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A Solarpunk Manifesto

Turning Imaginary into Reality

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to renewable energy and promote discourse on agroecology and eco-urbanism. As a just community, solarpunk advocates should promote four pillars of justice: (1) social justice; (2) justice across generations; (3) justice across communities; and (4) justice for non-humans. As a whole, these broad principles can guide global society towards a utopian, solarpunk future.

References

Abstract

In the last century, science fiction has become an incredibly powerful tool in depicting alternative social imaginaries, particularly those of the future. Extending beyond their fictitious nature is a commentary on the stark realities of modern society. The ‘cyberpunk’ subgenre, for example, offers a dystopian critique on the dangers of technological dependence and hypercapitalism. In studying science fiction, future imaginaries can be developed as utopian goals for governance systems to strive for. In contrast to cyberpunk, the subgenre of ‘solarpunk’ depicts a utopian society where humanity lives locally, sustainably, and in harmony with nature. This paper deconstructs solarpunk media to describe three guiding principles of solarpunk: anarchism, ecology, and justice. As an anarchist community, solarpunk strives for a post-scarcity, post-capitalist society devoid of hierarchy and domination. As an ecological community, solarpunk strives for local, self-sufficient, and sustainable living where both the human and non-human flourish. Finally, as a just community, solarpunk strives to rid society of marginalization and celebrate authenticity. These three principles can be used to guide humanity towards a utopian, solarpunk future.

Keywords: solarpunk; imaginaries; futures; anarchism; ecology; justice; punk

1. Introduction

Social imaginaries allow society to evaluate their moral purpose and order¹. It is how people directly perceive their social reality, how everything fits together, social norms, and

¹ Neill, J.O. Social Imaginaries: An Overview. *Encycl. Educ. Philos. Theory* 2020.

themes that underly their society². An important subset of social imaginaries are future imaginaries³. A future imaginary is a vision shared by a group of individuals depicting a desired future's political, economic, and social configurations. Drawing on specific themes and vocabulary, future imaginaries are used to strategize for those wishing to develop a given future. A critical set of future imaginaries today are the many possible futures of human-induced climate change. Global industrial practices have led to the Earth's systems destabilizing and the biosphere degrading, and current global governance structures have failed to mitigate the crisis and to promote optimism in doing so⁴⁵. The media and literature are wrought with visions of an apocalyptic future where human civilization has collapsed and along with it, the biosphere⁶. This rhetoric breeds a sense of fatalism that the world is doomed regardless of humanity's efforts⁷⁸. These apocalyptic visions are imaginaries depicting a dark future where humanity fails to prevent further climate change and the subsequent sixth mass extinction. The popular outcomes for humanity in

² Taylor, C. *Modern Social Imaginaries*; Duke University Press: Durham, UK, 2004; ISBN 0-8223-8580-5.

³ Lewis, J.E. The Future Imaginary. In *Proceedings of the TEDxMontreal 2013*, Montreal, QC, Canada, 14 September 2013; pp. 1–9.

⁴ Steffen, W.; Rockström, J.; Richardson, K.; Lenton, T.M.; Folke, C.; Liverman, D.; Summerhayes, C.P.; Barnosky, A.D.; Cornell, S.E.; Crucifix, M.; et al. Trajectories of the Earth System in the Anthropocene. *Proc. Natl. Acad. Sci. USA* **2018**, *115*, 8252–8259.

⁵ Stoddard, I.; Anderson, K.; Capstick, S.; Carton, W.; Depledge, J.; Facer, K.; Gough, C.; Hache, F.; Hoolohan, C.; Hultman, M.; et al. Three Decades of Climate Mitigation: Why Haven't We Bent the Global Emissions Curve? *Annu. Rev. Environ. Resour.* **2021**, *46*, 653–689.

⁶ Wallace-Wells, D. *The Uninhabitable Earth*; Tim Duggan Books: New York, NY, USA, 2017; Available online: nymag.com (accessed on 7 August 2023).

⁷ Malm, A. *How to Blow Up a Pipeline*; Verso: London, UK, 2021.

⁸ Lamb, W.F.; Mattioli, G.; Levi, S.; Timmons Roberts, J.; Capstick, S.; Creutzig, F.; Minx, J.C.; Müller-Hansen, F.; Culhane, T.; Steinberger, J.K. Discourses of Climate Delay. *Glob. Sustain.* **2020**, *3*, 1–5.

avenues to support these duties. One option is the representation of non-human interests in political settings. This is already occurring to a small degree with certain ecosystems, such as wetlands, being represented in international decision making¹²⁸. Another option is to recognize the potential 'capabilities' of non-humans to flourish as communities and ecosystems. Humanity would have an obligation to limit threats to the capabilities of non-humans.

Ideally, for a solarpunk future, these pillars of justice would naturally come to be. The elimination of hierarchy and domination would theoretically lead to social justice and the integration of ecological thought into governance and development would theoretically promote community, generational, and non-human justice. Solarpunk advocates, however, should not sit idly by and wait for justice to come to fruition and instead promote these pillars of justice at all levels of governance.

5. Conclusions

The manifesto written here presents an idyllic, utopian future imaginary for global governance to build towards. The themes of anarchism, ecology, and justice prevalent in solarpunk writings provided guiding principles for governance to adopt for building a better future. As an anarchist community, solarpunk advocates for post-capitalism and post-scarcity. Capitalism enforces artificial scarcity and promotes the domination of both nature and the working class. Technology exists today that can build a post-scarcity society and thus solarpunk advocates should aim to develop the foundations to do so. As an ecological community, solarpunk advocates believe humanity should live in harmony with nature. To do so, governance systems should further support the transition

¹²⁸ UNESCO. *Convention on Wetland of International Importance*; UNESCO: Ramsar, Iran, 1971.

within community to across communities. Thus, justice across community borders requires citizens to acknowledge the unevenness of environmental risks, create measures to minimize impacts, and provide robust social protection for the vulnerable.

Generational justice relates to...

“the responsibilities that people living today owe to future generations for protecting the Earth system, and the responsibilities that the present generation holds for remedying the environmental damage caused by those who lived before.”¹²⁷

(p. 70)

The conditions of the Anthropocene were not made in one generation but are a result of cumulative, multigenerational environmental degradations. Changes to the Earth’s systems will have profound implications for the livelihood of future generations and thus current generations have a duty to create future conditions that limit scarcity and reduce the risk of catastrophic state shifts in the Earth’s systems. Simply put, justice across generations requires that future generations do not suffer from the decisions of the past.

Justice for non-humans is conceptually more difficult to narrow down compared to the other pillars of justice. How and why should humanity hold itself accountable to non-humans? There are many different answers to this question. Non-humans could have intrinsic moral value, or much more simply, non-human life supports the conditions for all life to survive, including humans. Regardless of your outlook, humanity has a duty to protect non-humans from the changing conditions of our own making. There are multiple

¹²⁷ Dryzek, J.; Pickering, J. *Politics of the Anthropocene*; Oxford University Press: Oxford, UK, 2019.

these imaginaries are rightfully pessimistic: global civilization collapses and humanity may or may not go extinct. The goal of climate governance is to prevent these imaginaries from becoming reality, and herein lies the issue. Global environmental governance is predominantly reactive in nature, responding to issues as they arise however lacking in vision or conviction for building a post-Anthropocene humanity⁹. Governance systems build away from disaster whilst not building towards any particular future. For example, the 2 °C goal of the Paris Agreement is a simple long-term goal; however, there is little perspective into what the future of humanity looks like if these conditions are met. Climate change has effectively highlighted the many wrongs with the current global order and the future is much more intersectional than simply preventing ecological disasters.

The future of humanity needs a specific Imaginary to build towards as opposed to simply preventing catastrophe. One genre of social imaginaries for global governance to explore as a possible future are those within the punk identity.

What does it mean to be punk? The 1970s saw the proliferation of punk music through bands such as The Sex Pistols, The Dead Kennedys, and The Ramones¹⁰. As the genre grew in popularity, a ‘punk’ identity developed. Early punk bands used their platform to call out inequalities and injustices they saw in their society. Blue-collared youth felt increasingly marginalized by a globalizing society and used punk music to express their anger and disdain towards the establishment^{11,12}.

⁹ Biermann, F. The Future of ‘Environmental’ Policy in the Anthropocene: Time for a Paradigm Shift. *Environ. Polit.* **2021**, *30*, 61–80.

¹⁰ Langman, L. Punk, Porn and Resistance: Carnivalization and the Body in Popular Culture. *Curr. Sociol.* **2008**, *56*, 657–677.

¹¹ Langman, L. Punk, Porn and Resistance: Carnivalization and the Body in Popular Culture. *Curr. Sociol.* **2008**, *56*, 657–677.

¹² Moore, R. Postmodernism and Punk Subculture: Cultures of Authenticity and Deconstruction. *Commun. Rev.* **2004**, *7*, 305–327.

To punks, there was no future¹³¹⁴. The working class was predestined from birth for a life of banality, working monotonous jobs as a minute cog in the capitalist regime with no future beyond so. This meaningless life was juxtaposed on the looming threat of nuclear war to give punk a nihilistic and apocalyptic tone. The punk identity was built from a feeling of being trapped as spectators in a fast-moving and heavily consuming society. As a form of existential revolt, punks wanted to subvert the status quo to reclaim their future¹⁵¹⁶. Anarchy was the common tool for punk subversion, although a variety of subcultures developed, drawing on feminism, anti-racism, situationism, and in some cases, fascism (e.g., The Ramones)¹⁷¹⁸. Independence and personal freedom became a rallying across the growing punk identities: a desire to develop an authentic self despite the nihilism of the future. Thus, to be punk is to deconstruct the societal status quo that prevents one from having a future and inhibits the self from being truly authentic¹⁹.

Punk identity quickly influenced science fiction writing through promoting new social imaginaries. In 1982, Bruce

¹³ Sabin, R. *Punk Rock: So What?* Routledge: London, UK, 2002; ISBN 0203448405.

¹⁴ Worley, M. *No Future: Punk, Politics and British Youth Culture, 1976–1984*; Cambridge University Press: Cambridge, UK, 2017; ISBN 9781316779569.

¹⁵ Worley, M. *No Future: Punk, Politics and British Youth Culture, 1976–1984*; Cambridge University Press: Cambridge, UK, 2017; ISBN 9781316779569.

¹⁶ Davies, J. *The Future of “No Future”*: Punk Rock and Postmodern Theory. *J. Pop. Cult.* **1996**, 29, 3–25.

¹⁷ Sabin, R. *Punk Rock: So What?* Routledge: London, UK, 2002; ISBN 0203448405.

¹⁸ Stratton, J. *Jews, Punk and the Holocaust: From the Velvet Underground to the Ramones—The Jewish-American Story*. *Pop. Music* **2005**, 24, 79–105.

¹⁹ Lewin, P.; Williams, P. *The Ideology and Practice of Authenticity in Punk Subculture*. In *Authenticity in Culture, Self, and Society*; Routledge: London, UK, 2009.

injustice prevalent within modern societies. On redistribution, women are often subjected to lower-paid positions and less wages compared to men, whilst also being assigned unpaid reproductive and domestic labor. On recognition, androcentric norms privilege masculine traits while disparaging and objectifying femininity. Authenticity is a virtue of the punk identity and it hard to imagine one could feel authentic if they are marginalized for who they are¹²⁴. Anarchists strive for freedom, freedom for anyone to identify as they wish and be their authentic selves without discrimination¹²⁵.

The remaining three pillars connect well to discourse on planetary justice. Believing discourse on environmental justice was too limited in scope to manage the growing ecological crisis, Dryzek and Pickering proposed a framework of planetary justice¹²⁶. Parallel to solarpunk writings, Dryzek and Pickering conceived that the scope of justice must extend beyond national borders, beyond humanity, and beyond generations. Accordingly, the planetary justice framework can be adopted by the solarpunk community.

The first aspect of planetary justice is justice beyond national borders. In theory, national borders would cease to exist in a solarpunk society; however, the concept remains true at the community level. Environmental risks are not evenly distributed across a region or the world. The activities of one group can have far-reaching consequences to both humans and non-humans alike who are otherwise removed from the locality of said activities. Environmental impacts easily disregard community borders, shifting the duty of accountability from

¹²⁴ Lewin, P.; Williams, P. *The Ideology and Practice of Authenticity in Punk Subculture*. In *Authenticity in Culture, Self, and Society*; Routledge: London, UK, 2009.

¹²⁵ Bookchin, M. *Post-Scarcity Anarchism*, 3rd ed.; Ramparts Press: Menlo Park, CA, USA, 1986.

¹²⁶ Dryzek, J.; Pickering, J. *Politics of the Anthropocene*; Oxford University Press: Oxford, UK, 2019.

these features, a green city would have a decentralized water and renewable power system, host strong local enterprises, be designed to promote walking and low-impact transport (i.e., bicycles and buses as opposed to cars), have a circular or close-looped system to reduce waste, and importantly, have ecological (i.e., urban wetlands) and agroecological systems be directly integrated into community design. In theory, such a green city would not only have a low ecological footprint, but also be highly self-sufficient. The focus on ecological integration would strengthen the local ecology and mitigate anthropogenic disturbances. The concept of a perfectly green city is rather idyllic and fits well into solarpunk imaginaries.

4. Solarpunk as a Just Community

Anarchism requires the elimination of domination and hierarchy. The domination of one's future, their identity, or their non-humanity is counter to an anarchist society. In other words, the domination of individuals or nature is unjustifiable in an anarchist society. This holds true for solarpunk imaginaries. Implicated throughout the Solarpunk Manifesto and other solarpunk writings are four pillars necessary for a just society^{120 121 122}: (1) social justice; (2) justice across generations; (3) justice across communities; and (4) justice for non-humans. The first pillar of justice, social justice, targets injustices of recognition and redistribution as they relate to class and identity¹²³. Gender is an example of a commonly discussed

¹²⁰ Missolivialouise Land of Masks and Jewels. Available online: missolivialouise.tumblr.com (accessed on 1 April 2022).

¹²¹ The Solarpunk Community a Solarpunk Manifesto. Available online: www.re-des.org (accessed on 1 April 2022).

¹²² Owens, C. What is Solarpunk? Available online: solarpunkanarchists.com (accessed on 1 April 2022).

¹²³ Fraser, N. *Social Justice in the Age of Identity Politics: Redistribution, Recognition, Participation*; Sage Publications: Berlin, Germany, 1998.

Bethke coined the term cyberpunk when he used the term as the title of a short story²⁰. The story depicts a young delinquent named Mikey who lived in a society deeply connected to their technology, hence the 'cyber' component of cyberpunk. The 'punk' component refers to both the rebellious nature of the identity and the existential dread of having no future under a capitalistic society^{21 22}. Cyberpunk describes the alienation one feels in a highly capitalistic and highly technological society²³. A cyberpunk social imaginary is a warning, crying out that a hypercapitalist and technological future is not a future at all but a grim non-future for many²⁴. While many other punk-connected social imaginaries exist now, compared to cyberpunk, most are anachronistic in nature. For example, steampunk envisions a society in which steam-based technology was the dominant source of ingenuity²⁵. While creative, it is unlikely modern society will revert to using steam technology, and thus steampunk is not a strong contender as a future imaginary. If cyberpunk depicts a possible dystopian future, is there a punk-related social imaginary that depicts a plausible utopian future? There is, and it is called 'solarpunk'.

Compared to popular punk imaginaries, solarpunk is relatively new. Inspired by the Beluga Skysail, a cargo ship partially powered by wind, the blog 'Republic of the Bees' coined

²⁰ Bethke, B. *Cyberpunk*; Amazing Stories: Scottsdale, AZ, USA, 1982.

²¹ Britannica Cyberpunk. *Encyclopedia Britannica*; Britannica Cyberpunk: Chicago, IL, USA, 2017.

²² Williams, E.C. *Combined and Uneven Apocalypse: Luciferian Marxism*; John Hunt Publishing: Ropley, UK, 2011; ISBN 9781846944680.

²³ Hollinger, V. *Cybernetic Deconstructions: Cyberpunk and Postmodernism*. *Sci. Fict. Crit.* **2020**, *23*, 29–44.

²⁴ Williams, E.C. *Combined and Uneven Apocalypse: Luciferian Marxism*; John Hunt Publishing: Ropley, UK, 2011; ISBN 9781846944680.

²⁵ Republic of the Bees from Steampunk to Solarpunk. Available online: republicofthebees.wordpress.com (accessed on 1 April 2022).

solarpunk in 2008²⁶. The blog envisioned a solarpunk society being completely dependent on renewable energy and the revival of older, less damaging technologies, such as sailing. Solarpunk was meant to be more than a worldbuilding tool. It was also meant to be a societal goal; not just a tool for fiction, but as commentary on a new possible future. The renewable energy foundation of a solarpunk society already exists and for proponents of the imaginary it is a matter of advocating for a faster energy transition. Solarpunk discourse remained limited until 2014 when Tumblr user, missolivialouise, expanded on the topic on their blog²⁷. Solarpunk was to be more than a society built on renewable energy, but also one interconnected with nature and art. Children would learn both technology and gardening, artisanship would be promoted, and cities would be lush with vegetation, both for ecological and agricultural purposes. Tumblr user missolivialouise conceived that a solarpunk society would see less corporate capitalism and the promotion of small, local businesses. The post brought newfound popularity to the imaginary and eventually led to the creation of a manifesto written by ‘The Solarpunk Community’ in 2021²⁸. The manifesto contains 22 principles describing a solarpunk society from proposed visual aesthetics to concepts of justice. Broad themes can be extracted from the manifesto and other writings to create guiding principles for governance to use in building a solarpunk future^{29,30}. A solarpunk society is post-capitalist and post-scarcity. A solarpunk society is one that is

²⁶ Republic of the Bees from Steampunk to Solarpunk. Available online: republicofthebees.wordpress.com (accessed on 1 April 2022).

²⁷ Missolivialouise Land of Masks and Jewels. Available online: missolivialouise.tumblr.com (accessed on 1 April 2022).

²⁸ The Solarpunk Community a Solarpunk Manifesto. Available online: www.re-des.org (accessed on 1 April 2022).

²⁹ The Solarpunk Community a Solarpunk Manifesto. Available online: www.re-des.org (accessed on 1 April 2022).

³⁰ Owens, C. What is Solarpunk? Available online: solarpunkanarchists.com (accessed on 1 April 2022).

for a solarpunk future should support such movements¹¹⁵. Agriculture is not the only system where solarpunk advocates should strive for ecological integration, but in community development as well.

First proposed in the early 1900s, ‘garden cities’ marked the beginning of a movement to merge the best of countryside and city living¹¹⁶. Garden cities were envisioned as...

“a constellation of interconnected, self-contained new towns, surrounded by a greenbelt”.¹¹⁷ (p. 4)

Population density would be kept low with each dwelling sitting on a large plot of land. Community members would cooperatively manage city affairs for the common good. Today, the garden city movement has evolved into one known as green urbanism or eco-urbanism¹¹⁸. Discourse on green urbanism has revealed seven dominant features¹¹⁹: (1) the renewable energy city; (2) the carbon-neutral city; (3) the distributed city; (4) the biophilic city; (5) the eco-efficient city; (6) the place-based city; and (7) the sustainable transport city. With

¹¹⁵ Noll, S.E.; Werkheiser, I. Local Food Movements: Differing Conceptions of Food, People, and Change. In *The Oxford Handbook of Food Ethics*; Barnhill, A., Budolfson, M., Doggett, T., Eds.; Oxford University Press: Oxford, UK, 2017; pp. 112–136. ISBN 9780199372263.

¹¹⁶ Sharifi, A. From Garden City to Eco-Urbanism: The Quest for Sustainable Neighborhood Development from Garden City to Eco-Urbanism: The Quest for Sustainable Neighborhood Development. *Sustain. Cities Soc.* **2017**, *20*, 1–16.

¹¹⁷ Sharifi, A. From Garden City to Eco-Urbanism: The Quest for Sustainable Neighborhood Development from Garden City to Eco-Urbanism: The Quest for Sustainable Neighborhood Development. *Sustain. Cities Soc.* **2017**, *20*, 1–16.

¹¹⁸ Sharifi, A. From Garden City to Eco-Urbanism: The Quest for Sustainable Neighborhood Development from Garden City to Eco-Urbanism: The Quest for Sustainable Neighborhood Development. *Sustain. Cities Soc.* **2017**, *20*, 1–16.

¹¹⁹ Newman, P. Green Urbanism and its Application to Singapore. *Environ. Urban. ASIA* **2010**, *1*, 149–170.

aims to mimic these systems, although at a larger scale¹⁰⁹¹¹⁰. On the social component of agroecology, Francis et al. argued that all actors in the food system, from producers to consumers, along with the energy and material flow, need to be considered in developing sustainable agriculture¹¹¹. With the food system becoming increasingly globalized, it is important to explore localizing food systems. Developing local, sustainable food systems is an important aspect in promoting the self-sufficiency of post-scarcity anarchism¹¹²¹¹³. Bookchin connected this to the spontaneity of ecosystems. As he would write, ecosystems spontaneously trend towards diversity and thus so should agricultural systems to better promote their ecological health; the ecology of a region would dictate the structure of the agricultural system. Agriculture would no longer be in contestation with nature but in cooperation. In localizing their food system, communities can better manage their own self-sufficiency¹¹⁴. Local food movements have been growing since the mid-twentieth century and those wishing

¹⁰⁹ Wezel, A.; Bellon, S.; Francis, C.; Vallod, D. Agroecology as a Science, a Movement and a Practice. A Review. *Agron. Sustain. Dev.* **2009**, *29*, 503–515.

¹¹⁰ Tomich, T.P.; Brodt, S.; Ferris, H.; Galt, R.; Horwath, W.R.; Kebreab, E.; Leveau, J.H.J.; Liptzin, D.; Lubell, M.; Merel, P.; et al. Agroecology: A Review from a Global-Change Perspective. *Annu. Rev. Environ. Resour.* **2011**, *36*, 193–222.

¹¹¹ Francis, C.; Lieblein, G.; Gliessman, S.; Breland, T.A.; Creamer, N.; Harwood, R.; Salomonsson, L.; Helenius, J.; Rickerl, D.; Salvador, R.; et al. Agroecology: The Ecology of Food Systems Agroecology: The Ecology of Food Systems. *J. Sustain. Agric.* **2003**, *22*, 99–118.

¹¹² Bookchin, M. *Post-Scarcity Anarchism*, 3rd ed.; Ramparts Press: Menlo Park, CA, USA, 1986.

¹¹³ Bookchin, M. The Meaning of Confederalism. *Green Perspect.* **1990**, *20*, 1–11.

¹¹⁴ Feenstra, G.W. Local Food Systems and Sustainable Communities Local Food Systems and Sustainable Communities. *Am. J. Altern. Agric.* **1997**, *12*, 28–36.

ecologically minded. A solarpunk society is a just society, not only for humanity, but for non-humanity as well. A solarpunk society is community-oriented and prioritizes the local over the global. A solarpunk society deconstructs power and promotes horizontalism. In an act of existential revolt, solarpunk subverts the nihilistic and ‘no future’ rhetoric of classic punk and replaces it with hope and optimism: optimistic that there is a future although drastic social change and resistance is necessary to reach it; optimistic that this imaginary can become a reality and stay as such. As a social imaginary, solarpunk can provide guiding principles to direct activism and governance towards building a better future for humanity and the Earth.

While there is movement in managing global issues, the future of humanity should not be hobbled together by a patchwork of governance strategies; instead, there needs to be an imaginary, a vision to build towards. Although, as some would argue, punk is dead, the nihilism towards the future remains permeated through society³¹³²³³³⁴. The dystopia became even more so. The individual became increasingly marginalized in so far as their labor was their only source of value to the system³⁵. Labor became synonymous with life. Where this dread was originally juxtaposed with a nuclear apocalypse, it has been replaced with another threat of annihilation: climate change³⁶.

³¹ Wallace-Wells, D. *The Uninhabitable Earth*; Tim Duggan Books: New York, NY, USA, 2017; Available online: nymag.com (accessed on 7 August 2023).

³² Malm, A. *How to Blow Up a Pipeline*; Verso: London, UK, 2021.

³³ Worley, M. *No Future: Punk, Politics and British Youth Culture, 1976–1984*; Cambridge University Press: Cambridge, UK, 2017; ISBN 9781316779569.

³⁴ Davies, J. The Future of “No Future”: Punk Rock and Postmodern Theory. *J. Pop. Cult.* **1996**, *29*, 3–25.

³⁵ Daggett, C. *The Birth of Energy: Fossil Fuels, Thermodynamics, and the Politics of Work*; Duke University Press: Durham, NC, USA, 2019; ISBN 9781478005018.

³⁶ Rockström, J.; Gaffney, O. *Breaking Boundaries: The Science of Our Planet*; Dorling Kindersley Ltd.: London, UK, 2021; ISBN 9780744028133.

The neoliberal machine lends itself to believe that it can solve the global ecological crisis, although astute observers generally see this as nonsense³⁷³⁸. Just like the original punks, it feels as if there really is no future to be had. You either become dehumanized within the growth economy or see everything collapse under climate change. Perhaps, however, it is time to subvert this notion. Afterall, punks want to subvert the status quo, and one would imagine that would include punk nihilism. Replace dystopia and dread with utopia and hope. Replace cyberpunk with solarpunk. Imagine a future where resistance to the system did result in widespread social change. Solarpunk imaginaries could guide this future. It could be that rallying cry to subvert the system and build a new one. Using solarpunk imaginaries as inspiration, this paper develops guiding principles of anarchism, ecology, and justice to support subverting the status quo and building a better future.

2. Solarpunk as an Anarchist Community

Themes of community, self-sufficiency, and post-hierarchy in the Solarpunk Manifesto indicate that solarpunk is inherently anarchist³⁹. Other solarpunk writings are much more explicit and directly reference anarchist and decentralist writers, such as Murray Bookchin, Peter Kropotkin, and Fritz Schumacher⁴⁰. Anarchism is a complicated philosophy with many different perspectives; however, they are bound

³⁷ Lamb, W.F.; Mattioli, G.; Levi, S.; Timmons Roberts, J.; Capstick, S.; Creutzig, F.; Minx, J.C.; Müller-Hansen, F.; Culhane, T.; Steinberger, J.K. Discourses of Climate Delay. *Glob. Sustain.* **2020**, *3*, 1–5.

³⁸ Stevenson, H. Reforming Global Climate Governance in an Age of Bullshit. *Globalizations* **2020**, *18*, 1–17.

³⁹ The Solarpunk Community a Solarpunk Manifesto. Available online: www.re-des.org (accessed on 1 April 2022).

⁴⁰ Owens, C. What is Solarpunk? Available online: solarpunkanarchists.com (accessed on 1 April 2022).

forecasted to come from renewable sources¹⁰⁴¹⁰⁵. During this time, the reliance on non-renewables has declined and is expected to continue to do so. The transition away from fossil fuels to renewables is well underway and thus solarpunk advocates would do well to facilitate a continued and more rapid transition. Localizing a renewable energy grid can also be a tool for promoting community self-sufficiency, with another tool being ‘agroecology’.

Agroecology is a broad category of scientific and social discourse, although it has two practical implementations¹⁰⁶¹⁰⁷: (1) the application of ecological theory to the design and management of replenishing food systems; and (2) the integration of the ecological, economic, and social dimensions of food systems. Indigenous and traditional farmers have applied their own ecological knowledge to agricultural systems for centuries¹⁰⁸. These agroecosystems tend to mimic their natural counterparts and in doing so promote crop productivity, protect biodiversity, resist pests, and have more efficient nutrient cycling. The ecological nature of agroecosystems supports the growth of multiple crop species, which promotes dietary diversity in the local community. Modern agroecology

¹⁰⁴ International Energy Agency. *Global Energy Review 2021*; International Energy Agency: Paris, France, 2021.

¹⁰⁵ International Energy Agency. *Renewable Electricity Growth Is Accelerating Faster than Ever Worldwide, Supporting the Emergence of the New Global Energy Economy*. Available online: www.iea.org (accessed on 28 March 2022).

¹⁰⁶ Wezel, A.; Bellon, S.; Francis, C.; Vallod, D. Agroecology as a Science, a Movement and a Practice. *A Review. Agron. Sustain. Dev.* **2009**, *29*, 503–515.

¹⁰⁷ Francis, C.; Lieblein, G.; Gliessman, S.; Breland, T.A.; Creamer, N.; Harwood, R.; Salomonsson, L.; Helenius, J.; Rickerl, D.; Salvador, R.; et al. Agroecology: The Ecology of Food Systems Agroecology: The Ecology of Food Systems. *J. Sustain. Agric.* **2003**, *22*, 99–118.

¹⁰⁸ Altieri, M.A. Linking Ecologists and Traditional Farmers in the Search for Sustainable Agriculture. *Front. Ecol. Environ.* **2004**, *2*, 35–42.

that a singular focus on humankind cannot”.¹⁰⁰ (p. 100)

In achieving a solarpunk future, governance must strive to follow the ontological views of eco-anarchism and post-humanism. Governance should shift from being anthropocentric to ecocentric, considering the needs of the biosphere over the needs of humanity. While this may be a long process, there are pathways for solarpunk proponents to follow in guiding global governance down this path, the first being renewable energy.

Indirectly, fossil fuels may be considered a form of human domination over nature. With their original purpose as an energy source, the burning of fossil fuels has led to catastrophic changes in the Earth’s climate¹⁰¹. Compared to the relatively stable conditions of the Holocene, ecosystems are under severe threat as they deal with a changing, unstable climate¹⁰². Given this, it is essential that fossil fuels be phased out as an energy source and replaced with renewable sources, such as wind and solar. In 2015, the share of renewables accounted for 19% of the global energy budget, rising an average of 0.17% per year from 2010¹⁰³. By 2020, the share of renewables had increased to 29%, and through to 2026, 95% of new energy capacity is

¹⁰⁰ Mignolo, W.D. Coloniality and Globalization: A Decolonial Take. *Globalizations* **2021**, 18, 720–737.

¹⁰¹ Wallace-Wells, D. *The Uninhabitable Earth*; Tim Duggan Books: New York, NY, USA, 2017; Available online: nymag.com (accessed on 7 August 2023).

¹⁰² Steffen, W.; Rockström, J.; Richardson, K.; Lenton, T.M.; Folke, C.; Liverman, D.; Summerhayes, C.P.; Barnosky, A.D.; Cornell, S.E.; Crucifix, M.; et al. Trajectories of the Earth System in the Anthropocene. *Proc. Natl. Acad. Sci. USA* **2018**, 115, 8252–8259.

¹⁰³ Gielen, D.; Boshell, F.; Saygin, D.; Bazilian, M.D.; Wagner, N.; Gorini, R. The Role of Renewable Energy in the Global Energy Transformation. *Energy Strateg. Rev.* **2019**, 24, 38–50.

together by a general rejection of hierarchy and domination⁴¹. Anarchism rejects authority and replaces it with values of horizontalism, decentralization, and mutual aid⁴². Although not all punks are anarchists, one could argue that all anarchists are punks. The ‘punk’ in solarpunk is derived from its anarchist leanings and intentions to create their own future. Solarpunk rejects the status quo and rebels against the hierarchies imposed by the neoliberal global order⁴³. Solarpunk anarchism is thus defined by two interconnected tenets: post-capitalism and post-scarcity anarchism.

It is not surprising that a utopian anarchist imaginary would reject neoliberal capitalism. Where anarchism rejects hierarchy and domination, neoliberal capitalism promotes it⁴⁴. In this way, capitalism is an antithesis to anarchism. Under capitalism, the working class is dominated by the capitalist class who exploit working class labor to accrue wealth⁴⁵. Fritz Schumacher, author of *Small is Beautiful: Economics as If People Mattered*, believed that the enormity of the industrial economy was at fault for the vast inequalities and poor state of living for much of the world⁴⁶. To Schumacher, it was a matter of scale; the industrial economic system had bloated itself through engorging human and natural capital. As it grew in size, the calculus of the economy shunned the human. The working class were to be automatons for the bourgeoisie

⁴¹ Williams, D.M. Contemporary Anarchist and Anarchistic Movements. *Sociol. Compass* **2018**, 12, 1–17.

⁴² Morris, B. *Kropotkin and the History of Anarchism*; Anarchist Federation: Glasgow, UK, 2008.

⁴³ The Solarpunk Community a Solarpunk Manifesto. Available online: www.re-des.org (accessed on 1 April 2022).

⁴⁴ Springer, S. *Fuck Neoliberalism*. Ashgate Res. Companion Crit. Geopolit. **2016**, 15, 147–164.

⁴⁵ Arnold, S. Capitalism, Class Conflict, and Domination. *Social. Democr.* **2017**, 31, 1–21.

⁴⁶ Schumacher, E.F. *Small Is Beautiful: Economics as if People Mattered*; Blond and Briggs: London, UK, 1973.

with their sole purpose being to provide labor for production. The dehumanizing of the economy, as argued by Schumacher, was not an unintended consequence of the modern economy, but instead was its foundation. Industrialization set a clear hierarchy with the proletariat and nature being subservient to production and the bourgeoisie.

Kropotkin, an early anarchist writer, emphasized that as a social movement, anarchism was born amongst the working class in an attempt to protect themselves from a power-seeking minority^{47,48}. While there are measures within the neoliberal system (i.e., unions, state institutions, etc.) to diminish class inequality, they are far from perfect. A 2017 study demonstrated that between 1975 and 2010, relative global inequality between states fell, whereas absolute inequality rose⁴⁹. Excessive exploitation of human capital condemns billions of people to live with high levels of scarcity, an outcome modelled into capitalist calculations⁵⁰. As Murray Bookchin would write:

“A century ago, scarcity had to be endured; today, it has to be enforced—hence the importance of the state in the present era”.⁵¹ (p. 34)

In response to the artificial scarcity enforced under neoliberal capitalism, Murray Bookchin proposed ‘post-scarcity anarchism’ as a possible solution⁵².

⁴⁷ Morris, B. *Kropotkin and the History of Anarchism*; Anarchist Federation: Glasgow, UK, 2008.

⁴⁸ Kropotkin, P. *The Conquest of Bread*; Tresse et Stock: Paris, France, 1892.

⁴⁹ Niño-Zarazúa, M.; Roope, L.; Tarp, F. Global Inequality: Relatively Lower, Absolutely Higher. *Rev. Income Wealth* **2017**, *63*, 661–684.

⁵⁰ Arnold, S. Capitalism, Class Conflict, and Domination. *Social Democr.* **2017**, *31*, 1–21.

⁵¹ Bookchin, M. *Post-Scarcity Anarchism*, 3rd ed.; Ramparts Press: Menlo Park, CA, USA, 1986.

⁵² Bookchin, M. *Post-Scarcity Anarchism*, 3rd ed.; Ramparts Press: Menlo Park, CA, USA, 1986.

“above or apart from nature but has become an active force of nature, forcing an integration of social and planetary systems into a global ‘social order’”.⁹⁷ (p. 100)

Morally and ontologically, it removes humanity as the foci and instead acknowledges the right of non-human nature to exist outside the domain of human evaluation. An important tenet of post-humanism is providing agency to non-humans and the biosphere, which is otherwise lost when humanity is centered in governance⁹⁸. In challenging the anthropocentric nature of global governance, McDonald proposed an ecological security discourse...

“oriented towards ecosystem resilience and with it the rights and needs of the most vulnerable across time, spaces, and species.”.⁹⁹ (pp. 173)

Burke and Fishel further suggested an ontological foundation for planetary security, asserting:

“Our new materialist ethic asserts the need for human institutions to acknowledge the independent agency, power and flourishing of non-human lives and ecosystems, and grounds its ethics there. This provides an ecological awareness and a material focus on earth’s systems and their interrelatedness

⁹⁷ Burke, A.; Fishel, S. From Human Environment to Post- Human Earth: Troubling the Nature/ Culture Divide in the Stockholm Declaration. In *Anthropocene (In)Securities*; Lövbrand, E., Mobjörk, M., Eds.; Stockholm International Peace Research Institute: Stockholm, Sweden, 2021; pp. 99–116. ISBN 9781119130536.

⁹⁸ Cudworth, E.; Hobden, S. Of Parts and Wholes: Beyond the Human. *Millenn. J. Int. Stud.* **2013**, *41*, 1–21.

⁹⁹ McDonald, M. Climate Change and Security: Towards Ecological Security? *Int. Theory* **2018**, *10*, 153–180.

tities, but that it is the right of the first to dominate the second. Solarpunk writings and imagery depict a human society reintegrated with nature^{89,90}. The ‘solar’ in solarpunk thematically connects humanity back to its roots, with the sun being the primary source of energy⁹¹. Prior to the discovery of fossil fuels, a community’s energy budget was entirely dependent on solar radiation and plant photosynthesis. Unsustainable practices (i.e., over-use) would lead to their collapse^{92,93}. Fossil fuels mitigated such dangers by supporting the industrialization of food systems, although now it is leading to the degradation of the biosphere⁹⁴. Thus, for the realization of a solarpunk future, the full-scale domination of nature must end. This rhetoric lends itself to the discourses on eco-anarchism and post-humanism.

Striving for a ‘free ecological society’, eco-anarchists believe in freedom for both human and non-human life to flourish⁹⁵. For this to pass, humanity must end any domination over non-humans. In contrast to Cartesian dualism, eco-anarchists ontologically view humanity and nature as one interconnected whole⁹⁶. This ontological view is one shared by proponents of post-humanism. Post-humanism claims that humankind is neither...

⁸⁹ Missolivialouise Land of Masks and Jewels. Available online: missolivialouise.tumblr.com (accessed on 1 April 2022).

⁹⁰ The Solarpunk Community a Solarpunk Manifesto. Available online: www.re-des.org (accessed on 1 April 2022).

⁹¹ Wrigley, E.A. Energy and the English Industrial Revolution. *Philos. Trans. R. Soc.* **2015**, *371*, 1–10.

⁹² Diamond, J. *Collapse: How Societies Choose to Fail or Succeed*; Viking: New York, NY, USA, 2005; ISBN 0670033375.

⁹³ Garlinghouse, T. Rethinking Easter Island’s Historic ‘Collapse’. *Sci. Am.* 2020. Available online: www.scientificamerican.com (accessed on 7 August 2023).

⁹⁴ Gowdy, J. Our Hunter-Gatherer Future: Climate Change, Agriculture and Uncivilization. *Futures* **2020**, *115*, 1–9.

⁹⁵ Clark, J. What is Eco-Anarchism. *Ecol. Citiz.* **2020**, *3*, 9–14.

⁹⁶ Ingalsbee, T. Earth First! Activism: Ecological Postmodern Praxis in Radical Environmentalist Identities. *Sociol. Perspect.* **1996**, *39*, 263–276.

The concept of post-scarcity is straightforward. A technology of abundance exists today (e.g., automation) that upon further development can completely supply all social needs, along with providing a degree of luxury⁵³. No longer would production occur for the sake of production, nor consumption for the sake of consumption, but instead the economy would prioritize the security and welfare of all. Artificial scarcity would hypothetically cease to exist. Whereas modern automation weakens the proletariat, in a post-scarcity society, automation provides the means to support their growth and livelihood^{54,55}. Part of this process would be the abolition of private property⁵⁶. Once accomplished, the wage system would collapse, and the proletariat would be emancipated from capitalist dominion. Labor would be limited to any necessities left unproduced by automation, and leisure would constitute the majority of one’s time. Under these new conditions, the human psyche would be free for self-expression and creativity, a freedom otherwise lost under the mindless labor of industrial production. Per Kropotkin, for example, an individual wishing to own a piano could in theory associate with carpenters as part of their collective leisure to build one. Individuals would have the freedom to pursue their passions⁵⁷.

Harkening to Marxist ideals, post-scarcity anarchism requires the complete abolition of the state⁵⁸. In deviation

⁵³ Bookchin, M. *Post-Scarcity Anarchism*, 3rd ed.; Ramparts Press: Menlo Park, CA, USA, 1986.

⁵⁴ Schumacher, E.F. *Small Is Beautiful: Economics as if People Mattered*; Blond and Briggs: London, UK, 1973.

⁵⁵ Bookchin, M. *Post-Scarcity Anarchism*, 3rd ed.; Ramparts Press: Menlo Park, CA, USA, 1986.

⁵⁶ Kropotkin, P. *Anarchist Communism: Its Basis and Principles*; Freedom Press: London, UK, 1927.

⁵⁷ Kropotkin, P. *The Conquest of Bread*; Tresse et Stock: Paris, France, 1892.

⁵⁸ Kropotkin, P. *Selected Writings on Anarchism and Revolution*, 3rd ed.; Miller, M.A., Ed.; The MIT Press: Cambridge, MA, USA, 1975.

from Marx, however, anarcho-communists would argue that a transitional, revolutionary state (e.g., state socialism) is as equally dangerous as a capitalist state given it consolidates power and authority to a few who may not relinquish such power. Thus, a post-scarcity anarchist society would require the complete dissolution of the state through revolution and the establishment of a network of decentralized communities⁵⁹. Each community would be carefully tailored to the characteristics of its region with the intention of replacing the oppressive urban sprawl of modern cities⁶⁰. Given its anarchist philosophy, community governance is completely decentralized. Participatory, democratic assemblies vote on policy, while administrative bodies coordinate policy implementation whilst not conducting policy making themselves⁶¹. In rejecting hierarchy for participatory democracy, power is distributed horizontally across the community as opposed to the top-down approach prevalent in governance today^{62,63}. Confederated councils link these communities into a greater network with the goal of creating interdependence and self-sufficiency. While these communities may desire goods only available to them globally, theoretically these regional networks should produce and distribute enough resources for the contentment and survival of each other. This is not to say communities without local access to coffee, for example, should lose access to non-local goods, but instead communities should have self-sufficiency in their respective locality.

⁵⁹ Bookchin, M. The Meaning of Confederalism. *Green Perspect.* **1990**, 20, 1–11.

⁶⁰ Bookchin, M. *Post-Scarcity Anarchism*, 3rd ed.; Ramparts Press: Menlo Park, CA, USA, 1986.

⁶¹ Bookchin, M. The Meaning of Confederalism. *Green Perspect.* **1990**, 20, 1–11.

⁶² Springer, S. Fuck Neoliberalism. *Ashgate Res. Companion Crit. Geopolit.* **2016**, 15, 147–164.

⁶³ Bookchin, M. The Meaning of Confederalism. *Green Perspect.* **1990**, 20, 1–11.

percapitalism is a Marxist term to denote the growing ‘speed and intensity’ of the global flow of capital⁸³. Neoliberalism promoted the deregulation of the global market to allow for the free flow of capital and provides little opportunity for state intervention⁸⁴. The nature-to-commodity conveyor belt proliferated worldwide, leaving a lasting mark of domination on the ecosphere.

Capitalism is not all to blame for the present-day domination of nature. Seventeenth century philosophers, Francis Bacon and René Descartes, were highly influential in separating humanity from nature. A forefather of the modern scientific method, Francis Bacon considered nature to be a tool to be used by man to construct a better world for himself⁸⁵. Similarly, Descartes saw the potential for technology to help man better understand nature and one day become the “masters and possessors of nature”⁸⁶ (p. 35). To Descartes, nature was something to be controlled and tamed. Cartesian dualism, alongside the growing discourse on scientific method, empowered early European norms of global legalism and laid the foundation for modern Eurocentric global governance^{87,88}. Further facilitated by capitalism, European modernity was built on the notion that nature was a tool to be controlled by humanity, implicating not only that humanity and nature are distinct en-

⁸³ Vujnovic, M. Hypercapitalism. In *The Wiley-Blackwell Encyclopedia of Globalization*; Blackwell Publishing Ltd.: Hoboken, NJ, USA, 2017; pp. 1–3.

⁸⁴ Harman, C. *Zombie Capitalism: Global Crisis and the Relevance of Marx*; Bookmarks Publication: London, UK, 2009.

⁸⁵ Klein, J.; Giglioni, G. Francis Bacon. In *The Stanford Encyclopedia of Philosophy*; Stanford University: Stanford, CA, USA, 2020.

⁸⁶ Descartes, R.; Cress, D.A. *Discourse on Method and Meditations on First Philosophy*, 4th ed.; Cress, D.A., Ed.; Hackett Publishing Company: Indianapolis, IN, USA, 1998; ISBN 0872204219.

⁸⁷ Mignolo, W.D. Coloniality and Globalization: A Decolonial Take. *Globalizations* **2021**, 18, 720–737.

⁸⁸ Blaney, D.L.; Tickner, A.B. Worlding, Ontological Politics and the Possibility of a Decolonial IR. *Millenn. J. Int. Stud.* **2017**, 45, 293–311.

and pollination⁷⁸. These benefits inherently occur outside the market and yet there have been several attempts to determine their market value. Famously in 1997, a group of scientists estimated the average value of the entire biosphere at USD 33 trillion per year⁷⁹. An underlying assumption of these efforts is that the market will adjust accordingly to protect these systems over economic growth, but this has not been the case.

A conveyor belt is an often used but apt metaphor to describe the relationship between industrial capitalism and nature. Some piece of nature goes in, some form of production occurs, and a commodity pops out. Problematic within this process is the general undervaluation of ecological functioning^{80,81}. The functioning of the ecosphere is integral in protecting current life from catastrophic change, and when viewed as a commodity, the work and energy of the ecosphere is left unpaid. The value of the ecosphere in promoting human well-being is ignored behind dreams of economic growth. During commodification, any lost ecosystem functioning is labelled as an 'externality' and has been ignored throughout much of industrial history, with the true prize being the output commodity and subsequent economic growth⁸². The nature-to-commodity conveyor belt was amplified when global civilization entered a state of 'hypercapitalism', referred to as neoliberalism. Hy-

⁷⁸ De Groot, R.S.; Alkemade, R.; Braat, L.; Hein, L.; Willemsen, L. Challenges in Integrating the Concept of Ecosystem Services and Values in Landscape Planning, Management and Decision Making. *Ecol. Complex.* **2010**, *7*, 260–272.

⁷⁹ Costanza, R.; D'Arge, R.; De Groot, R.; Farber, S.; Grasso, M.; Hannon, B.; Limburg, K.; Naeem, S.; O'Neill, R.V.; Paruelo, J.; et al. The Value of the World's Ecosystem Services and Natural Capital. *Nature* **1997**, *387*, 253–260.

⁸⁰ Moore, J.W. The Rise of Cheap Nature. In *Anthropocene or Capitalocene?* PM Press: Oakland, CA, USA, 2016; pp. 1–52. ISBN 9781629631486.

⁸¹ Moore, J.W. *Capitalism in the Web of Life*; Verso: London, UK, 2015; ISBN 9781781689028.

⁸² Castree, N. Commodifying What Nature? *Prog. Hum. Geogr.* **2003**, *27*, 273–297.

Under ideal conditions, it is easy to dream that this future could come to be; however, with the global economy nested within the state system, complete social reconstruction will be difficult. Fortunately, there are policies for proponents of a solarpunk future to promote in guiding society towards this goal, the first action being 'degrowth'. Degrowth is a growing discourse that challenges the hegemonic nature of growth in the global economy⁶⁴. Comparable to the thoughts of Fritz Schumacher, advocates for degrowth believe the incessant need for economic growth has led to unnecessary losses in ecological and social welfare⁶⁵. Economic growth increases social happiness and welfare to a limit, whereas past that limit, growth provides diminishing returns. Growth past this point is socially and ecologically unsustainable. The goal of degrowth is to prioritize fulfilment over labor⁶⁶.

Achieving 'degrowth' will require drastic institutional change in the economy; however, it will require less than the complete social reconstruction to achieve post-scarcity anarchism. Proposals for degrowth include decoupling labor from the economy, work-sharing, work hour reductions, cooperative production and consumption, currency regulation, and basic income^{67,68}. Similar to post-scarcity anarchism, a primary goal of degrowth is to promote local self-sufficiency. As part of this process, degrowth can also be an avenue for proponents of solarpunk imaginaries to promote the empowerment of cities in international geopolitics. Cities have been gaining newfound authority and legitimacy on the global stage in

⁶⁴ Latouche, B.S. *Degrowth Economics*. *Monde Dipl.* **2004**, *11*, 3–7.

⁶⁵ Kallis, G. *Defense of Degrowth: Opinions and Manifestos*; Uneven Earth Press: Athens, Greece, 2017.

⁶⁶ Kallis, G. *Degrowth*; Agenda Publishing: Newcastle upon Tyne, UK, 2018; Volume 7, ISBN 9772081415.

⁶⁷ Kallis, G. *Defense of Degrowth: Opinions and Manifestos*; Uneven Earth Press: Athens, Greece, 2017.

⁶⁸ Sekulova, F.; Kallis, G.; Rodríguez-labajos, B.; Schneider, F. *Degrowth: From Theory to Practice*. *J. Clean. Prod.* **2013**, *38*, 1–6.

dealing with issues such as climate change and migration^{69,70}. Targeting city-level politics with policies promoting localization and self-sufficiency could go a long way in setting the foundation for a solarpunk future. In targeting policies that promote localization and degrowth, solarpunk advocates can start pushing society towards the conditions necessary to establish a post-scarcity anarchist society.

Deeply connected to concepts of post-capitalism, post-scarcity, and degrowth is ecological theory. It is difficult to imagine a future utopia where non-human life is exploited to the degree it is now. Thus, if the ‘punk’ in solarpunk refers to its anarchist foundation, then the ‘solar’ refers to the reintegration of human and ecological systems. The following section develops these themes as part of the guiding principles towards building a solarpunk future.

3. Solarpunk as an Ecological Community

The domination of capitalism extends well beyond the working class, extending to nature as well. As pre-modern economies transitioned from small, isolated markets into ‘one big market’ under industrial capitalism, there was a shift in market priorities. Where pre-modern markets prioritized household subsistence and redistribution, capitalist markets prioritize the production of goods for sale and the accrual of wealth^{71,72}. As part of this process, Karl Polanyi argued

⁶⁹ Thouez, C. Cities as Emergent International Actors in the Field of Migration: Evidence from the Lead-up and Adoption of the Un Global Compacts on Migration and Refugees. *Glob. Gov.* **2020**, *26*, 650–672.

⁷⁰ Hsu, A.; Cheng, Y.; Weinfurter, A.; Xu, K.; Yick, C. Track Climate Pledges of Cities and Companies. *Nature* **2016**, *532*, 303–306.

⁷¹ Block, F. Karl Polanyi and the Writing of The Great Transformation. In *Proceedings of the Karl Polanyi Conference*, México city, Mexico, 14–16 November 2001.

⁷² Gemici, K. Karl Polanyi and the Antinomies of Embeddedness. *Socio-Econ. Rev.* **2008**, *6*, 5–33.

that labor, land, and money were falsely commodified by the system in what he would call ‘fictitious commodities’⁷³. Polanyi believed society would collapse if markets were the sole mechanism governing these commodities and thus state intervention is necessary to prevent any market failures⁷⁴. If one were to generalize ‘land’ into ‘nature’ as a fictitious commodity, the relationship between capitalism and nature becomes clear.

Commodification is a highly nuanced term and can easily fall into a category of buzzwords to describe the ever-encroaching nature of capitalism into “every nook and cranny”⁷⁵ (p. 278). It is often depicted as a physical transformation, where one object is converted into a commodity for market distribution, although this not always the case. Generally, the process of commodification implies that a whole class of goods or services are converted for sale, and not just a single instance of a class⁷⁶. Inherent in this process is that the value of a commodity is not intrinsic and must be assigned by the market. For nature, evaluation is simple. Value is primarily assigned based on the benefit it provides to humans⁷⁷. In Western science, the functioning of the ecosphere is still described in market terms though its depiction as goods and services, such as atmospheric regulation, biodiversity,

⁷³ Block, F. Karl Polanyi and the Writing of The Great Transformation. In *Proceedings of the Karl Polanyi Conference*, México city, Mexico, 14–16 November 2001.

⁷⁴ Gemici, K. Karl Polanyi and the Antinomies of Embeddedness. *Socio-Econ. Rev.* **2008**, *6*, 5–33.

⁷⁵ Castree, N. Commodifying What Nature? *Prog. Hum. Geogr.* **2003**, *27*, 273–297.

⁷⁶ Castree, N. Commodifying What Nature? *Prog. Hum. Geogr.* **2003**, *27*, 273–297.

⁷⁷ Mitchell, A. Only Human? A Worldly Approach to Security. *Secur. Dialogue* **2014**, *45*, 5–21.