

Lester R. Brown

President,
Earth Policy Institute
Author, *Plan B 2.0: Rescuing a
Planet Under Stress and a
Civilization in trouble*

Restructuring the Ecological Market Place: Plans for an Environmentally Sustainable Future

Those of us who have been working on environmental issues for some decades have been convinced that we need to restructure the economy for the simple reason that it's slowly destroying its natural support system. The forests are shrinking, fisheries are collapsing, soils are eroding, deserts are expanding, coral reefs are dying, water tables are falling, temperatures are rising and ice is melting, but not enough of us have been convinced to make the substantial changes that are needed. What's happening in China now, I think, is going to convince just about anyone who's engaging this issue.

Ever since we can remember, ever since I can remember, we've been saying that the U.S., with five percent of the world's people, has been consuming a third to 40 percent of the earth's resources. That was true. It is no longer true. In the consumption of most basic resources China has now overtaken the United States in the food sector, grain and meat; the energy sector, oil and coal; the industrial sectors, steel. Of those five basic resources, China now consumes more than the United States in all except oil. But with meat consumption China consumes almost twice as much meat as we do in the United States. Steel consumption—China consumes more than twice as much as we do—258 million tons to 104 million tons. We're not even in the same league with China in steel consumption.

Now that China has overtaken the United States in the consumption of the most basic resources, we're given license to ask the next question, which is what happens when China catches up to us in consumption per person? If we assume that the Chinese economy grows at eight percent per year—a bit slower than in recent years—until 2031, in that year, income per person in China will be the same as in the United States today. If we further assume that China's consumption pattern will be similar to that in the United States, that is, that they will spend their money more or less as we do, then China's grain consumption in 2031 will be equal to two-thirds of the current world grain harvest. Its paper consumption, at the U.S. per capita level, will be double the current world production. There go the world's forests. If China has three cars for every four people as we do, it will have a fleet of 1.1 billion cars. The world's fleet is currently 800 million cars. It would have to pave with roads, highways and parking lots an area comparable to the area now planted with rice. In

2031 China's 1.45 billion people would be consuming 99 million barrels of oil a day. The world is currently producing 84 million barrels a day and may never produce much more than that.

What China is teaching us is that the Western economic model, a fossil fuel-based automobile center throwaway economy, is not going to work for China

What China is teaching us is that the Western economic model, a fossil fuel-based automobile center throwaway economy, is not going to work for China. If it doesn't work for China, it will not work for India, which by 2031 will have an even larger population. Nor will it work for the other three billion people in the developing countries who are also dreaming the American dream. Most importantly, in an increasingly integrated global economy where we all depend on the same oil, grain, steel, it will not work for the industrial countries either. It will not work for us.

China is useful in the sense that, because it's so big and because it's going so fast, it's sort of telescoping history, helping us see where the world is headed. The challenge for our generation is to replace the old economic model—fossil fuel-based, automobile-centered, throwaway economy—with a new economy, one that is powered by renewable sources of energy, one that has a much more diversified transport system and one that has a comprehensive re-use, recycle economy. This is the challenge for our generation.

Now, one of the questions in this analysis is what will convince us that we have to not only restructure the global

economy but that we have to do it quickly. We're not going to wait until 2031 to discover that the old economic model is no longer working. In fact, I don't think we want to go too much farther down this road with the old economic model. It simply cannot take us, the world, where we want to go. The challenge is to restruc-

Japan, in the reforested mountains of South Korea, we see it in the bicycle-friendly streets of Amsterdam and in the growing trend of hybrid cars in the United States. So, we can begin to see it emerging, but it's not moving nearly fast enough. The challenge is to pick up the pace.

be converted into fuel.

What began as government programs in the U.S., and in the European community, Brazil and a scattering of other countries, what began as bio-fuel programs was driven by government incentives—52 cents a gallon subsidy for ethanol in this country, a dollar a gallon for bio-diesel produced from soybeans. But the market is now taking over and driving the investment. In Brazil there are no longer any subsidies at all for ethanol production; they don't need any because the market price of ethanol is so far above the production costs. Brazil is already meeting with delegations in Japan and China about long-term ethanol supply contracts produced from sugar cane. In this country we now have 95 ethanol distilleries, [with] another 30 or 35 under construction. It's just growing by leaps and bounds. \$5 billion [has been] committed to new ethanol distilleries in Brazil—private capital. In Europe we are also seeing both ethanol and bio-diesel production.

What this all means is that, whereas until recently there was only one group of buyers in the commodities market buying agricultural commodities for conversion into products that would end up on the supermarket shelves, now there's a second group of buyers who are buying the same commodities for fuel producers. So, what we're seeing is the emergence of competition between supermarkets and service stations for the same agriculture commodities. In Europe, this has already created a shortage of high-quality vegetable oils. The margarine producers association of Europe is complaining that they can't get enough vegetable oil to satisfy the demand for margarine. Bloomberg reported last week that the world price of sugar is at the highest level in 24 years and it is projected to rise further.

Another way of looking at this at a global level is where we're seeing the

One of the interesting questions is what would be the wakeup call? Well, I think there's going to be a lot of wakeup calls. I think Katrina was a wakeup call in a sense; it sort of reminded us that rising surface water temperatures in the oceans, and particularly in the Gulf of Mexico, create more powerful and destructive storms.

One can sketch out many scenarios. I'd like to sketch out one that I think is among the more likely. Incidentally, I would say that the rise in price of oil is one of the early economic manifestations of the stresses that are developing in the world economy. We have always been concerned about the effect of high oil prices on food production costs because modern agriculture is so oil-intensive, and that remains a legitimate concern. But the more important effect of high oil prices is on the demand side of the food equation. Almost everything we eat can be converted into automotive fuel, and when the price of oil is at \$60 a barrel it becomes profitable to convert many agricultural commodities either into ethanol or into bio-diesel. All the major commodities can be used to produce fuel – wheat, corn, soybeans, sugar cane, you name it.

What this means is that the price of oil is going to become the support price for agricultural commodities and therefore the food prices, because at any time the food value of the commodity is less than the fuel value, the commodity will

ture the economy so that economic progress can continue, and it can, we have the technology. We see glimpses of the new economy emerging in many places in the world. We see it in the wind farms of Northern Europe, for example. In Europe 40 million people now get their residential electricity from wind farms. That's projected to approach 200 million by 2020, that's half of Europe's population. We see it in the solar rooftops in



Lester R. Brown
President, Earth Policy Institute
Author, *Plan B 2.0: Rescuing a Planet Under Stress and a Civilization in trouble*

stage being set for competition between the 800 million of us who are affluent enough to own automobiles and the two billion poorest people in the world for whom getting enough food to make it from day to day is something of a challenge. I don't think that we have yet grasped the dimensions of this new social and political issue that is fast emerging.

In 1991 the U.S. Department of Energy did a national wind resource inventory in which they pointed out that three of our 50 states, North Dakota, Kansas and Texas, have enough wind energy that if harnessed it could satisfy national electricity needs

This is occurring against a backdrop where world grain stocks are the lowest level in 30 years. Now, ordinarily that would lead to some fairly bullish grain prices, but grain prices are fairly quiet now. The principal reason for that is the concern with avian flu.

One of the huge growth sectors in the world for livestock and poultry is in east Asia and certainly in China, where the demand for poultry was growing very rapidly. But now with the avian flu a lot of farmers in those countries are simply not willing to invest in flocks that may become infected and be slaughtered and lost. So that's sort of muting things for the moment, but it probably will not last for long. If we see a dramatic rise in world grain prices, which is a distinct possibility—and I'm not talking about 15 or 20 years from now, but over the next year or two—then we're looking at potential

political instability in low-income countries that import a large share of their grain stock. Political instability in Indonesia, Nigeria, Mexico, or wherever, could easily disrupt global economic progress and begin to affect the Nikkei Index and the Dow Jones 500. So while those of us in this room could cope with the doubling of world grain prices in terms of the effect on food prices, if it begins to affect stock markets and the economic outlook then it begins to affect everyone—it affects our investments, our pension funds, etc. I happen to think this is a likely scenario, but one could sketch out many other scenarios where this type of situation with resources, with oil, with water and a lot of other resources is going to begin to manifest itself in a major way.

Up until now I've been talking about an automotive fuel economy based on liquid fuels, gasoline, ethanol, and biodiesel. There is another model; I'll use the U.S. to illustrate. If we were to decide, either for reasons of reducing oil dependency or stabilizing climate, that we're going to dramatically reduce oil dependency and gasoline use, we could do it by simply devising a program whereby over the next ten years we would shift entirely to the gas-electric hybrid propulsion technology and cut gasoline use in half. But hybrids give us another option. If you take a Toyota Prius, for example, and add a second battery and a plug-in capacity, then we can do most of our short distance driving—daily commute, grocery shopping—on electricity alone. We would need an electric-only button on the hybrid to do this—entirely doable.

Now, if at the same time we begin investing in hundreds of wind farms across the country—we already have 100-plus, feeding cheap electricity into the grid—then we're largely running our cars on wind energy, and we've got an abundance of wind energy. In 1991 the U.S. Department of Energy did a national

wind resource inventory in which they pointed out that three of our 50 states, North Dakota, Kansas and Texas, have enough wind energy that if harnessed it could satisfy national electricity needs. We all said, "wow," because we didn't realize how huge the wind resource was. But in retrospect we now know that that was a gross underestimate because it was based on the wind turbine technology of 1991. Advances in wind turbine design since then enable turbines to operate at lower wind speeds and to convert wind into electricity more efficiently. And because instead of being 120 feet tall they are 300 feet tall, they are harvesting at a higher level where winds are stronger and more reliable. The neat thing about marrying wind energy and gas-electric hybrids is that the batteries in the automobiles become a storage facility for wind energy that helps deal with the fluctuations, which is one of the weaknesses of wind energy as an energy source. But remember, it's a gas-electric hybrid and we have a tank of gasoline to fall back on if it's needed.

This is a new option that is beginning to get some traction. Interestingly, in Washington there's a convergence of neocons, who are concerned about our oil dependence and what it means for the future of the country, and environmentalists, who both support this new energy model. There was a conference held on Capital Hill, where a number of key members of Congress were present and endorsing the idea. It's exciting to realize that we no longer have to be dependent on oil. The neat thing about wind is that it's cheap. The cost of the wind electricity equivalent of a gallon of gasoline is about 60 cents. It's economic, it's abundant and it's ours. No one can cut off the wind supply. Not a bad deal.

My son was driving in west Texas some time back and he saw one of the new wind farms. Texas is probably going to overtake California as the leading state with wind electric generation in another year

or so. But he said it was interesting because you could see the rows of wind turbines sort of receding toward the horizon and scattered among them were oil wells. And the wind turbines were turning and the oil wells were pumping and he said it was like seeing the past and the future meet. What he was looking at was a transition from fossil fuel to wind energy—to renewable sources of energy. And I said, “If you go forward 30 years from now the wind turbines will still be turning, but the oil pumps, the oil wells, will probably not be pumping.”

So this is the nature of the shift that’s underway. As most of you know, for probably the better part of the last decade many utilities in this country have offered their customers a green power option. If you wanted to get part or all of your electricity from a green source and, usually that’s been from wind, you would pay an extra ten or 15 percent but you would feel good about it because you’re encouraging investment in a clean source of energy that’s locally available, that is within the country. What’s happened recently—studied the figures in some detail for the Austin, Texas utility, is that because of rising natural gas prices—if I remember rightly they’ve doubled in the last 14 months—those who signed up for green electricity have now found that the cost of that, which was once above the market prices, is now below the market price.

Suddenly, there are a lot of environmentalists out there wanting to sign up for green electricity and there’s not enough to go around. It will take a lot of investment to catch up. On that point, one of the more interesting developments is that, I think just about a year ago, Goldman Sachs, one of the world’s largest investment bankers, bought a small wind farm development company called “Horizon.” That company now has under construction or in the planning stages 5,000 megawatts of wind-generated electricity. Five thousand megawatts,

just to put it in perspective, is equal to 17 average coal fire power plants with 300 megawatts of capacity each. It’s huge, and I don’t think Goldman Sachs is doing this just because they want to be good environmentalists, although that may be a factor. They’re doing it because they see this as where the future is. Horizon is a wholly-owned subsidiary of Goldman Sachs.

In the book, *Plan B 2.0*, there are three principal components of the plan. One is an economic restructuring of the global economy. That does not really require any physical allocation; the key there is to get the market to tell the truth about the real costs of goods and services. For example, a gallon of gasoline costs, \$3 a gallon in this country. But the real cost of a gallon of gasoline is closer to \$11 a gallon. There’s a fairly detailed study on this cited in the book. It simply looks at all the costs—the cost of treating respiratory illnesses from breathing polluted air, the cost of military presence in the Middle East to protect our access to the oil there, the cost of damage from acid rain, the cost of climate change, etc. You put it all together and burning fossil fuel is a fairly costly undertaking.

The Center For Disease Control did a very similar thing for cigarette smoking in this country. It was published about three years ago and they looked at the cost to society of smoking a pack of cigarettes. They included two costs: the cost of treating smoking-related illnesses and the cost of lost worker productivity from those illnesses. They concluded that each pack of cigarettes smoked in this country cost society \$7.18. Someone had to pay that—it might be the worker, it might be the employer, it might be the taxpayers underwriting the costs of medical care. But the costs are real. Someone pays it. We need to use that model to have an official study of the costs of burning a gallon of gasoline.

We’re all economic decision makers—as consumers, as corporate planners, as government policy makers, investment bankers—we all respond to the market, to price signals, but the market is giving us bad information. It says that the cost of a pack of cigarettes is \$3 when in fact it should be \$8, or that the price of gasoline is \$3 when it should be \$11. We need to incorporate those costs, and the way to do it is to restructure the tax system once we figure out what the indirect costs of those commodities are. We need to reduce income taxes and offset that with taxes on the environmentally destructive activities—carbon emissions, use of pesticides, discharge of toxic wastes, materials found at a landfill, etc. No change in tax levels, just change the composition to reduce income taxes and increase taxes on environmentally destructive activities.

“Socialism collapsed because it did not allow the market to tell the economic truth; capitalism may collapse because it does not allow the market to tell the ecological truth.”

Oystein Dahle, a Norwegian who took my place as Chairman of the Board of WorldWatch said, and this is almost a decade ago, after the collapse of the Soviet Union, he said, “Socialism collapsed because it did not allow the market to tell the economic truth; capitalism may collapse because it does not allow the market to tell the ecological truth.” I mention it because it distills into two short sentences an essential economic truth.

Eradicating poverty and stabilizing

population, I put those in the same package because they're so closely related. Jeffery Sachs, the economist at Colombia and formerly at Harvard, has said that for the first time in history we have the resources in the world to eradicate poverty. What an exciting thought. It means getting all the kids of elementary age in school, providing rudimentary health care, vaccination against infectious diseases for children everywhere, school lunch programs in the poorest of the poor countries. It means making sure that women everywhere have access to reproductive health care and family planning services and we can go down the list. The budget for that worldwide comes to some \$68 billion a year.

And then I talk about an earth restoration budget—reforesting the earth, restoring oceanic fisheries, soil conservation, and down the list. That's an additional \$93 billion a year and these two together come to \$161 billion. Now, \$161 billion of additional expenditures is a lot of money. It's one-third of the U.S. military budget for this year. If I had to choose between investing in new weapons systems to control terrorism and dealing with these basic issues in the world like environmental restoration and eradicating poverty. I think I would go with the latter.

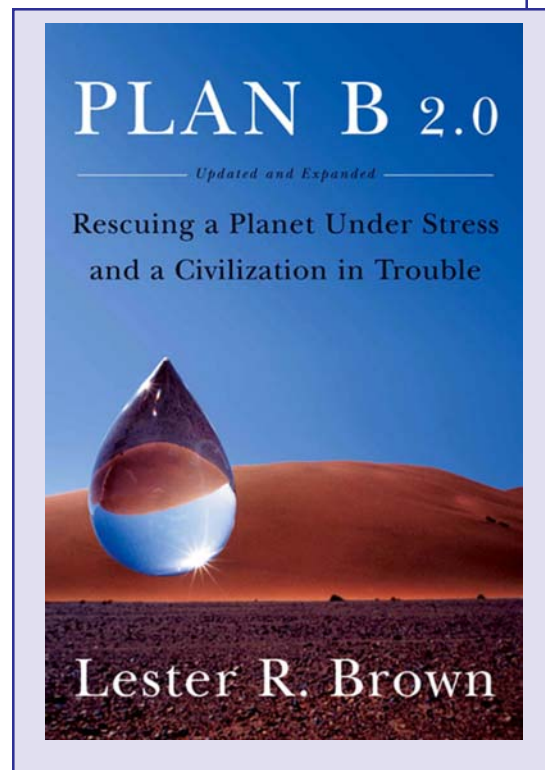
In my opinion the real threats to our future are climate change, population growth, and spreading water shortages, not terrorism. I think terrorism is on the list and I'd put it in the top ten, but not near the top. The way to deal with terrorism is to win global public opinion. We're losing it; we're trying to solve a problem with a military solution and a military solution does not work. I think we have to re-think things in a fundamental way.

[It's] interesting, what mayors are doing now. 180 of them have signed on to the Kyoto protocol. When you think about it, this is a political revolution at

the grassroots level. These are mayors of the largest cities in the country, including Los Angeles, New York and San Francisco. 180 cities said they're going to meet the Kyoto protocol goals. This is a response to the leadership vacuum in Washington on the climate issue and from a political scientist's point of view, which I'm not, it's a fascinating development. But it's also a sign of hope because it's coming out from the grassroots and eventually that will drive policy at the national level.

My final point is that of all the commodities in short supply probably the scarcest of all is time. One of the problems is we don't know how much time we have left. Nature sets the deadlines, nature establishes the thresholds. We don't know whether we've reached the point now where climate change has become irreversible. If it has, for example, then the ice in the Arctic Sea, which has now shrunk some 20 percent in the summers of the last 30 years, will continue to shrink. The meaning of that is probably much greater than most realize. Incoming sunlight, when it hits snow and ice, 80 percent of it is reflected back into space, 20 percent is absorbed as heat, but when the incoming sunlight hits open water where the ice has melted that ratio is roughly reversed—20 percent is reflected back into space and 80 percent is absorbed as heat. This is why the Arctic is warming so fast. This is what modelers call a "positive feedback loop," that is, a trend which, once well underway, begins to feed on itself.

Now, the problem with the ice melting in the Arctic Sea is not that it will raise sea levels, but that it warms the Arctic region and is starting to melt the Greenland ice sheet. Greenland is twice the size of Texas and the ice sheet is a mile and a half thick in places. It will take a couple of centuries, at a minimum, but if it all



goes, the sea level rises 23 feet. Many of the world's coastal cities would be underwater; all the rice-growing river deltas of Asia would be under water.

What it sets the stage for is, for the first time in history, to the best of my knowledge, what I would call a fracturing of society along generational lines. We've had fracturing of societies along racial and religious and ethnic and even geographic lines, but now we may face it along generational lines. The next generation will be asking the question, "Why didn't you do something? Why did you sit and watch this scenario unfold?" They will be able to read the same scientific literature that we're reading today that expresses a growing sense of urgency within the scientific community, a growing sense of urgency that has not yet been translated into a reduction in atmospheric CO₂ emissions.

Plan B 2.0 is seen by many as a book about the environment, and it is. I am by training a natural scientist and an environmentalist, but it's also about the fu-

ture of the economy and thus about the future of our early 21st century civilization. Jared Diamond makes it very clear in his book *Collapse* that when societies get on an economic path that is environmentally unsustainable they have two choices. They can either change course or continue with what I call Plan A, business as usual, and watch the economies and environmental support systems eventually decline to the point where the economy itself declines and eventually collapses. So these are the choices, I think, we're facing and with an urgency that I don't think most of us yet realize.

Thank you very much.

*Speeches to the Los Angeles World Affairs Council are edited for readability, not content.
The Council is a non-partisan organization. The views expressed herein are solely those of the individual authors.
The Council is a non-profit organization that pays neither honoraria nor expenses to its speakers.*