

The Climate Solution

TECHNICAL SUMMARY

By Glenn Weinreb | Oct 24-2025

There are several techniques for solving problems, one of which is to break a problem down into component parts, and look for a solution. In theory, we can apply this to climate. Yet what are the component parts? Below is a summary, in no particular order.

The Excess Carbon Dioxide Problem

Today's atmosphere contains an additional 1130 billion of tons of carbon dioxide, relative to where it was 150 years ago. This causes the earth's average temperature to increase, due to the absorption of outgoing infrared radiation and short-term feedbacks (e.g., more heat leads to more water in air which causes more heat).

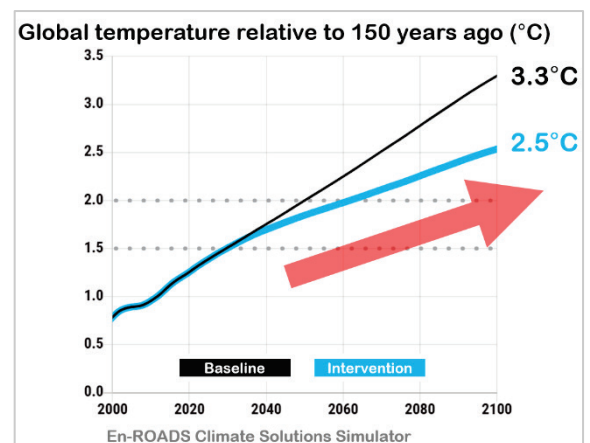
The Carbon Dioxide Emissions Problem

The 1130-billion-tons of excess *increases* by 38 billion tons each year due to carbon dioxide *emissions*. Put differently, the excess increases roughly 1/30th each year due to the burning of coal, oil and natural gas. The 38-billion-ton increase has little impact on the temperature of the planet, since global warming is primarily caused by the 1130 billion ton excess and other factors.

The Global Warming Problem

The MIT [En-ROADS](#) Climate Solution Software estimates future global temperatures in the event a global tax causes the price of fossil fuel to increase 4-fold. It estimates this would lower the projected end-of-century temperature from 3.3°C to 2.5°C, relative to where we were 150 years ago. Also, in both the baseline and intervention cases, the average global temperature keeps going up, as shown in the graph. This is sometimes referred to as “runaway climate change” or “the global warming problem.”

At first glance it might seem like the carbon dioxide emissions problem (i.e., 38 G_tCO₂/yr), and the global warming problem (i.e., 0.3°C/decade) are the same; however, they are different. Global warming is caused by many things, of which annual emissions only plays a small role.



Harm comes from global warming, not emissions. Yet government policy focuses on emissions, not warming. What does this mean? It means our society is solving the wrong problem, and will accomplish little.

The Reflecting-Sunlight-is-Bad Problem

The public has been lead to believe reflecting sunlight (“geoengineering”) is bad. However, it is needed to solve the global warming problem. Ultimately, scientists need to determine how to reflect sunlight at a reasonable cost and without harm.

The Journalism Problem

Journalists report on existing climate initiatives, yet do not explain what it takes to solve the entire climate problem. Also, they do not quantifying the impact of existing climate initiatives on global carbon dioxide emissions and on global warming. There are several techniques for doing this, such as the MIT software; however, this is largely ignored. Incomplete reporting has led to a lack of clarity by the public—which has led to wasted time and money.

The Unrealized Warming Problem

After emitting carbon dioxide into atmosphere, some warming occurs within several months due to the absorption of infrared radiation and short-term feedbacks. However, significantly more warming occurs over many years due to long-term feedbacks (e.g. melting sea ice, thawing permafrost, etc.).

More specifically, about 15% of warming occurs within a few months, 28% within five years, 28% over the next 100 years, and 28% over the next 1000 years. This suggests warming would still occur if *emissions* stopped completely in one day. Scientists refer to this as “unrealized warming” or “warming in the pipeline.”

The Acceleration Problem

The average global temperature was about 1.2°C above pre-industrial levels in 2022, and then it jumped 0.3°C in two years, to hit 1.5°C in 2024. For reference, the global warming *rate* was 0.18°C-per-decade between 1970 and 2010. In other words, global warming seems to be accelerating. Unfortunately, accelerating changes are also observed with sea ice, ocean currents, and thawing permafrost.

The Climate Tipping Point Problem

Climate tipping points are critical thresholds in Earth's systems that once crossed trigger abrupt changes. Like a row of dominoes, the toppling of one tipping point can unleash a cascade of effects accelerating the pace of climate change beyond our control. Tipping points are triggered by higher global temperatures; therefore, more warming puts us at risk of tipping point activation.

The Sea Ice Problem

The first tipping point to activate will probably be North Pole sea ice. After it melts, the average global temperature is expected to jump about 0.6°C. This is due to sunlight being absorbed by sea water, instead of being reflected by ice. After this, more tipping points are expected to activate.

The Air Pollution Cooling Problem

Sunlight reflects off air pollution and back into outer space—and this offsets global warming with cooling. Also, this presents us with an additional problem. If we stopped burning fossil fuel completely tomorrow, this cooling effect would go away, and the global warming *rate* would surge from 0.30°C-per-decade to roughly 0.45°C-per-decade.

The Methane Problem

Methane emissions also cause global warming.

The Prisoner's Dilemma Problem

In some cases, the green option costs less than the carbon option, and switching over is easy. While in other cases, the green option costs more, and switching over is less popular, especially at large scales. In these cases, the additional cost of the green product is referred to as the “green premium.” Unfortunately, consumers tend to avoid this so-called premium. This is because they do not benefit from reducing their own emissions—they are too small. Instead, harm comes from the collective emissions of our planet's eight billion people. For this reason, each person wants everyone else to reduce. In other words, it is in one's best financial interests to minimize their own climate costs, while encouraging others to act. Economists refer to this as a “prisoner's dilemma problem.”

The Lowest-Cost Incentive Problem

When the green option cost more (positive green premium), carbon dioxide emissions could be reduced at the lowest-cost to society by favoring initiatives with the lowest cost-per-ton-of-carbon-dioxide-emissions reduced (i.e., minimize \$/tCO₂). However, one's own emissions are too small to do harm to oneself. Therefore, there is no incentive to decarbonize at the lowest-cost. This leads to wasted money and wasted time, which puts us at risk of running out of money before achieving meaningful progress.

The Corporate Incentive Problem

Companies are often encouraged to reduce their carbon dioxide emissions. But in practice, they face two choices. They can either decarbonize for real, at high cost. Or they can appear to decarbonize, at less cost. For publicly traded companies, spending more on climate action usually means lower profit, which can push stock prices down. However, CEOs are expected to do the opposite. They are expected to increase profit and increase stock price. So many respond with token climate efforts designed to look good while keeping costs low. One common approach is buying carbon offsets. In theory, these pay for projects that

reduce emissions. But in many cases, they do not deliver as promised. For example, if a carbon offset blocks tree farmers from harvesting on one parcel of land, and trees are instead harvested elsewhere, there's no benefit. Ultimately, many CEOs need to select either more decarbonization and less profit, or less decarbonization and more profit. Too often they choose the latter option, in part because their decarbonization claims are rarely verified.

The GDP Growth Problem

When building up solar power, it eventually produces enough electricity to satisfy all customers when sunny. If one builds further, electricity is discarded due to supply from solar exceeding demand. In other words, eventually the amount of electricity from solar panels exceeds the amount of electricity consumed by customers. This is referred to as “solar saturation,” and at this point, solar construction stops. Ultimately there is a limit to how much decarbonization can be achieved with solar power. The same applies to wind power.

So what impact would global solar saturation have on global carbon dioxide emissions? Let's quantify. The sun burns bright about 6 hours out of every 24, which means we can get roughly 25% of our electricity from solar power (6/24). Also, roughly one-third of carbon dioxide emissions are from electrical power. Therefore, building up solar until saturation would *decrease* global carbon dioxide emissions by approximately 8% ($\frac{1}{12} = \frac{1}{4} \times \frac{1}{3}$).

Also, global GDP growth is approximately 3%-per-year, which works out to an 80% increase over 20 years ($80\% = 1.03^{20} - 1$). Therefore, global carbon dioxide emissions would *increase* 72% due to GDP growth and solar, if solar was built up over 20 years (80% - 8%).

The Hi-Jack Problem

Policymakers concerned about climate change often face what's known as “hi-jack.” This is when a different political group takes control of an issue to advance their own interests. For example, the U.S. Inflation Reduction Act ([IRA](#)) required builders of solar farms to buy U.S. made solar panels to qualify for subsidies. While this created U.S. jobs, it also raised the cost of solar electricity—ironically leading to higher carbon dioxide emissions. This policy came at a time when U.S. unemployment was at 4%, which is full employment. Adding jobs under such conditions can lead to labor shortages and rising wages, which is great for workers. Climate change employs few people relative to labor, manufacturing, and automotive—which makes it politically weak relative to other groups, which leads to hi-jack.

The Big R&D Problem

Universities typically focus on professor-sized projects, while companies typically focus on projects that provide a return on investment within a reasonable amount of time. But there's another type that is often overlooked. These are large-scale projects that exceed the capabilities of a university or a company. Examples include The Manhattan Project during

World War II, and the U.S. program that landed a man on the moon. In theory, a large R&D initiative could drive down the cost of 24/7 green energy and determine how to reflect sunlight without harm. However, this might not be considered since large initiatives are avoided by companies due to excessive risk, avoided by universities due to a reliance on professor-sized projects, and avoided by governments unless under extreme pressure. Ultimately, a reasonably-priced solution might exist, but without financial support. Bill Gates refers to this as “The Big R&D Problem.”

A Path to Solve the Entire Climate Problem

Now that we have broken the climate problem down into 17 different sub-problems, what is a reasonable path forward?

There is only one solution. It is Big R&D to drive down the cost of 24/7 green energy to below that of fossil fuel, to solve the emissions problem; and Big R&D to determine how to reflect sunlight at reasonable cost and without harm, to solve the warming problem.

Big R&D does not required require support from governments and companies, since a few funding sources can push it forward. In a sense, this is the opposite of what we are doing now, which is to expect all governments and all companies to incur additional costs when they don't benefit.

If Big R&D is the answer, why aren't we doing it?

Ultimately we have a communications problem—it is difficult to communicate this approach when surrounded by a sea of confusion.

The Last Great Hope

Unfortunately, our society does not have a plan to solve the climate problem. It does not evaluate the cost and impact of decarbonization initiatives. It does not have a mechanism that favors the lowest-cost approach. And no one feels responsible for solving the entire climate problem. Perhaps the last point is the most relevant. Can we make someone—or some organization—responsible for fixing this? And if so, what might that look like? We believe a climate laboratory that supports Big R&D might be the answer, and if this is true, it might be the last great hope of avoiding disaster.

Further Reading

What are the big ideas for solving the entire climate problem?

<https://www.aplantosavetheplanet.org/biv>

Decarbonization R&D Videos

<https://www.aplantosavetheplanet.org/drd>

Reflecting Sunlight Videos

<https://www.aplantosavetheplanet.org/rsv>

Climate Plan Videos

<https://www.aplantosavetheplanet.org/cpv>

Climate Lab Video Series

<https://www.aplantosavetheplanet.org/video>

United Nations Climate Lab Concept Paper (3-page PDF)

<https://www.aplantosavetheplanet.org/unclcp>

Climate Lab Business Plan (75-page PDF)

<https://www.aplantosavetheplanet.org/bp>

Sunlight Reflectivity Field Experiments (PDF)

<https://www.aplantosavetheplanet.org/sai>

Experiments that Measure How Much Sunlight Reflects off Aerosols (PDF)

<https://www.aplantosavetheplanet.org/ae>

Climate Plan Generation Website (PDF)

<https://www.aplantosavetheplanet.org/website>

Articles by Glenn Weinreb

<http://www.manhattan2.org/#articles>

A Plan to Save the Planet by Glenn Weinreb (free book)

<http://www.APlanToSaveThePlanet.org/pdf>

Climate Lab Video Series

How to Solve the Climate Problem [#0]

<https://www.youtube.com/watch?v=B5LZos40MOE>

Announcing The Climate Laboratory! [#1]

https://www.youtube.com/watch?v=7jB_xUTAGTE

Tackling Climate with More R&D [#2]

<https://www.youtube.com/watch?v=5IoAzcr5W-Y>

The Climate Lab Strategy [#3]

https://www.youtube.com/watch?v=9U1B_1wgpAo

What is Our Climate Plan? [#4]

<https://www.youtube.com/watch?v=aTzmZGHa9EM>

What does a Climate Plan Look Like? [#5]

<https://www.youtube.com/watch?v=IZLFWarYlbw>

The Climate Acceleration Problem [#6]

<https://www.youtube.com/watch?v=6r3Xag24iOI>

The Science of Global Warming [#7]

<https://www.youtube.com/watch?v=Por9aWKLdc4>

The Uncertainty of Climate Change [#8]

<https://www.youtube.com/watch?v=HoqX7uBaeKU>

Reflecting Sunlight [#9]

<https://www.youtube.com/watch?v=AJ-ddFDiA4w>

Can Air Pollution Save the Planet? [#10]

<https://www.youtube.com/watch?v=p402hv9tSDA>

Low-Cost Nuclear Power [#11]

<https://www.youtube.com/watch?v=AIlbovU67wI>

Automated Nuclear Power Construction [#12]

<https://youtu.be/af00cy117Qo>

How to Make \$10 Trillion Dollars [#13]

<https://www.youtube.com/watch?v=4gqmKGV1h5Y>