

SOLARPUNK 2050

By Liam Landon, UC Berkeley, Class of 2024

*Mycelium, the earthly web,
it constructs soil and breathes life*

*into dying matter; a microcosm
of what we know and do not know
about cooperation and intimacy,*

*kinship and mutuality, friendship
and community, healing and sustenance.*

-Alison Hawthorne Deming

"Mycelium is the ultimate sustainable technology. It operates on solar energy, is self-replicating, and self-assembling, and has been doing so for millions of years."

-Paul Stamets, American Mycologist

In researching this project, I spent a significant amount of time not only looking into the impressive work already funded by the Solar Energy Technologies Office (SETO), but also at the Solarpunk movement as a whole, and I became enamored with the countless ways that SETO was helping realize the Solarpunk vision. Solarpunk, like any other niche literary and artistic movement, is incredibly dynamic and abstract. However, this movement is particularly versatile due to its grounding in reality. Solarpunk oozes hope and optimism but doesn't let that blind itself to the harsh realities of technological limitations, economic pressures, and, most importantly, systemic inequity. SETO's projects jumped out to me as the real-world solutions to the barriers standing in the way of the idealized vision pervasive in Solarpunk writing, music, and architecture. Solarpunk art and the overarching goals of the SETO are a perfect match.

The connection between Solarpunk and SETO was obvious, but any realization of their shared goals appeared to require fundamental change to the 'behind-the-scenes' energy economy of the United States. The way SETO proposes integrating and expanding solar power in the U.S. in their *Solar Futures Study* struck me as remarkably similar to the way that the extensive, interlinked mycelium networks function in the soil of old growth forests. The mycelium of these dense, ancient forests connects trees and other living organisms into a large network that can communicate, share resources, and collectively evolve in a way that has clearly demonstrated itself to be sustainable. The mycelium performs roles as a decomposer and a food source, cleaning and nourishing the forest at the same time – similar SETO's proposed role of solar power by 2050.

My submission to the ORISE Solarpunk Futures competition utilizes the unifying theme of mycelium and mushroom architecture to visualize the ways in which new solar technologies could realistically, equitably, and artistically be implemented into society. This piece takes the findings and goals of the *Solar Futures Study* literally, depicting what a cityscape might look like by 2050, the year in which SETO predicted solar power could potentially account for 45% of the U.S. power economy. The title is a reference to the popular video game and television series produced by CD Projekt RED, *Cyberpunk 2077*, thus dubbing our vision, *SOLARPUNK 2050*.

Solarpunk media typically shows modern-looking buildings that have sprawling vines and greenspace covering the concrete walls and expansive skyscrapers of futuristic cities. I wanted to take that style one step further by integrating not just plant life but also solar technology seamlessly into the modern architectures slowly growing across urban centers all over the country. *SOLARPUNK 2050* doesn't depict impossible architecture or a complete re-imagining of city planning, but instead looks at how the technologies funded through SETO could naturally integrate into the cities that already exist.

Assuming a near perfect optimization of photovoltaic technologies by 2050, almost every application of solar panels will be dual-use. Street lamps and stop lights will be entirely self-sustaining through solar power, and all roofs will be actively contributing to the amount of usable energy in our power grid. Larger buildings would provide space for concentrating solar power (CSP) dishes to collect energy and utilize their large surface area to generate power using photovoltaic windows. The electrification goals of SETO require that public and private solar panels are all connected to the same power grid. Every building consuming energy is also putting energy back into the grid, contributing to an incredibly reliable, sustainable, and healthy energy economy.

SETO also places an emphasis on the equitable implementation of solar energy into urban centers and communities. In order for solar energy to be accessible for everyone it must be implemented in a way that is community driven. In this regard, SETO's research is finding new ways to lower the cost of solar energy materials, minimizing manufacturing costs, and incentivising local authorities to invest in installing solar power. SETO's research takes this community- and equity-focused direction, and I wanted to represent that by demonstrating the ways that public properties such as parks and shopping centers can seamlessly incorporate solar technologies. Umbrellas, awnings, chain-link fences, and even basketball backboards that contribute to generating power for more street lamps at night or a public wifi network for the park are all small scale examples that could easily be implemented and beneficial to communities. I love that SETO has this type of vision for the future of solar power, and I believe that this start at the local community level will lower the barrier to entry for low- to middle-income families to make their own investments in solar power.

Bibliography

1. Enchanted Living Magazine. "SolarPunks: Brave and Beautiful New World." Enchanted Living Magazine, 2 Sept. 2020, <https://enchantedlivingmagazine.com/solarpunks-brave-and-beautiful-new-world/>.
2. Builtin. "What Is Solarpunk? A Guide to the Eco-Friendly Science Fiction Genre." Builtin, 18 Sept. 2020, <https://builtin.com/greentech/solarpunk>.
3. Reddit. "New to Solarpunk? Start Here!" Reddit, 16 June 2021, https://www.reddit.com/r/solarpunk/comments/vb1ky1/new_to_solarpunk_start_here/.
4. World Building Institute. "Weight of Light: A Collection of Solarpunk Futures." World Building Institute, Arizona State University, 2019, <https://imaginationasu.wpenginepowered.com/wp-content/uploads/2019/02/Weight-of-Light-W.pdf>.
5. Wikipedia contributors. "Art Nouveau." Wikipedia, The Free Encyclopedia. Wikipedia, The Free Encyclopedia, 8 Apr. 2023, https://en.wikipedia.org/wiki/Art_Nouveau.
6. Solarpunk Druid. "Solarpunk and Art Nouveau." Solarpunk Druid, 12 Oct. 2020, <https://solarpunkdruid.com/solarpunk-article/solarpunk-and-art-nouveau/>.
7. FibreGuard. "Biomimicry in Architecture: How Designers Look to Nature for Inspiration." FibreGuard, 22 Oct. 2020, <https://fibreguard.com/blog/biomimicry-in-architecture-how-designers-look-to-nature-for-inspiration>.
8. Parametric House. "MycoTree: The World's First Natural Structure Using Mycelium." Parametric House, 7 Mar. 2019, <https://parametrichouse.com/mycotree/#:~:text=MycoTree%20is%20a%20spatial%20branching,weak%20material%20in%20compression%20only>.
9. ArchDaily. "Eco Boulevard in Vallecas / Ecosistema Urbano." ArchDaily, 17 Dec. 2008, <https://www.archdaily.com/6303/eco-boulevard-in-vallecas-ecosistema-urbano>.
10. National Renewable Energy Laboratory. "Solar Futures Study." U.S. Department of Energy, Energy.gov, 2019, <https://www.energy.gov/eere/solar/solar-futures-study>.