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### Environment and Development Challenges: The Imperative of a Carbon Fee and Dividend

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#### **[–] Abstract and Keywords**

This chapter discusses the importance of a carbon fee and dividend in minimizing the impacts of climate change on humanity and nature. Before outlining the policies needed to produce a rapid phase-out of fossil fuel emissions, it enumerates the fundamental flaws of the Kyoto Protocol from the standpoint of climate science. One flaw is the “cap” mechanism, which purports to reduce carbon emissions at the rate required to stabilize climate but fails to provide universal price signals that would reward efforts to reduce emissions. Another flaw concerns “offsets” that allow nations to limit reduction of fossil fuel emissions. This chapter argues that the Kyoto Protocol’s cap-and-trade-with-offsets approach must be abandoned and replaced with an approach that phases out fossil fuels in an economically efficient manner, such as utilizing carbon-free energy sources like renewable energy and nuclear power. Specifically, it proposes a flat (across-the-board) rising fee (tax) on carbon emissions. It also explains how such an approach may be implemented both nationally and internationally.

Keywords: cap mechanism, carbon dividend, carbon emissions, carbon fee, climate change, fossil fuel emissions, fossil fuels, Kyoto Protocol, offsets, renewable energy

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MOST governments have paid little attention to the threat of human-made climate change. They have acknowledged its likely existence, notably in the United Nations Framework Convention on Climate Change (UNFCCC, 1992), in which 195 nations agreed to avoid “dangerous anthropogenic interference” with climate. However, the instrument chosen to implement the Framework Convention, the Kyoto Protocol, is so ineffectual that global fossil fuel carbon dioxide (CO<sub>2</sub>) emissions have increased by about 3% per year since its adoption in 1997, as opposed to a growth rate of 1.5% per year in the decades preceding the Kyoto Protocol [<http://www.columbia.edu/~mhs119/Emissions/>, which is an update of a graph in Hansen and Sato (2001)].

This feckless path cannot continue much longer, if there is to be hope of preserving a planet resembling the one on which civilization developed, a world that avoids the economic devastation of continually receding shorelines and the moral nightmare of having exterminated a large fraction of the species on Earth. The science is clear enough: burning most fossil fuels would invoke such consequences (Hansen et al., 2013).

At least a moderate overshoot of climate change into the dangerous zone is unavoidable now, but, fortunately, prompt actions initiating a change of directions this decade could minimize the impacts on humanity and nature. The policies needed to produce a rapid phase-out of fossil fuel emissions would have a wide range of other benefits for the public, especially in those nations that recognize the advantages in being early adopters of effective policies. So there is some basis for optimism that the political will necessary to enact effective policies could be marshaled.

**(p. 640)** However, for this to happen it is essential that the next approach not repeat the fundamental mistakes

that doomed the Kyoto Protocol. If another 15 years is wasted on an ineffectual approach, it will be too late to avoid catastrophic consequences for today's young people and future generations. Therefore it is important to clarify the principal flaws in the Kyoto approach from the standpoint of climate science.

### 26.1 Kyoto Protocol

A fundamental flaw of the Kyoto approach is that it was based on a "cap" mechanism. This approach embodies two ineluctable problems. First, it made it impossible to find a formula for emission caps that was equitable among nations and also reduced carbon emissions at the rate required to stabilize climate. Second, it failed to provide clear price signals that would reward businesses, individuals and nations that led the way in reducing emissions.

The validity of the first assertion can be proven by comparing national responsibilities for climate change, which are proportional to cumulative historical emissions (Hansen et al., 2007; Hansen, 2009). The United Kingdom, United States, and Germany have per capita responsibilities exceeding the responsibilities of China and India by almost a factor of ten (Hansen et al., 2007). Even if the United Kingdom, United States, and Germany terminated emissions tomorrow, by the time China, India and other developing nations reached comparable responsibility for climate change the world would be on a course headed to certain climate disasters.

### 26.2 Key Points: Why a Carbon Fee and Dividend Is Imperative

1. There is a limit on fossil fuel carbon dioxide that we can pour into the atmosphere without guaranteeing unacceptably tragic, immoral climatic consequences for young people and nature.
2. It is clear that we will soon pass the limit on carbon emissions, because it requires decades to replace fossil fuel energy infrastructure with carbon-neutral and carbon-negative energies.
3. Climate system inertia, which delays full climate response to human-made changes of atmospheric composition, is both our friend and foe. The delay (p. 641) allows moderate overshoot of the sustainable carbon load, but it also brings the danger of passing a climatic point of no return that sets in motion a series of catastrophic events out of humanity's control.
4. The ineffectual paradigm of prior efforts to reign in carbon emissions must be replaced by one in which an across-the-board rising carbon fee is collected from fossil fuel companies at the place where the fossil fuel enters a domestic market, that is, at the domestic mine or port-of-entry.
5. All funds collected from fossil fuel companies should be distributed to the public. This is needed for the public to endorse a substantial continually rising carbon price and to provide individuals the wherewithal to phase in needed changes in energy-use choices.

It is unrealistic to think that a "cap" approach can be made global or near-global. Nations less responsible for the world's climate predicament believe, with considerable justification, that they should not have to adhere to caps on CO<sub>2</sub> emissions (much less steadily shrinking caps) that are comparable to caps on industrialized countries. At the same time, some industrialized countries, including the United States, refuse to bind themselves to caps that are more stringent than those imposed on developing countries. This impasse cannot be resolved under a cap approach. Indeed, the targets adopted to date with a cap approach have been but a drop in the bucket compared to the reductions required to stabilize climate.

A secondary, but important, flaw of the Kyoto approach is its introduction of "offsets." Nations are allowed to limit reduction of fossil fuel emissions by means of alternative actions such as tree planting or reduced emissions of non-CO<sub>2</sub> climate forcings such as methane or chlorofluorocarbons. However, these offsets are not equivalent to fossil fuel emissions, because the fossil fuel carbon will stay in surface carbon reservoirs (atmosphere, ocean, soil, biosphere) for millennia. Rapid phase-out of fossil fuel emissions, as required to stabilize climate, becomes implausible if leakage is permitted via offsets. Leakage is avoided via the flat across-the-board carbon fee on fossil fuels in the fee-and-dividend approach. Incentives to reduce non-CO<sub>2</sub> climate forcings will be useful, but such programs should not be allowed to interfere with the more fundamental requirement of phasing out fossil fuel CO<sub>2</sub> emissions.

### 26.3 Fee and Dividend

Fee-and-dividend (Hansen, 2009) has a flat fee (a single number specified in US\$ per tonne of CO<sub>2</sub>) collected from fossil fuel companies covering domestic sales of all fossil (p. 642) fuels. Collection cost is trivial, as there are only a small number of collection points: the first sale at domestic mines and at the port-of-entry for imported fossil fuels. All funds collected from the fee are distributed electronically (to bank account or debit card) monthly to legal residents of the country in equal per capita amounts. Citizens using less than average fossil fuels (more than 60% of the public with current distribution of energy use) will therefore receive more in their monthly dividend than they pay in increased prices. But all individuals will have a strong incentive to reduce their carbon footprint in order to stay on the positive side of the ledger or improve their position.

The carbon fee would start small and rise at a rate that sows benefits of economic stimulation while minimizing economic disruptions from sudden change. Economic efficiency requires the price of fossil fuels to rise toward a level that matches their cost to society. At present fossil fuels are the dominant energy only because the environmental and social costs are externalized onto society as a whole rather than being internalized into their prices (G-20 Summit Team, 2010). Human health costs due to air and water pollution from mining and burning of fossil fuels are borne by the public, as are costs of climate change that have been estimated at US\$100–1000/tCO<sub>2</sub> (Ackerman et al., 2009).

### 26.4 International Implementation

When the reality and consequences of the climate threat become clear enough the international community should recognize that all nations are in the same boat and that the fruitless cap-and-trade-with-offsets approach must be abandoned. The reality is that the Kyoto Protocol and proposed replacements are “indulgences” schemes Hansen (Hansen, 2009), which allow aggressive development of fossil fuels to continue worldwide. Developing countries acquiesce if sufficient payments for offsets and adaptation are provided. This works fine for adults in developed and developing countries today, but this abuse of young people and future generations must eventually end as the facts become widely apparent.

A fundamental fact is that as long as fossil fuels are allowed to be cheap, via subsidies and failure to pay their costs to society, they will be burned. Even ostensibly successful caps have no significant benefit. They simply reduce demand for the fuel, thus lowering its price and creating incentives for it to be burned somewhere by somebody. What is required is an approach that results in economically efficient phase-out of fossil fuels, with replacement by energy efficiency and carbon-free energy sources such as renewable energy and nuclear power.

Specifically, there must be a flat (across-the-board) rising fee (tax) on carbon emissions. With such a flat fee, collected by the energy-using nation at its domestic mines (p. 643) and ports of entry, there is no need for trading carbon permits or financial derivatives based on them. Indeed the price oscillations inherent in carbon trading drown out the price signals. The required rapid phase-out of fossil fuels and phase-in of alternatives requires that businesses and consumers be confident that the fee will continue to rise. Another flaw of trading is the fact that it necessarily brings big banks into the matter—and all of the bank profits are extracted from the public via increased energy prices.

A carbon fee (tax) approach can be made global much more readily than cap-and-trade (Hsu, 2011). For example, say a substantial economic block (e.g., Europe and the United States or Europe and China) agrees to have a carbon tax. They would place border duties on products from nations without an equivalent carbon tax, based on a standard estimates of fossil fuels used in production of the product. Such a border tax is allowed by rules of the World Trade Organization, with the proviso that exporters who can document that their production uses less fossil fuels than the standard will be assigned an appropriately adjusted border duty. Border duties will create a strong incentive for exporting nations to impose their own carbon tax, so they can collect the funds rather than have them collected by the importing country.

Once the inevitability of a rising carbon price is recognized, the economic advantages of being an early adopter of fee-and-dividend will spur its implementation. These include improved economic efficiency of honest energy pricing and a head-start in development of energy-efficient and low-carbon products. The potential economic gains to middle and lower income citizens who minimize their carbon footprint will address concerns of people in many nations where citizens are becoming restive about growing wealth disparities. Note that the effect of a carbon price on upper class citizens is modest and nonthreatening except to a handful of fossil fuel moguls who extract

obscene profits from the public's dependence on fossil fuels. An added social benefit of fee-and-dividend is its impact on illegal immigration—by providing a strong economic incentive for immigrants to become legal, it provides an approach for slowing and even reversing illegal immigration that will be more effective than border patrols.

### 26.5 National Implementation

The greatest barriers to solution of fossil fuel addiction in most nations are the influence of the fossil fuel industry on politicians and the media and the short-term view of politicians. Thus it is possible that leadership moving the world to sustainable energy policies may arise in China (Hansen, 2010), where the leaders are rich in technical and scientific training and rule a nation that has a history of taking the long view. Although China's CO<sub>2</sub> emissions have skyrocketed above those of other nations, China (p. 644) has reasons to move off the fossil fuel track as rapidly as practical. China has several hundred million people living within a 25-meter elevation of sea level, and the country stands to suffer grievously from intensification of droughts, floods, and storms that will accompany continued global warming (IPCC, 2007; Hansen, 2009; Hansen et al., 2013). China also recognizes the merits of avoiding a fossil fuel addiction comparable to that of the United States. Thus China has already become the global leader in development of energy efficiency, renewable energies, and nuclear power.

Conceivably the threat of impending second-class economic status could stir the United States into action, but it is imperative that the action contain no remnant of prior cap-and-trade fiascos, which were loaded with giveaways to big banks, big utilities, big coal and big oil. The approach must be simple and clear, with the fee rising steadily and 100% of the collected revenue distributed to legal residents on a per capita basis.

The fee-and-dividend approach allows the market place to select technology winners. The government should not choose favorites, that is, subsidies should be eliminated for all energies, not just fossil fuels. This approach will spur innovation, stimulating the economy as price signals encourage the public to adopt energy efficiency and clean energies. All materials and services will naturally incorporate fossil fuel costs. For example, sustainable food products from nearby farms will gain an advantage over highly fertilized products from halfway around the world.

The carbon price will need to start small, growing as the public gains confidence that they are receiving 100% of the proceeds. If the fee begins at US\$15/tCO<sub>2</sub> and rises \$10 per year, the rate after 10 years would be equivalent to about US\$1 per gallon of gasoline. Given today's fossil fuel use in the United States, that tax rate would generate about US\$600 billion per year, thus providing dividends of about US\$2000 per legal adult resident or about US\$6000 per year for a family with two or more children, with half a share for each child up to two children per family.

The proposal for a gradually rising fee on carbon emissions collected from fossil fuel companies with proceeds fully distributed to the public was praised in the United States by the policy director of Republicans for Environmental Protection (Dipeso, 2010) as: "Transparent. Market-based. Does not enlarge government. Leaves energy decisions to individual choices ... Sounds like a conservative climate plan."

A grassroots organization, Citizens Climate Lobby, has been formed in the United States and Canada with the objective of promoting fee-and-dividend. My advice to this organization is adoption of a motto "100% or fight," because politicians are certain to try to tap such a large revenue stream. Already there are suggestions that part of the proceeds should be used "to pay down the national debt," a euphemism for the fact that it would become just another tax thrown into the pot. Supporters of young people and climate stabilization will need to have the determination and discipline shown by the "Tea Party" movement if they are to successfully overcome the forces for fossil fuel business-as-usual.

### (p. 645) 26.6 Global Strategic Situation

Europe is the region where citizens and political leaders have been most aware of the urgency of slowing fossil fuel emissions. Given the stranglehold that the fossil fuel industry has achieved on energy policies in the United States, it is natural to look to Europe for leadership. Yet Europe, despite dismal experience with cap-and-trade-with-offsets, continues to push this feckless approach, perhaps because of bureaucratic inertia and vested interests of individuals. China, at least in the short run, likely would be only too happy to continue such a framework, as the

“offsets” have proven to be a cash cow for China.

The cap-and-trade-with-offsets framework, set up with the best of intentions, fails to make fossil fuels pay their costs to society, thus allowing fossil fuel addiction to continue and encouraging “drill, baby, drill” policies to extract every fossil fuel that can be found. There is a desperate need for global political leaders who can see through special financial interests and understand the actions required to achieve a bright future for young people and the planet. Perhaps such leaders exist—the problem is really not *that* difficult.

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