

Interest Rates and Climate Change

Realigning our Incentives through the Power of the Commons

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False Choices: Cap and Trade Vs. Carbon Tax

During the past several decades, humanity has emerged as a perilous force of nature. Through its technological, economic and political choices and activities, modern civilization has produced destructive economies of scale, powered by exponential growth and fossil fuels. Our consumption of vital resources is already exceeding the carrying capacity of the planet. By 2030, as world population increases to 8 billion, we will witness dramatic new increases in global demand for food, water, land and energy and the right to release greenhouse gases through industry, transportation and deforestation. From our petrol-guzzling urban economies to our tree-burning subsistence economies, world society is rapidly changing the physical, chemical and biological systems of Earth, creating widespread pollution and global heating. The science of climate change is daunting, but the facts are clear. “If humanity wishes to preserve a planet similar to that on which civilization developed and to which life on Earth is adapted,” says James Hansen of NASA, “paleoclimate evidence and ongoing climate change suggest that CO₂ will need to be reduced from its current 385 ppm to at most 350 ppm.” To make this radical adjustment, the world must decrease global emissions significantly over the next 5–20 years to limit temperature increases to 2°C (3.6°F). An increase above that would lead to a cascade of disasters (Figure 1).

Figure 1

Predicted Effects of Temperature Increases of More Than 2° Celsius

- extreme droughts, storms, heat waves
- melting polar ice, snowpack, glaciers, permafrost
- increased hurricanes, cyclones, storm surges
- increased sea levels, flooded coasts, flooded islands
- loss of water for drinking, irrigation
- loss of farmland, declines in crop yields
- increases in agricultural pests, wildfires
- changes in wildlife migration, reproduction patterns
- ecosystem collapse, species extinction
- malnutrition, hunger, famine, infectious disease
- weak economies, high unemployment, disrupted lives
- climate refugees, mass migration, humanitarian crises
- wars for land, food, water, energy
- failed states, civil unrest, insurgency, terrorism, genocide

Although global heating is the result of both natural and human causes, it is the human sources that are critical since they are largely preventable. Anthropogenic climate change poses a classic *tragedy of the commons*: without restraints on the use of the

atmosphere, civilization captures the benefits of industrial emissions while the producers and consumers of oil, coal and natural gas use the sky commons as an open sewer. Every day, industry disposes 90 million tons of waste products into our shared atmosphere at no cost. This is an enormous collective action problem. Yet the world has a long and varied experience in meeting similar challenges of smaller scale. Many local communities collaborate in sharing the burden of resource protection. Whether their commons are traditional (rivers, forests, indigenous culture) or emerging (energy, intellectual property, internet), people are successfully managing these common resources. But the failure of the 2009 Intergovernmental Panel on Climate Change (IPCC) discussions underscores the need for a global framework that allocates the use of the atmosphere and introduces incentives necessary to sustain our natural life support systems. In searching for answers, society is trapped in a false dichotomy: we believe that only markets and governments are capable of providing solutions for climate change, even though these institutions were never designed to internalize the costs of negative externalities like carbon emissions.

There is another way to solve collective problems of this scale and jurisdiction. The emerging framework of the commons brings the monoculture of the Market State—the modern economic and governmental superstructure—into sharp focus and provides the analytical tools and predictive power to penetrate the deep dichotomies of its operations and policies. The commons illustrate, for example, how the major policy responses to global heating—*cap and trade* (via the private sector) and *carbon taxes* (via the public sector)—are more about the ideological debate on how much government regulation should be permitted in the market economy than about climate change itself. The commons reveal that this supposed rivalry between market and state policies, which dominates our politics and news headlines, is merely a procedural issue, diverting attention away from the essential crisis of our shared atmosphere. Both cap and trade and carbon tax are deeply flawed because they fail to comprehend the very thing they are trying to address—the essential value of the sky to the people of Earth.

Under *cap and trade*, a ceiling is placed on the quantity of carbon emissions and a system of tradable permits is created to distribute emissions rights. Businesses and individuals that produce carbon gases beyond the cap are penalized by having to buy additional credits, while those who reduce emissions would pay less and can sell their credits to heavier users. The rationale is that through the certainty of a strong cap, social behavior will shift to avoid the cost of emissions, companies will be able to make capital investments in green technology and jobs, and CO₂ emissions will decline.

Carbon taxes are the public sector alternative—fees that reduce consumption by imposing government penalties on emissions. Like cap and trade, the carbon tax would reduce pollution by raising the cost of carbon emissions, thereby sending clear signals to businesses to refocus their investment patterns. Unlike cap and trade, carbon taxes would eliminate the expense of setting up new carbon markets and would also produce much less financial speculation and political lobbying than carbon trading. The social benefit is that government can use the tax revenue to lower the costs of carbon abatement and compensate people who are disproportionately affected by higher fuel costs.

These policy proposals (or some mixture of them) are presented as the only options. *But from a commons perspective, the narrowing of climate policy to tradable permits and taxes presents us with false choices, reflecting a profound dichotomy in the Market State: an epistemological confusion between price and value.* Carbon trading and taxation both adhere to the behaviorist/structuralist principle that truth can be found only in people's language and behavior—not through their mental capacities or intersubjectivity. Both assume that the only way the world economy can integrate lower carbon emissions into market calculations is by punishing the bad behavior of emitting greenhouse gases into the atmosphere, and rewarding the good behavior of reducing emissions and conserving energy. Either way, through trading or taxing, behaviorism would become the basis of a new policy framework created exclusively to reduce carbon emissions, as though CO₂ were Earth's most significant economic resource. But cap and trade and carbon tax policies could never reflect the world's relative scarcities as a standard of universal value because

- CO₂ is not the only greenhouse gas in the atmosphere
- the atmosphere is not the only natural commons
- the natural commons is not the only type of commons (social, cultural, intellectual, genetic and solar commons also have preservation value)

What carbon trading and taxing *do* reflect are the motivations of state capitalism: governments for 'cost-free' regulation, businesses for 'corporate welfare' subsidies, and economists for 'efficient' carbon prices. *The idea that only higher prices or taxes can incentivize us to reduce carbon emissions through our outward behavior as consumers and taxpayers does not stem from an integrated understanding of natural systems or from humanity's deepest ideals and intentions for the planet. Since neither scheme accurately links complex ecological data with our collective economic and social values for reducing climate change, they could both make conditions worse.*

Really Hot Air: The Carbon Price

Getting prices right is the belief that the market should estimate a price on the use of scarce resources that equals their cost to society and nature. In the case of greenhouse gases, the market is expressing labor, capital and raw material costs, but not incorporating the social and ecological costs of emissions into the price of fossil fuels. For example, gasoline prices currently represent the

cost of locating and extracting oil and refining and delivering gas; yet tax subsidies to the oil industry, the industry's security costs, the health effects of climate change, and the costs of other damages caused by global heating are not reflected in the price of gasoline at the pump. In market terms, excluding these variables has led to inefficient outcomes: emission levels are too high, energy and conservation research is lagging, and ecosystem destruction is costing the global economy \$2 trillion a year. In 2007, the IPCC concluded that the price needed to stabilize CO₂ concentrations at Hansen's safety level of 350 ppm by 2020-2030 is between \$20-50 per ton. In making these estimates, experts hope that markets will come closer to setting a real price on carbon emissions, enabling energy producers, utilities, investors and customers to internalize the external costs of environmental degradation and climate change into their behavior.

A growing movement of environmentalists and financiers is also expecting environmentally accurate prices to generate a flood of private and public monies into renewable energy technologies, industries and jobs, unleashing a wave of innovation, improving economic efficiency and creating a healthier way of life. Some foresee a new era of technological and commercial innovation that would rival the Industrial Revolution, harnessing the power of the profit motive to allow nations to grow economically without increasing their emissions.

Yet the green finance movement is riddled with contradictions. First is the matter of subsidies. Environmentalists often complain that fossil fuel subsidies encourage wasteful consumption, reduce energy security, impede investment in clean energy sources and undermine efforts to deal with the threat of climate change. The International Energy Agency (IEA) estimated that in 2008, 37 large developing countries spent \$557 bn in energy price supports, including assistance for oil, natural gas and coal. Petrochemical, fertilizer and food exports are also heavily subsidized. In developed countries, fossil fuels have enjoyed favorable tax breaks and other incentives for decades, allowing energy companies, electric utilities, auto companies and their consumers to grow accustomed to cheap hydrocarbons. While environmentalists strongly object to fossil fuel subsidies, many producers of renewable energy are receiving their own subsidies to produce large volumes of reliable energy and create economies of scale to compete against non-renewables. Many renewables are now subsidized more heavily per unit of energy than fossil fuels, including the popular feed-in tariff for renewable energy producers, which is imposed on electric utilities by governments and paid for directly by consumers. But government subsidization of exports also encourages high-carbon industries to avoid expensive environmental standards by relocating to countries where the cost of polluting is lower, raising the specter of *green protectionism* and trade wars by countries with higher carbon prices. Meanwhile, green producers continue to argue that a strong, stable price on carbon is essential for the development of clean technologies in manufacturing, energy, construction and agriculture. *But the idea that the price of carbon-based energy should reflect its real costs to the environment*

and society is nullified whenever governments use public funds to support renewable and non-renewable energies. Both types of subsidies create significant price distortions. As long as the renewable and fossil fuel industries are subsidized, market prices will not reflect their actual environmental and social costs, making the goal of setting an accurate carbon price impossible.

A second contradiction is political motive. The green finance movement sees potential profit in leveraging the huge disparities between the misaligned market prices for fossil fuels and the actual environmental costs and needs of society. Entrepreneurs and investors stand to benefit from green solutions to the problems of overconsumption and enclosure of the scarce resource of the atmospheric commons through trading rights. Yet environmental trading and climate bonds generate hypothetical values which obscure the deeper correlations between the debt-driven overproduction, overconsumption and carbon emissions that are bankrupting the world's critical ecosystems. On the one hand, despite their goals to *dematerialize* the economy through energy efficient technologies that reduce the consumption of natural resources and the generation of waste, many 'green' producers are still consuming more fossil fuel energy per unit of economic output than the renewable energy they produce. On the other hand, green entrepreneurs often assure the public that it doesn't have to choose between the economy and the environment anymore: but what this really means is that human choice has no role—that everyone should simply trust that efficient markets, optimization, perfect information and no obstacles to free exchange (the Market State program) will reverse climate change. Community eco-projects aside, there is little emphasis in the green finance movement on participatory democratic action or political alternatives to subsidies, protectionism, bonds and debt-financing. Instead of the economic benefits of environmental trading, ecological financial products and green technology trickling down to the people, it's more likely that *green economics will lead to a net transfer of wealth from debtors to entrepreneurs, investors and bankers*. Rather than 'climate wealth' for all, there will be greater scarcity and environmental destruction, particularly for the marginalized groups who are most directly affected by the worsening impact of greenhouse gases.

A third contradiction is economic ideology. *This is the key difference between green economics and the commons economy. While both are focused on transforming production, green economics would do this directly through market-based environmentalism.* From the commons perspective, the underpricing of scarce natural resources and environmental assets is not only because the price on ecological destruction is set too low. Commoners recognize that internalizing the marginal costs of pollution and climate change through carbon pricing cannot close the gap between the private costs and the socio-environmental costs of production and consumption. *The global commons are not being exploited merely because nature's services are underpriced in the market, but because they are being propertized, commodified, subsidized and subjected to interest-bearing debt. The carbon price simply perpetuates the*

myth that property rights and debt-based financing can solve our environmental and social problems, even while the interest-generating structure of the market system undermines its own resource base and is ultimately unsustainable.

We must reexamine the claim that incorporating higher prices for CO₂ emissions into our activities is the only way to change human behavior. Price may be a proximate cause of climate change, but it is not the root cause. Price pertains only to the economy—not to the greater flow of natural resources from the environment, through the economy, and back to the environment as waste. The price system cannot express the true risks and costs of extracting and burning fossil fuels because it does not reflect the collective value of our finite biophysical system. This is why global heating will force the entire economic structure to transform. Without a universal agreement on emissions stabilization based on an integrated understanding of people's needs for a system of value in harmony with the biosphere, the Market State will continue to generate ecologically and socially distorting subsidies and debt-based financing, denying the difference between *objective prices* in the marketplace and the *subjective value* (at least potentially) expressed through our currencies. *The political refusal to differentiate price from value—the legacy of behaviorism, structuralism and linguistic determinism—is creating an institutional and policy crisis in the Market State.* We know that market failure—the inability to absorb the indirect costs of goods and services, value ecological services, and maintain sustainable-yield thresholds—has already caused the breakdown of the economy's natural support systems. Why then should we expect the market to solve the very problems it created without restructuring the economy itself?

Time is Money: Discounting the Future, Denying the Commons

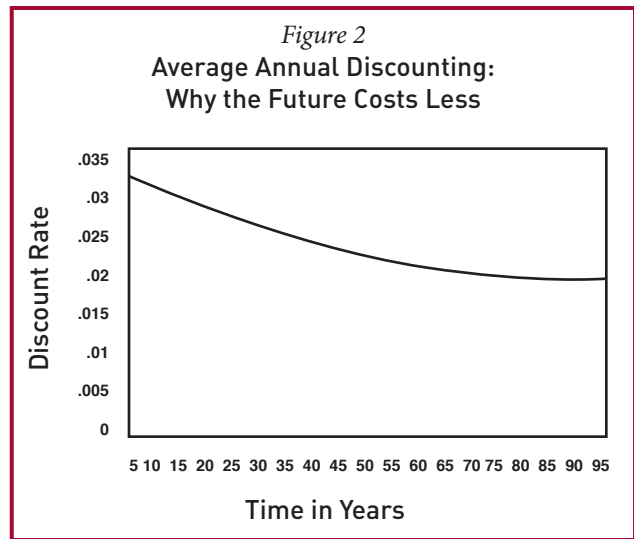
Money is a vital commons which everyone uses for the expression of value. However, the monetary power in modern society is currently under private control. In this system, virtually all money is created as bank deposits when banks lend money at interest. Since banks do not create the money that borrowers need to pay this interest, borrowers must raise the money from sources outside the bank (such as wages). Hence, the economy grows only when the interest is paid and additional money is created through the issuance of new loans. Economists say that the market adjusts itself to the scarcity of resources, but this is only partially true. For the economy to continue to grow with a limited amount of money in circulation, people and businesses both have to compete for it in order to survive, trapping them in a loop of endless borrowing underwritten by cheap labor, human creativity, and cultural and natural resources. The exponential growth of money has persuaded modern society that it can live outside the natural law of the commons—that resource exhaustion, overpopulation and pollution are not significant problems since Earth is an endless pool of resources and a dumping ground for waste. But continually taking out new loans to fund the interest on old loans is a highly ineffective way of allocating resources in short supply, endangering people now and for generations to come. By robbing assets from the future and selling them in the present, humanity faces the limits

of how much more of its commons—minerals, labor, health, genome, biosphere—it can continue to convert into money to keep the system going. The engine of perpetual growth is creating excess production and consumption in some places, poverty and migration in others, and energy insecurity and ecological degradation everywhere—all of which contribute to greenhouse gas emissions.

This is a world-changing economic crisis, since the environmental damage caused by rising temperatures in coming decades could reduce global output and consumption significantly. Either we do nothing and accept the various ecological disasters brought on by ceaseless economic growth, or undertake costly measures for adaptation and mitigation of climate change. But our economic estimates for the future are in dispute. Since we don't know the actual amount of carbon dioxide increase in the future, economists like William Nordhaus have cautioned against taking immediate action to avoid the damage and loss that may result. Because our present market rates place little weight on ultra long-term investments, such experts advise against spending today on the benefits of reducing climate change that will only be realized far in the future. Other economists like Nicholas Stern propose factoring the risks of global heating into current cost-benefit calculations. They call for investing a percentage of the present generation's yearly income on emissions reductions, building an endowment that amounts to a percentage of future generations' income.

All of this raises the question, how much is it worth now to create the benefits of emission reductions that won't be realized for another century? The IPCC estimates that \$1.375 trillion a year will be needed to limit global temperature increases to 2°C. Scientists and economists are in general agreement that the cost of slowing and eventually reversing the growth of carbon emissions through greater efficiency and clean electricity generation will be 1–2% of global GDP over the next fifty years. Beyond that, there is broad disagreement on the level of global output that will be needed. A number of organizations, including the IPCC and the International Energy Agency (IEA), have concluded that the economic cost of action is far less than the cost of inaction. For example, tackling climate change would cost 1% of global GDP today, but doing nothing could cost 5–10% on a permanent basis in future years.

Economic estimates of the decrease in CO₂ through mitigation are based on *pure time discounting*—an annual rate which estimates the very long-term benefits of making investments now to prevent the probable damages arising from climate change in the future (Figure 2). Discounting reduces the present value of costs and benefits for every year they are delayed, which discourages society from paying money for a project today (when it will cost more) rather than paying for it years from now (when it will cost less). Since the cost of investing in climate change reduction is less in current prices the longer we wait, there are strong disincentives for taking immediate action, even though we may be causing significant harm to the planet by postponing efforts to limit the impact of climate-changing fuels in the atmosphere.



From the commons perspective, the debate over high or low discount rates completely misses the point. Here again, the visionaries of the Market State propose a pair of false choices that conflate price with value. By comparing projected rates of climate change with their potential damages and the costs of reducing emissions, the goal of these economists is to set carbon prices so that the market itself will cut emissions. This presumes that the market is the only possible means of representing collective value. But from the standpoint of the commons, the formula of discounting—which assumes that the people, resources and species of the future are not worth as much as those of the present—is highly misleading. The discount rate gives less weight to the benefits and costs that occur in future years, expressed through the depreciation of money over time, *on the belief that people prefer to receive benefits sooner and pay for them later*. But what is the rationale behind this? Quite simply, we devalue the future because it seems far away and is not in our immediate interest. *So the discount rate is merely an expression of our current self-interest expressed through prices*—an inexcusable reason for disinheriting our grandchildren's grandchildren and their progeny from the benefits we enjoy!

Rather than devise an alternative metric that distinguishes price from value, policymakers are still using the same behaviorist premises for discounting the future, whether they support a high discount rate that allows climate change to proceed unabated by shifting the costs to future generations, or an ultra-low discount rate that encourages us to spend now to reduce emissions and ensure the benefits of a clean atmosphere later. Proponents of green economics are decidedly in the latter camp. Through entrepreneurial innovation and rapid technological change, they believe, the world could reindustrialize sustainably using efficient energy, clean technology and environmentally friendly products. And as consumers and businesses are forced to adjust their practices and lifestyles by reducing fossil fuel consumption, and businesses find that investing in efficiency or alternative energy is cost-effective, all parties will absorb the new environmental costs through higher prices.

Yet the green economics movement has underestimated the structural problems involved in replacing fossil fuel technologies and

curbing our appetite for oil and coal through ecological industrialization and the transition to renewable energy sources. The capital stock of industrial civilization is already locked into fossil fuels, creating deep-seated inertia and resistance to renewable energies. Renewables and solar are competing with fossil fuels not only on the basis of *energy return on investment* (which compares the amount of energy a project produces with the amount it consumes), but also on the basis of investor obligations in the *bond markets*. Endowments, pension and life insurance funds, along with mutual funds, are heavily invested in the fossil fuel sector through long-term bonds. Sovereign, municipal and corporate bonds, which underwrite the fossil fuel infrastructure, are amortized for terms up to 40 years, often producing yields above 5%. Particularly in today's volatile economy, investments in the entire fossil fuel supply chain (from wells and pumps to pipelines and ships, and from ports and refineries to distribution and sales) are impossible to redirect quickly. Hence, the development of renewables on a mass scale will be a major challenge as long as bond market rates and cheap debt make investments in centralized energy infrastructure more profitable than decentralized renewable energy projects.

Some observers have predicted peaks in world oil and gas production and supply in coming years. Yet producers do not believe that renewable energy demand will replace fossil fuel demand any time soon. Fossil fuels currently provide about 80% of total global energy. The IEA, Exxon, and others in the industry predict that by 2050, the world will be even more dependent on oil, coal and gas than today, requiring \$1 trillion in new investment each year. Oil companies expect to prosper because their technology and expertise are abundant, advances in technology should help them find more resources, and new exploration and infrastructure can be financed through higher oil prices. They also expect to continue receiving support—directly through government subsidies, and indirectly through unpaid ecological and personal health liabilities. In addition, traditional fossil fuel sources are still cost-effective to extract, refine and distribute, and offer more attractive yields to investors than renewable energies, which have higher initial costs and debt-to-equity ratios. These entrenched, trillion dollar investments in the fossil fuel industry are a major reason why governments have not committed to binding limits on emissions and infrastructure-changing investments in green technology and jobs.

Investors are also nervous that cost-benefit estimates using discounting—whether through market rates or bond rates—have yet to put a viable price on mitigating the risks of climate change. While scientists are pushing for long-term climate stabilization targets like those of the IPCC, domestic targets for carbon emissions under the Kyoto Protocol are based on much shorter time-periods. That's largely because national politicians and business leaders, driven by election cycles and quarterly earnings reports, have been reluctant to set sustainable targets very far into the future. Since there is little agreement on a global emissions curve for the coming centuries, no one is really able to assess the risks and costs of global heating, or the future benefits of investments

in mitigation. Yet without targets for emissions stabilization, the financial world cannot create the credit and financing needed to offset yields in fossil fuel investments with investments in solar and renewables. And without strong institutional incentives for making the transition to a post-carbon world, neither the present investment patterns nor the energy infrastructure are likely to change significantly for several decades. Even now, many individuals who campaign for a green energy future are unaware that their personal investments in pensions and life insurance are probably tied up in non-renewables for the long term. All of this strongly reinforces the predisposition of the Market State toward unlimited economic growth and continued emissions of harmful gases into the atmosphere.

Carbonized Money: Heartbeat of the Beast

There's no question that the climate crisis will transform the economic system; what most people have not recognized is that the green economy will not flourish until the monetary system itself is transformed. While the 'triple bottom line' strategy (people, profit, planet) proposes that our social, economic and ecological problems can be solved through investments in clean technology, the reduction of oil production and consumption, and the creation of massive stimulus for business and jobs, it leaves out a crucial variable—the *reserve value of money*. Modern macroeconomics has led people to believe that currency value is essentially a function of the marketplace and that the economy depends more on people's continuous flows of income than on the world's stocks of natural and social capital. Hence, we think of energy more in terms of its price and seldom consider its connection with monetary value.

Because oil is priced primarily in dollars across the world and has more direct influence on the value of currency than any other resource, the US dollar is fundamentally linked to global crude oil as its *de facto* reserve base. So when it sets interest rates the US Federal Reserve is largely reacting to relative price stability—inflation or deflation—caused by the global reserve and flow of petroleum as it affects US and global economic output and growth. Thus, to a significant degree, it is the oil-driven engine of productivity in relation to the global oil reserve that the Federal Reserve uses to set the value of US currency and, by virtue of US dollar hegemony, the world's currencies. This has startling implications. *Imagine what it would be like to green the planet without transforming the present monetary system and its virtual oil standard. Even if every person and every business in the world were to adopt clean and renewable sources of energy and all of us actually stopped emitting greenhouse gases right at this moment, petroleum will remain the most important ingredient of economic growth, and the profit and wage incentives in these 'green' businesses will still be denominated in dollar values that are linked directly to oil.* And if our currencies are still based on fossil fuel for their worth, what good does it do to pin our strategies on raising the price of CO₂ to encourage more investment in renewable technology, when the continuing misvaluation of energy is the heartbeat of the beast?

production of a resource, and resource restoration (or mitigation) funds for the repair or regeneration of these resources.

Hence, the long-term wealth guaranteed by commons trusts is generated through the sustainability or preservation value of the common assets they are managing, not through the potential financial revenue of those commons. Unlike the interest rate, which measures changes in the value of assets, the sustainability rate expresses the value of changes in assets. This is a key distinction. *Instead of emphasizing the distribution of income and consumption through greater quantities of output and consumption, the sustainability metric stresses the distribution of the stock of wealth by ensuring that renewable resources are created at the same rate as the depletion of non-renewables.* This will result in a wholesale transformation of values, harmonizing the interests of the users of capital with those of the producers of capital, and realigning the incentives for both public and private investment toward zero-interest energy sources and away from debt-fueled overproduction, overconsumption and CO₂ emissions.

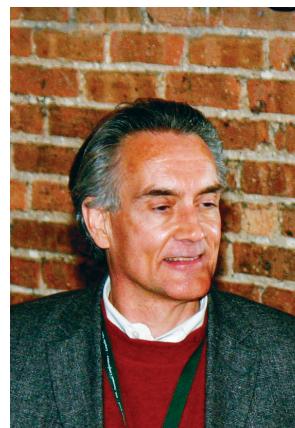
Intergenerational Wealth: Toward the Commons Economy

Nations are deeply divided over how to manage the global commons, particularly the decarbonization of the atmosphere. Rich states refuse to make major emissions cuts until large developing nations like China, India, and Brazil also take radical steps. Poor states argue that the industrial world, which has been producing emissions for centuries, should provide the resources to help them grow economically while they adapt to climate change and minimize their own emissions. Yet the differences between rich and poor nations cannot be resolved on the same terms that gave rise to them. Our predominant vision of social justice—*adaptation* to cope with the impacts of climate change through investment, aid and technology—will not be realized through the current economic structure. Adaptation to address present impacts and relieve human misery and suffering is vital for obvious reasons; but the catalyst that is needed to unify nations and transform the economic system is *mitigation*—measures for limiting future damage from climate change.

The 1987 Brundtland Commission Report called for “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” Thus far, the world community has viewed sustainable development through the lens of neo-liberalism and progress has been slight. But fully honoring the principle that *the future has value to the people who will live in the future* would adjust our fundamental patterns of economic activity toward a more holistic system that will also benefit the present generation. Ensuring that people in the far future have a standard of living on a par with our own requires a new kind of international planning based, not on geopolitical or corporate objectives, but on global resource distribution relative to population growth and ecological carrying capacity. *Giving the same weight to future generations’ welfare as we give to those now living obliges us to increase the present wealth per capita—and this will transform the balance of trade, finance and aid for the current generation.*

But as long as our global plan for the well-being of future generations is merely a quest to get prices right in the present, the value of the commons will continue to be suppressed by the market. Far from presenting a comprehensive alternative to climate change, carbon emission permits and taxes are incomplete measures of the sources of human incentives and collective worth within the greater biosphere. Renewable energy and technology are essential, but today’s green economics is merely another expression of the market’s misalignment of incentives and risk, since green investment is almost entirely dependent on subsidies, protectionism and debt-financing, which shift social incentives only at the margin. Nor is it adequate to address the problem of climate change by discounting the future—spending more money now and living with less global heating, or spending less money now and living with more global heating. *Mitigation to reduce global heating must be measured, not by the scarcity-based instruments of interest or bond rates, but through a value that balances claims of future wealth with the economy’s power to generate that wealth sustainably today.*

In a commons economy, the cost of failing to address climate change is viewed as a function of the sustainability of the resources that back our currencies. Thus, in computing the costs and benefits of climate mitigation for the future, it is money itself—the medium of exchange between buyers and sellers—that creates the incentives necessary for the global adjustment of value. With a commons reserve currency issued in co-credits, where the relative value of present and future goods arises from the commons as a collective expression of nature, society and culture, signals about the actual scarcity of resources and the cost of environmental damage and social disparities are conveyed directly through our money. *When global sustainability is expressed through the value of currency, each of us will have much fuller and immediate realization of the potential impact of our purchasing power in spending, saving or investing, making it worth less to do ecological and social harm, and worth more to be ecologically and socially restorative.* Prices will find the right level only after money is properly valued, breaking the endless-growth imperative, balancing the interests of the future with those of the present, and actualizing our incentives through nature, society and the economy. To get prices right, we need to get money right. This means getting energy right. And to do that, we must first get the commons right.



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