"Why nature won't save us from climate change but technology will": Creating a New Heaven and a New Earth Through Carbon Capture Technologies

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Abstract

Warnings about climate change often come wrapped in apocalyptic language and scenarios, often as a rhetorical strategy to convey the sense of urgency with which action is required. Similarly, technologies that promise to deliver us from the impending climate apocalypse often come shrouded as savior-technologies. Once such example are carbon capture and storage solutions. Language and imagery on websites and in marketing material presents these technologies as *transformative technologies*: they promise to transform something harmful in the atmosphere (CO2) into paradisiacal plentitude: carbon as infinite energy resource. This paper will discuss and explore the underlying ideas behind carbon capture and storage technologies and discuss how language used to talk about the climate opportunities they offer transcends the everyday and the ordinary. Based on David Chidester's understanding of religion, this paper argues that the power of carbon capture narratives is grounded in religious tropes and ideas.

1. Introduction

> Many of us share some dim apprehension that the world is flying out of control, that the center cannot hold. Raging wildfires, once-in-1,000-year storms, and lethal heat waves have become fixtures of the evening news – and all this after the planet has warmed by less than 1 degree Celsius above preindustrial temperatures.[1]
>
> *Peter Brannen*

Peter Brannen's book *The Ends of the World*[2] reflects increasingly common perceptions about the state and future of planet earth found in popular media. Common to these perceptions are a sense of a loss of control and the uncertainty over our planet's climate future. This uncertainty

[1] Peter Brannen, *The Ends of the World: Volcanic Apocalypses, Lethal Oceans, and Our Quest to Understand Earth's Past Mass Extinctions*, 2017, 249.
[2] Brannen, *The Ends of the World*.

is often communicated using apocalyptic language and the coverage of the 2017 Hurricane Irma provides examples for this recurring sense of uncertainty.[3] Apocalyptic language conveys a sense of urgency with which we must act to prevent the impending catastrophe – if it is not too late for that already; the path towards the catastrophe seems threaded deep.

A sense of urgency often also underpins the arguments of geoengineering proponents. Broadly speaking, geoengineering refers to technologies aimed to mitigate the impact of CO2 emissions on the planet's climate. While geoengineering advocates and providers across the sector often draw on religious narratives, carbon dioxide removal (CDR) technologies, i.e. technologies that aim to remove CO2 from the atmosphere or directly at their industrial sources,[4] in particular invite narratives of a new heaven and a new earth, or in other words: of a new creation. Using four CDR companies as case studies, *Climeworks*, *Carbon Engineering*, *Global Thermostat*, and *Sky Mining*, this paper will offer a close reading of their websites, texts, and iconography online and argue that carbon capture technologies are both redemptive and creational technologies. These narratives around redemption and creation make it explicit that discourses around carbon dioxide removal technologies involve a range of stakeholders and negotiate various (and often competing) interests. In particular, the religious narratives found in the context of CDR (and geoengineering more broadly) can highlight the economic interests that are driving developments. In a first step, this paper will briefly introduce geoengineering and look at geoengineering as visual narrative. In a second step, it will provide an overview over the religious elements in such narratives. The third part of the paper is dedicated to a close reading of the textual and visual narratives of *Climeworks*, *Carbon Engineering*, *Global Thermostat*, and *Sky Mining*.

2. Geoengineering – The Technology and its Narrative Context

There is no agreement on the exact definition of the term geoengineering and its related terms such as weather and climate modification, climate engineering, or geohacking. Broadly speaking, these terms relate to the *deliberate* interventions in the climate system in order to counteract global warming and mitigate the impact of CO2 emissions, though the exact effects and side effects are currently still subject to debate.[5] In a 2009 report, The Royal Society defined

[3] Bill McKibben, "Stop Talking Right Now about the Threat of Climate Change. It's Here; It's Happening | Bill McKibben," *The Guardian*, September 11, 2017, sec. Opinion, http://www.theguardian.com/commentisfree/2017/sep/11/threat-climate-change-hurricane-harvey-irma-droughts.

[4] Niall Mac Dowell et al., "The Role of CO2 Capture and Utilization in Mitigating Climate Change," *Nature Climate Change* 7, no. 4 (April 5, 2017): 243–49, https://doi.org/10.1038/nclimate3231.

[5] Paula Curvelo, "Questioning the Geoengineering Scientific Worldview," *The International Journal of Interdisciplinary Environmental Studies* 7, no. 1 (2013): 35–53; Kathryn Yusoff, "The Geoengine: Geoengineering and the Geopolitics of Planetary Modification," *Environment and Planning A* 45, no. 12

geoengineering as "deliberate large-scale manipulation of the planetary environment to counteract anthropogenic climate change"[6]. The Keith Group at Harvard, one of the most publicly visible group of climate engineering researchers, defines geoengineering as

> a set of emerging technologies that could manipulate the environment and partially offset some of the impacts of climate change. It could not be a replacement for reducing emissions (mitigation) or coping with a changing climate (adaptation); yet, it could supplement these efforts.[7]

Geoengineering proposals (both feasible and hypothetical) commonly fall into either of two broad categories: 1) Solar Radiation Management (SRM) approaches attempt to reflect fractions of the sunlight back into space. Inspiration for SRM is commonly drawn from natural events that dimmed parts of the planet such as volcanic eruptions; 2) Carbon Dioxide Removal (CDR) techniques that attempt to remove CO2 from the atmosphere to either store it or turn it into a resource for other products.[8] The driving force behind geoengineering is an understanding that a reduction of CO2 emissions is either not sufficient anymore or could not be implemented fast enough to avert the further rising of global temperatures.

Geoengineering – in its broad sense – is not a new phenomenon. James R. Fleming argues that geoengineering can be traced back as early as at least the 1830s for various political, economic, and military agendas. These broader social and ethical dimensions are often neglected in debates about geoengineering.[9] Yet, the lack of an ethical dimension does not mean that scientific discussions about geoengineering are neutral. Technologies, their materiality, the motivation for developing them, and the narratives that give meaning to them, are always embedded into what I called a "Circuit of Technological Imaginaries"[10] consisting of (in no particular order) the sublime, the body, aesthetics, agency, materiality, and narratives.[11] This *Circuit of Technological Imaginaries* aims to render visible that technology is more than its materiality. Technology – or technologies – are linked to ways of knowing and discovering,

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(December 2013): 2801, https://doi.org/10.1068/a45645; Paula Curvelo, "Geoengineering Dreams," in *Science, Philosophy and Sustainability: The End of the Cartesian Dream*, ed. Ângela Guimarães Pereira and Silvio Funtowicz (London: Routledge, 2015), 116–20.

[6] The Royal Society, *Geoengineering the Climate: Science, Governance and Uncertainty. RX Policy Document 10/09 RS1636* (London: The Royal Society, 2009).

[7] The Keith Group, "Geoengineering," 2017, https://keith.seas.harvard.edu/geoengineering.

[8] Royal Society, *Geoengineering the Climate: Science, Governance and Uncertainty. RX Policy Document 10/09 RS1636*, ix.

[9] Cf. James Rodger Fleming, "The Pathological History of Weather and Climate Modification: Three Cycles of Promise and Hype," *Historical Studies in the Physical and Biological Sciences* 37, no. 1 (September 2006): 16, 24, https://doi.org/10.1525/hsps.2006.37.1.3.

[10] Alexander D. Ornella, "Towards a 'Circuit of Technological Imaginaries'. A Theoretical Approach," in *Religion in Cultural Imaginaries*, ed. Daria Pezzoli-Olgiati (Baden-Baden: Nomos, 2015).

[11] Ornella, 322.

they provide ways and means to relate and situate ourselves to and within the world as our world, they outbursts of human creativity, and they bear witness to exploitation and processes of othering. The circuit makes clear that technologies do not stand alone by themselves, that their material manifestation and their scientific context are always embedded into processes of imagining and envisioning social life and social futures. Mircea Eliade describes the practice of turning what is perceived as chaos into something organized and structured, into one's world – or cosmos – as "*cosmicizing*"[12] partaking in the "divine act of creation"[13].

Technologies can be seen as a cosmicizing practice. Technology, their scientific context and their material manifestations are always embedded in a web of narratives that both give meaning to technology and help us make sense of our being-in-the-world, in the here-and-now.[14] The sublime, which I identified as one of the elements of the Circuit, can be used as category to show that technology acts as "transcendent agent": it is connected to the other-worldly and helps to bring about the other-worldly.[15] This other-worldly dimension of technology manifests itself in the (imaginary) spaces technology inhabits and in the way designers, scientists, marketers, and others use technologies and representations of technologies to create such imaginary spaces. Jörg J. Berns, for example, argues that technological developments and human longing are intimately intertwined and that both producers and users of technologies use transcendent imagery to locate technologies in heavenly and infernal spaces. They do not only signify a space (e.g. torture instruments mark an infernal space while musical instruments mark heavenly spaces) but also emerge out of them and are deeply rooted in the characteristics and the purpose of these spaces.[16]

As agent of the sublime and cosmicizing agent, technologies can perform an important rhetorical function in creation stories and help situate people within an environment and their relationship with it. Americans, for example, as David E. Nye argues, "constructed technological foundation stories primarily to explain their place in the New World, not to understand the technologies. A new machine acquired social meaning when placed in a context and used for some purpose."[17] These technological creation stories were not so much about

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[12] Mircea Eliade, *The Sacred and the Profane: The Nature of Religion* (New York: Harcourt, Brace & World, 1987), 30 emphasis in the original text.

[13] Eliade, 31.

[14] Ornella, "Towards a 'Circuit of Technological Imaginaries'. A Theoretical Approach," 328.

[15] Ornella, 325.

[16] Jörg Jochen Berns, *Himmelsmaschinen - Höllenmaschinen: zur Technologie der Ewigkeit* (Berlin: Semele-Verl., 2007), 10f.; Jörg Jochen Berns, *Die Herkunft des Automobils aus Himmelstrionfo und Höllenmaschine*, Kleine kulturwissenschaftliche Bibliothek 54 (Berlin: K. Wagenbach, 1996), 7.

[17] David E. Nye, *America as Second Creation. Technology and Narratives of New Beginnings* (Cambridge, MA: MIT Press, 2003), 2.

explaining technologies but about imbuing meaning, creating social structures, an order of and for the world through technological means. These examples show that understandings and definitions of "religion" and "technology" are more complicated and the lines between the two more blurry than in public perception and technology can have a magical, even sacral, dimension.[18]

3. The Religious Dimension of Geoengineering

Geoengineering debates create cosmicizing narratives. Paula Curvelo and Ângela Pereira argue that geoengineering debates take taking place across the three domains of science, society, and policy and are connected by a number of master narratives, e.g. the narrative of progress, the narrative of urgency, the narratives of ethics and of failure, and ideas of the natural/unnatural.[19] Or, as Bill Gates put it: we need "energy miracles", although not one "that's impossible" because he has "seen miracles happen before."[20] Because geoengineering debates take place at the intersection of science and society, they have given rise to textual, verbal, and visual narratives. In fact, visual elements are a key ingredient of geoengineering narratives because, as Gretchen Barbatsis argues, pictorial expressions are a form of structuring thought and convey (narrative) meaning.[21] Paula Curvelo suggests to explore ethical issues inherent in technological proposals to solving global warming, something that has been mostly neglected so far, by looking at the visual narratives such proposals produce.[22] As such, images visualize and reveal what might be hidden in textual and verbal accounts of climate change and geoengineering: "Consequently, these images are now seen as part of the geoengineering story, by revealing facts, knowledge, values, fears, desires, promises, anxieties and incredulity, not only about the proposals for tackling climate change, but also and above all, by revealing what we know about the world and how we make sense of our place in it."[23] What Curvelo and Barbatsis say about images, the visual, and the pictorial also applies to our imagination, mental and verbal images, and what could be called the geoengineering imaginary. In fact, the visual and the imaginary

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[18] Cf. Jeremy Stolow, "Introduction: Religion, Technology, and the Things in Between," in *Deus in Machina: Religion, Technology, and the Things in Between*, ed. Jeremy Stolow (New York: Fordham University Press, 2013), 3–5.

[19] Paula Curvelo and Ângela Guimarães Pereira, "Geoengineering: Reflections on Current Debates," *The International Journal of Science in Society* 4, no. 3 (2013): 13.

[20] Bill Gates and Melinda Gates, "Two Superpowers We Wish We Had. Gatesnotes 2016 Annual Letter," gatesnotes.com, February 22, 2016, https://www.gatesnotes.com/2016-Annual-Letter.

[21] Cf. Gretchen Barbatsis, "Narrative Theory," in *Handbook of Visual Communication: Theory, Methods, and Media*, ed. Ken Smith et al. (Mahwah/NJ: Lawrence Erlbaum, 2005), 330.

[22] Paula Curvelo, "Exploring the Ethics of Geoengineering through Images," *The International Journal of the Image* 2, no. 2 (2012): 178f.

[23] Curvelo, 184.

are always already intertwined, in particular when it comes to visualizing the unknown, the invisible, in particular in science and technology studies.[24]

While Curvelo brings to light the entanglement between the academic geoengineering debate and geoengineering narratives of a more ideological nature, religion features little in her analyses. Yet, themes that transcend the ordinary infuse these debates and have transformed these technologies from a maybe to an unavoidable harbinger of a new world. For example, in the mid/late 2000s, geoengineering researchers argued that their research is an ethical imperative to have a Plan B or backstop if all else fails,[25] something the general public was fairly open to.[26] More recently, in public debate and media coverage, the discourse has been shifting to emphasizing the inevitability of geoengineering as "unavoidable truth"[27] and threat to "the very coordinates of our everyday lives and routines"[28] given the rapid progress of climate change.[29] These narratives often are, as Mike Hulme argues, "rooted in our human instincts for nostalgia, fear, pride and justice"[30].

Hulme's framework shows that climate change and geoengineering are not solely scientific questions but fundamentally anthropological ones; they pose the question of being human in this world and how we relate to and interact with our environment. Both show the fundamental human and social constructedness of what we perceive to be "nature" or the "natural environment".

Geoengineering – as large-scale interventions – promises to be a holistic tool that allows human control not only of the immediate environment but of the planet as a whole. Doing so,

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[24] Keith Kenney, "Representation: What Do We 'See' When We Look at a 'Picture'?," in *Handbook of Visual Communication: Theory, Methods, and Media*, ed. Ken Smith et al. (Mahwah/NJ: Lawrence Erlbaum Associates, Publishers, 2005), 110; Martin Ruivenkamp and Arie Rip, "Entanglement of Imaging and Imagining of Nanotechnology," *NanoEthics* 5, no. 2 (August 2011): 185f., https://doi.org/10.1007/s11569-011-0122-2; Martin Ruivenkamp and Arie Rip, "Visualizing the Invisible Nanoscale: Study of Visualization Practices in Nanotechnology Community of Practice," *Science Studies* 23, no. 1 (2010): 4, 29.

[25] Brigitte Nerlich and Rusi Jaspal, "Metaphors We Die By? Geoengineering, Metaphors, and the Argument From Catastrophe," *Metaphor and Symbol* 27, no. 2 (April 2012): 135, https://doi.org/10.1080/10926488.2012.665795.

[26] Dane Scott, "Insurance Policy or Technological Fix? The Ethical Implications of Framing Solar Radiation Management," in *Engineering the Climate: The Ethics of Solar Radiation Management*, ed. Christopher Preston and Albert Borgmann (Plymouth, UK: Lexington Books, 2012), 153f.

[27] Laurie Goering, "Carbon-Sucking Technology Needed by 2030s, Scientists Warn," news.trust.org, October 10, 2017, http://news.trust.org/item/20171010175429-zazqr/.

[28] Erik Swyngedouw, "Apocalypse Forever?," *Theory, Culture & Society* 27, no. 2–3 (March 2010): 218, https://doi.org/10.1177/0263276409358728.

[29] Goering, "Carbon-Sucking Technology Needed by 2030s, Scientists Warn"; Reuters, "World Will Need 'carbon Sucking' Technology by 2030s, Scientists Warn," *The Guardian*, October 11, 2017, sec. Environment, http://www.theguardian.com/environment/2017/oct/11/world-will-need-carbon-sucking-technology-by-2030s-scientists-warn; By Reuters, "Carbon-Sucking Technology Needed by 2030s, Scientists Warn," Mail Online, October 10, 2017, http://www.dailymail.co.uk/~/article-4967336/index.html.

[30] Mike Hulme, *Why We Disagree About Climate Change: Understanding Controversy, Inaction and Opportunity* (Cambridge: Cambridge University Press, 2009), 341, https://doi.org/10.1017/CBO9780511841200.

geoengineering promises to redefine the Biblical/theological notion of humanity as co-creators.[31] Forrest Clingerman argues that geoengineering raises questions "about our self-image as seen through the technological imagination of the environment."[32] This re-imagining of ourselves as human beings transforms the social and technological narratives of geoengineering into a theological endeavor, into a form of "crypto-theology"[33] as Forrest Clingerman calls it. He argues that the framework of "crypto-theology" allows to highlight that both pro and contra geoengineering approaches re-inscribe the nature / un-nature (or non-nature) divide that sees human beings to be set apart and different from the natural world.[34]

The notion of being set apart from the natural world is also linked to the idea of human mastery over nature. Mastering nature through technology is a radicalization of a common – but in contemporary theology heavily critiqued – interpretation of Genesis 1:26-2:3 that sees earth as humanity's dominion to be ruled over. Geoengineering surrenders all of creation to humanity's control and becomes a materialization of a Biblical decree.[35] Some critics, such as Lynn White, see such a narrow interpretation of Genesis as the root cause of all ecological evils: "Hence we shall continue to have a worsening ecologic crisis until we reject the Christian axiom that nature has no reason for existence save to serve man."[36]

Most Christian theologians have long moved on from the understanding of dominion to one of stewardship,[37] and Christian and non-Christian opponents alike use the imagery of God to warn that messing with the climate means playing God and messing with his creation.[38] Yet, we can still trace the legacy of the dominion narrative in contemporary cultural consciousness. David

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[31] Cf. Alexander D. Ornella, "Creation Technologies. The Technological Condition of Humanity," *ET-Studies* 1, no. 1 (2010): 53–68; Cf. Bart Hansen and Paul Schotsmans, "Cloning: The Human as Created Co-Creator," *Ethical Perspectives* 8, no. 2 (July 1, 2001): 81–83, https://doi.org/10.2143/EP.8.2.503828.

[32] Forrest Clingerman, "Geoengineering, Theology, and the Meaning of Being Human," *Zygon?* 49, no. 1 (March 2014): 10, https://doi.org/10.1111/zygo.12072; Cf. also Clingerman, 7.

[33] Forrest Clingerman, "Between Babel and Pelagius: Religion, Theology and Geoengineering," in *Engineering the Climate: The Ethics of Solar Radiation Management*, ed. Christopher Preston (Lanham, MD: Lexington Books, 2012), 212.

[34] Clingerman, 11.

[35] Curvelo, "Geoengineering Dreams," 125; F. Clingerman, "Theologians as Interpreters--Not Prophets--in a Changing Climate," *Journal of the American Academy of Religion* 83, no. 2 (June 1, 2015): 348, https://doi.org/10.1093/jaarel/lfv016.

[36] Lynn Jr. White, "The Historical Roots of Our Ecologic Crisis," *Science. New Series* 155, no. 3767 (1967): 1207. For a critical assessment of White's arguments: Matthew Orr, "Environmental Decline and the Rise of Religion," *Zygon* 38, no. 4 (2003): 895–910; Clingerman, "Between Babel and Pelagius: Religion, Theology and Geoengineering," 204.

[37] Fletcher Harper, "Greening Faith: Turning Belief into Action for the Earth," *Zygon*® 46, no. 4 (December 2011): 957–71, https://doi.org/10.1111/j.1467-9744.2011.01231.x.

[38] Wylie Carr, "'This Is God's Stuff We're Messing With': Geoengineering as a Religious Issue (Opinion Article)," *Geoengineering Our Climate?* (blog), April 29, 2014, https://geoengineeringourclimate.com/2014/04/29/this-is-gods-stuff-were-messing-with-geoengineering-as-a-religious-issue/; Clingerman, "Theologians as Interpreters--Not Prophets--in a Changing Climate," 349.

Keith, one of the most public faces of geoengineering research, in particular Solar Radiation Management, bears witness to such a religiously infused cultural memory in his TED talk where he argued that we cannot but research geoengineering:

> That if engineers and scientists really turned their minds to this, it's amazing how we can affect the planet. The one thing about this is it gives us extraordinary leverage. This improved science and engineering will, whether we like it or not, give us more and more leverage to affect the planet, to control the planet, to give us weather and climate control – not because we plan it, not because we want it, just because science delivers it to us bit by bit, with better knowledge of the way the system works and better engineering tools to effect it.[39]

In this account, geoengineering is not a tool but becomes a moral imperative. More so, when Keith argues that "science delivers it to us bit by bit", he assigns agency to science and technology. Science becomes a transcendent agent that completes human dominion and the Genesis narrative: God's image at last – but only through technology as agent of transcendence. In his analysis of geoengineering proposals, Clingerman found that they are often based on the "potential goodness of the human spirit"[40]. I would argue that Keith's understanding of science renders any questions of goodness or human free will meaningless and turns his call for a cautious roll out of geoengineering into an empty rhetorical shell. In the very public form of a TED talk,[41] Keith proclaimed that science and engineering will hand over control "whether we like it or not". The question, then, is not anymore "if" but "how" to use and *who* gets to use it for *whose* benefit.

Robert M. Geraci argues that "[t]echnologies are, themselves, metaphysically underdetermined: they do not tell us how to interpret them but must, instead, be interpreted by their users."[42] He further argues that "faith in technological progress, and technological salvation, was cemented in western culture"[43]. Looking at the settlement period of what became the United states, David Nye argues that "Americans constructed technological foundation stories primarily to explain their place in the New World, not to understand the technologies."[44] In his portrayal of science and knowledge, David Keith interprets and technologies and explains our position in the world. In fact, he creates a narrative that has soteriological, eschatological, and gnostic elements. It is

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[39] David Keith, *A Critical Look at Geoengineering against Climate Change*, 2007, https://www.ted.com/talks/david_keith_s_surprising_ideas_on_climate_change.

[40] Clingerman, "Between Babel and Pelagius: Religion, Theology and Geoengineering," 212.

[41] Cf. Susan Matheson, "Going Public in Support of Science," *Cell* 169, no. 2 (April 2017): 181–82, https://doi.org/10.1016/j.cell.2017.03.029.

[42] Robert M Geraci, "A Tale of Two Futures: Techno-Eschatology in the US and India," *Social Compass* 63, no. 3 (September 2016): 321, https://doi.org/10.1177/0037768616652332.

[43] Geraci, 323.

[44] Nye, *America as Second Creation. Technology and Narratives of New Beginnings*, 2.

soteriological, because it ascribes agency to science and perceives sciences as divine actor that dispenses salvation. It is eschatological because geoengineering fantasies envision a world that is technologically created, that completes a world that is potentially there (or has been there) but is-not-yet, a world that, as Romans 8:22-25 tells us, "has been groaning in labor pains until now". It is gnostic because it is through knowledge that salvation comes to us, revealed knowledge and not knowledge discovered or created by us.[45] In addition, Clingerman identifies Pelagian elements in the idea that there are technological fixes for human disruptive (and sinful) behavior. Underlying in such an attitude is the "the assumption that humans work toward their own salvation and have the capabilities and gifts necessary to do so without requiring God's grace."[46]

> There are similarities between the optimism of the human spirit expressed by Pelagianism and the theological framework implicit in geoengineering proposals. […] both suggest the presence of an intellectual capacity to work toward our salvation – and it is our prerogative to do so – whether it is a salvation from sin or the worst effects of climate change.[47]

The tendency to campaign for climate engineering with theological undertones might also have to do with the notion that the climate is perceived to be "up there", i.e. heavenly, rather than "down here". In fact, religion and weather have been intimately intertwined for a long time. Good or bad weather has long served as reward or punishment for human behavior towards the divine. Prayers and sacrifices have served as appeasement of the gods to ensure good weather. "As a result, *religion can be counted as undertaking the first attempts at geoengineering!*"[48] In other words: doing climate work and climate engineering can be seen as doing the work of the gods.

In the analysis of carbon capture imagery to follow, in my argument that doing climate work can be seen as doing the work of god, I draw on David Chidester's definition of religion:

> "religion is an arena of human activity marked by the concerns of the transcendent, the sacred, the ultimate – concerns that enable people to experiment with what it means to be human. Religious ways of being human engage the transcendent – that which rises above and beyond the ordinary. They engage the sacred – that which is set apart from the ordinary. And they engage the ultimate – that which defines the final, unavoidable limit of all our ordinary concerns."[49]

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[45] Cf. Kurt Rudolph, *Die Gnosis. Wesen Und Geschichte Einer Spätantiken Religion* (Leipzig: Koehler & Amelang, 1977), 60f.

[46] Cf. Clingerman, "Between Babel and Pelagius: Religion, Theology and Geoengineering," 213.

[47] Clingerman, 214.

[48] Clingerman, 204f.

[49] David Chidester, *Authentic Fakes: Religion and American Popular Culture* (Berkeley: University of California Press, 2005), 1.

4. Creating a New Heaven and a New Earth: Carbon Dioxide Removal Technologies

Religiously infused technological narratives allow advocates (or opponents) to situate a specific technology in its cultural context and render it meaningful for both an expert as well as popular audience. Robert M. Geraci argues that

> "The adoption of technology happens, in part, based upon religious premises. […] technology marks the end of the world as we know it; it is crucial to our perspectives on history and our eschatological expectations. […] The day-to-day reality in which new technologies are built, advertised, disseminated, and adopted requires more thorough study, particularly to deepen our understanding of how eschatological religious perspectives are implicated in this process."[50]

In the following analysis, I will focus on CDR solutions, often considered as clean or "'good' geoengineering" [51] as opposed to SRM that is often seen as more risky and "'bad' geoengineering"[52] – with all the moral implications of good/bad. The notion of "good" geoengineering is also linked to ideas of purity: CDR offers to remove CO2 from the atmosphere, cleanse it from human contagion, and set carbon free as life giving element: a new, purer, and more whole world emerges. The ideas of purity and the creation of a new world will emerge in the following textual and visual analysis of the websites and promotional materials of four CDR enterprises: *Carbon Engineering*, *Climeworks*, *Global Thermostat*, and *SkyMining*. These companies have been chosen because they get frequent mentions in news coverage about carbon dioxide removal solutions.[53]

4.1. Carbon Engineering – carbonengineering.com

Carbon Engineering (CE) is a Canadian company that offers direct air capture and "Air to Fuels" solutions. Carbon Engineering aims reduce or eliminate the need for and processing of crude oil and replace it with a closed carbon cycle (image above). Through the closed carbon cycle, no new CO2 would be emitted into the atmosphere anymore.[54]

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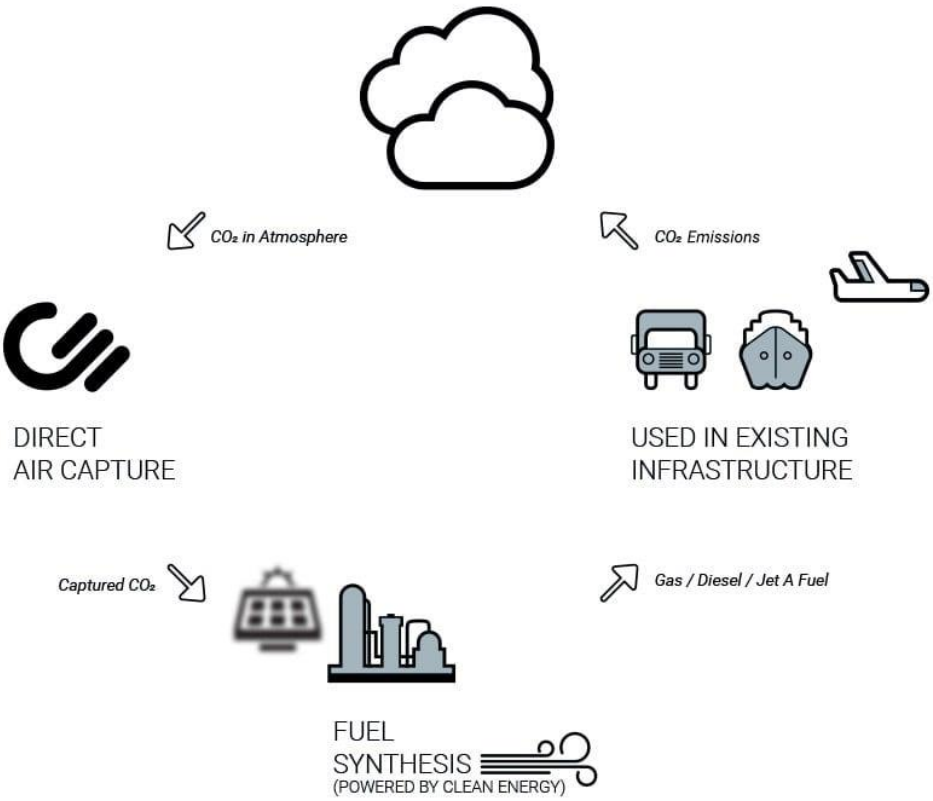
[50] Geraci, "A Tale of Two Futures," 330.

[51] Yusoff, "The Geoengine," 2799.

[52] Yusoff, 2799.

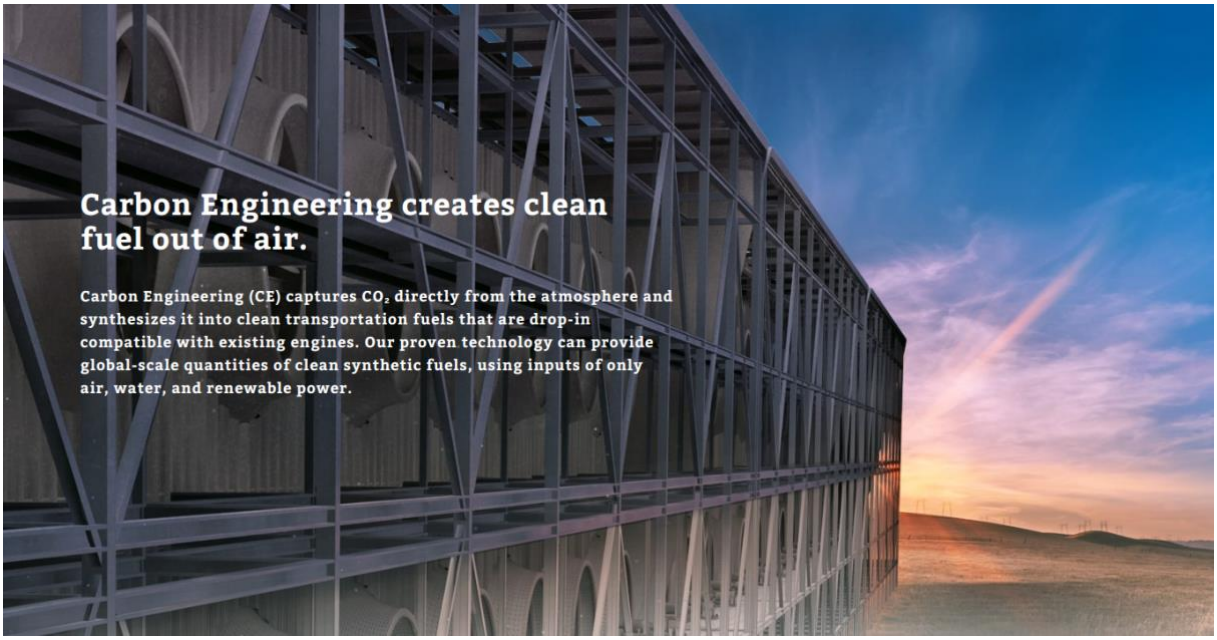
[53] Cf. James Temple, "The Carbon-Capture Era May Finally Be Starting," MIT Technology Review, February 20, 2018, https://www.technologyreview.com/s/610296/the-carbon-capture-era-may-finally-be-starting/; Cf. Mike Hower, "7 Companies to Watch in Carbon Capture and Storage," Text, GreenBiz, July 14, 2016, https://www.greenbiz.com/article/companies-watch-carbon-capture-and-storage.

[54] Carbon Engineering, "About Air to Fuels Technology," *Carbon Engineering* (blog), 2017, http://carbonengineering.com/about-a2f/.



Carbon Engineering Carbon Cycle. Image source: http://carbonengineering.com/about-a2f/, accessed Oct 2017.

The language used across the website is overall fairly technical and seems to lack religious connotations. Yet, the visuals and the media testimonials CE presents on its website imagines carbon capture as the dawn of a new era. The main image on the company's landing page is a technical sketch of their carbon capture solution built right into vast empty land. Sunrays add to the dramatic and romantic effect to convey perfect harmony between nature and technology, the end of an old and the dawn of a new era. The only trace of (modern) civilization seems to be a few power towers in the distant.



Carbon Engineering Carbon Capture Plant. Image source: http://carbonengineering.com/about-a2f/, accessed Oct 2017.

Carbon Engineering Air2Fuel. Image source: http://carbonengineering.com/about-a2f/, accessed Oct 2017; Leahy, "This Gasoline Is Made of Carbon Sucked From the Air", 2018.

Their Air-to-Fuels technology is equally imagined as natural resource because it draws exclusively on atmospheric CO2.[55] CarbonEngineering uses snippets from media reports to

[55] Cf. Carbon Engineering.

support the idea of a new era. The idea of a new world is emphasized by media coverage on CarbonEngineering. National Geographic headlines their coverage with "IMAGINE DRIVING UP to your local gas station and being able to choose between regular, premium, or carbon-free gasoline."[56] Air-to-Fuel is presented as truly revolutionary, world changing technology with the potential to disrupt political and economic power structures: "Any country, any region, can have its own fuel. They'd be no longer dependent on the geopolitical situation if Country X has oil and Country Y does not"[57], argues Steve Oldham from CarbonEngineering.

As such, CarbonEngineering is part of a broader narrative that harnesses a "plentitude of evil" and transforms it into a "plentitude of good". Through the images and the narrative, a "hypothetical future"[58] is presented as within reach through technological innovation and intervention.

4.2. Climeworks – climeworks.com

Climeworks, a Swiss startup emerging out of research at the ETH Zürich, in particular presents carbon capture technology as transformative, redemptive, and creation technology. Their textual and visual language support the idea of redemption and transformation, a world in which humans and nature live in harmony and perfect balance – technologically mediated. The landing page features in huge letters the heading "What if?" with (presumably) the Swiss Alps tipped with snow. Scrolling further down, the background image changes to a Climeworks CO2 removal plant in the foreground and the Swiss Alps in the background with the layover text saying "Our vision is to achieve that". The message seems clear: the only way to arrive at that perfectly balanced human-nature relationship through technological intervention; or in theological terms through technology as mediator between nature as it ought to be (in equilibrium) and corrupt human nature. In that sense, carbon dioxide removal technologies, the imaginary what-if/already-not yet becomes a promise of salvation: carbon dioxide removal technology are all of the three at the same time: creators of new worlds, mediators of salvation, and the promise of salvation. Carbon dioxide removal technologies hold theological meaning in Jochen Hörisch's sense:

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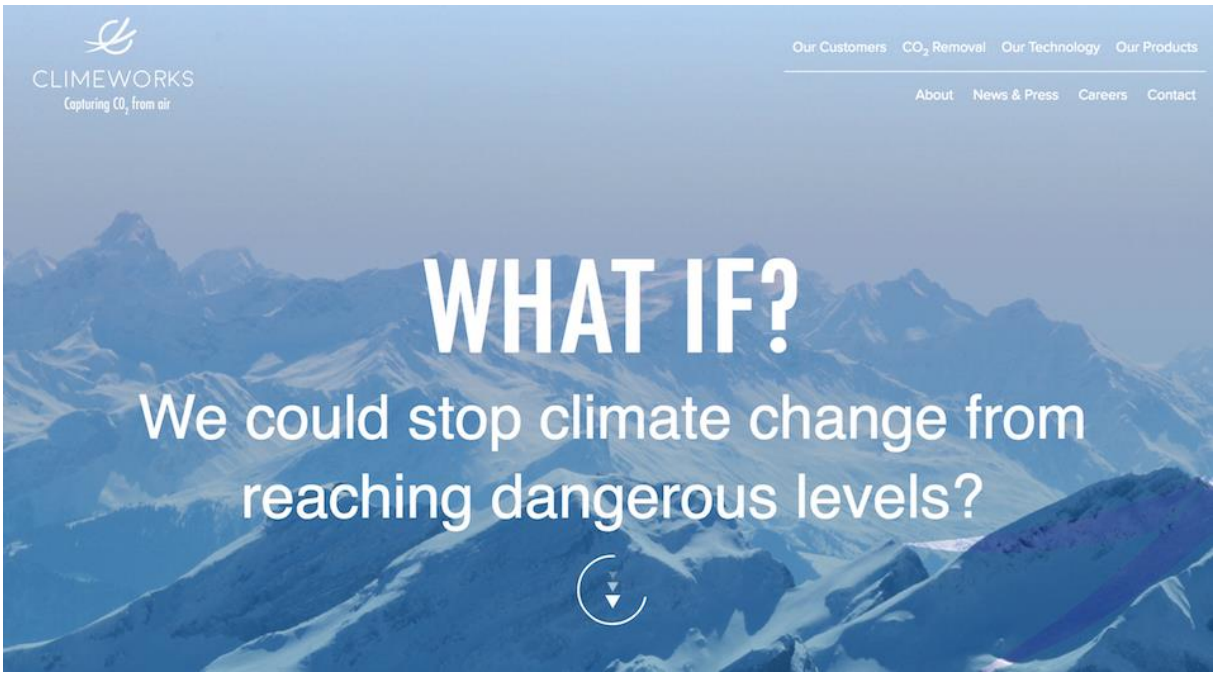
[56] Stephen Leahy, "This Gasoline Is Made of Carbon Sucked From the Air," National Geographic News, June 7, 2018, https://news.nationalgeographic.com/2018/06/carbon-engineering-liquid-fuel-carbon-capture-neutral-science/.

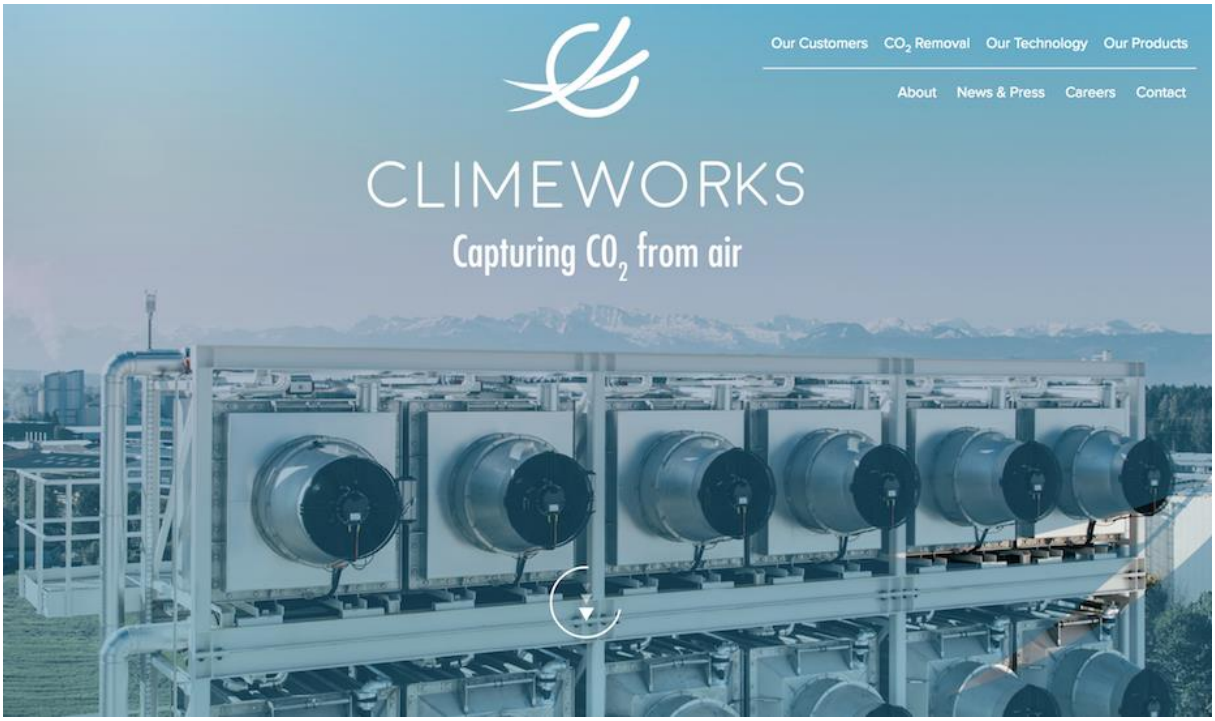
[57] Bob Weber, "B.C. Company Says It Is Sucking Carbon from Air, Making Fuel | CBC News," CBC - The Canadian Press, June 7, 2018, https://www.cbc.ca/news/canada/british-columbia/b-c-company-says-it-is-sucking-carbon-from-air-making-fuel-1.4696817.

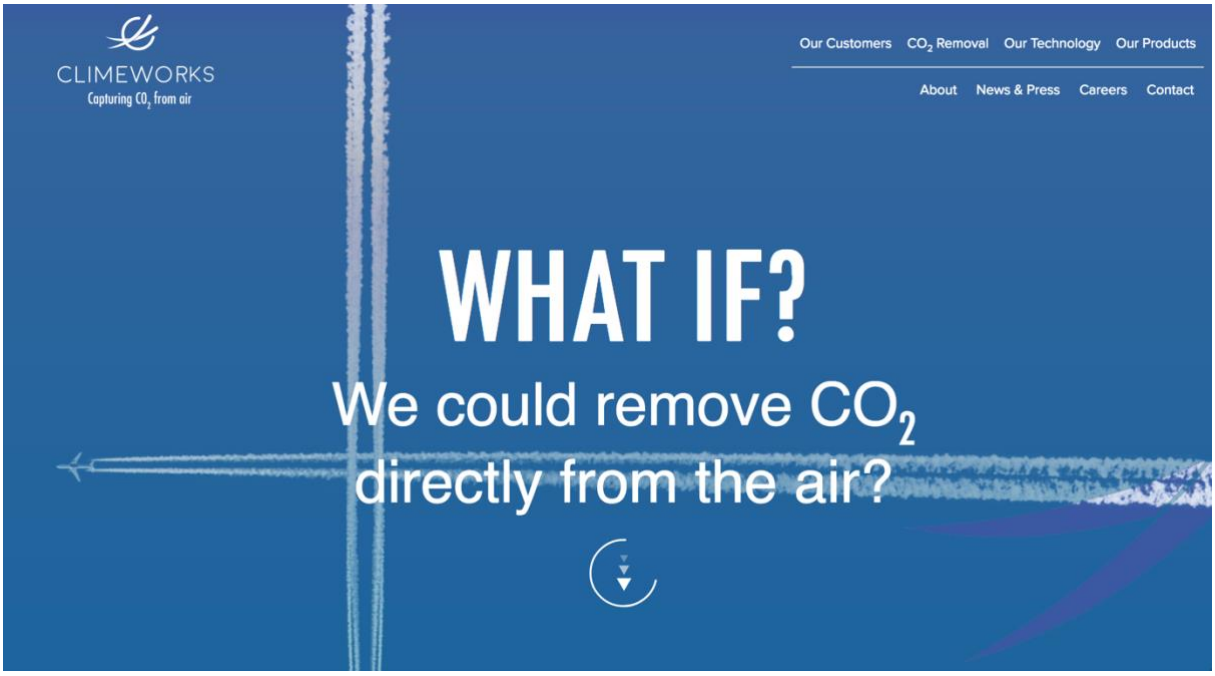
[58] Marc Gunther, "Startups Have Figured out How to Remove Carbon from the Air. Will Anyone Pay Them to Do It?," *The Guardian*, July 14, 2015, sec. Guardian Sustainable Business, http://www.theguardian.com/sustainable-business/2015/jul/14/carbon-direct-air-capture-startups-tech-climate.

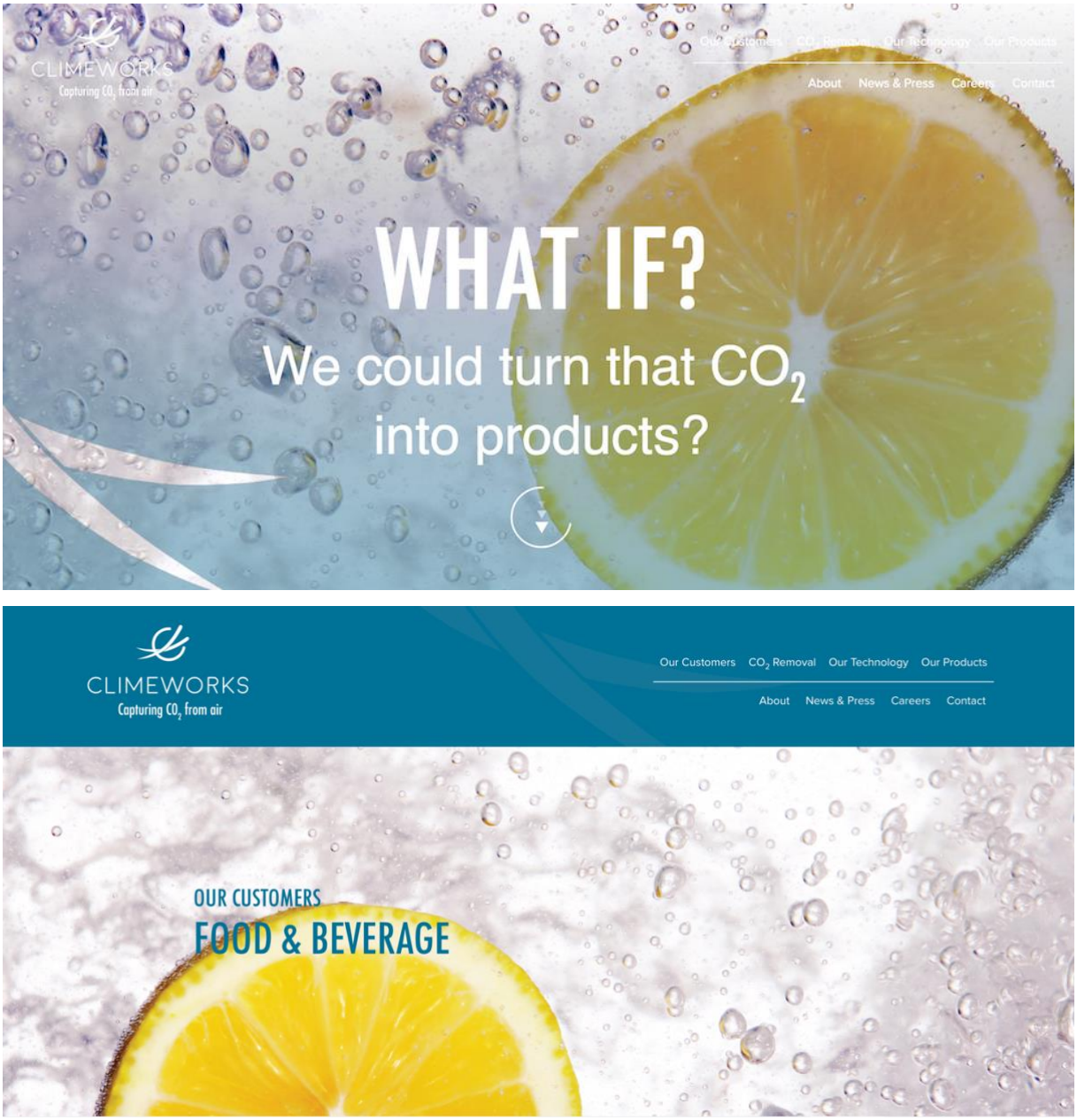
"Heilsversprechen sind, wie sollte es anders sein, mediale Heilsversprechen; und allen Medien wohnen Heilsversprechen inne."[59]
"Auch die neusten Medien setzen erst einmal bemerkenswert bruchlos fort, was in den Stiftungsakten zumindest der wort- und schriftseligen monotheistischen Offenbarungsreligionen medial angelegt war und seitdem zu wirken nicht aufgehört hat. … Am Anfang der Thora … steht das schöpferische Wort."[60]



[59] "Promises of salvation are - how could it be any different - promises of salvation of media; and all media have innate promises of salvation." Jochen Hörisch, *Gott, Geld, Medien: Studien zu den Medien, die die Welt im Innersten zusammenhalten*, 1. Aufl., Orig.-Ausg., [Nachdr.], Edition Suhrkamp 2363 (Frankfurt am Main: Suhrkamp, 2010), 164.
[60] "Initially, new media continue remarkably seamlessly what was founded as mediated form in the scriptures of the monotheistic religions of revelation with their focus on word and text and this continues to have impact to date … In the beginning of Thora … is the creative Word." Hörisch, 165.


Our Customers
CO_2 Removal
Our Technology
Our Products
About
News & Press
Careers
Contact
CLIMEWORKS
Capturing CO_2 from air


CLIMEWORKS
Capturing CO_2 from air
Our Customers
CO_2 Removal
Our Technology
Our Products
About
News & Press
Careers
Contact
WHAT IF?
We could remove CO_2
directly from the air?



Climeworks Carbon Capture Plant and carbon commercialization. Image source: http://www.climeworks.com/, accessed 2017-2018.

The "what if" narrative, however, does not stop at creating an imaginary zero emissions world, but they aim to make this utopian world tangible and realizable: "Using a Climeworks Plant, bottling companies can generate high purity CO2 on site, literally out of thin air."[61] They promise not just a clean environment, but an economic plentitude and infinite resources to make economic enterprises more profitable. "Farmers use greenhouses to create finely tuned conditions to ensure optimum yield from their crops. Raising CO2 levels within these

[61] Climeworks, "Food & Beverage | Climeworks – Capturing CO2 from Air," 2018, http://www.climeworks.com/our-customers/food-beverage/.

greenhouses increases the rate of photosynthesis which can boost the crop yield by up to 20 per cent."[62]

Climeworks CO2 for greenhouses. Image source: http://www.climeworks.com/our-customers/greenhouses/, accessed 2017-2019.

While "on site" suggests an independent supply with the potential to disrupt economic structure, Climeworks and others fit quite well into a capitalist narrative of growth and profit, a capitalist utopia of unlimited growth because of unlimited resources. Or as Giorgos Kallis and Hug March point out: "A society of high energy use and advanced technologies, even a 'solar communism' à la Schwartzman (2012), would need experts to manage them and by necessity will be undemocratic and nonegalitarian."[63]

The visual language in the images on the Climeworks website seem to marry nature with technology. The visuals support the overall narrative that "Climate change is driven by human activities […] causing global warming"[64] and that technology is needed not only to mitigate against the impact of human activities and safeguard nature, but return to an idyllic past that is at the same time a technologically created utopia. Using captured CO2 for Greenhouse gases contributes to a technologically fine-tuned and controlled nature with the aim to support human development with minimal environmental impact.

Climeworks' narrative resonates well with ecomodernism, a group that commits itself to "to the real processes, already underway, that have begun to decouple human well-being from

[62] Climeworks, "Greenhouses | Climeworks – Capturing CO2 from Air," 2017, http://www.climeworks.com/our-customers/greenhouses/.

[63] Giorgos Kallis and Hug March, "Imaginaries of Hope: The Utopianism of Degrowth," *Annals of the Association of American Geographers* 105, no. 2 (March 4, 2015): 365, https://doi.org/10.1080/00045608.2014.973803.

[64] Climeworks, "CO2 Removal | Climeworks – Capturing CO2 from Air," 2018, http://www.climeworks.com/co2-removal/.

environmental destruction, we believe that such a future might be achieved."[65] What looks like a rational scientific approach to solving what is branded as climate crisis, comes with a specific world view of the status of nature and is deeply religious.

The Ecomodernist manifesto connects human activity with these different realms and doing so propose religious ways of being human and religious ways of climate change mitigation. The opening of the manifesto establishes a connection between humans and planet earth: "To say that the Earth is a human planet becomes truer every day. Humans are made from the Earth, and the Earth is remade by human hands. Many earth scientists express this by stating that the Earth has entered a new geological epoch: the Anthropocene, the Age of Humans."[66] Due to this connectedness, their aim is to work towards a "good Anthropocene" by "decoupling human development from environmental impacts". A "good Anthropocene" seems to be inherently good, seems to be connected to a greater good in a religious sense, carry moral duties with it, and connect humans to a greater whole, something that goes beyond – transcends – the ordinary and the everyday: "A good Anthropocene demands that humans use their growing social, economic, and technological powers to make life better for people, stabilize the climate, and protect the natural world."[67]

A "good Anthropocene" rests on the religious ideas of stewardship and salvation: "The idea(s) of the future of such believers, as well as of 'Promethean planetary stewards in the Anthropocene,' seems to depend on a promise of salvation, the reliability of which can be neither supported nor falsified by means that are independent of controversial assumptions about the future."[68] The theology of a "good Anthropocene" is linked to a myth of evil that refers to an innocent past and a loss of innocence. The Adamic myth, Paul Ricœur argues, describes how evil comes into the world through Adam and his choices.[69] "The 'Adamic' myth is the fruit of the prophetic accusation directed against man; the same theology that makes God innocent accuses man."[70] Climeworks presents carbon capture solution as that very prophetic technology that visualizes the accusation against humanity and presents technology as the very salvific solution.

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[65] Ecomodernism, "A Manifesto for a Good Anthropocene," An ECOMODERNIST MANIFESTO, 2018, http://www.ecomodernism.org/.

[66] Ecomodernism, "An Ecomodernist Manifesto," An ECOMODERNIST MANIFESTO, April 2015, http://www.ecomodernism.org/manifesto-english/.

[67] Ecomodernism.

[68] Christopher Baumgartner, "Transformations of Stewardship in the Anthropocene," in *Religion in the Anthropocene*, ed. Celia Deane-Drumond, Sigurd Bergmann, and Markus Vogt (Eugene/OR: Cascade, 2017), 64.

[69] Cf. Paul Ricœur, *The Symbolism of Evil* (Boston: Beacon Press, 1969), 244f.

[70] Ricœur, 240.

Called a "magic rabbit"[71] by BBC's Matt MCGrath, Climeworks keeps attracting investments and expanding their production facilities.[72] By providing narratives that attract investors, Climeworks demonstrates that technological narratives are neither rational nor value free but provide, as Bergmann puts it, "meaning and structure for human life"[73]. Drawing on Mircea Eliade and David E. Nye, I would push Bermann's analysis further. Eliade argues that when humans settled in uninhabited territories, they engaged in a process he called "cosmicizing"[74]. To "cosmicize", he argues, means to take possession of and to consecrate land: ""What is to become 'our world' must first be 'created'."[75]

> For them, their labor was only repetition of a primordial act, the transformation of chaos into cosmos by the divine act of creation. When they tilled the desert soil, they were in fact repeating the act of the gods who had organized chaos by giving it a structure, forms, and norms.[76]

In his analysis of the narratives around technologies during the American settlement, Nye links stories of and about technology to stories of creation. In these stories, technologies – as primitive as, for example, the axe – did not just help to shape the environment but "the creation of new social worlds […] In each case, a new form of society based on successful exploitation of a new technology became possible."[77]

As such, Climeworks does not only provide meaningful technology that re-opens the way to possible futures that might otherwise be closed due to climate change. As such, geoengineering technology becomes, in fact, a *creator mundi*. It becomes a *creator mundi* by promising order in the complex question of climate change and in doing so connect the mundane, rational, to that which transcends the everyday and ordinary. Eliade argues that "to organize a space is to repeat the paradigmatic work of the gods."[78]

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[71] Matt McGrath, "Climate's Magic Rabbit: Pulling CO2 out of Thin Air," November 15, 2017, sec. Science & Environment, https://www.bbc.com/news/science-environment-41816332.

[72] Cf. Akshat Rathi, "Climeworks Has Opened a Third Plant Capturing Carbon Dioxide from the Air," Quartz, October 1, 2018, https://qz.com/1407687/climeworks-has-opened-a-third-plant-capturing-carbon-dioxide-from-the-air/; cf. The Engineer, "Climeworks Raise $31m in Equity Funding for CO2 Capturing Technology," *The Engineer* (blog), August 28, 2018, https://www.theengineer.co.uk/climeworks-equity-co2/.

[73] Sigurd Bergmann, "'Millions of Machines Are Already Roaring': Fetishised Technology Encountered by the Life-Giving Spirit," in *Technofutures, Nature and the Sacred: Transdisciplinary Perspectives*, ed. Celia Deane-Drumond, Sigurd Bergmann, and Bronislaw Szerszynski (Surrey: Ashgate, 2015), 116.

[74] Eliade, *The Sacred and the Profane: The Nature of Religion*, 30.

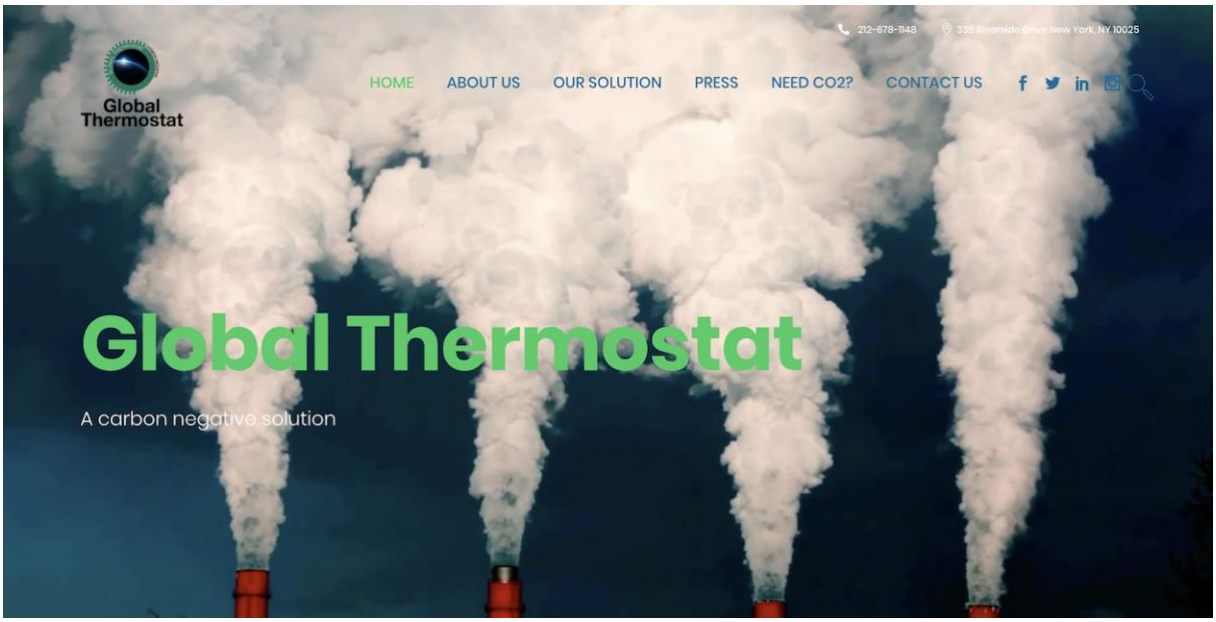
[75] Eliade, 31.

[76] Eliade, 31.

[77] Nye, *America as Second Creation. Technology and Narratives of New Beginnings*, 11.

[78] Eliade, *The Sacred and the Profane: The Nature of Religion*, 32.

4.3. Requesting CO2 as Prayer Request? Global Thermostat: A Carbon Negative Solution: globalthermostat.com



Global Thermostat front page. Image source: http://globalthermostat.com/, accessed Oct 2019.

Global Thermostat is another company offering to remove CO2 in order to rescue us from the perils of global warming. Their promotional video promises to "reverse engineer global warming … reverse it backwards and suck it out of the environment"[79]. The iconography on their landing page visually represents reverse engineering. The visitor can see four animated chimneys from which smoke does not rise up but through reverse playback makes it look like it is being sucked back into the chimneys. The imagery offers a visualization of the reverse engineering claim.

Global Thermostat's chimneys are like Berns' acheiropoetic heaven machine, i.e. a machine not human made.[80] They are, of course, built by humans, but if we take Keith's narrative serious, these machines and the opportunities that come with them are ultimately given to us by science: "That if engineers and scientists really turned their minds to this, it's amazing how we can affect the planet. … not because we plan it, not because we want it, just because science delivers it to us bit by bit"[81]. Science, here, appears almost personified: science delivers, reveals,

[79] Global Thermostat, "Forbes KPMG Voice Capturing Carbon," August 22, 2016, https://www.youtube.com/watch?v=dPEQg63Te7g.
[80] Cf. Berns, *Himmelsmaschinen - Höllenmaschinen*, 12.
[81] Keith, *A Critical Look at Geoengineering against Climate Change*.

not all at one, but deliberate, careful, and bite sized. Science resonates the idea of Biblical personified wisdom that is at the deity's side or acts as the deity's voice.[82]

The religiously charged narrative horizon continues on a visual level on the website of Global Thermostat. The smoke does not rise up into the heavens but the chimneys suck it back in. Smoke, however, has a long history in religious traditions and practice. As Brent Plate argues, "the burning of incense in sacred sites has a visual logic: smoke rises. … Smoke from incense and burnt offerings become lines of communication with the deities."[83] Incense is often seen as "food of the gods"[84] and the Biblical Psalmist prays: "Let my prayer be counted as incense before you, and the lifting up of my hands as an evening sacrifice" (Ps 141:2).

The image of smoke descending down onto earth inverts Biblical imagery and religious incantations. It creates a *Weltbild* (conception of the world[85]) in its own right, albeit one that – similar to the religious heritage of smoke – also has a visual heritage. When Claude Monet visualized pollution created by the industrial revolution, he conveyed a sense of beauty from an almost Biblical perspective: "Here the human agents of the Anthropocene look at their creation from its own viewpoint, as it were, and see that it was good. […] Whereas the material smog was a dangerous by-product, this modern aesthetic countered it by transforming the very perception of its difference into a sign of human superiority and the continuing conquest of nature."[86]

Global Thermostat advertises the removal of carbon dioxide and a "carbon negative solution"[87], but that does not imply that CO2 – or the smoke that visualizes CO2 – is inherently bad. Rather, they offer a "transformative technology" that "provides an abundant, reliable source of CO2 drawn from industrial flues or directly from the air"[88]. They reframe smoke into a low cost resource that is available anywhere. Removing polluting CO2 from the air and harnessing carbon in a carbon-cycle economy becomes, in this aesthetic, food for the altar of the gods of

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[82] Cf. James L. Crenshaw, "Wisdom Traditions and the Writings: Sage and Scribe," in *The Oxford Handbook of the Writings of the Hebrew Bible*, ed. Donn F. Morgan (Oxford University Press, 2018), 84f., https://doi.org/10.1093/oxfordhb/9780190212438.013.7.

[83] S. Brent Plate, *A History of Religion in 5 1/2 Objects: Bringing the Spiritual to Its Senses* (Boston: Beacon Press, 2014), 72.

[84] Plate, 62.

[85] Cf. Natalie Fritz et al., *Sichtbare Religion: Eine Einfuehrung in Die Religionswissenschaft*, De Gruyter Studium (Berlin: De Gruyter, 2018), 52; Cf. Christopher Volpe, "Art and Climate Change: Contemporary Artists Respond to Global Crisis," *Zygon*® 53, no. 2 (June 2018): 613–23, https://doi.org/10.1111/zygo.12413; Cf. David A. Larrabee, "Climate Change and Conflicting Future Visions," *Zygon*® 53, no. 2 (June 2018): 516, https://doi.org/10.1111/zygo.12399.

[86] Nicholas Mirzoeff, "Visualizing the Anthropocene," *Public Culture* 26, no. 2 (2014): 222, https://doi.org/10.1215/08992363-2392039.

[87] Global Thermostat, "Global Thermostat," Global Thermostat, 2019, https://globalthermostat.com/.

[88] Global Thermostat.

consumption: plentitude on earth, in this life, technologically produced. The chimneys become a symbol for what carbon capture solutions are: they suck transcendence into immanence, they realize another, wholly different world.

Carbon capture solutions such as GT and Climeworks create new worlds by redeeming old ones. The redemption of the old world comes through ritualization and the transformation of something harmful into something useful and valuable: "GT turns pollution into cash, transforming carbon dioxide from a global liability into an immensely global asset."[89] This new world is not an elusive or exclusive concept but imagined as something everyone (or better: any organization) can participate in – through ritualization.

Global Thermostat CO2 request. Image source: http://globalthermostat.com/need-co2/, accessed Oct 2019.

Rituazlization and participation in Global Thermostat's redemptive and transformative process comes in the form of something that resembles prayer requests. The site navigation offers a link labelled "Need CO2" linking to a site titled "CO2 request".[90] This terminology resembles the terminology of church websites that offer believers the opportunity to submit a prayer request. The language alone might not be sufficient to establish the link between a CO2 request and a prayer request. But the website shows the heading "CO2 request" against the background of a view of electrified planet earth from outer space. Similar to the image of the chimneys sucking in smoke on the front page, heaven and earth come together.

Meerten Ter Borg argues that "Transcendence is also a precondition for the creation of art, for sports, and even for lazily flicking channels in front of the television."[91] Drawing on my own Circuit of Technological Imaginaries, I want to push Borg's understanding of transcendence. Transcendence can be seen as precondition not just for art but for what drives humans to envision and imagine creative technological solutions to everyday problems. In this context,

[89] Global Thermostat, "Global Thermostat Overview," September 17, 2015, https://www.youtube.com/watch?v=nS5VW-92_Rw.

[90] Global Thermostat, "CO2 Request," *Global Thermostat* (blog), 2017, http://globalthermostat.com/need-co2/.

[91] Meerten B. ter Borg, "Transcendence and Religion," *Implicit Religion* 11, no. 3 (2009): 232, https://doi.org/10.1558/imre.v11i3.229.

the CO2 request becomes an incantation to turn the zero-carbon cycle into reality. Patricia Baquedano-Lopez argues that in the broadest understanding, prayer links different dimensions: "prayer is a discursive act that bridges human limitation and the spiritual realm. To pray is to be conscious of mortal existence. Perhaps there is no other single speech event that engages people at the critical points of the life cycle than prayer."[92] Scientists and media alike often portray carbon capture technologies as life changing event because it might be the only thing left that could mitigate against the impact of crossing the point of no return.[93]

> "Global Thermostat's technology cleans the atmosphere of excess CO_2, giving the world the time it needs to deploy new sources of energy for a clean and secure energy future – while increasing energy supplies."[94]

The economic context of the CO2 request does not diminish the religious characteristic of it, rather, it contributes to it. It transforms the proposed economic transaction from a financial into a meaningful one. "Prayer, however, is no longer situated solely within the domain of religious institutions […] Prayers can be requested, exchanged, and even bought. […] Prayers are also being marketed for consumers, as in, for example, the popular dial-a-prayer telephonic services increasingly advertised through mass media."[95]

The religious narrative is further strengthened by emphasizing the importance of carbon for life on earth. Peter Eisenberger, co-founder of Global Thermostat, contributes to refocusing the public's attention on carbon rather than CO2 calling carbon a "positive molecule":

> "It is what live is about, we are all made out of carbon, we make our energy out of carbon … it's really a very positive molecule, and the problem is, we're not managing it right. … I think that's where we're going to be going, collectively as a species, try and find ways to mimic the energetic and structural way that carbon is used by the rest of life, and to use our knowledge and technology to do that even more effectively than nature does."[96]

The wording Eisenberger uses bears religious resonance and links current geoengineering and carbon capture debates to Genesis 2:7 where god created Adam out of dust: "Then the Lord God formed a man from the dust of the ground and breathed into his nostrils the breath of life, and the man became a living being." In this narrative, carbon capture technologies such as

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[92] Patricia Baquedano-López, "Prayer," *Journal of Linguistic Anthropology* 9, no. 1–2 (2000): 197.

[93] Cf. Steve Hanley, "15,000 Scientists: Climate Change Is Already Past The Point Of No Return," CleanTechnica, November 14, 2017, https://cleantechnica.com/2017/11/14/climate-change-already-past-point-no-return-warns-union-concerned-scientists/; Cf. Peter Walker, "Climate Change Escalating so Fast It Is 'beyond Point of No Return,'" The Independent, December 1, 2016, http://www.independent.co.uk/news/science/donald-trump-climate-change-policy-global-warming-expert-thomas-crowther-a7450236.html.

[94] Global Thermostat, "The GT Solution," *Global Thermostat* (blog), 2017, http://globalthermostat.com/the-gt-solution/.

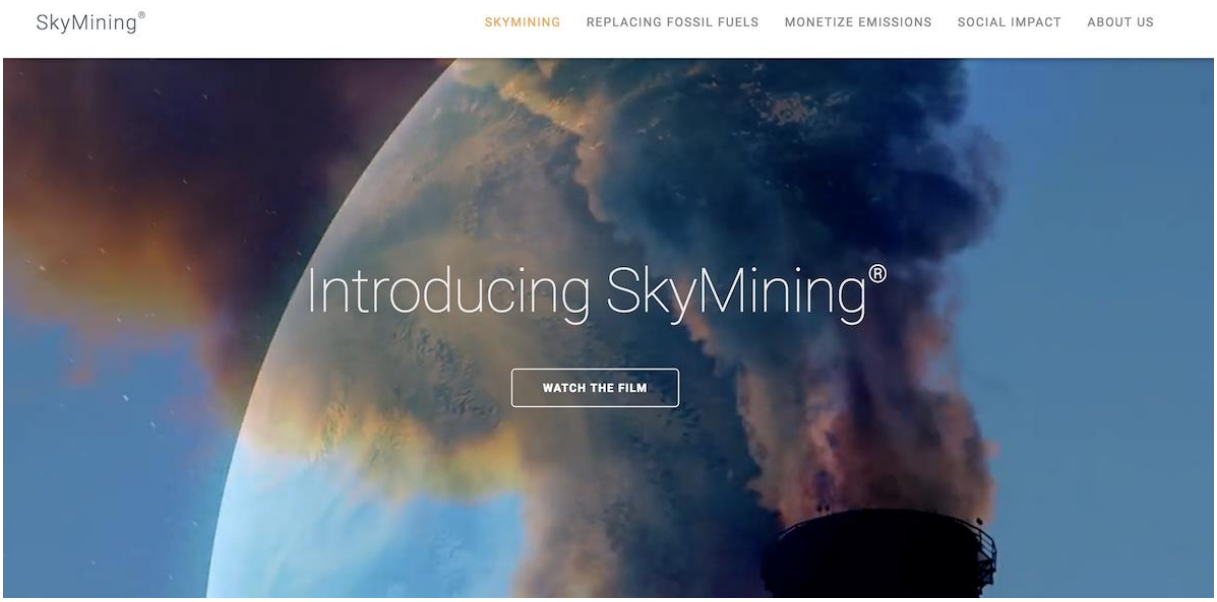
[95] Baquedano-López, "Prayer," 198.

[96] Global Thermostat, "How to Profit from CO2 Emissions," December 16, 2015, https://www.youtube.com/watch?v=1OBSeTyvHag.

Global Thermostat's become transformative agents that transforms CO2 and restores carbon to its original, creative, and life-giving state.

SkyMining is yet another company that in its visual language and promotional materials promises to stop humanity's addiction to dirty fossil fuels, avert the impending climate apocalypse, and help bring about an entirely new world. One could argue that the narratives suggest not the creation of a new world but the restoration of the old and pure one, before it became tainted by human CO2 emissions. It is probably a little bit of both, the restoration of a perceived before state and the bringing about of something new. Yet, there is a strong case to be made that it really is more about bringing about something entirely new, the creation of a new world, because – after all – the "restored" world is deeply informed and shaped by technology.

4.4. SkyMining – A World of Plenitude: skymining.com



SkyMining front page. Image source: https://skymining.com/, accessed 2017-2019.

Skymining is a bit of an outlier from the previous examples because rather than employing a machine to capture CO2, they rely on grasses which subsequently are turned into a fossil fuel replacement. Yet, I have included Skymining for two reasons: 1) The company advertises their approach as carbon negative; 2) the process itself is described in very machinic and technological terms. I do not mean the process of extracting carbon out of the harvested grasses, but the grasses themselves: as the "world's most effective CO2 pumps", Skyming states, the

"specialized grasses contain hyper-efficient CO2-pumps. These pumps evolved over 30 million years ago to deal with CO2 scarcity, and nothing in nature nor anything man-made, can compete with their cost, scalability and efficiency" (https://skymining.com/).

SkyMining's promotional video also visualizes a new world. It starts with a view into blue planet earth from space and we hear a voice over commentary:

"Imagine, if all the energy mankind will ever need is already in the sky.
Imagine, if the solution to climate change is locked inside the very CO2 that is causing it.
We have found a profitable way to remove all the world's CO2 emissions straight from the atmosphere and recycle the carbon inside that CO2 to stop the world's addiction to dirty fossil fuel."[97]

SkyMining promotional video:

SkyMining promotional video. Screentshot: https://youtu.be/aYzC8RXqidI, accessed Oct 2017

By inviting the viewer to "imagine" while looking onto planet earth from space, the viewers are invited to imagine both a non-existent and already existing world: non-existent because we do not make use of airborne carbon yet, existing because, as SkyMining tells us, both all the energy and the solution to climate change is already here, in front of ours eyes, within our grasp. As such, the SkyMining's geoengineering narrative expresses in popsci language the theological eschatological notion of the "already but not yet": that the Kingdome of God is already dawning but has not yet come to completion. Or in SkyMining's geoengineering speech: all the energy and all the solutions are *already* here (graspable in the sky) but they have *not yet* been fully realized.

The promise of the *not yet*, also reflects Exodus 2:8's promise of a land that is flowing with milk and honey: "SkyMining deposits vast amounts of carbon in the earth because we plant grass on marginal land. This reverses desertification, slows deforestation, and rebuilds soil on otherwise unusable land to provide future food security."[98] The video visualizes this through rich and saturated colors and solemn background music.

The video ends with a further view onto planet earth from space – a world reborn, created anew through geoengineering technologies.

[97] Skymining, "Introducing SkyMining," 2017, https://www.youtube.com/watch?v=cBLBKCSgNKs.
[98] Skymining.

Similarly to Climeworks, much of Skymining's visual imagery features green valleys, images featuring the sun, and images with rich and vibrating colors showcasing the possible impact of Skymining on everyday practices such as the production of food, the cooking of food, or travel. The visual language signifies the end of an old and the coming of a new era. Also similarly to Climeworks and Global Thermostat, the discourse is visibly embedded in the money economy. Not only does the website feature an image of a VISA card,[99] but they encourage people to "do the right thing. Profitably."[100] The promise here is similar to the introductory video: a "Schlaraffenland" and world of plentitude that is easily obtainable. It promises that ethical behavior is not only simple and easy but also profitable. With Steve Rayner, we can label this easy-ethico-economic marketing strategy as easy-profitable-ethical presentation as "profoundly flawed magical thinking"[101]. Rayner bases his understanding of "magical" in Edward Evan Evans-Pritchard and Godfrey Lienhardt's works. Magical practices among the Dinka, Lienhardt for example argues, serve as an expression of determination rather an assurance that hoped something will actually happen.[102] Carbon capture solutions, then, might be magical thinking as expressions of corporations' determination to turn climate change into yet another source for profits. It might be flawed magical thinking when it comes to the narrative that a few carbon capture plants will effectively reverse engineer and avert climate change.

5. Conclusion: Indulging Overabundance or a Land of Milk and Honey

What is gained from an analysis of the religious connotations of carbon dioxide removal solutions? In fact, such an analysis is problematic for at least two reasons: on the one hand, the websites discussed in this paper focus primarily on industrial customers rather than the general public. Media reports on corporate greed as well as academic literature often understand corporations as rational agents whose decisions are driven by the goal to maximize profits.[103] On the other hand, the very concept of "religion" is arbitrary as JZ Smith argues:

> while there is a staggering amount of data, phenomena, of human experiences and expressions that might be characterized in one culture or another, by one criterion or another, as religion – there is no data for religion. Religion is solely the creation of the scholar's study. It is created for

[99] Cf. Skymining, "Skymining | Become a Climate Leader," Skymining, 2018, https://skymining.com/monetize-emissions.html.

[100] Skymining, "Skymining | Social Impact," Skymining, 2018, https://skymining.com/social-impact.html.

[101] Steve Rayner, "What Might Evans-Pritchard Have Made of Two Degrees?," *Anthropology Today* 32, no. 4 (August 2016): 2, https://doi.org/10.1111/1467-8322.12263.

[102] Cf. Godfrey Lienhardt, *Divinity and Experience: The Religion of the Dinka* (Oxford: Clarendon Press, 1961), 282f.

[103] Cf. Brian T. McCann and George A. Shinkle, "Attention to Fairness versus Profits: The Determinants of Satisficing Pricing: Attention to Fairness versus Profits," *Journal of Management Studies* 54, no. 5 (July 2017): 583, https://doi.org/10.1111/joms.12246.

> the scholar's analytic purposes by his imaginative acts of comparison and generalization. Religion has no existence apart from the academy.[104]

Yet, the creation of the category of religion for "analytic purposes" is what makes the analysis in this paper valuable: why can we find rhetorical and visual aspects, cues, and strategy that grouped together resemble visual and narrative strategies found in what scholars call "religion"? And why can we find these religious tropes on websites targeting primarily corporate clients or public, political, financial stakeholders?

Intuition and politics can be a crucial factor in corporate procurement and supply chain management decisions.[105] Additionally, CEO incentives, educational background of decision makers, an organizations Corporate Social Responsibility strategy may also influence procurement and supply chain decisions.[106]

The reliance on religious rhetoric and imaginaries in the examples discussed in this article makes it explicit that a range of stakeholders beyond commercial customers are involved in the carbon capture discourses: researchers, policy makers, investors, the general public. Clayton et al. suggest that the environment needs to be understood "as a source of information that needs to be processed and interpreted"[107]. They suggest that climate policy needs to consider the impact of climate change on psychological health and recommend to expand "the definition of health to include human well-being and social justice"[108] and to promote awareness of how the most vulnerable are affected by climate change and depleting resources. The religiously infused narratives – unintentionally – render explicit that issues of social justice might not be at the heart of carbon capture solutions and that the idea of (economic) plentitude might just be a continuation of existing injustices.

De Vries et al. argue that public communication about carbon capture approaches needs to be carefully crafted and curated because the public knows – generally speaking – relatively little about these technologies.[109] Even with effective communication, a lack of background

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[104] Jonathan Z. Smith, *Imagining Religion: From Babylon to Jonestown*, Chicago Studies in the History of Judaism (Chicago: Univ. of Chicago Press, 1988), xi.

[105] Cf. Alina Stanczyk et al., "Global Sourcing Decision-Making Processes: Politics, Intuition, and Procedural Rationality," *Journal of Business Logistics* 36, no. 2 (June 2015): 161, 176, https://doi.org/10.1111/jbl.12090.

[106] Cf. Mikko H. Manner, "The Impact of CEO Characteristics on Corporate Social Performance," *Journal of Business Ethics* 93, no. S1 (June 2010): 53–72, https://doi.org/10.1007/s10551-010-0626-7; Cf. Michel Dion, "Corporate Citizenship, Social Responsibility, and Sustainability Reports as 'Would-Be' Narratives," *Humanistic Management Journal* 2, no. 1 (October 2017): 83–102, https://doi.org/10.1007/s41463-017-0022-x.

[107] Susan Clayton et al., "Expanding the Role for Psychology in Addressing Environmental Challenges.," *American Psychologist* 71, no. 3 (April 2016): 201, https://doi.org/10.1037/a0039482.

[108] Clayton et al., 201.

[109] Cf. Gerdien de Vries, Bart W. Terwel, and Naomi Ellemers, "Spare the Details, Share the Relevance: The Dilution Effect in Communications about Carbon Dioxide Capture and Storage," *Journal of Environmental Psychology* 38 (June 2014): 116, 121, https://doi.org/10.1016/j.jenvp.2014.01.003.

knowledge and scientific knowledge might make the evaluation of risks and benefits of carbon capture challenging.[110] As such, proponents of the various approaches to carbon capture might draw on language that resonates utopian imagery to visualize and market a technologically enhanced future world. Terwel et al. argue that the roll out of carbon capture on a large scale will depend on the public's trust in the organizations rolling out such technologies.[111] "An important addition to existing literature is that trust can be preserved by communicating public-serving motives in combination with seemingly more truthful organization-serving motives."[112] By making the economic benefits of the technologically created world of plentitude so obvious, religious language might suspend the public's suspicion in the economic motifs of corporations and establish a sense of trust. The problem with such utopian images of the future, however, are not only the suspension of critical thinking, but its impact on individual action. Van Kasteren argues that "Behavioural responses to climate change presuppose knowledge of pathways to action."[113] Yet, presenting carbon capture as savior-technology might be a barrier for recognizing climate change mitigation as collective and individual responsibility.

Religious language might also be – unconsciously – be employed to convince the public of the benevolence of technology. Patrick Devine-Wright explored the tension between the public, Planning Commissions, and developers. He argues, that the 2008 Planning Act resulted in a loss of opportunities for the public to critically engage in the planning and permission process of energy projects. Developers, in turn, understood the public as "'ever-present danger' who could at any moment act to obstruct their proposals"[114]. Utopian imaginaries, then, can serve as strategy to alleviate and soothe public concern.

There is general agreement in the geoengineering community that geoengineering the climate is not a replacement for reducing carbon emissions.[115] Critics, however, continue to caution that the knowledge of real or potential geoengineering technologies might prompt people to

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[110] Cf. Emma Ter Mors et al., "Effective Communication about Complex Environmental Issues: Perceived Quality of Information about Carbon Dioxide Capture and Storage (CCS) Depends on Stakeholder Collaboration," *Journal of Environmental Psychology* 30, no. 4 (December 2010): 348, https://doi.org/10.1016/j.jenvp.2010.06.001.

[111] Cf. Bart W. Terwel et al., "How Organizational Motives and Communications Affect Public Trust in Organizations: The Case of Carbon Dioxide Capture and Storage," *Journal of Environmental Psychology* 29, no. 2 (June 2009): 290, https://doi.org/10.1016/j.jenvp.2008.11.004.

[112] Terwel et al., 298.

[113] Yasmin van Kasteren, "How Are Householders Talking about Climate Change Adaptation?," *Journal of Environmental Psychology* 40 (December 2014): 339, https://doi.org/10.1016/j.jenvp.2014.09.001.

[114] Patrick Devine-Wright, "Public Engagement with Large-Scale Renewable Energy Technologies: Breaking the Cycle of NIMBYism: Breaking the Cycle of NIMBYism," *Wiley Interdisciplinary Reviews: Climate Change* 2, no. 1 (January 2011): 22, https://doi.org/10.1002/wcc.89.

[115] Cf. David W. Keith, Gernot Wagner, and Claire L. Zabel, "Solar Geoengineering Reduces Atmospheric Carbon Burden," *Nature Climate Change* 7, no. 9 (September 1, 2017): 617, https://doi.org/10.1038/nclimate3376.

continue a carbon intensive lifestyle. Brigitte Nerlich, Nelya Koteyko, and others have compared this attitude to the system of selling indulgences in the Catholic Church in the pre-Reformation era.[116] Nerlich and Koteyko in particular emphasize the double meaning of the word "indulgence": in the Catholic sense as a remission of the temporal punishment (climate change) for sin (carbon intensive lifestyle) as well as indulging in a carbon intensive lifestyle.[117] I want to push this comparison further because what carbon offset, zero carbon energy circles, carbon dioxide removal, or the idea of a negative carbon economy really offer is the idea of indulging while being indulged, to indulge and be forgiven, to make Cockaigne become reality. Carbon dioxide removal projects promise paradisiacal plentitude: when *Carbon Engineering* promises to deliver clean fuels and renewable (i.e. non-exhaustive) power and when ClimeWorks promises to turn the carbon stored in CO2 in plentiful raw material for the transportation and food industry, they communicate a sense that the world of plenty is within reach. SkyMining makes this transcendent element even more explicit when they ask their viewers to "imagine if *all* the energy mankind will *ever* need is *already* in the sky" (emphasis added based on emphasis in voice over commentary). Their promise is that plentitude is not something that awaits in a paradisiacal afterlife, but exists already in the here and now, just waiting for us to tap in to and indulge in.

The visual language and narratives of economic prosperity and energy plentitude also show that the lines between scientific debate, religious imaginaries, and popular culture continue to be blurry. It is also part and parcel of an increasing presence of geoengineering topics in public and popular culture. The Climate Engineering Conference 2017, for example, dedicated a panel to the topic of how to communicate geoengineering topics.[118] The fall of 2017 saw the release of the Hollywood film GEOSTORM (Dean Devlin, USA 2017) in which geoengineering is used to control the climate (and ultimately turned into a weapon).

However, as the carbon dioxide removal examples discussed above show, the discourse about emissions is also shifting due to economic interests. Rather than emissions being evil, they become a resource. Our carbon intensive lifestyle, in this narrative, has created an overabundance of resources waiting to be harnessed.

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[116] Brigitte Nerlich and Nelya Koteyko, "Compounds, Creativity and Complexity in Climate Change Communication: The Case of 'Carbon Indulgences,'" *Global Environmental Change* 19, no. 3 (August 2009): 348, https://doi.org/10.1016/j.gloenvcha.2009.03.001; John Tierney, "Sinful Second Homes," *The New York Times*, August 8, 2006, sec. Opinion, https://www.nytimes.com/2006/08/08/opinion/08tierney.html; George Monbiot, "Selling Indulgences," George Monbiot, October 19, 2006, http://www.monbiot.com/2006/10/19/selling-indulgences/.

[117] Nerlich and Koteyko, "Compounds, Creativity and Complexity in Climate Change Communication."

[118] IASS, "Parallel Session1.1: Communicating Climate Engineering," Climate Engineering Conference 2017, April 24, 2017, http://www.ce-conference.org/session/parallel-session11-communicating-climate-engineering.

Carbon dioxide removal technologies do not only cleanse our current world but by doing so they promise to create a new world of milk and honey, a paradisiacal world in which we can continue to waste. But if there is an eternal supply of energy, can there even be such a thing as waste? We can continue to indulge but without sin. I understand sinfulness here theologically in the sense that the concept not only names a transgression against divine law, but as expression that human being are networked beings and that individual actions can have negative impacts on the environment and fellow human beings. As such, sinfulness names transgressions against divine law but also transgressions against the human and non-human world.

There is, of course, also an economic aspect to this creation of a new world. The narratives of the carbon dioxide removal companies discussed promise to create a financial return out of nothing, a *creatio ex nihilo*. The language of creation, the salvific promise, and the economic drive together turn these technologies into an economy of salvation and link it to divine revelation and thus to the heavenly realm.[119]

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[119] Paul M. Blowers, *Drama of the Divine Economy: Creator and Creation in Early Christian Theology and Piety*, Oxford Early Christian Studies (Oxford: Oxford University Press, 2012), 375.

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