

'The Threat to the Planet': An Exchange

To the Editors:

I want to compliment Dr. Jim Hansen for another lucid presentation of the science documenting the human-induced global warming problem. In fact, Dr. Hansen's article ["The Threat to the Planet," *NYR*, July 13] covers a critical topic that Al Gore's movie omits, namely it gives the reader a good sense of how soon cuts in carbon emissions would have to begin in order to limit warming to 2 degrees Fahrenheit, i.e., through the presentation of his "alternative" scenario. Here Dr. Hansen clearly indicates that humanity has less than a decade to begin reducing the emissions rate of carbon in order to achieve the "benefits" of this alternative scenario when compared to "business-as-usual." In addition, Dr. Hansen makes the claim that economists would generally recommend that a carbon tax be implemented on all carbon emissions in order to achieve this goal of declining emissions within a decade.

Unfortunately, here is where I believe Dr. Hansen's recommendations fall somewhat short of what is necessary to achieve his own scenario, and will only be likely to leave the reader of his article with the false impression that a modest carbon tax can easily get humanity off the hook without much fuss and bother by reducing carbon emissions to "acceptable" levels. He even claims that this carbon tax should be phased in gradually, a recommendation that clearly conflicts with achieving carbon emissions decreases within a decade.

What Dr. Hansen fails to discuss is how large this carbon tax might have to be in order to achieve the magnitude of the effect he correctly wants. Given how locked in all economies are to high energy-using equipment including vehicles, it is well known that the price of energy would have to be many times the current price in order to induce the desired levels in reduction of energy use through price effects alone. For example, if gasoline is currently about \$3 per gallon, the price including Hansen's proposed carbon tax would have to be several times this level, at least, to have any significant impact on total energy consumption within a decade. (Remember gasoline in Europe already costs almost \$6 per gallon, and Europe also uses far too much gasoline.) Much higher energy prices would be needed because people's response to higher energy prices alone can only be very limited until all the energy-using equipment in the world can change over to vastly more efficient equipment. This takes decades, and a lot of new investment. Thus, to induce less energy consumption, and less carbon emissions within a decade, the carbon tax that Dr. Hansen advocates might have to be vastly higher than the \$10-20 per ton of CO₂ that economists often discuss as appropriate today; perhaps \$100 per ton of CO₂, or more. This level of a carbon tax would probably throw most national economies, particularly that of the US, into disarray.

In addition, Dr. Hansen fails to point out that Al Gore's own chart, which he reproduces in his article, shows that the US uses about 5.5 times the world average of carbon per capita. Thus, if by 2050 or so, the world average carbon-emissions rate had to fall by 50 percent from current levels, which seems consistent with Dr. Hansen's alternative scenario, then if equity were to be imposed on the US on a per capita basis, the US would have to cut back carbon emissions by a factor of 11 (1/2 times 1/5.5). This is a 91 percent reduction! This level of reduction would truly revolutionize the US energy system, and the overall economy as well. I claim that this level of reduction would not be achievable without major changes in American values and, to some extent, the American way of life, in addition to major changes in energy-using technologies.

Returning, then, to the issue of the magnitude of a carbon tax that would be

needed to achieve such a large reduction in US carbon emissions, a very high carbon tax would have to be combined with complementary carbon tax rebate programs for two main reasons. First, the rebates would have to target the tax payments to exactly the kinds of new, more energy-efficient technologies that would be needed. Examples would be super-insulated homes, very efficient appliances and vehicles, and, probably, investments for solar and wind facilities and new electric transmission lines needed to bring renewable power to the sections of the US that have poor supplies. Secondly, the rebates would have to be allocated in ways so that the poor and middle class would not be thrown into poverty by the high carbon tax imposed on all their carbon use, while renewable energy had a chance to become the dominant



Solar panels in front of the decommissioned Rancho Seco nuclear power plant, Sacramento, California, February 2002

type of energy supply over the next few decades. I am afraid that Dr. Hansen's concept of a revenue-neutral carbon tax would not sufficiently incentivize new technologies quickly enough, if most (higher-income) people did not feel some net financial pain due to the new carbon tax.

The "bottom line" is that much more will need to be done by the US government (and governments in general) in the way of planning new energy efficiency programs and a vast new renewable energy infrastructure than Dr. Hansen lets on to by his narrow focus on the single policy instrument of a carbon tax. Again, this criticism does not subtract from the excellent aspects of most of his review.

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Jim Hansen replies:

I use the terms "carbon tax" and "revenue neutral" in a general sense. "Revenue neutral" means that governments should not use the climate problem as an excuse to increase the overall tax burden. However, individuals and businesses may pay more or less tax depending on choices they make, such as the vehicles they drive, other products they buy, and personal habits. In proposing a "carbon tax" I did not specify the details of collecting the tax. The tax might include schemes to optimize effectiveness such as "cap and trade," an arrangement in which the government "caps" the emissions of certain sources. For example, let us say that emissions from power plants must be reduced by 50 percent. If an individual plant failed to reduce its emissions by 50 percent, it could buy emission rights from another plant that had reduced its emissions by more than 50 percent.

An important principle is that governments should assure that each energy source is priced to include its true cost to society, including damage to the environment and human health. Present policies in the United States, China, India, and other key

countries dramatically violate this principle, since these governments subsidize use of fossil fuels and do not apportion costs of environmental and health damage to the energy sources that create the damage.

Energy policy should include a gradual but steadily increasing carbon tax. That is the primary requirement for attainment of the "alternative" scenario for future climate. An important point is the certainty that the tax will continue to increase, which citizens and businesses must have confidence in. Because it is gradual, it will not cause economic disruption, and because it is certain, it will unleash human ingenuity in discovering ways to improve efficiency and develop renewable energies. The government should leave the picking of winners to the marketplace.

I appreciate Dr. Rosen's perspective, but



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I disagree that sudden large tax changes are desirable. Gradual, but steady and certain, growth of the tax is needed to avoid economic disruption and waste as existing infrastructure is phased out. The carbon tax will be large in the end, and the rate at which it grows may be adjusted as experience is gained and evidence about climate change accumulates.

Governments must also exert leadership in many other ways such as setting minimum standards for appliance efficiencies, building codes, and vehicle performance. Standards are needed because consumers often purchase energy-inefficient products with the least up-front cost, even when the life cycle cost of a better technology product is lower.

Dr. Rosen is correct that a certain shock treatment is needed, but it would best be delivered with a two-by-four as a solid whack to the head of politicians who remain oblivious to fundamental physical facts. The Earth's history reveals that global warming of an additional 2-3 degrees Celsius (5 degrees Fahrenheit) would transform the planet and would be disastrous for humans and other species. Actions to avoid these consequences without economic disruption need to begin now. We cannot afford to waste another decade in trying to wake up political leaders.

Finally, I recognize that some politicians will be averse to the word "tax," even revenue-neutral tax. They can replace the word with a euphemism if they choose, but I recommend a forthright approach with the public. The ability of Americans to understand and respond to the climate crisis, if it is honestly and clearly presented, should not be underestimated.

To the Editors:

I note with interest and some concern that Jim Hansen does not mention nuclear electric generation among the approaches to curbing carbon dioxide emissions and perhaps delaying severe global warming. The "liberals" and Al Gore may not like to admit it, but an operating nuclear power plant does not emit carbon dioxide. Even

when the CO₂ emissions from uranium enrichment, fuel fabrication, and associated transportation are included, a nuclear power plant is responsible for considerably less CO₂ than a fossil fuel plant of the same capacity.

About 20 percent of US electric generation today is by nuclear power plants, and this could certainly be increased substantially during the next decade. Surely this is a more democratic, not to speak of humane, solution than curbing CO₂ emissions by increasing the cost of electricity and gasoline. Anything can be rationed by increasing its cost; that way those who have money can have what they want and poor people can't have any. Tax rebates don't do you any good if you don't have money to buy gasoline in the first place. My own commute is eighteen miles round-trip and my car gets twenty-six miles per gallon. At \$3 per gallon that is \$9.64 per week. For someone earning \$12 per hour, slightly more than twice minimum wage, that is 2 percent of that individual's gross income. Bus fare in my city (Albuquerque, New Mexico) is \$1 per trip—comparable to the cost of gasoline for this commute. Moreover, on \$12 per hour, this individual can hardly afford a hybrid car or a "lightweight carbon-composite" car, especially if he or she is also supporting a child or two on \$12 per hour.

In completely ignoring nuclear electric power generation, Hansen appears to have bought into the unfortunate Democratic and liberal antinuclear point of view, with its exaggeration of the health and other risks of operating nuclear plants and disposal of spent nuclear fuel. If the reader is asked to accept the science of global warming and not be swayed by anti-Kyoto Protocol propaganda, cannot Hansen accept the actual science and engineering of nuclear power, and not be swayed by anti-nuclear propaganda?

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Jim Hansen replies:

I thank Dr. Weiner for her comments, but I must point out that she is incorrect in her assertion. I do not ignore the potential contribution of nuclear power for delivering nearly CO₂-free electrical power. On the contrary, I state, "... new electricity requirements should be met by the use of renewable energies such as wind power as well as by nuclear power and other sources that do not produce CO₂."

Nuclear power is an emotionally charged issue for many people, but not for me. I have often stated that I would rather live next to a nuclear power plant than next to a coal-fired power plant. We must recognize, however, that several serious issues with nuclear power have yet to be adequately addressed, including procedures for disposal of nuclear waste and assurance that weapons-grade nuclear material can be kept out of the hands of terrorists. Governments should address these issues with greater urgency than they have to date, and they should simplify licensing procedures to reduce the time required to construct nuclear power plants.

If these problems are successfully addressed, there is potential for the new-generation and next-generation nuclear power to contribute to solution of the climate problem. However, this should be determined on the basis of open economic competition with other energy sources and energy efficiency. A gradually increasing carbon tax will favor nuclear power, as well as renewable energies and energy efficiency, but taxpayers should not be saddled with funding direct subsidies of nuclear power.