



# Global Climate Compensation

[www.global-climate-compensation.org](http://www.global-climate-compensation.org)

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## Elevator Pitch

The challenge facing humanity can be summarized as follows:

1. Our current economic system requires everlasting growth.
2. We live on a planet that cannot support further growth.
3. It follows that we need immediate and fundamental system change. Note the words *immediate* and *fundamental*; it is a bit late in the day for research and incremental approaches.
4. Unfortunately, the power structures of our society prevent these changes. The people who got rich and powerful from the existing system have little incentive to change it.
5. Therefore, the rich and the powerful (the RIPs) need to be “convinced” to change. One way to do so is to ensure that they cannot make money anymore.

Global Carbon Compensation would initiate the necessary system change by invalidating any business model heavily dependent on fossil fuels. It is based on the assumption that whereas capitalism is beyond repair, the market economy can still be useful, provided that the incentives are right and everyone has enough money to participate.

For far too long, we have tried to outsource the climate crisis to a small number of politicians, scientists, and engineers. With Global Climate Compensation, every nation, corporation, and individual on the whole planet would have a financial interest to do something about it.

## How Do We Get Out of This Mess?

*How serious is the threat to the environment? Here is one measure of the problem: all we have to do to destroy the planet's climate and biota and leave a ruined world to our children and grandchildren is to keep doing exactly what we are doing today.*

*James Gustave Speth, The Bridge at the Edge of the World*

## Global Climate Compensation

A specter is haunting the world – the specter of climate disaster. After three decades of international climate negotiations, the carbon dioxide concentration of the atmosphere has reached an unprecedented level of 420 ppm, roughly 50% higher than before the industrial revolution, and it is increasing faster than ever.

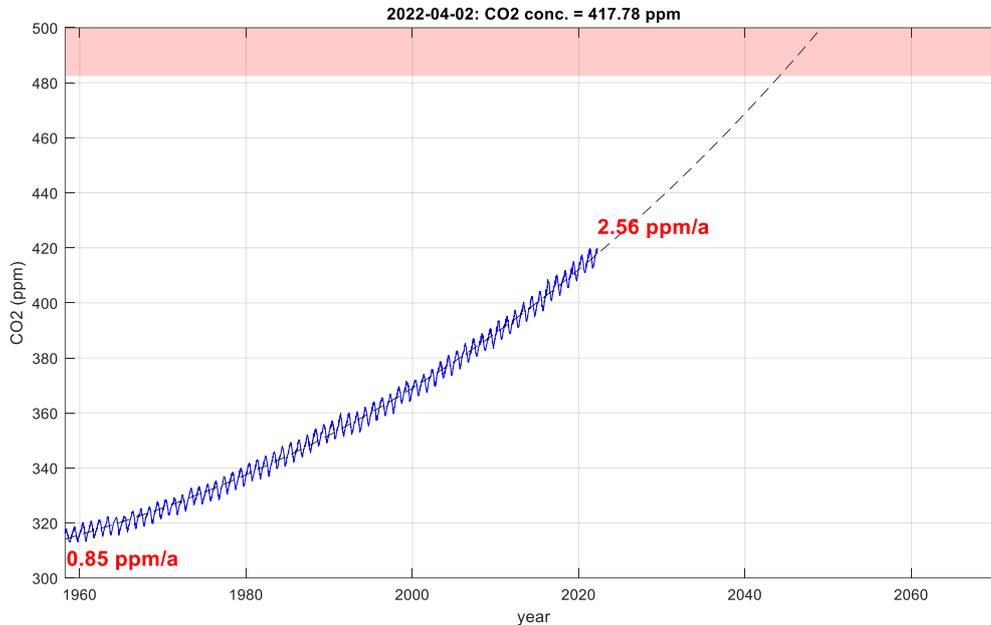


Figure 1 The Keeling Curve shows the atmospheric concentration of CO<sub>2</sub> since 1958. The solid blue line represents weekly measurements, and the dashed line is a guide to the eye. The concentration is not only increasing but increasing at an accelerating rate. If we want to stay “significantly below 2.0°C of global warming,” we had better stay below 450 ppm.<sup>1</sup>

As of 2022, the Earth’s temperature has increased by more than 1.1 °C and is likely to reach 1.5°C before the year 2030 compared to preindustrial levels.<sup>2</sup> It is also clear that climate research has significantly underestimated the impact of global warming, as evidenced by climate-related natural disasters and extreme weather.<sup>3</sup> If +1.1 °C of warming is already dangerous, how can +1.5°C or even +2.0°C be considered safe?<sup>4</sup>

The world currently does not have a plan for preventing catastrophic climate change, and we never tried to develop one. Instead, we put all our faith in technology, hoping that innovations would somehow make fossil fuels obsolete, eliminating the need for difficult decisions or lifestyle changes. Whether this was ever anything more than wishful thinking is irrelevant. The point is that it did not happen. Carbon-based fossil fuels continue to provide more than 80% of the primary energy used by human society<sup>5</sup>, a number which has not changed appreciably during the last 40 years, and the per capita greenhouse gas emissions are still increasing.<sup>6</sup>

Humanity is at a crossroads. Either we start immediately to reduce emissions significantly, or we sentence anyone born within this century to live under climatic and atmospheric conditions previously unknown to humankind. We do not know whether our children will be able to survive, but we give them no choice but to try.<sup>7</sup> To “stay significantly below 2.0°C of global warming,” as demanded by the Paris agreement, we must reduce greenhouse gas emissions by almost 50% during the next eight years.<sup>8</sup> The problem is that most of the infrastructure in the energy and transportation sectors has an expected lifespan of 20-50 years. There are no indications that emissions will be lower in 2030 than

today with current policies, and it is hardly surprising that young people and climate scientists are sounding increasingly desperate.

Unfortunately, one does not solve problems by simply describing them or by being outraged. It is also pointless to call on politicians to act unless they know what to do. We need a plan and for that, we first need to understand that our current approach to dealing with the climate crisis is fundamentally flawed. The reason is that it is based on the concept of *sustainable growth* or the assumption that fossil fuels can be phased out without costs. As long as governments prioritize access to affordable energy over climate protection, our only hope is that rebuilding our entire fossil-fuel-based infrastructure will be quick, cheap, and painless. Although an increasing number of scientists very reasonably question the feasibility of *decoupling* the economy from its carbon footprint, the IPCC largely ignores other options.<sup>9</sup> To put it bluntly, saving capitalism is still considered more important than saving humanity. Or, as President George H. W. Bush said in the talks leading up to the Earth Summit in Rio de Janeiro in 1992, “the American way of life is not up for negotiations. Period.”<sup>10</sup>

Unfortunately, sustainable growth is yet another attempt to deny the obvious: nothing can grow forever on a finite planet. It is important to remember that climate change is not the only challenge facing humanity. We are also dealing with biodiversity loss, resource scarcity, chemical pollution, and global poverty. Whether we consider the Planetary Boundaries<sup>11</sup> or the Global Footprint<sup>12</sup>, it is evident that our current lifestyle is not sustainable. Therefore, our only choice is between engineering a reasonably controlled emergency landing or continuing with business as usual until resource scarcity and catastrophic climate change put a sudden end to human civilization. In 1972, Dennis Meadows and the researchers behind *Limits to Growth*<sup>13</sup> published several predictive scenarios based on different hypotheses. According to the model, the trajectory we are following to date places us on track towards a collapse by the middle of this century and their predictions look increasingly prescient<sup>14</sup>. We are rapidly running out of time to fix the problem.

Climate change, mainly caused by CO<sub>2</sub> from our use of fossil fuels is arguably the driver behind these problems. Rather than attempting to mitigate the many different consequences, tackling the root cause should be our first priority.

Global Climate Compensation (GCC) is a simple system for initiating the necessary societal transformation by making it unprofitable to use fossil fuels. It works as follows:

1. All fossil fuel producers pay a fee proportional to the carbon content of their production.
2. The money from the fund is distributed among the world’s nations on a per capita basis.

This system would change the rules of global competition and invalidate any business model dependent on fossil fuels. In addition, it would go a long way towards abolishing worldwide poverty, as poorer countries would initially be overcompensated for the increasing energy costs. Once GCC has been implemented, nations and businesses must decarbonize to remain competitive.

## The Case for Global Climate Compensation

*Everything should be made as simple as possible, but not simpler.*

*Albert Einstein*

*It is futile to do with more things that which can be done with fewer (Frustra fit per plura quod potest fieri per pauciora).<sup>15</sup>*

*William of Ockham*

## Global Climate Compensation

The main argument in favor of GCC is that it is simple and effective and could be implemented immediately. There are only a small number of fossil-fuel producers in the world (less than 300) and roughly 200 nations.<sup>16</sup> No other parties would have to be involved, and no new institutions need to be created. The carbon content of fossil fuels is well known, and no complex monitoring system would be required to collect the fee. Likewise, the payout from the fund could simply be added to the tax revenue of national governments with zero additional administrative effort.

Since the fossil-fuel companies are free to pass on their higher costs to their customers, the result of GCC would be a global carbon tax without any loopholes or tax-havens. The billionaire in the Bahamas would have no choice but to pay more for the fuel to his luxury yacht or private jet. We know that the world economy responds very quickly to changes in energy prices, meaning that the effect of GCC would be immediate.

The system would be cost-neutral for the global economy, but the redistribution mechanism would have interesting effects. As an example, we consider a carbon price of 100 USD per metric ton of CO<sub>2</sub>. With current emissions of about 36 Gt per year, the fund would receive 3.6 trillion USD (3.6 TUSD) annually. For comparison, global defense spending amounts to approximately 2.0 TUSD annually<sup>17</sup>, and the total subsidies to the fossil fuel sector have been estimated at 5.9 TUSD.<sup>18</sup>

The result would be a controlled increase in the oil price of approximately 40 USD per barrel, which is significant but not unprecedented. The cost of fossil energy would increase by 2 cents per kWh (natural gas) to 4 cents per kWh (coal). However, in contrast to other price hikes, the money would not end up with the fossil-fuel companies but with governments. In this example, every nation would receive a payout of 450 USD per capita and year with no strings attached. Governments could use the money to reduce deficits or fund any of the Sustainable Development Goals (SDGs) of the United Nations. Rich countries would be well advised to use the funds to decarbonize their economies, but poorer nations might decide that they have more urgent priorities.

Since this is the most controversial aspect of the plan, some explanation might be required. We do not have a world government, and no international organization can dictate the policies of any country. Many nations have functioning political systems and governments that would simply add the payout from the fund to their tax revenue and use it according to national political priorities. Given the increased cost of fossil fuels, decarbonization is likely to be one such priority, especially since the Paris agreement would still be effective. GCC is compatible with any national policies designed to reduce the dependence on fossil fuels. As a matter of fact, these policies would make more sense and be easier to finance once the system has been implemented.

An authoritarian state could use part of the money to subsidize fossil fuels, thereby ensuring the support of the people, and give the rest to the ruling elite. However, this would be suicidal. As the global carbon price increases and other nations phase out fossil fuels, the revenue from the fund would eventually be insufficient to pay for the subsidies. Once GCC has been introduced, energy efficiency will be necessary for global competitiveness. It would be in the naked self-interest of any country or corporation to use as little fossil fuel as possible.

Another argument for GCC can best be explained with the simple diagram below, showing global GDP and global CO<sub>2</sub> emissions from 1960 until today and our current approach to addressing the threat of climate change.

## Global Climate Compensation

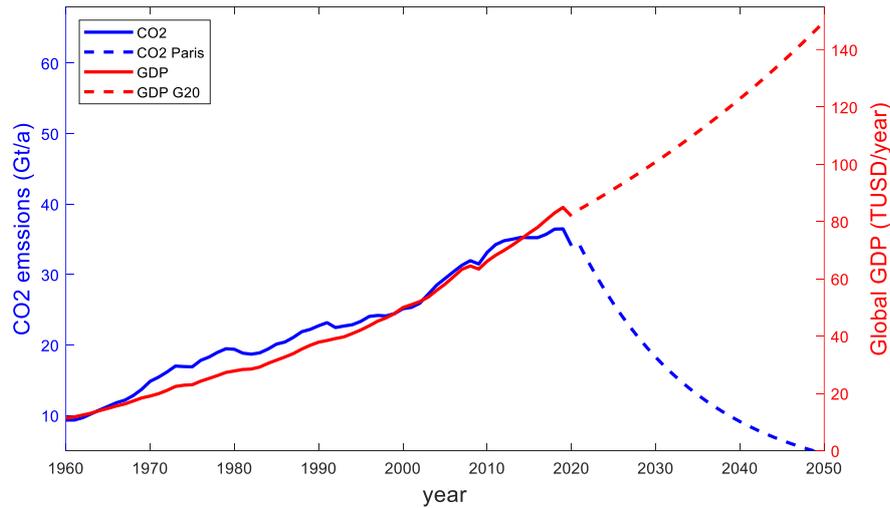


Figure 2 Global CO2 emissions in gigatons per year (blue) and global GDP in trillion USD (red) from 1960 to 2020 (solid lines). The dashed red line represents 2% economic growth as demanded by the G20. The dashed blue line represents a reduction in CO2 by 6.7% per year that would limit global warming to significantly less than 2°C.<sup>19</sup>

Current thinking requires the immediate decoupling of two quantities that have been strongly correlated for the last 60 years. Whether this is possible is an open question. The IPCC largely believes so. Other prominent researchers and most ordinary people do not.<sup>20</sup> To them, we are facing a fundamental conflict of interests:

1. On the one hand, our society is almost entirely dependent on fossil fuels, making it very difficult and costly to phase them out. If we reduce the extraction and production too quickly, many people will die, as our food production and distribution do not work without fossil fuels.
2. If we continue to rely on fossil fuels, on the other hand, the planet will eventually become uninhabitable due to the catastrophic effects of climate change, and even more people will die.

Many people have resolved this cognitive dissonance by denying one of these two facts. The proponents of fossil fuels have downplayed or denied the risk of climate change and the environmental movement has underestimated the costs and the risks related to decarbonization. This fundamental disagreement on facts has made a constructive dialog very difficult.

The simple truth is that we do not know if and how fast we can phase out fossil fuels. Fortunately, we do not have to. The trick is to devise a policy that works either way. Global Climate Compensation will increase the cost of fossil fuels and provide governments with money for the energy transition. If the optimists are correct, this will accelerate the ongoing technological transformation, leading to rapid decarbonization without any adverse effects. If the pessimists are right, GCC will lead to higher prices and a recession. Either way, carbon emissions will drop and future generations will benefit.

The idea behind GCC is to use the carbon price as a control parameter that is slowly increased to achieve the desired effects. Think of this as a thermostat regulating the temperature in your fridge. The cooling power required to keep a refrigerator at a constant temperature cannot be predicted in advance, as it depends on many unknown and unknowable parameters, such as the temperature in the room, the number of times the door is opened, and the temperature and quantity of groceries put into the fridge. Knowing these quantities would require predicting the future. Nonetheless, we know

that the temperature can be controlled by measuring the temperature in the fridge and adjusting the cooling power accordingly.

A thermostat is an example of a feedback control system. You measure the quantity you want to control (the temperature in your fridge) and adjust a control parameter (the cooling power) accordingly. The same idea is used in the cruise control of your car and in autopilots.

Naturally, the Earth's climate system and human societies are far more complex than any fridge. It follows that we can neither predict the costs of climate change, which is an unmanageable risk, nor those of the energy transition.<sup>21</sup> The problem is, as Nassim Nicholas Taleb famously explained, that the future is largely determined by rare events that are not amenable to statistical analysis.<sup>22</sup> Societies will not progress linearly as the temperature rises but collapse due to wars and revolutions. Likewise, the cost of the energy transition will depend on changes in human behavior and new technologies that might become available. Furthermore, even if we make a prediction, nobody will believe it because the research cannot be validated.<sup>23</sup> What we do know is that we need to reduce carbon emissions quickly and that a global carbon price is probably the best control parameter. Fortunately, this is all we need to know to devise an effective policy.

The only way to determine if an idea works is to test it. GCC represents a controlled, risk-free, and reversible experiment with the global economy to find out if and how fast we can decarbonize the economy. If it fails, we will have lost nothing. If it succeeds, we will have cut through the Gordian knot of global climate politics.

Our other option is to continue with our uncontrolled, dangerous, and irreversible experiment with the only habitable planet in the known universe to find out if our species can survive in a different atmosphere under very different climatic conditions. If it fails, human civilization is doomed, and there is no way back. Unfortunately, there is almost unanimous agreement among scientists that it will fail.

The introduction of GCC would be a manageable risk. Climate change is not.

## The Pros and Cons of Doing the Right Thing

*Work for something because it is good, not just because it stands a chance to succeed.*

*Vaclav Havel*

The difference between GCC and other proposals for carbon taxes is that GCC is a global system incorporating climate justice. This is not only fair, but it is also necessary for the plan to be effective. A national carbon tax in Germany does not prevent India from building coal-fired power plants. With GCC, a country like India would have an incentive to invest in renewables, and the nations in the Global North with large carbon footprints would pay for it. If they have a problem with this, they had better decarbonize. As soon as their per capita emissions (including consumption, imports, and exports) are lower than the global average, they will become net beneficiaries of the system. Thus, GCC would initiate a "race to the bottom" for carbon emissions motivated by rational economic considerations. It would also mercilessly expose any greenwashing.

The global effects of GCC can best be understood through the following stakeholder analysis.

### The Global South

We can safely assume that the Global South would sign up to GCC as they have almost 80% of the world's population and would consequently receive most of the payouts from the fund.<sup>24</sup> The Paris agreement calls for developed countries to provide USD 100 billion annually to address the needs of poorer nations. Even though this is often celebrated as a sign of the generosity of the Global North, the reality shows that most of the money is provided in the form of loans (that will then have to be repaid), and some nations have simply relabeled their foreign aid budgets to ensure that they do not have to contribute any extra money.<sup>25</sup> Furthermore, 100 billion USD corresponds to half the annual gross profit of the online retailer Amazon or the same amount that Germany decided to invest in strengthening its defense after the Russian invasion of Ukraine. Nobody seriously believes that we can protect 80% of the world's population from climate change with this amount of money. With GCC, the Global South would receive 30 times as much or roughly USD 3 trillion. This number would drop as the world reduces its dependence on fossil fuels, but GCC would still provide far more money to the Global South than any other deal.

In other words, if the world were a global democracy, there would be nothing left to discuss. A policy proposal with the support of more than 80% of the electorate typically carries the day.

### China

China is the world's largest contributor to climate change. However, contrary to the USA, China has a large population and relatively low emissions per capita. Furthermore, a significant portion of China's emissions is caused by the production of consumer products for the rich countries in Europe and Northern America. Chinese manufacturers would have to pay more for energy but could pass on the higher costs to their customers. With the implementation of GCC, it will always be the end-users or consumers who pay. Consequently, it is reasonable to assume that China would be in favor of the plan.

### The Global North

The Global North is likely to be less enthusiastic about GCC, but it does offer some advantages also for rich industrialized countries. First, it provides governments with a way to introduce a carbon tax and raise money without facing the wrath of the voters. GCC only requires fossil-fuel companies to compensate for their emissions. Whether they pass on these costs to their customers or pay for it by reducing the dividend to the shareholders is their decision. Governments could therefore not be blamed directly for the rising energy costs.

Furthermore, the whole point of implementing climate justice is to give poorer countries the financial means to deal with the climate crisis. If fewer people are forced to flee their homes, there will be fewer refugees trying to reach Europe and the United States. GCC is therefore the only realistic and humane way to alleviate the refugee crisis.

It is also likely that workers and unions would support the idea. The main reasons for job insecurity in the Global North are outsourcing and automation. If the carbon price were to rise everywhere, both would become less attractive. Companies would again be interested in producing closer to their customers using as few machines as possible. GCC would be a massive boost to the status of the workers everywhere.

GCC would cause prices to rise. However, this does not mean that consumers would suffer, because they often have the option of consuming less. Only if we accept the shop-until-you-drop narrative of a purposeless society, do we have a problem. With the redistribution mechanism of GCC, every

government in the world would have sufficient resources to provide for the basic needs of everyone, in terms of housing, food, and access to energy. It is their problem if they fail.

Finally, it is important to emphasize that GCC is a tax on inefficient use of energy and not on wealth. Nothing in the plan prevents individuals, corporations, and nations from getting rich if they can do so without using large amounts of fossil fuels.

### The Private Sector

Many corporations claim to take climate change seriously and have released bold plans for switching to the circular economy and adopting a net-zero policy for their entire supply chains.<sup>26</sup> If they succeed, their production costs will become independent of the fossil-fuel price and GCC would provide them a competitive advantage. In addition, GCC is a liberal and business-friendly solution that does not introduce any additional regulations or red tape.

In short, any business that is serious about climate change must support GCC.

### Fossil fuel producers

It is fair to say that fossil-fuel companies have an image problem. Not only because they produce the carbon-based fuels responsible for climate change, but they have also been caught red-handed influencing politicians and funding questionable science with the aim of preventing effective climate protection policies.<sup>27</sup> These actions are particularly reprehensible as Big Oil knew the truth about climate change all along.<sup>28</sup>

The problem is that the world is currently dependent on fossil fuels, not only for energy but also as raw materials for the entire petrochemical industry. We use oil for manufacturing plastic and various chemicals, and natural gas for producing fertilizers. Whether we like it or not, our society currently cannot function without fossil fuels.

GCC makes a simple request from the fossil fuel producers. If they want to act responsibly and contribute to solving the climate crisis, they should agree to GCC and act as tax collectors for a global carbon tax. Those who do so would be allowed to continue their business. The others should be black-listed and prevented from doing any business. If governments do not act, NGOs, consumers, shareholders, activists, and private citizens should join forces to increase the societal pressure on the fossil fuel producers until paying GCC becomes the rational choice.

## Does Anyone Have a Better Idea?

*Problems that remain persistently insoluble should always be suspected as questions asked in the wrong way.*

*Alan Wilson Watts*

Our planet is dying and the reason for its demise is our economic system. There are no natural causes for the increasing greenhouse gas concentrations, the acidification of the oceans, the declining biodiversity, the microplastic and artificial long-lived chemicals accumulating in our bodies, and the decreasing fertility of the human species. We are not being attacked by aliens, there are no known meteorites on a collision course with our planet, and our Sun continues to provide us with the energy needed for life. It will be pointless to look for external causes for the collapse of human civilization because there are none.

## Global Climate Compensation

It follows that we have a choice. We can either continue with business as usual until the inevitable collapse of human civilization, or we can take charge of our destiny by designing a sustainable society. The only way to predict the future is to control it. To do so, we must first take charge of the present by challenging existing power structures and reconsidering our interaction with the natural environment.

Our current economic system is designed to generate wealth through the rapid extraction of natural resources. No consideration is given to the fact that these resources will be unavailable to future generations, and environmental protection is largely regarded as undesirable political interference in an otherwise perfect system. The mere thought of expanding governments' power to prevent a climate catastrophe makes many people nervous, as evidenced by *The Economist* recently devoting a cover story to *The threat from the illiberal left*.<sup>29</sup> Whereas there is general agreement on the physics of climate change, there is little agreement on the technologies or policies required to solve the problem. To make matters worse, most people have more pressing concerns than climate change and are not prepared to spend a significant amount of their time or money to stop climate destruction.

The greatest threat to humanity today is our denial of the failure of global climate politics. The *common wisdom* was that the climate crisis could be resolved by technology within the current system. We pretended that improved energy efficiency and increasing access to renewable energy would somehow decrease the demand for fossil fuels, even though William Stanley Jevons understood already in 1865 that this was not likely to happen. As more energy becomes available, more energy will be used, and global energy demand is still increasing faster than the supply of renewable energy. Common wisdom, as J. K. Galbraith pointed out, is characterized by being acceptable and not by being right.<sup>30</sup>

Sustainable Growth is based on the assumption that there is a business model for reducing humanity's impact on the natural environment and that technological developments will somehow make it profitable to reduce greenhouse gas emissions. That the assumption is demonstrably false does not seem to bother anyone.

Consider the case of renewable energy. We first have to decide whether renewables are too expensive or fossil fuels are too cheap. In the latter case, subsidizing renewables will simply make even more energy available and fossil fuels will continue to be used as long as it is profitable. This is the famous all-of-the-above strategy promoted by the Obama administration.<sup>31</sup> As technological developments are hardly going to make fossil fuels more expensive, it is clear that political action will be required.

Another example is carbon capture. There is currently a lot of excitement about the sinking cost of capturing carbon from exhaust gases or directly from the atmosphere. The problem is that there is no business model for doing so, as long as the cost of emitting carbon into the atmosphere is zero. Again, legislation will be required for carbon capture to work.

National governments are perfectly capable of solving problems through legislation, even when there is no direct commercial interest in doing so. Housing codes in earthquake-prone areas are designed to keep people safe, and smoking bans were not introduced to make the tobacco industry happy. If climate change were a national problem, it would probably have been solved a long time ago. However, we are now in the situation of trying to solve a global crisis with national governments.

An obvious problem is that nations do not trust each other. Because of the geopolitical importance of fossil fuels (in particular oil and gas), the challenge of decarbonization is similar to that of disarmament. After all, what is the point of building a sustainable utopia if it will result in you being overrun by a marauding army with gas-guzzling tanks? Solving the climate crisis will require an unprecedented

level of international collaboration and the signs are not very encouraging at the moment. However, we already have one very powerful system of international collaboration. As Yuval Harari has pointed out, “money is the most universal and most efficient system of mutual trust ever devised.” As soon as we manage to affix a price tag to the problem, international collaboration will become automatic.

The key to solving problems is asking the right questions. So far, every nation has been trying to answer the question of how to reduce its reliance on fossil fuels while maintaining international competitiveness. The correct question is how to make fossil fuels more expensive on the international market while ensuring that the polluters pay and the poor do not suffer. The solution has to be easy to implement and monitor, be based on money, encourage international collaboration, and incorporate global climate justice. Global Climate Compensation appears to satisfy all these criteria.

## What To Do Next

*There is a crack, a crack in everything  
That's how the light gets in.*

*Leonard Cohen, Anthem*

In *Testament to Youth*, Vera Brittain gives the following assessment of the meetings of the League of Nations:

*The Assemblies of those early years were worth attending, for the Foreign Ministers of the Great Powers had not yet realised how easily, by means of a little tact and some elegant camouflage, the League might be used as a stage on which they could play the skilled game of the Old Diplomacy circumspectly dressed up in international costume. Before 1925, perhaps as many as fifty per cent of the delegates who went to Geneva honestly believed that the organisation of international peace was a workable proposition.*

Just as the League of Nations failed to maintain world peace, the United Nations Framework on Climate Change is unlikely to be able to prevent catastrophic climate change. Betting the future of humanity on the remote chance that it will succeed seems like a bad idea.

Given the state of the world, young people are starting to feel increasingly desperate and outraged. This is understandable, as they grow up in a society without a positive vision for the future. They will be worse off than their parents and the lives of their children will be even more miserable.

The question is how to turn the outrage into a force for constructive change. For this, we need a plan that addresses the fundamental problem: the fossil fuel industry is profiting from emitting dangerous gases into the atmosphere. This has to stop, and we know how to stop it.

The message is simple: a small number of corporations hold the future of humanity in their hands. They have the power to destroy the planet or to save it. We all have to convince them to make the right choice. If we succeed, the prospects for the future will look a lot brighter.

One cannot be in the business of destroying the planet and ruining the lives of billions and expect to get away with it. Our job is to generate enough societal pressure on these corporations to force them to change. There are less than 300 of them. There are billions of us, but we need to act. One can't be neutral on a dying planet.

Join us at [www.global-climate-compensation.org](http://www.global-climate-compensation.org). The battle for the future of humanity is just about to begin.

## About the Author

I am a father, physicist, climate activist, and blogger, devoting most of my time to finding solutions to the climate emergency. These solutions have to involve immediate, global, and fundamental changes to our economic system. In contrast to most people, I believe they are feasible.

Please feel free to contact me: [www.nordborg.ch/about](http://www.nordborg.ch/about)

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<sup>1</sup> The CO<sub>2</sub> concentration of the atmosphere is publicly available from the Scripps CO<sub>2</sub> Program (<https://scrippsco2.ucsd.edu>)

<sup>2</sup> Global Temperature in 2021 by James Hansen, Makiko Saito, Reto Ruedy (<http://www.columbia.edu/~jeh1/mailings/2022/Temperature2021.13January2022.pdf>)

<sup>3</sup> Naomi Oreskes, Michael Oppenheimer, and Dale Jamieson, *Scientists Have Been Underestimating the Pace of Climate Change*, <https://blogs.scientificamerican.com/observations/scientists-have-been-underestimating-the-pace-of-climate-change>

<sup>4</sup> David Spratt and Ian Dunlop, *What Lies Beneath* (<http://www.climatecodered.org/p/what-lies-beneath.html>)

<sup>5</sup> BP, Statistical Review of World Energy, <https://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy.html>

<sup>6</sup> IPCC Sixth Assessment Report, <https://www.ipcc.ch/report/sixth-assessment-report-working-group-3>

<sup>7</sup> David Wallace-Wells, *The Uninhabitable Earth*

<sup>8</sup> IPCC, Global Warming of 1.5°C, <https://www.ipcc.ch/sr15>

<sup>9</sup> Timothée Parrique, Degrowth in the IPCC AR6 WGII, <https://timotheeparrique.com/degrowth-in-the-ipcc-ar6-wgii>; Amy Westerwelt, Debunking Demand: An Ode to Chapter Five,

<sup>10</sup> Thalif Deen, U.S. Lifestyle Is Not Up for Negotiation, <https://www.ipsnews.net/2012/05/us-lifestyle-is-not-up-for-negotiation>

<sup>11</sup> Stockholm Resilience Center, *Planetary Boundaries*, <https://www.stockholmresilience.org/research/planetary-boundaries.html>

<sup>12</sup> Global Footprint Network, <https://www.footprintnetwork.org>

<sup>13</sup> Donella H. Meadows, Dennis L. Meadows, Jørgen Randers, and William W. Behrens III, Limits to Growth, [https://en.wikipedia.org/wiki/The\\_Limits\\_to\\_Growth](https://en.wikipedia.org/wiki/The_Limits_to_Growth)

<sup>14</sup> Graham Turner and Cathy Alexander, Limits to Growth was right. New research shows we're nearing collapse, <https://www.theguardian.com/commentisfree/2014/sep/02/limits-to-growth-was-right-new-research-shows-were-nearing-collapse>

<sup>15</sup> Occam's razor, [https://en.wikipedia.org/wiki/Occam's\\_razor](https://en.wikipedia.org/wiki/Occam's_razor)

<sup>16</sup> Climate Accountability Institute, <https://climateaccountability.org/carbonmajors.html>

<sup>17</sup> Stockholm International Peace Research Institute (SIPRI), Arms and military expenditure, <https://sipri.org/research/armament-and-disarmament/arms-and-military-expenditure>

<sup>18</sup> International Monetary Fund (IMF), *Fossil Fuel Subsidies*, <https://www.imf.org/en/Topics/climate-change/energy-subsidies>

<sup>19</sup> CO<sub>2</sub> emissions from Global Carbon Budget 2021 (<https://www.icos-cp.eu/science-and-impact/global-carbon-budget/2021>); Global GDP from the World Bank (Constant 2010 USD, <https://data.worldbank.org>)

<sup>20</sup> Jason Hickel, The World's Sustainable Development Goals Aren't Sustainable (<https://foreignpolicy.com/2020/09/30/the-worlds-sustainable-development-goals-arent-sustainable>); Simon P. Michaux, Calculation of the Extra Capacity Required of Non-Fossil Fuel Power Generation Systems to Completely Phase Out Fossil Fuels (<https://austinpublishinggroup.com/environmental-sciences/fulltext/aes-v7-id1071.pdf>)

<sup>21</sup> The impossibility of the task has not prevented people from trying. William H. Nordhaus even delivered a Nobel Prize Lecture in 2018 pretending he could do so (<https://www.nobelprize.org/prizes/economic-sciences/2018/nordhaus/lecture>). A careful analysis of this kind of modelling can be found here: Steve Keen, *The appallingly bad neoclassical economics of climate change* (<https://www.tandfonline.com/doi/full/10.1080/14747731.2020.1807856>)

<sup>22</sup> Nassim Nicholas Taleb, *The Black Swan*

<sup>23</sup> According to Karl Popper, only the scientific consensus represents knowledge. A single scientific study is a hypothesis that has to be tested independently by other researchers.

<sup>24</sup> Global South Countries 2022 (<https://worldpopulationreview.com/country-rankings/global-south-countries>)

<sup>25</sup> COP26: Delivering on \$100 billion climate finance (<https://commonslibrary.parliament.uk/cop26-delivering-on-100-billion-climate-finance>)

<sup>26</sup> The Net-Zero Standard (<https://sciencebasedtargets.org/net-zero>)

<sup>27</sup> Naomi Oreskes and Erik Conway, *Merchants of Doubt* (<https://www.merchantsofdoubt.org>); Michael Mann, *The New Climate War* (<https://michaelmann.net/books/climate-war>)

<sup>28</sup> Benjamin Franta, *Shell and Exxon's secret 1980s climate change warnings* (<https://www.theguardian.com/environment/climate-consensus-97-per-cent/2018/sep/19/shell-and-exxons-secret-1980s-climate-change-warnings>)

<sup>29</sup> The Economist, September 4<sup>th</sup> 2021, <https://www.economist.com/leaders/2021/09/04/the-threat-from-the-illiberal-left>

<sup>30</sup> J. K. Galbraith, *The Affluent Society*.

<sup>31</sup> New Report: The All-of-the-Above Energy Strategy as a Path to Sustainable Economic Growth, <https://obamawhitehouse.archives.gov/blog/2014/05/29/new-report-all-above-energy-strategy-path-sustainable-economic-growth>