



Toward A Global Energy Transition

By Ross Gelbspan

This paper details a plan with a set of three interactive and mutually reinforcing strategies designed to reduce the world's use of carbon fuels by at least 70%, and at the same time, create millions of jobs around the world, especially in developing countries.

The plan is driven by concerns that global climate change is progressing far more rapidly than scientists anticipated even a few years ago.

To control the escalating pace of change and to allow the climate to re-stabilize, humanity has to cut its burning of fossil fuels by at least 70% in a very short time. That is the consensus of more than 2,000 scientists from 100 countries reporting to the UN-sponsored Intergovernmental Panel on Climate Change in the largest and most rigorously peer-reviewed scientific collaboration in history.

The urgency of the threat is spelled out in two other recent peer-reviewed studies corroborating the UN panel's findings. One focuses on environmental impacts, the other on future energy consumption.

In 2001, researchers at the Hadley Center, Britain's principle climate research institute, found that the climate will change 50% more quickly than was previously assumed. That is because earlier computer models calculated the impacts of a warming atmosphere on a relatively static biosphere. But when they factored in the warming that has already taken place, they found that the rate of change is compounding. They project that most of the world's forests will begin to turn from sinks to sources—dying off and emitting carbon—by around 2040.

The other study is equally troubling. Eleven researchers found several years ago that unless the world is getting half its energy from non-carbon sources by 2018, we will be locked into an inevitable doubling—and possible tripling—of pre-industrial carbon dioxide (CO₂) levels later in this century. A follow-up study by many of the same researchers, published in *Science* in November 2002, calls for a crash program to develop a carbon-free energy economy. Using conservative projections of future energy use, the researchers found that within 50 years humanity will need to be generating at least three times more energy from non-carbon sources than the world currently produces from fossil fuels to avoid a catastrophic build-up of atmospheric CO₂ later in this century.

The science is taken very seriously outside the United States. In other countries, hardly anybody debates whether human activities are seriously affecting the climate. The debates are about policy choices, such as how to change energy delivery structures without wrecking national economies. The agreement on the urgency of the climate threat is evident in the responses in Europe. Holland has completed a plan to cut emissions by 80% in the next 40 years. The United Kingdom has committed itself to 60% reductions in 50 years. Germany is planning for 50% cuts in 50 years.

By contrast, the White House has become the East Coast branch office of ExxonMobil and Peabody coal, and climate change has become the pre-eminent case study in the contamination of the U.S. political system by money.

Two years ago, U.S. President George W. Bush reneged on a campaign promise to cap carbon emissions from coal-burning power plants. He then unveiled his administration's energy plan, which is basically a shortcut to climate hell. In a truly Orwellian stroke, the White House excised all references to the dangers of climate change on the EPA's website in mid-2003. Finally, Bush withdrew the United States from the Kyoto climate negotiations, and the administration's chief climate negotiator declared that the United States would not engage in the Kyoto process for at least 10 years.

Ad Hoc Group's Plan Offers First Ray of Hope

However, there may be an approach that could address our increasingly inflamed atmosphere and our reluctant political leadership as well. It is provisionally called the World Energy Modernization Plan.

This plan was developed by an ad hoc, informal group of about 15 energy company presidents, economists, energy policy experts and others who met at the Center for Health and the Global Environment at Harvard Medical School.

Since its development three years ago, the plan was presented at side conferences to the climate negotiations in Buenos Aires and Bonn. It has been endorsed by a number of developing countries' non-governmental organizations (NGOs). It received a very positive reception from the former CEO of Shell-U.K. who was also director of a Group of Eight (G-8) Task Force on Renewable Energy. It was the subject of a briefing with a group of oil executives in Cairo. It attracted the interest of a small number of senators and congress members two years ago. Most recently, it was endorsed by a former British ambassador to the United Nations.

The plan addresses a stark reality: The deep oceans are warming, the tundra is thawing, the glaciers are melting, infectious diseases are migrating, and the timing of the seasons has changed. All that has resulted from only one degree of warming. It is expected that the earth will warm another three to 10 degrees later in this century, according to the UN-sponsored Intergovernmental Panel on Climate Change (IPCC).

Against that background, we are offering this set of regulatory strategies. While they have been reviewed by a number of economists and energy policy experts, they are still provisional. Some elements may require major revamping. Although we happen to think this proposal is elegant, we are not dogmatic about its particulars.

We believe very strongly that these strategies present a model of the scope and scale of action that is appropriate to the magnitude of the climate crisis. To date, we have seen no other policy recommendations that adequately address either the scope or urgency of the problem.

The plan involves three interacting strategies. One is a subsidy switch, in which industrial countries would eliminate government subsidies for fossil fuels and establish equivalent subsidies for renewable, non-carbon energy technologies. Another is a clean energy transfer fund, which entails creating a pool of money on the order of \$300 billion a year to provide renewable energy technologies to developing countries. The last one is a progressively more stringent fossil fuel efficiency standard that rises by 5% per year; its adoption, perhaps within the Kyoto framework, could be complemented with the emissions trading mechanism to help nations meet it.

While each of these strategies can be viewed as a stand-alone policy, they are better understood as a set of interactive policies that could speed the energy transition far more rapidly than if they were implemented in piecemeal fashion.

If the subsidy switch in industrial nations were implemented in tandem with the progressive fossil fuel efficiency standard, we believe those two policies alone could jumpstart an energy transition in the North. But, as we know, the problem is global in scope. The transfer fund addresses the fact that even if the countries of the North dramatically reduce emissions, those cuts would be overwhelmed by the coming pulse of carbon from India, China, Mexico, and Nigeria.

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Subsidy Switch Could Lead to Fuel Switch

The United States currently spends more than \$20 billion a year to subsidize fossil fuels. The aggregate subsidies for fossil fuels in industrial countries has been estimated at \$200 billion a year.

We are proposing that in the industrial countries those subsidies be withdrawn from fossil fuels and equivalent subsidies be established for renewable energy sources. A small portion of the U.S. subsidies must be used to retrain or buyout the nation's approximately 50,000 coal miners. But the lions' share of the subsidies would still be intended for the major oil companies to retrain their workers and re-tool to become aggressive developers of fuel cells, wind farms, and solar systems. In other words, we envision the subsidies as a tool to help oil companies transform themselves into renewable energy companies.



A windfarm in Oklahoma. Source: Oklahoma Municipal Power Authority.

Fund to Help Poor Countries Go Green

The second element of the plan involves the creation of a new \$300-billion-a-year fund to help transfer renewable energy resources to developing countries. Virtually all poor countries would love to go solar; virtually none can afford it. Among them are countries with the smoggiest cities in the world today, such as China, Mexico, Thailand, and Chile.

The late Dr. Stephen Bernow, assistant director of The Tellus Institute in Boston, came up with the estimated need for \$300 billion per year for up to a decade to transfer non-carbon energy technologies to developing countries. One attractive source of revenue to fund the transfer lies in a so-called "Tobin tax," named after its developer, Nobel prize-winning economist Dr. James Tobin. This tax is levied on banks and other agents that conduct international currency transactions.

Tobin conceived his tax as a way of damping the volatility in capital markets by discouraging short-term trading and encouraging longer-term capital investments. But it would also generate enormous revenues. Today the commerce in currency swaps by banks and speculators amounts to \$1.5 trillion per day. A tax of a quarter-penny on a dollar would, for technical reasons, net the \$300 billion a year, which could go for wind farms in India; fuel-cell factories in South Africa; solar equipment assemblies in El Salvador; and vast, solar-

powered hydrogen-producing farms in the Middle East.

Since currency transactions are electronically tracked by the private banking system, the need for a large, new bureaucracy could be avoided simply by paying the banks a fee to administer the fund. That administrative fee would, to some extent, offset the banks' loss of income from the reduction in currency trading that would result from the imposition of the tax. The involvement of the private banking system in administering the fund would also help in minimizing corruption in recipient countries by the banks' establishment of clear benchmarks for payment to contractors.

The system, moreover, would give recipient countries latitude in negotiating contracts with renewable energy vendors. That way they could ensure domestic ownership of new energy facilities and require substantial employment of local labor in their construction and operation.

Several developing country commentators have suggested that corruption could be further reduced by requiring recipient governments to include representatives of ethnic and indigenous minorities, universities, NGOs, and labor unions in making decisions about the procurement and startup of new energy installations.

The only additional bureaucracy would be an international auditing agency to monitor transactions to ensure equal access for all energy vendors and to review

contracting procedures between banks, vendors and recipient governments.

If a Tobin tax proves unacceptable, a fund of the same magnitude could be raised from a tax on airline travel or a carbon tax in industrial countries, although both these sources are more regressive. Florentin Krause, of the IPCC's Working Group III, and Stephen DeCanio, former staff economist for the Reagan Council of Economic Advisers, estimate that if carbon emissions were taxed at the rate of \$50 a ton, the revenue would cover the cost of transferring clean energy technologies to developing countries.

(At this point, we have not calculated what would happen to transitional prices of carbon fuels if subsidies were removed and a carbon tax imposed simultaneously. That may, or may not, cause too large an economic shock in the short term.)

Regardless of its revenue source, the fund would be allocated according to a United Nations formula. Climate, energy use, population, economic growth rates, and other factors would be used to determine each developing country's annual percentage.

Individual countries would decide how to utilize their share. For example, if India were to receive \$5 billion in the first year, it could pick its own mix of wind farms, village solar installations, fuel cell generators and biogas facilities.

In this hypothetical example, the Indian government could then entertain bids for these clean energy projects. As contractors reached specified development and construction benchmarks, they would be paid directly by the banks. And the banks, as noted, would receive fees for administering the fund.

As developing countries acquired technology, the fund could simply be phased out, or the money in it could be diverted to other global needs.

The fund would not be a conventional North-South giveaway. Rather, it is envisioned as a transfer of speculative, non-productive resources from finance sector transactions to the industrial sector for intensely productive, wealth-generating, job-creating investments.

The fund also could be a critical investment in U.S. national security by improving developing nations' economic wellbeing. The global climate envelops us all. What is needed is the kind of thinking that gave rise to the Marshall Plan after World War II. The plan converted impoverished and dependent European nations into prosperous and robust trading partners. We believe a clean energy transfer fund of this sort would have a similar impact on developing and transitional economies.

Equitable International Emission Standards

The third and unifying regulatory strategy of the plan calls on the parties to Kyoto to subordinate the ineffectual and inequitable system of international emissions trading to a simple and equitable fossil fuel efficiency standard that becomes 5% more stringent each year.

This mechanism, if incorporated into the Kyoto Protocol, would harmonize and guide the global energy transition in a way that emissions trading cannot.

The system of international emissions trading at the heart of the Kyoto Protocol is based on the concept that a country that exceeds its allowed quantity of carbon emissions can buy emission credits from a country that emits less than its allowed quantity. Under this system, the United States, for instance, can pay Costa

Rica to plant more trees to absorb carbon dioxide and subtract the resulting reduction from its own allowance.

This system of international "cap and trade," as it is called in the jargon of the Kyoto negotiators, has significant failings.

Emissions trading can work relatively well within nations. Domestic cap-and-trade programs can help meet the goals of a progressively more stringent fossil fuel efficiency standard because they are easy to monitor and enforce.

However, internationally, the cap-and-trade system breaks down on several counts. It is not enforceable and is plagued by irreconcilable equity disputes between the countries of the North and South.

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Industrial and developing countries are at odds over allocating emission rights. The industrial nations participating in the Kyoto process determined that each country's emission rights would be based on its 1990 levels to protect their economies. By contrast, developing countries contend that only a per capita allocation is fair. But if the emission quota for each U.S. citizen were the same as for each citizen of India, that would decimate the U.S. economy.

Another equity issue was articulated by the late Anil Agarwal, founder of the Centre for Science and Environment in New Delhi. Agarwal criticized the provisions in the Kyoto Protocol that allow industrial nations to buy limitless amounts of cheap emission reductions in developing countries and to bank them indefinitely into the future. This means that when developing nations eventually become obligated to cut their own emissions (under a subsequent round of the Kyoto Protocol), they will be left with only the most expensive options. This clearly constitutes a form of environmental colonialism.

International carbon trading cannot be the primary vehicle to propel a worldwide energy transition. Even if all the problems with monitoring, enforcement, and equity could be resolved, it could at best, be used as a fine-tuning instrument to help countries meet the final 10 to 15% of their obligations.

We simply can't finesse nature with accounting tricks.

Instead, the parties to the Kyoto talks should increase their fossil fuel energy efficiency by 5% every year until the global 70% reduction is attained. That means a country would either produce the same amount of goods as the previous year with less carbon fuel or produce more goods with the same amount of carbon fuel use as the previous year.

Since no economy can grow at 5% for long, emissions reductions would outpace long-term economic growth, benefiting the environment.

Every country would begin at its current baseline for emission levels, which would eliminate the inequities inherent in the cap-and-trade system. In tandem with the fund, this would ensure the participation of developing countries.

During the first few years under the proposed efficiency standard, most countries would likely meet

3-POINT STRATEGY FOR TRANSITION TO RENEWABLE ENERGY

- The subsidy switch would encourage the metamorphosis of oil companies into renewable energy companies.
- The progressive fossil fuel efficiency standard would harmonize the transformation of national energy delivery structures, create a level field of predictable regulation for the major energy corporations, and boost the renewable energy business into a global industry.
- The competition for the new \$300-billion-a-year market in clean energy would power the whole process.

their goals by implementing low-cost improvements to their energy systems. After a few years, however, more expensive technology would be required to meet the progressively higher standard, making renewable energy sources more cost effective in comparison to fossil fuel solutions. The demand would create the mass markets and economies of scale for renewables.

This approach would be far simpler to negotiate than the current protocol, with its morass of details involving emissions trading, reviews of the adequacy of commitments, and differentiated emission targets for each country. It would also be easier to monitor and enforce. A nation's compliance would be measured simply by calculating the annual change in the ratio of its carbon fuel use to its gross domestic product. That ratio would have to change by 5% a year.

The approach has a precedent in the Montreal Protocol, under which companies phased out ozone-destroying chemicals. That protocol was successful because the same companies that made the destructive chemicals were able to produce their substitutes with no loss of competitive standing within the industry. The energy industry must be restructured in the same way. Several oil executives have said in private conversations that they can, in an orderly fashion, decarbonize their energy supplies. But they need the governments of the world to regulate the process so all companies can make the transition in lockstep without losing market share to competitors. A progressive fossil fuel efficiency standard would provide that type of regulation.

On economic grounds, this plan makes perfect sense. Recently, Swiss Re-Insurance said it anticipates losses from climate impacts to reach \$150 billion a year within this decade. Munich Re, the world's largest reinsurer, estimates that within several decades, losses from climate impacts will reach \$300 billion a year. They will affect the banking and insurance industries; cause property damage; raise health care costs; ruin crops; and destroy energy, communications and transportation infrastructures. Last year, the largest re-insurer in Britain said that unchecked climate change could bankrupt the global economy by 2065.

By contrast, the dramatic expansion of the overall wealth in the global economy from a worldwide energy transition would create new markets and significantly invigorate existing ones.

Development economists agree that energy investments in poor countries create far more wealth and jobs than equivalent investments in any other economic sector. We believe a plan of this magnitude would create millions of jobs in developing nations. It would raise living standards abroad without compromising ours. It would allow developing countries to grow without some of the budgetary burdens of importing oil. And in a very short time, it would nudge the renewable energy industry into the position of leading global economic growth.

A global energy transition requires governments to regulate some of the world's largest corporations. On the record, corporations reflexively resist any move toward new regulation. But history indicates that if regulations are non-discriminatory, industry-wide and predictable, then corporations can depend on them in formulating their strategic plans, and business leaders will accept them. These strategies provide a viable option to the multinational oil majors: Submitting to new regulations, they will gain a \$300-billion-a-year market.

When it comes to the issue of sustainable development in a rapidly deteriorating biosphere, many commentators have observed that changes in values frequently follow changes in technology. It is hoped that the very act of addressing the true proportions of the climate crisis will bring home to everyone the realization that we are living on a planet with limits—and that we are now bumping up against those limits.

Ultimately, a crash program to rewire the world with clean energy would hopefully yield far more than a fuel

switch. It could very easily lead to closed-loop industrial processes, smart-growth planning, far more recycling and reuse, the adoption of environmental accounting in calculating national GDPs, and, ultimately, a whole new ethic of sustainability that would transform our institutions, practices and dynamics in ways we cannot begin to imagine.

Energy Transition Could Be Global Pilot Project

The realization that we are all part of a larger and increasingly vulnerable community could engender a new sense of common purpose. We could all keep very busy for years to come by applying energy transition strategies and then forging the effort into a global project for redesign of the entire human enterprise.

This perspective may well be overly ambitious. But the alternative—given the escalating instability of the climate system and the increasing desperation caused by global economic inequities—is truly too horrible to contemplate.

A meaningful solution to the climate crisis could potentially be the beginning of a much larger transformation of our social and economic dynamics. A solution that is appropriate in scale and magnitude also could serve as a pilot project that could begin to democratize the global economy.

Just as we are seeing the globalization of the economy, we are also seeing the globalization of communications among activist groups. NGOs can use the UN Framework Convention on Climate Change to influence the energy transition process. In the long run, they cannot only help step up the pace of emissions reductions, but they also can intervene in other areas of global economic governance.

It is just possible that the act of rewiring of the planet could begin to point us toward that optimal calibration of competition and cooperation that would maximize our energy, creativity, and productivity.

Ross Gelbspan is a former reporter for the Boston Globe and the author of The Heat Is On: The High Stakes Battle over Earth's Threatened Climate (www.heatisonline.org) His latest book, Fevered Planet, is scheduled for publication in 2004 (Basic Books).