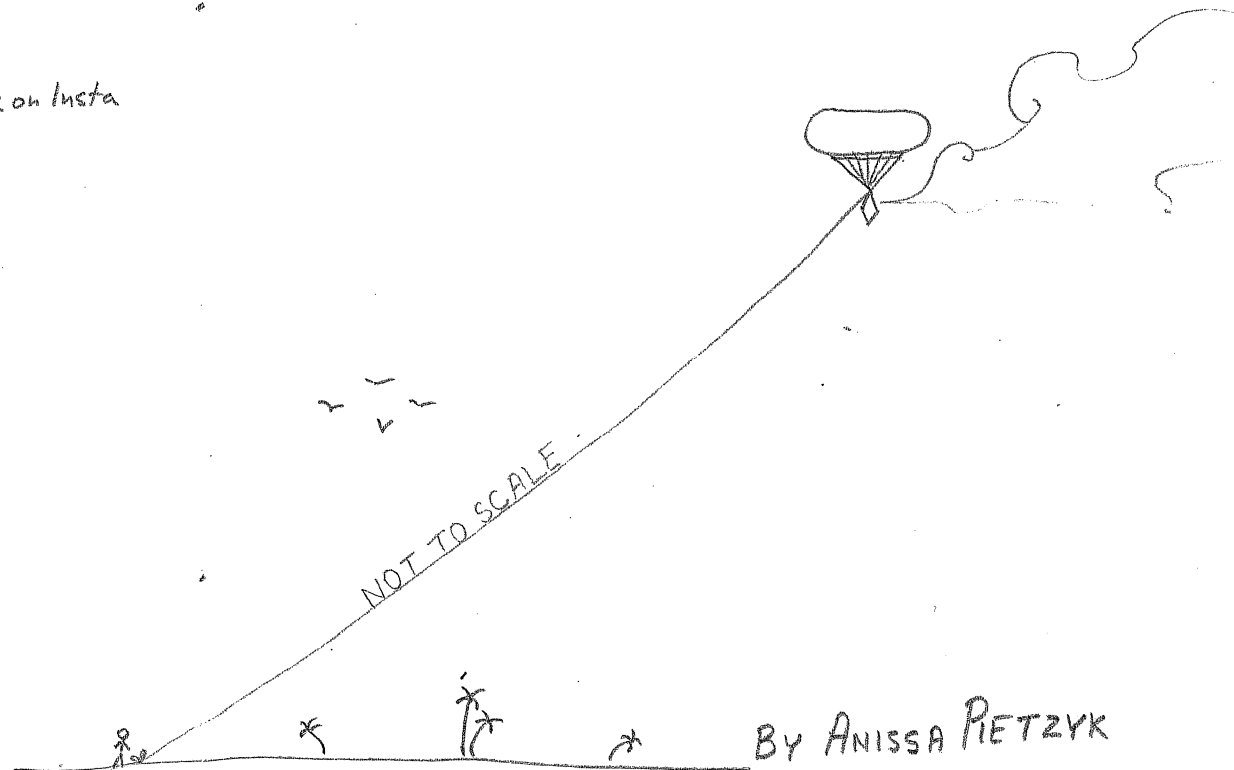


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What in the
Blue Sky
is SAI?



I have been hearing about global warming and greenhouse gasses since I was in elementary school. Hearing about it has become something of a routine, or better yet a practiced performance, in which we recount the mechanisms of the gasses, lament our participation in the cycle of destruction, and ponder over the popularized solutions to the problem.

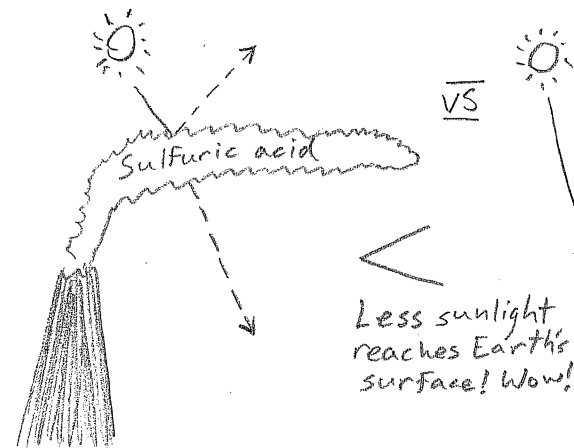


In my own experience, this conversation is exhausting. Especially where I come from in South Dakota, most people will shut down the topic of reducing emissions quickly, saying we heed our cars to get across the state, we can't afford to change the way our farm operates, etc. Which is fair, as someone from a small, relatively unwalkable city, I get it. Where I've noticed most South Dakotans re-enter the conversation is when the proposed "Fixes" for greenhouse gasses wouldn't require anything in their lives to change, prime example being SD's wonderful wind and hydroelectric programs. (U.S. Energy Information Association)

Where does that leave us? What can we do to handle living in a world where even the weather is controlled by money? Well, talking it out helps. Not just to get the feels out (although that is important), but also to exchange information communally. I didn't learn about SAI until earlier in 2026, despite Make Sunsets existing barely an hour away from my hometown! Doesn't this feel like something we should be talking about, especially given how little other world-shattering sci-fi stuff happens here (that's an exaggeration, lots of sci-fi stuff happens in SD every day if you know where to look)? The way I first heard about SAI was from this awesome popular science book by Ryan North called "How to Take Over the World," which is actually a really funny place to learn about trouble happening in your own backyard. Part of the reason the zine form you are holding in your hands is such an appealing way for me to write about this is because, much like SAI, zines are cheap to produce and easy to diffusely scatter in your community. By all means give this book to a friend when you're finished with it! Or, if you want some extra Anissa-Brownie-Points, cut out the binding and photocopy it as many times as you'd like! Also, if you don't want to cut your book, I'll have a printable PDF version on my website & socials on the back of the book. Or you can recycle this book/mulch it, both would please me greatly! Regardless of what you do with this book, thank you for reading it. It was cathartic to get all of this down in writing, and I hope you enjoyed it too! ♥

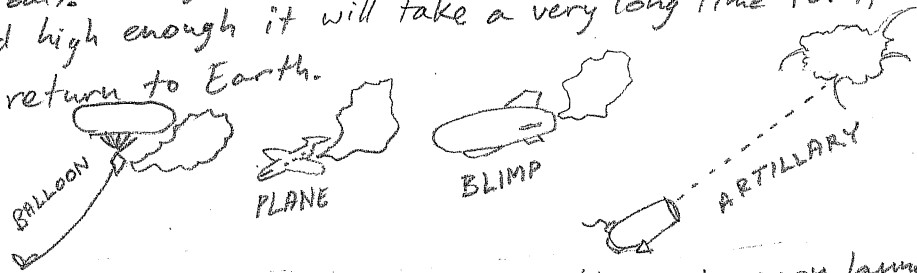
I'm not terribly afraid of these things yet, because if someone tried to use SAI on that scale we would more than likely hear about it. What scares me more is how easy it is for businesses like Make Sunsets to mess around with this stuff and get away with it. And seriously, let's call it what it is, business, made to make a profit. Every balloon they launch is profitable, the cost of each balloon being less than what investors are willing to pay them. The reason so many companies buy into SAI is because it allows them to put a cute green label on their product with a declaration that they are a product with a reduced carbon footprint. Yet now that we've looked under the hood it's pretty obvious SAI is just delaying the symptoms of these companies' emissions, which have continued to go on as if nothing has changed. It's quite like using a temporary comfort to distract from a larger incoming threat. At the end of the day Stratospheric Aerosol Injection feels like putting a bandage on wound that still needs treated for an infection. Not to beat a dead horse, but I'm also afraid of what might happen if we started using SAI on a large scale, then decided to stop. Would the sudden heat to a world that had gotten used to the cold be the end of us? I don't know! No matter how good the future models and projections are, we just can't know for sure until we watch it happen with our own eyes!

A developing solution that has been pretty heavily researched for the past couple of years is Stratospheric Aerosol Injection or SAI for short. For those words to make sense, first you need to know a bit about volcanic winters, which are actually pretty neat, in my opinion. The long and short of it is that once in a blue moon a volcano will erupt super high into the atmosphere, with the just right type of aerosols, that the aerosols will become suspended in the stratosphere, AKA the SKY! By the way, aerosol here means when a liquid or solid particle is itty-bitty enough to become suspended in a gas, like those found in our sky. For this to work, our volcano's aerosol of choice must be sulfuric acid, because that sulfur component is what will increase our stratosphere's albedo, albedo just being the fancy word for how diffusely reflective a material is, diffusely just meaning the reflected light is scattered and isn't perfectly mirrored. I know that's kind of a lot, but in essence a volcanic winter is a long stretch of cool weather caused by sulfur in the sky reflecting some sunlight back into space before it can hit Earth's surface.
(Rafferty & Jackson)



Earth's Surface.
A historical example you may know is the Year Without a Summer, when Mount Tambora erupted and caused average global temps to drop 1°F. The visual effects are well documented by painters Casper David Friedrich & J.M.W. Turner. Plus Byron, the Shelleys, & Polidori used the weather as an excuse to write stuff I KNOW you've heard of.

Now, to get back on topic, what is Stratospheric Aerosol Injection? SAI is a man-made method for creating a relatively small-scale volcanic winter, without the typical risks associated with a fiery eruption. Sulfates are added to the stratosphere by way of tethered weather balloon (although planes, blimps, and artillery are also being investigated), and depending on factors like the weather and time of year, this aerosol can stay airborne for up to four years if the conditions are perfect (Geoengineering Global). The goal here is to deploy the sulfuric acid high enough it will take a very long time for it to return to Earth.



Also important to mention, it really matters where you launch this stuff. Anywhere you launch SAI there will be trade offs. The National Oceanic and Atmospheric Administration has found SAI most effective at 30° North or South Latitudes, but this could set back progress in repairing our ozone layer. They've also investigated launching near/on the equator, which could work, but would affect the weather & water cycle for people living nearby (NOAA). More on that later! Okay so in summary, SAI works by somehow somehow putting vast quantities of sulfur in the sky, higher than even a commercial plane flies. From there the sulfur works the same as when a volcano launches it, only now there are humans involved who are trying to reap the rewards of volcanic winter while avoiding the usual pitfalls of such a thing.

Plus, as depressing as it is to write about, I also think you should know about some of the dangerous side effects of SAI that I haven't brought up yet. I mentioned this earlier, but volcanic winters have historically had a lot of nasty side effects that could also easily be caused by SAI if calculations aren't perfect. The aforementioned Year without a Summer was also known as "Eighteen Hundred and Froze to Death" (National Park Service). The Australia sized aerosol cloud tanked crop production, and changed regional weather patterns for the worse. Floods were happening in areas without the infrastructure to handle them, and some American lakes were frozen all the way into July. Now, this isn't to say that SAI is inherently evil and plotting to do all these things. It would take a truly incredible feat of bad math to overdose the sky on Sulfates enough to cause this kind of damage.



Oh and you know what the best part of this is? SAI's effects are only temporary. How does this sulfur return to Earth? In the form of acid rain unfortunately. There is no winning here. :-

Alright, time to address the elephant in the room. By preventing some sunlight from reaching the Earth, our skies would turn a monotonous shade of white as if it were overcast, even on a cloudless day. In the same vein shadows would become muted, and lose their shape. I would try to appeal to your ethos and explain why, as an artist, I hate this, but I also just hate this as a human who, like most humans, lives on Earth! At this stage SAI isn't being used on a large enough scale to make a visual impact outside of the areas it is being tested. But, if you want a historical example of what this looked like, I would recommend looking up Caspar David Friedrich's painting "Two Men by the Sea" (1817), which was made during the Year without a Summer.



The writer's
rendition of
the artist's
rendition of
the Year
without a
Summer

And enough beating around the bush, I'm just gonna say it. SAI does not actually fix anything! Yes it can temporarily cool the Earth, but SAI fails to address why the Earth is warming up in the first place. It can be tempting to think that SAI, despite not "fixing" anything, is buying us time to find a solution to our emission problem. There's a catch: we already know the fix is to change human behavior to reduce emissions. SAI, more than anything, is creating an excuse to continue not doing anything, by masking the consequences of human irresponsibility behind a white sky.

At face value, I can understand why SAI is such a promising solution to people. It's the kind of solution that requires your money rather than your participation. And as far as geoengineering goes, this would actually be pretty cheap to pull off compared to what it would cost to electrify all vehicles, for instance. For just \$30 million, ^{you} could load your private jet with tonnes of SO₂, ^(IRVINE & HORTON) and pull this off over the weekend. As implied through my example, using SAI is considered a unilateral strategy, because it can be accomplished by a single company, nation, or self-motivated individual, and does not require any kind of global cooperation. Are you beginning to sense what kind of person might be interested in SAI? SAI is a really effective way to show off impressive cooling numbers in a short period of time at a low price point. The biggest example of this in recent years has been the geoengineering start-up company Make Sunsets, which is/has its headquarters in South Dakota, because of course SD is the state with lax enough legislation to let this happen. Don't get me wrong, I love my homestate, but we need to do better. Anyway, the reason I bring up Make Sunsets is because they demonstrate the relationship between money, cooling, and emission offsetting. As of writing this in October 2026, Make Sunsets sells "Cooling Credits" for \$10 per gram of SO₂. Their primary customer is other companies looking to offset their their own carbon emissions, who want to "improve" the climate without having to change their operation (Ellis). This is tangential, but do you know how Make Sunsets chose their name? It comes from the glamorous sunsets & sunrises that happen during volcanic winters, which fill the sky with an almost perfectly smooth blend of reds. But what about the rest of the day?

Imagine if the
sky were white not blue

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