Solving Climate Change using the Monetary System

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Introduction

As evidence mounts that human activity is causing the ever warmer temperatures being seen around the world, we have not yet been successful at averting an impending global climate crisis. It was nearly a decade ago, in 2015, that world leaders promised to limit the rise of global temperatures to 1.5°C above pre-industrial levels in the long-term. In Feb 2024, the world reached the first year in which a global 1.5°C temperature rise was measured (1). In a May 2024 survey conducted by the Guardian of hundreds of IPCC scientists: 77% expect the global temperatures to rise above 2.5°C, and nearly half of them expect even a 3.0°C rise(2). The IPCC estimates the costs of damages from warming in 2100 for 1.5°C and. 2°C to be $54 and $69 trillion respectively (3).

Since the start of the industrial revolution, there has been an net increase of approximately 940,000,000,000 Tons (940 Gt) of Carbon Dioxide in the air, with estimated emissions reaching 40 billion tons annually as of 2020 (4). Therefore, simply focusing on emission reduction is not enough; we need to actively pursue carbon sequestration, actually removing the excess carbon dioxide from the air. This is very costly, and there is little or no political will in democratic societies to impose the necessary sacrifices on voters and taxpayers now for future benefits. In addition, efforts to tax and reduce emissions in one country cause companies to move and shift their emissions to other countries with fewer regulations. Reduction in demand in a few countries causes a reduction in the global prices for oil and gas which enables other countries to burn more fossil fuels because they can buy them at cheaper prices in the global markets.

There is a solution that can pay for the removal of carbon from the air, and one that wouldn't impact government budgets or cause increased taxation. In addition, it can administer global efforts, so that no individual nation has an unfair advantage over others. All this can be accomplished by using the power of central banks, such as the Federal Reserve or the European Central Bank (ECB) to create money, and this can be administered globally through the IMF, which is effectively the international central bank for central banks. Even though the IMF has been critiqued by some for its lending practices in developing countries in the past, it turns out that its governance structure with 190 member nations, is actually reasonably fair and democratic. It has 85% consensus voting, and It doesn't favour individual nations with special veto rights. Even nations that are global competitors, or combatants in war, are collaborating as part of the IMF. Without too much effort, the mandate of the IMF could be expanded to including financing and managing the process of global climate remediation.

In order to understand why this could actually be a solution that helps us to overcome the looming disasters of a destabilized climate, such as extreme weather conditions, floods and droughts, rising sea levels, mass migration, and shortages in global food production — some of which we have already started to experience in recent years — we need to gain a better understanding of why the current climate remediation efforts haven't been successful, as well as the role of central banks and how they manage the money supply, and ways we could redirect the global monetary system to provide the tremendous funds necessary to help us avert a global climate crisis.

The Limitations of Current Approaches

Let's review a few key reasons why the current climate remediation efforts have so far not been successful.

Non-binding national commitments

Non-binding national commitments for emissions reductions are often a part of international agreements and treaties, such as the Paris agreement. These commitments are voluntary pledges made by countries to achieve certain goals. However, because they are non-binding, there is no legal obligation or enforcement mechanism to ensure that countries adhere to these commitments. In the context of climate change, these non-binding commitments often involve pledges to reduce greenhouse gas emissions or implement specific environmental policies.

Off-set certificates allow emissions now with questionable savings later

For instance, an organization might release a certain amount of carbon dioxide into the atmosphere today, with promises to offset this by planting trees in the future. However, if these trees never grow to their full size, they won't be able to sequester the promised amount of carbon, making the offset certificate less effective than initially planned. In addition, it make little sense to off-set carbon that is taken permanently out of the earth, and off-set it with non-permanent tree planting or biological measures that may re-emit carbon after a few decades, because of forest fires, wood burning, or biological decomposition.

Reducing local emissions increases emissions elsewhere

This refers to a global phenomenon, sometimes called the "Green Paradox" described by German economist Hans-Werner Zinn, where reducing emissions in one world region can inadvertently lead to an increase in emissions elsewhere. This happens because as one region reduces its demand for oil, the global price of oil drops, encouraging other regions to increase their consumption, leading to more emissions. This concept underscores the need for global, coordinated action on climate change (5).

Cap and Trade Schemes may actually increase overall emissions

in Cap and Trade schemes, the government assigns quotas for carbon emissions to specific sectors of the economy and individual companies therein. If companies don't need the allocated emissions, then they can sell those emissions rights to other companies who need them. The intention is to allow market forces to determine the least costly form of emissions savings. However, if the initial cap on emissions is set too high, or if too many allowances are distributed to participating entities, the system may not create a sufficient incentive to reduce emissions, and it may in fact cause increased emissions because companies that would have reduced their emissions under a carbon taxation scheme, now have the ability to emit cheaper than before.

Fractured markets, no standards or economies of scale

The market for carbon sequestration projects is currently fractured, with little to no standards in place. In addition, patents are held by a large number of different entities world wide, which makes licensing of climate remediation technologies costly and

slow. This situation hinders the development of economies of scale, which are crucial for reducing costs and increasing efficiency in the sector. A unified approach to technical standards, uniform and easy patent licensing, greater market cooperation could help address these challenges.

Destabilizing democracies

Climate action, especially the implementation of effective policies to address global warming, often presents challenges in democratic societies. A key issue is the potential for such policies to destabilize democracies, particularly when they require significant sacrifices from the public.

Taxation and Climate Inflation

One of the primary means by which governments fund climate action is through taxation. However, this can lead to what is known as 'climate inflation,' an increase in the cost of living due to the implementation of climate policies. This inflation can disproportionately affect the poor, resulting effectively in a regressive form of taxation. As climate action becomes more urgent and the costs increase, this regressive impact can become more pronounced, leading to social unrest and opposition to climate policies, as well as nationalistic political movements that seek to undermine democratic processes.

Short-term vs. long-term decision bias

Another challenge is the short-term versus long-term decision bias inherent in democratic systems. Politicians are often more focused on the next election cycle than on long-term issues like climate change. This is because voters have a tendency to prioritize immediate needs such as food, housing, healthcare, and education, as well as issues like migration and safety, over long-term climate remediation efforts. This can hinder the implementation of effective climate policies and lead to a delay in action.

Social media echo chambers

The rise of social media and the creation of 'echo chambers' or 'information silos' also play a role in politicizing climate change and inhibiting action. These platforms often reinforce existing beliefs and prejudices, creating a non-fact based belief system that can fuel right-leaning, isolationist, and identitarian movements. These movements often oppose climate action, and even question that climate change exists, or that it is

man made, thereby creating a political disincentive for politicians to advocate for strong climate policies.

Large resources needed without government budgets or taxation

Addressing climate change effectively requires significant resources and long-term planning. However, the scale of the resources needed often exceeds what can be raised politically through government budgets and taxation alone. This presents a major challenge, as it requires innovative solutions and alternative sources of funding. Without these, the necessary climate action may be delayed or insufficient, exacerbating the impacts of climate change.

Reduction vs. sequestration

The inadequacy of focusing solely on emissions reduction

An analogy can be drawn between the climate crisis and a sinking boat. If a boat is leaking below the water line, it must sink, regardless of how small you make the hole. To keep the boat afloat, you must pump the water out. Similarly, while reducing emissions is crucial, it is not enough to address the climate crisis effectively. The climate will continue to destabilize as long as there is a net positive addition of carbon to the atmosphere. To truly solve the problem, we must actively remove the excess carbon that has already accumulated in the atmosphere. That process is called carbon sequestration.

Climate Change is like a sinking boat

TWO OBJECTIVES

01
Patch the holes

02
Pump the water out of the boat

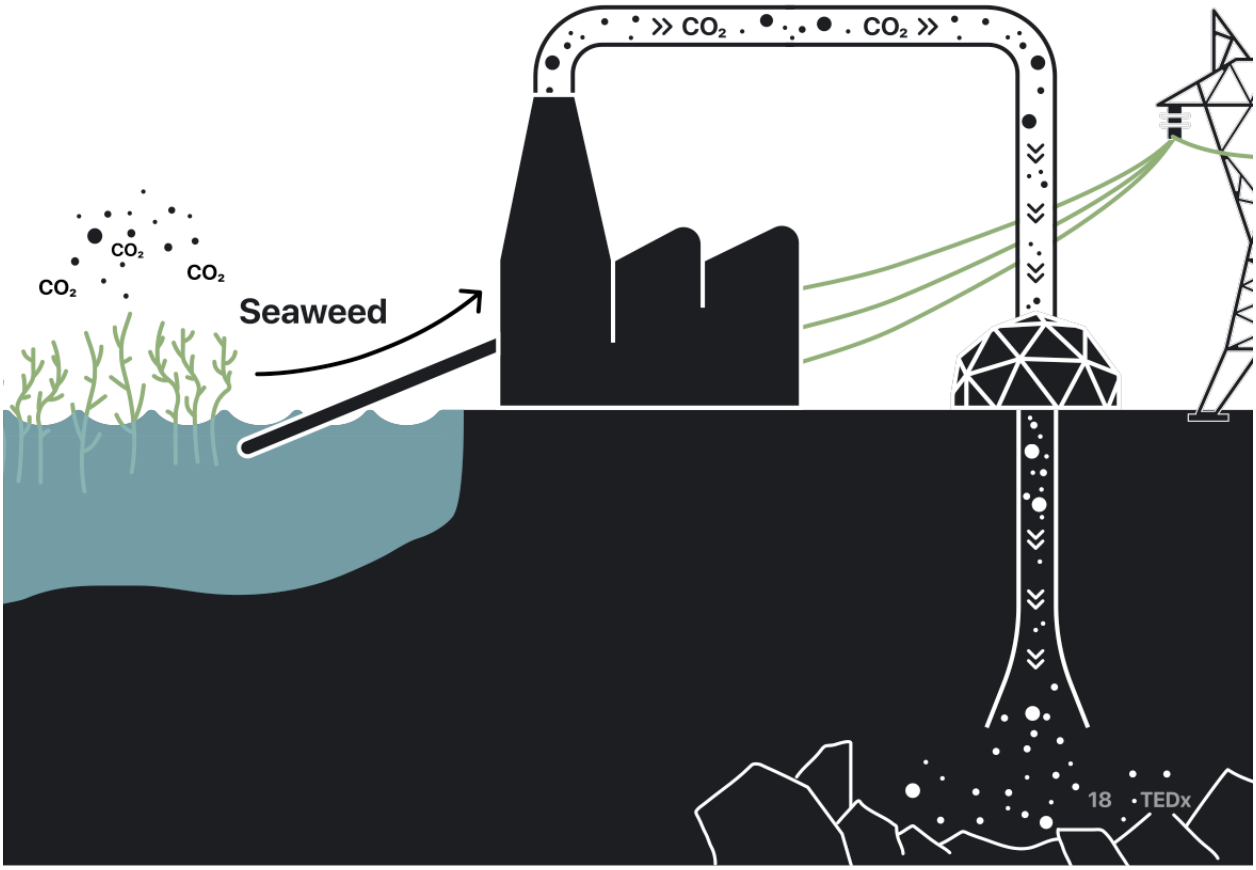
Natural carbon capture

Natural carbon capture, involves enhancing the ability of ecosystems to absorb CO2. This can be achieved through afforestation, reforestation, soil carbon sequestration, wetland restoration, and blue carbon sequestration by which coastal and marine ecosystems—like mangroves, algae, seagrasses, and salt marshes—capture and store carbon dioxide from the atmosphere in both the plants themselves and the sediment below them.

Technological carbon capture

Technological methods, on the other hand, use engineered systems to capture CO2. These can include carbon capture and storage (CCS), where CO2 is captured from point sources like power plants and stored in geological formations, direct air capture (DAC) where CO2 is removed directly from the atmosphere, bioenergy with carbon capture and storage (BECCS), and mineral carbonation.

Example of an integrated Approach to Climate Management: ABECCS - Algae Bioenergy Carbon Capture and Storage



ABECCS, or Algae Bioenergy Carbon Capture and Storage, is a process that uses algae to capture and store carbon dioxide. The algae, through photosynthesis, absorb carbon dioxide and produce biomass, which can be converted into bioenergy. The remaining carbon is stored permanently as mineralized carbonates in geological formations, effectively reducing greenhouse gas emissions from the air. This method combines carbon sequestration with renewable energy production, providing a sustainable solution for both climate change mitigation and energy needs.

Quality of carbon sequestration mechanisms

Not every ton of sequestered carbon is equal, and frequently large corporations play games, commonly known as “green washing”, to enhance their consumer brands by claiming “net zero” emissions. They “offset” current fossil fuel emissions with future

savings in emissions or removal of carbon from the air, which may or may not create a net positive change in the long run (6).

When assessing the quality of carbon sequestration mechanisms, several key factors are often considered:

1. **Volume:** The capacity of a carbon sequestration project to absorb and store carbon dioxide is a key measure of its effectiveness. This is typically measured in tons of carbon dioxide equivalent (CO2e) and can vary significantly depending on the type of project and the specific methods used.
2. **Energy:** The energy efficiency of a carbon sequestration project is a crucial factor. Projects should aim to minimize the amount of energy used in the sequestration process — for instance, in capturing and storing carbon — to ensure that the benefits of carbon reduction aren't offset by high energy consumption.
3. **Negativity:** Carbon sequestration is often seen as a "negative emissions" strategy — that is, a method that not only reduces emissions but actively removes carbon dioxide from the atmosphere. The degree of negativity, or the amount of carbon dioxide removed versus the amount emitted during the process, is a key measure of a project's impact.
4. **Permanence:** Permanence refers to the length of time that carbon remains stored once it's sequestered. This can range from years to centuries, depending on the sequestration method. For instance, carbon stored in forests may be released if the forest is cut down or destroyed by fire, while carbon stored underground in geological formations may stay there indefinitely.
5. **Additionality:** A carbon sequestration project demonstrates additionality if it results in a reduction in carbon emissions that would not have occurred in the absence of the project. This ensures that the project is not simply replacing or displacing other carbon reduction efforts, but is contributing to an overall decrease in global emissions.
6. **Specificity:** Finally, specificity refers to the ability to accurately measure and verify the amount of carbon sequestered by a project. This is critical for providing transparency and accountability, and for ensuring that the benefits of carbon sequestration are accurately reflected in emissions accounting and reporting.

By considering these factors, we can ensure that carbon sequestration efforts are effective, efficient, and contribute meaningfully to the goal of mitigating climate

change.

Central banks and the money supply

Independently managing the amount of money in circulation

Central banks (7), such as the Federal Reserve or the European Central Bank (ECB), are typically created outside of the immediate government structure to ensure their independence in making monetary policy decisions (8). This setup helps prevent political interference in economic decisions, allowing central banks to focus on long-term economic stability rather than short-term political gains. This is analogous to managing long-term climate stability instead of pursuing short-term political agendas.

Central banks have a mandate to manage a country's currency, money supply, and interest rates. They aim to ensure financial stability and foster economic growth by controlling inflation and avoiding deflation, regulating the banking system, and acting as a lender of last resort to financial institutions during times of financial distress. Central banks also manage the reserves of foreign currencies and gold in order to influence or stabilize the exchange rate of the national currency with foreign currencies with is important for a nation’s trade with other countries.

The money supply must be balanced in relation to the productivity of the economy. If too much money is in circulation then the economy experiences inflation in which prices for the costs of living increase, and savings lose their value. If the money supply is too limited, the economy experiences deflation where prices fall. While that sounds nice at first, deflation causes an economy to stagnate and reduce employment, because consumption and investments are continually deferred to the future when prices are expected to be lower. Most central banks attempt to achieve a slight inflation of no more than 2% per year. Again, this is remarkably similar to managing the amount of green house gases in the air. The amount of CO2 in the air must be balanced in relationship to the natural absorption of CO2 by biological processes. Just as too much money in circulation causes inflation which destabilizes the economy, too much green house gases in the air increase global temperatures and destabilize the climate.

Modern “fiat” based money is simply made up

The important thing to note for our discussions on financing climate remediation is that in the past money was created and backed by scarce physical resources, such as obtained by digging up gold or silver from the earth, or with modern crypto currencies, like Bitcoin, such as by “mining” new coins by spending electricity on useless computer calculations.

For modern currencies, like the US dollar, the euro, the Japanese yen, also known as “fiat” or faith based currencies (9), the nation’s central bank simply creates or invents the amounts of money that it wants to put into circulation. This is accomplished by lending that newly created money to governments and companies by purchasing their bonds in ”Open Market Operations”, and in the latter case, specifically in recent years, through “quantitative easing” (“QE”), or by lending it to commercial banks through a mechanism called the “discount window”, and allowing banks to lend a multiple of the bank’s money reserves as loans to their customers (“Fractional Reserve Banking”).

Sidebar: This “debt-based” issuance of money, requires that always more money is paid back as interest to the lending commercial bank or central bank, than was initially given as a loan. This is literally the root cause for forcing our global economy to constantly grow, which in turns causes an increasing rate of consumption of natural resources, such as clean air and water, soil fertility, habitat destruction, and bio-diversity, beyond the natural replenishment capacity of the plant. In 2023, the natural carrying capacity of the earth for that year was exceeded on Aug 3, sometimes call the “Earth Overshoot Day” (10).

The central bank regulates the money supply in circulation, by how many bonds it buys or sells in Open Market Operations, by the nations interest rates (”prime rate”, “discount rate”, or “federal funds rate”), and by the fractional reserve rate that banks must maintain in their own accounts when lending to customers, usually around 10% in the US.

Central banks - a solution for financing climate r

emediation?

In order to avoid the worst effects of climate destabilization, a large amount of economic resources — that means labor, technology, and capital, needs to be dedicated towards removing carbon from the air. This has to be paid for, but for the political reasons discussed above, it cannot come out of government budgets or taxation.

The solution is that instead of central banks putting money into circulation by effectively lending it with interest to governments, corporations (in many cases, actually oil companies), and banks, **why not spend it into existence, and inject it into the economy, by directly financing carbon sequestration initiatives, or lending money to companies that engage in climate remediation, such as through "Green Bonds"?**

Instead of creating money by extracting gold and silver from the earth, why not extract carbon dioxide from the air and permanently sequester it underground?

What does it actually mean "to spend money into existence"? It means, that the central bank directly or indirectly pays for large scale carbon removal activities, which creates jobs that pay employees money, which they then again spend on normal consumption, such as food, housing, healthcare, eduction, transportation, etc. which creates further jobs and further salaries, which again get spent on food, housing, etc. The same is the case with the technologies and machinery that are required for carbon removal. They also have to be manufactured by other companies, which again creates jobs, salary, and so on.

Spending money into existence though climate remediation by central banks, doesn't have to be the only way of creating and managing a nation's money supply. All the other traditional tools discussed above are still available for the central banks to manage the economy. However, if central bank spending on carbon sequestration becomes the primary means of money creation, then large sums of money and economic activity can be allocated to what is of long-term benefit to the whole nation. Again, central banks are in a unique position to execute long-term economic, possibly also climate, strategies as their independence shelters them somewhat from day-to-day political processes and short-term political thinking.

But we need a global solution...

This can really work, but there is just one problem. It makes little or no sense if the central banks of one country or a few countries do this, whereas other countries simply benefit from reduced carbon in the air and from the reduction in oil and gas prices, and simply buy and burn more cheap oil to fuel their own economies.

We need global coordination across all central banks world wide, and across all nations, even if these nations are in international competition, or even at war with each other. It turns out, that there is actually an international central bank of central banks, in which nearly all nations are members, and which has a sensible governance structure with fair distribution of voting rights and no inherent veto powers such as

those that commonly block the decisions of the Security Council of the United Nations. This central bank of central banks even issues its own currency which is the used globally by its member banks to manager there own foreign currency reserve holdings.

The IMF and its structure

The International Monetary Fund (IMF) (11) has faced criticism in the past, primarily because it requires austerity measures and balanced budgets from nations that it lends money to, which often causes a reduction in social services. The IMF is also associated by some with the predatory lending practices of industrial nations towards developing countries which favor the industries and financial institutions of lender nations, and cause excessive long-term debt service and interest payments of already struggling debtor nations. This criticism may very well be justified, and may lead people who care deeply about the environment and the climate to off-handedly disregard any solutions that would utilize central banks, the monetary system, and the IMF. However, the absolute truth is, that despite best intentions by many parties, current solutions to global warming are failing for many of the reasons described above. There is no easy way that magically changes human nature, political systems, and geopolitical competitions, in the timeframe required for us to avoid disaster. In order to avoid the very real consequences of climate change that include mass species extinction, extreme weather conditions, floods and droughts, rising sea levels, mass migration, and hunger through most of the developing world, it may be necessary for all of us to overcome even legitimate personal biases of the past, and look at possible solutions with a fresh and open mind.

The IMF may actually be in a unique position due to its structure to advance global climate remediation efforts. It may only require a few extensions to its charter. Let's look at its structure in more detail.

The IMF operates on a "quota" voting system designed to ensure fair representation and participation of its 190 member countries. Each member country is assigned a quota based on its relative position in the world economy (12).

The IMF's highest decision-making body is the Board of Governors. This board is comprised of one governor and one alternate governor appointed by each member country, usually the minister of finance or the governor of the central bank. They meet

annually to make major policy decisions, such as admitting new members, approving quota increases, and amending the IMF's Articles of Agreement.

The Executive Board is responsible for conducting the day-to-day business of the IMF. Comprising 24 Executive Directors, the seven large shareholders (the United States, Japan, China, Germany, France, the United Kingdom, and Saudi Arabia) appoint their own Executive Directors, while the remaining 17 Directors are elected by groups of member countries. The Executive Board meets several times a week to approve financial assistance to member countries, review economic developments, and provide policy advice (13).

The Managing Director, appointed by the Executive Board for a renewable five-year term, is the head of the IMF staff and serves as the Chair of the Executive Board. This role involves managing the IMF's staff, conducting the business of the IMF, and representing the institution externally.

The IMF's decision-making process is based on a weighted voting system, where each member country's voting power is determined by its quota. The larger a country's quota, the more voting power it has. However, most decisions are made by consensus, with the aim of reaching a broad agreement among member countries.

IMF Voting Right and Power Distribution

The voting rights of the top 10 member nations of the International Monetary Fund (IMF) are based on their quotas, which are determined by their relative position in the world economy. As of March 2023, the top 10 members and their voting shares are as follows:

1. United States: 16.50%
2. Japan: 6.14%
3. China: 6.08%
4. Germany: 5.32%
5. France: 4.03%
6. United Kingdom: 4.03%
7. Italy: 3.02%
8. India: 2.63%
9. Russia: 2.59%

10. Brazil: 2.22%

These 10 countries collectively hold more than 52% of the total voting power in the IMF. The United States, with a 16.50% voting share, has the largest individual voting power and is currently the only country with an effective veto power over major policy decisions, which require an 85% supermajority. The quota for the United States or the 85% supermajority would need to be adjusted so that no country has veto powers.

It's important to note that the IMF's quota system and voting shares are reviewed periodically to ensure that they reflect changes in the global economy. The most recent quota change, in the 14th General Review of Quotas, was completed in 2010 and resulted in a significant shift in voting power towards emerging market and developing economies, particularly China, India, Brazil, and Russia.

Despite the weighted voting system, the IMF strives to make decisions by consensus whenever possible, with the goal of ensuring broad support and cooperation among its member countries.

Special drawing rights (SDRs)

The Special Drawing Rights (SDRs) (14) are an international reserve asset that the International Monetary Fund created in 1969. The SDRs are meant to supplement the existing reserves of member countries. Technically, SDRs are not a currency but rather a potential claim on the freely usable currencies of IMF members. They represent a basket of currencies, and currently this includes the U.S. dollar, euro, Chinese renminbi, Japanese yen, and British pound sterling.

The value of an SDR is determined by a weighted basket of the five currencies mentioned above. The weights assigned to each currency are reviewed every five years to ensure they reflect their relative importance in the world's trading and financial systems. Currently, SDRs are allocated to IMF member countries in proportion to their IMF quotas. The IMF has the authority to create and allocate SDRs to its members, providing them with additional liquidity when needed.

SDRs serve as a supplement to international reserves, helping countries manage their balance of payments and provide a cushion against financial shocks. SDRs are used as a unit of account by the IMF and some other international organizations. They are also used as a denomination for some international financial transactions and instruments.

SDRs have a primary purpose of providing liquidity to the global economic system and supporting the functioning of the international monetary system. They help countries

manage their reserves, settle international transactions, and cope with financial crises. The role of SDRs has been limited compared to other reserve assets, such as the U.S. dollar and gold. Their use has been subject to ongoing discussions and reforms within the IMF. However, the IMF has taken steps to increase the allocation and use of SDRs in response to the global financial crisis and the COVID-19 pandemic. These efforts aim to bolster the global financial safety net and promote economic stability and growth.

Global carbon sequestration fund

A potential solution to fund carbon sequestration projects internationally without depending on individual government budgets or taxation could be the establishment of a Global Carbon Sequestration Fund within the International Monetary Fund (IMF) framework.

This fund could use a portion of the IMF's existing or newly created Special Drawing Rights (SDRs) specifically for funding carbon sequestration projects. These "Green SDRs" would be earmarked for the Global Carbon Sequestration fund.

The fund would be governed by a board of directors, composed of representatives from contributing countries, the IMF, and relevant international organizations such as the United Nations Framework Convention on Climate Change (UNFCCC), the IPCC, and the World Bank. This board would set the fund's policies, criteria, and priorities for project selection and funding.

The fund would establish a transparent and competitive process for selecting carbon sequestration projects to support. Projects could be proposed by governments, international organizations, private sector entities, or civil society groups. The selection criteria would prioritize projects based on their potential for long-term carbon sequestration, scalability, co-benefits, and alignment with sustainable development goals.

The fund would provide grants, loans, or other financial instruments to carbon sequestration projects. The funding terms would be designed to ensure the projects' long-term viability and sustainability.

The fund would also establish a robust monitoring and verification system to ensure that the supported projects deliver the expected carbon sequestration outcomes. This system would involve independent third-party audits, regular reporting, and transparent data sharing.

Using SDRs as the primary funding source would allow countries to participate in international climate mitigation efforts without directly impacting their national budgets or tax revenues. The fund would leverage the IMF's institutional framework, financial expertise, and global reach to mobilize resources and support large-scale carbon sequestration projects in a coordinated and efficient manner.

Creating a patent and technology pool

To expedite the global use of carbon sequestration technologies, the IMF could establish a global patent and technology pool. This would consolidate patents and key licensable technologies related to carbon removal, facilitating their widespread adoption and the use of best practices. The patent pool would function as a platform for voluntary patent sharing and cross-licensing. Patent holders would contribute their patents, available for licensing on fair and non-discriminatory terms. This creates a central hub for accessing these technologies, reducing transaction costs and legal uncertainties.

The IMF could ensure all countries, especially developing ones, have access to the patent and technology pool. This may involve financial aid for licensing fees and technical assistance for the licensing process. The use of eminent domain provisions for patents could also be explored to accelerate access to these technologies. A transparent revenue-sharing mechanism is needed to incentivize patent holder participation. The patent and technology pool could also negotiate aggregated global purchase agreements for key equipment, technologies, and software licenses to achieve the lowest costs for carbon sequestration for all participants, in order avoid leakage of funds to self-interested parties.

Conclusion

Global climate remediation is clearly a herculean task — the biggest challenge humanity has ever faced. It's going to require a massive amount of resources and effort, and our governments simply can't shoulder this burden alone. Current political systems often prioritize short-term wins over long-term necessities, like saving our planet. It is clear that for climate remediation to be effective, it is necessary to not only reduce emissions but also sequester a significant amount of carbon released since the Industrial Revolution. In order to achieve this, a large part of our global industrial capacity has to be mobilized.

The global central banking system, with its political independence and ability to manage national money supply, could be repurposed towards long-term climate remediation, funding such activities without impacting government budgets or increasing taxes. The International Monetary Fund (IMF) could oversee such efforts on a global scale due to its broad membership, near consensus-based decision-making process, and lack of fixed veto rights by individual member nations. A Carbon Sequestration Fund and a global Patent and Technology Pool, administered by the IMF and funded with the IMF's Special Drawing Rights (SDRs), could provide a practical solution to climate remediation challenges. Such a project has tremendous potential to unite humanity towards a common purpose for the benefit future generations.

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