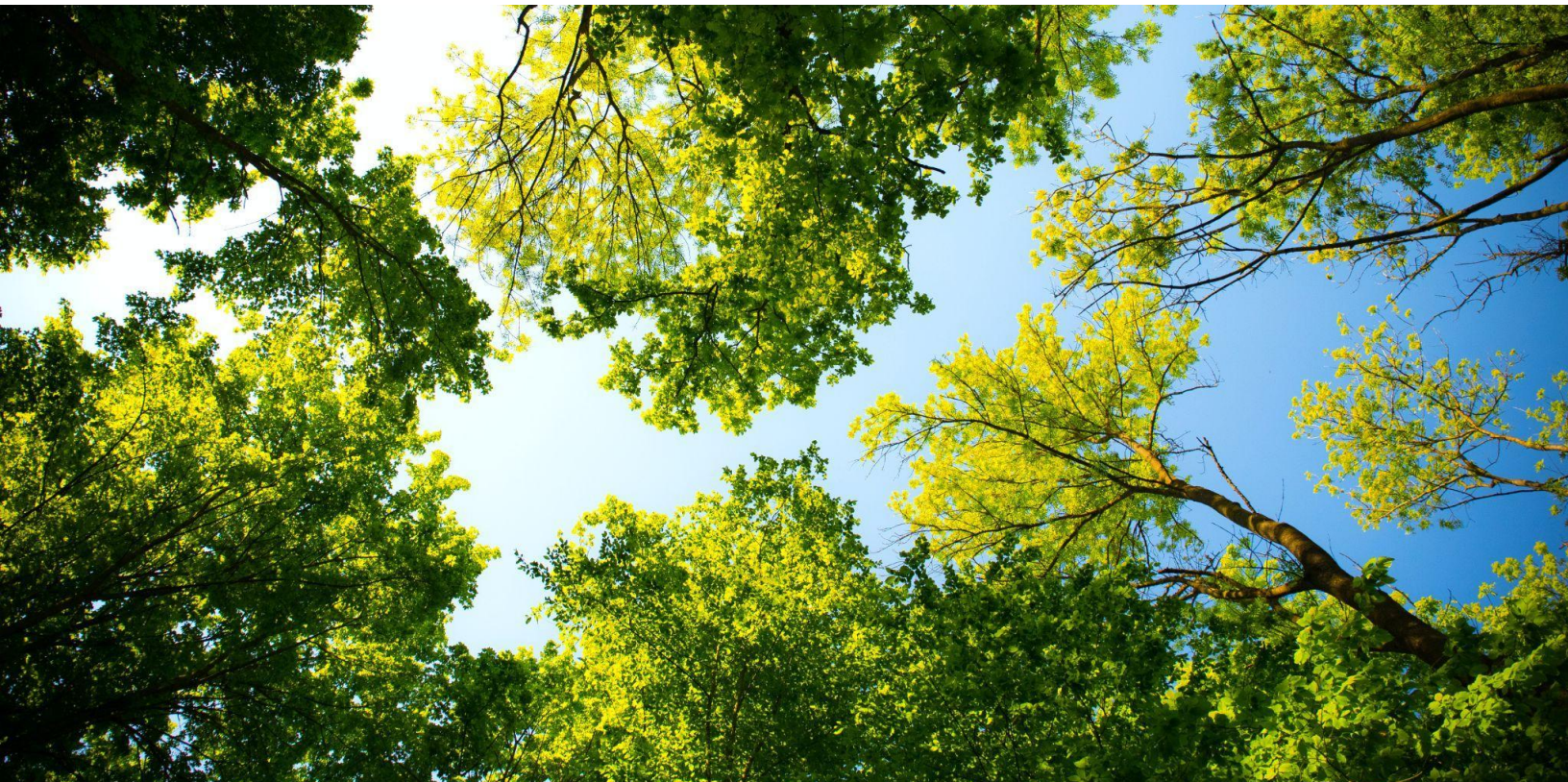


Sasvat Patel & Krish Mendapara

A Solar Solve: The **Green** Innovation to Pollution



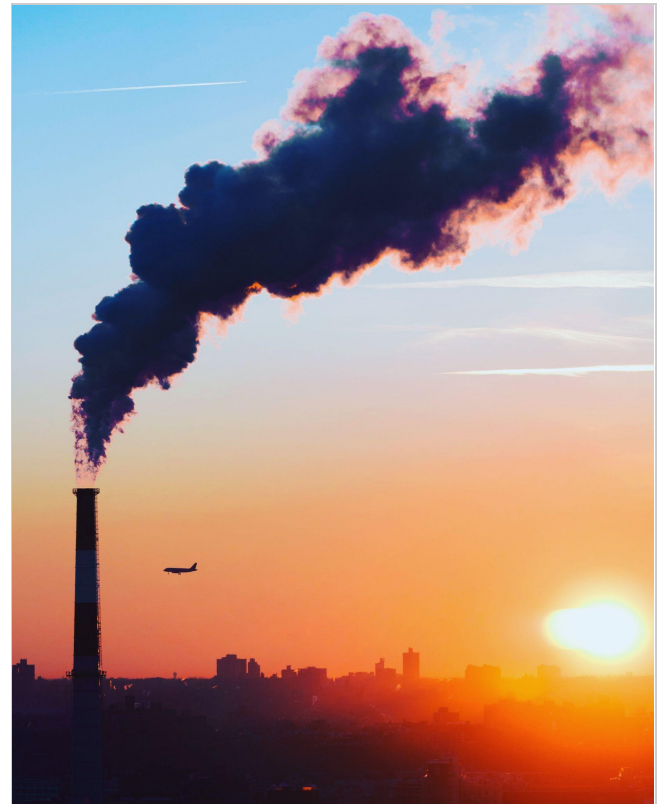
Scenery of Trees: Image taken from <https://www.pexels.com/photo/tall-trees-589802/>

Are natural solar panels the next move?

Since the dawn of the twenty-first century, new technologies have been rapidly emerging and have far augmented human intellect itself. However, our efforts are seemingly futile relative to the ever-increasing demand for energy. With heavy infrastructure developed for fossil fuels, we have relied on this form of energy, overlooking the consequences. Climate change may pose the greatest threat to human civilization itself. Therefore, finding alternative renewable energy sources may be the deciding factor in saving our planet and a point of no return. So how might we avoid this impending fate? Limited time restricts us from developing new methods. Therefore, our idea is to use solar panels. You must be thinking, solar panels already exist? What more can we do to improve them?

What is Pollution?

What is pollution exactly? Pollution is the introduction of harmful materials into the environment. These harmful materials are called pollutants. Pollutants are mostly artificial, produced when we burn fossil fuels. There are several types of fossil fuels such as natural gas, oil, coal, which all produce greenhouse gases (Carbon Dioxide, Methane, Nitrous Oxide). The burning of these gases reduces the ability for heat to escape Earth, warming the planet. Pollution even damages the quality of air, water, and land. It may produce muddy landscapes, poison soils, or kill plants and animals directly. Long-term exposure to air pollution can lead to chronic respiratory disease, and lung cancer among other diseases. All these changes in the planet's atmosphere are compiling into what we know as climate change, possibly the most devastating problem humankind has ever faced.



What is the new idea?

Plants have survived millions of years by using the sun to their advantage. They do this through photosynthesis, where they intake carbon dioxide and produce energy with oxygen as a byproduct. How might they do this? The answer to this is chloroplasts. The actual mechanics are far beyond the scope for now, in short, they use carbon dioxide and water and convert this into energy. Plants achieve this process by breaking down molecules, where the breaking of the molecular forces releases significant quantities of energy. Plants are rather good at this too. The interdisciplinary team of roboticists and biologists at IIT-Istituto Italiano di Tecnologia in Italy found that the average household plant is capable of generating enough energy to power 100 LED light bulbs simultaneously. So what if we created a solar panel made of chloroplasts to produce energy, using photosynthesis, water, and carbon dioxide (two plentiful resources) to produce energy and oxygen?

Why is this better?

Our efforts are gradually becoming futile to reverse climate change, emphasizing the importance of finding a solution to replace fossil fuels. With the limited time, we will have to use our innovation to elaborate on ideas already proposed. Experts have concluded that solar energy holds the highest potential to resolve our issues. A detailed report conducted by the National Renewable Energy Laboratory concluded that solar energy holds the most potential because of its reliability and ability to store energy for periods of time (to fill the energy gap at night). However, solar energy needs to be more favourable than fossil fuels if we want to convince the world to switch. Then it dawned on us. What if we were to use the world's best solar panel? Plants are the answer to this, who have flourished for millions of years using only the sun as energy. With plants, we kill two birds with one stone. Plants generate oxygen while intaking carbon dioxide, both reversing climate change and reducing pollutants.

Where can it be implemented?

A benefit of solar energy is that it can be implemented anywhere. This principle also applies to the plant-based solar panels proposed by scientists. A secondary benefit of the concept is that it will encourage plant growth. These new solar panels require chloroplasts. We cannot grow chloroplasts and must extract them from the original plant. When we extract the chloroplasts, it does not severely harm the plant, which will regrow them. Plants produce oxygen, which will help flatten the spike of pollution. One downside is that the plant-based solar panels are less efficient in colder climates, since more of the energy produced will be conserved as heat to sustain the plants. Another downside is that solar energy fields need large spaces to produce sizable quantities of electricity.



When can this be created, and How is it better?

Using technologies in fields such as microbiology and nanotechnology, we can already implement this concept. Although initially, the cost may limit investment, with future research and development, the price will decrease. The only waste products produced by plants are oxygen, water, and heat, which can all be recycled back into the environment.

Who will it affect?

Plant-based solar panels will benefit everyone, everywhere. Initially, however, this solution will appear detrimental, with the cost of making such technology more significant than fossil fuels and traditional solar panels. However, similar computers used to cost millions of dollars just mere decades ago. Today, with proper investment and research, we have expanded the scope of human intellect and augmented human intelligence itself using computers, which are now a quintillion times more powerful. The question now remains whether we can develop the technology fast enough to fulfill our desperation.



Sustainable Development Goals

This method of harnessing energy correlates to two prominent sustainability goals proposed by the United Nations. This includes a strategy to produce affordable, clean energy (7th goal). The other goal that this project fulfills is the 13th goal, because the idea encourages climate action and environmental sustainability by promoting plant growth and reversing the effects of climate change by both limiting fossil fuel usage and producing oxygen. All in all, this provides benefits to our health and the environment. We can help the ecosystems and help save Earth from further damage.

Works Cited

- Bassham, J. A. (n.d.). *Photosynthesis*. Encyclopædia Britannica.
<https://www.britannica.com/science/photosynthesis#:~:text=The%20process%20of%20photosynthesis%20is,six%20oxygen%20molecules%2C%20the%20products.>
- Camfil. (2018, February 9). Diseases caused by air pollution - risk factors and control methods.
<https://cleanair.camfil.us/2018/02/09/diseases-caused-by-air-pollution-risk-factors-and-control-methods/#:~:text=The%20most%20common%20diseases%20caused%20by%20air%20pollution%20include%20ischemic,lower%20respiratory%20infections%20in%20children.>
- CBC/Radio Canada. (2020, September 21). How Alberta - yes, Alberta - could lead Canada in wind and solar by 2025 | CBC News. CBCnews.
<https://www.cbc.ca/news/business/alberta-wind-and-solar-future-1.5728757#:~:text=Growth%20in%20Alberta's%20renewable%20energy,capacity%20as%20early%20as%202025.>
- Puiu, T. (2020, February 11). Your smartphone is millions of times more powerful than all of NASA's combined computing in 1969. ZME Science.
[https://www.zmescience.com/science/news-science/smartphone-power-compared-to-apollo-432/.](https://www.zmescience.com/science/news-science/smartphone-power-compared-to-apollo-432/)
- ScienceDaily. (2018, December 12). How plants can generate electricity to power LED light bulbs.
<https://www.sciencedaily.com/releases/2018/12/181212093308.htm#:~:text=Researchers%20discovered%20that%20plants%20can,power%20100%20LED%20light%20bulbs.>
- ThinkProgress. (2012, July 30). National Renewable Energy Laboratory: Solar Has The Most Potential Of Any Renewable Energy Source. ThinkProgress.
[https://archive.thinkprogress.org/national-renewable-energy-laboratory-solar-has-the-most-potential-of-any-renewable-energy-source-87da2c774fcc/.](https://archive.thinkprogress.org/national-renewable-energy-laboratory-solar-has-the-most-potential-of-any-renewable-energy-source-87da2c774fcc/)