective climate action seemed the most likely way to prevent climate anxiety turning into depression, plausibly because it alleviates feelings of individual powerlessness. Perhaps even more importantly, collective climate action may be necessary to prevent a future marred with many climate catastrophes (Gonzalez-Perez and Piedrahita-Carvajal, 2022) and the widespread unhappiness they would cause. So while we should empower promising climate tech by investing in it, we should also empower ourselves by joining with others and pushing for immediate emissions reductions. If we're right, this will make us happier individually and collectively, especially in the medium- and long-run.

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