“Global Warming: Who Loses--And Who Wins?”

Gregg Easterbrook

Coastal cities inundated, farming regions parched, ocean currents disrupted, tropical diseases spreading, glaciers melting—an artificial greenhouse effect could generate countless tribulations.

If Earth’s climate changes meaningfully—and the National Academy of Sciences, previously skeptical, said in 2005 that signs of climate change have become significant—there could be broad-based disruption of the global economy unparalleled by any event other than World War II.

Economic change means winners as well as losers. Huge sums will be made and lost if the global climate changes. Everyone wonders what warming might do to the environment—but what might it do to the global distribution of money and power?

Whether mainly natural or mainly artificial, climate change could bring different regions of the world tremendous benefits as well as drastic problems. The world had been mostly warming for thousands of years before the industrial era began, and that warming has been indisputably favorable to the spread of civilization. The trouble is that the world’s economic geography is today organized according to a climate that has largely prevailed since the Middle Ages—runaway climate change would force big changes in the physical ordering of society. In the past, small climate changes have had substantial impact on agriculture, trade routes, and the types of products and commodities that sell. Larger climate shifts have catalyzed the rise and fall of whole societies. The Mayan Empire, for instance, did not disappear “mysteriously”; it likely fell into decline owing to decades of drought that ruined its agricultural base and deprived its cities of drinking water. On the other side of the coin, Europe’s Medieval Warm Period, which lasted from around 1000 to 1400, was essential to the rise of Spain, France, and England: Those clement centuries allowed the expansion of farm production, population, cities, and universities, which in turn set the stage for the Industrial Revolution. Unless greenhouse-effect theory is completely wrong—and science increasingly supports the idea that it is right—21st-century climate change means that sweeping social and economic changes are in the works.

To date the greenhouse-effect debate has been largely carried out in abstractions—arguments about the distant past (what *do* those 100,000-year-old ice cores in Greenland really tell us about ancient temperatures, anyway?) coupled to computer-model conjecture regarding the 22nd century, with the occasional Hollywood disaster movie thrown in. Soon, both abstraction and postapocalyptic fantasy could be pushed aside by the economic and political realities of a warming world. If the global climate continues changing, many people and nations will find themselves in possession of land and resources of rising value, while others will suffer dire losses—and these winners and losers could start appearing faster than you might imagine. Add artificially triggered climate change to the volatility already initiated by globalization, and the next few

decades may see previously unthinkable levels of economic upheaval, in which fortunes are won and lost based as much on the physical climate as on the business climate.

It may sound odd to ask of global warming, What's in it for me? But the question is neither crass nor tongue-in-cheek. The ways in which climate change could skew the world's distribution of wealth should help us appreciate just how profoundly an artificial greenhouse effect might shake our lives. Moreover, some of the lasting effects of climate change are likely to come not so much from the warming itself but from how we react to it: If the world warms appreciably, men and women will not sit by idly, eating bonbons and reading weather reports; there will be instead what economists call "adaptive response," most likely a great deal of it. Some aspects of this response may inflame tensions between those who are winning and those who are losing. How people, the global economy, and the international power structure adapt to climate change may influence how we live for generations. If the world warms, who will win? Who will lose? And what's in it for you?

LAND

Real estate might be expected to appreciate steadily in value during the 21st century, given that both the global population and global prosperity are rising. The supply of land is fixed, and if there's a fixed supply of something but a growing demand, appreciation should be automatic. That's unless climate change increases the supply of land by warming currently frosty areas while throwing the amount of *desirable* land into tremendous flux. My hometown of Buffalo, New York, for example, is today so déclassé that some of its stately Beaux-Arts homes, built during the Gilded Age and overlooking a park designed by Frederick Law Olmsted, sell for about the price of one-bedroom condos in Boston or San Francisco. If a warming world makes the area less cold and snowy, Buffalo might become one of the country's desirable addresses.

At the same time, Arizona and Nevada, blazing growth markets today, might become unbearably hot and see their real-estate markets crash. If the oceans rise, Florida's rapid growth could be, well, swamped by an increase in its perilously high groundwater table. Houston could decline, made insufferable by worsened summertime humidity, while the splendid, rustic Laurentide Mountains region north of Montreal, if warmed up a bit, might transmogrify into the new Poconos.

These are just a few of many possible examples. Climate change could upset the applecarts of real-estate values all over the world, with low-latitude properties tanking while high latitudes become the Sun Belt of the mid-21st century.

Local changes in housing demand are only small beer. To consider the big picture, examine a Mercator projection of our planet, and observe how the Earth's landmasses spread from the equator to the poles. Assume global warming is reasonably uniform. (Some computer models suggest that warming will vary widely by region; for the purposes of this article, suffice it to say that all predictions regarding an artificial greenhouse effect are extremely uncertain.) The equatorial and low-latitude areas of the

world presumably will become hotter and less desirable as places of habitation, plus less valuable in economic terms; with a few exceptions, these areas are home to developing nations where living standards are already low.

So where is the high-latitude landmass that might grow more valuable in a warming world? By accident of geography, except for Antarctica nearly all such land is in the Northern Hemisphere, whose continents are broad west-to-east. Only a relatively small portion of South America, which narrows as one travels south, is high latitude, and none of Africa or Australia is. (Cape Town is roughly the same distance from the equator as Cape Hatteras; Melbourne is about the same distance from the equator as Manhattan.) More specifically, nearly all the added land-value benefits of a warming world might accrue to Alaska, Canada, Greenland, Russia, and Scandinavia.

This raises the possibility that an artificial greenhouse effect could harm nations that are already hard pressed and benefit nations that are already affluent. If Alaska turned temperate, it would drive conservationists to distraction, but it would also open for development an area more than twice the size of Texas. Rising world temperatures might throw Indonesia, Mexico, Nigeria, and other low-latitude nations into generations of misery, while causing Canada, Greenland, and Scandinavia to experience a rip-roarin' economic boom. Many Greenlanders are already cheering the retreat of glaciers, since this melting stands to make their vast island far more valuable. Last July, *The Wall Street Journal* reported that the growing season in the portion of Greenland open to cultivation is already two weeks longer than it was in the 1970s.

And Russia! For generations poets have bemoaned this realm as cursed by enormous, foreboding, harsh Siberia. What if the region in question were instead enormous, temperate, inviting Siberia? Climate change could place Russia in possession of the largest new region of pristine, exploitable land since the sailing ships of Europe first spied the shores of what would be called North America. The snows of Siberia cover soils that have never been depleted by controlled agriculture. What's more, beneath Siberia's snow may lie geologic formations that hold vast deposits of fossil fuels, as well as mineral resources. When considering ratification of the Kyoto Protocol to regulate greenhouse gases, the Moscow government dragged its feet, though the treaty was worded to offer the Russians extensive favors. Why might this have happened? Perhaps because Russia might be much better off in a warming world: Warming's benefits to Russia could exceed those to all other nations combined.

Of course, it could be argued that politicians seldom give much thought—one way or the other—to actions whose value will become clear only after they leave office, so perhaps Moscow does not have a grand strategy to warm the world for its own good. But a warmer world may be much to Russia's liking, whether it comes by strategy or accident. And how long until high-latitude nations realize global warming might be in their interests? In recent years, Canada has increased its greenhouse-gas output more rapidly than most other rich countries. Maybe this is a result of prosperity and oil-field development—or maybe those wily Canadians have a master plan for their huge expanse of currently uninhabitable land.

Global warming might do more for the North, however, than just opening up new land. Temperatures are rising on average, but *when* are they rising? Daytime? Nighttime? Winter? Summer? One fear about artificially triggered climate change has been that global warming would lead to scorching summer-afternoon highs, which would kill crops and brown out the electric power grid. Instead, so far a good share of the warming—especially in North America—has come in the form of nighttime and winter lows that are less low. Higher lows reduce the harshness of winter in northern climes and moderate the demand for energy. And fewer freezes allow extended growing seasons, boosting farm production. In North America, spring comes ever earlier—in recent years, trees have flowered in Washington, D.C., almost a week earlier on average than a generation ago. People may find this creepy, but earlier springs and milder winters can have economic value to agriculture—and lest we forget, all modern societies, including the United States, are grounded in agriculture.

If a primary impact of an artificially warmed world is to make land in Canada, Greenland, Russia, Scandinavia, and the United States more valuable, this could have three powerful effects on the 21st-century global situation.

First, historically privileged northern societies might not decline geopolitically, as many commentators have predicted. Indeed, the great age of northern power may lie ahead, if Earth's very climate is on the verge of conferring boons to that part of the world. Should it turn out that headlong fossil-fuel combustion by northern nations has set in motion climate change that strengthens the relative world position of those same nations, future essayists will have a field day. But the prospect is serious. By the middle of the 21st century, a new global balance of power may emerge in which Russia and America are once again the world's paired superpowers—only this time during a Warming War instead of a Cold War.

Second, if northern societies find that climate change makes them more wealthy, the quest for world equity could be dealt a huge setback. Despite the popular misconception, globalized economics have been a positive force for increased equity. As the Indian economist Surjit Bhalla has shown, the developing world produced 29 percent of the globe's income in 1950; by 2000 that share had risen to 42 percent, while the developing world's share of population rose at a slower rate. All other things being equal, we might expect continued economic globalization to distribute wealth more widely. But if climate change increases the value of northern land and resources, while leaving nations near the equator hotter and wracked by storms or droughts, all other things would not be equal.

That brings us to the third great concern: If climate change causes developing nations to falter, and social conditions within them deteriorate, many millions of jobless or hungry refugees may come to the borders of the favored North, demanding to be let in. If the very Earth itself turns against poor nations, punishing them with heat and storms, how could the United States morally deny the refugees succor?

Shifts in the relative values of places and resources have often led to war, and it is all too imaginable that climate change will cause nations to envy each other's territory. This

envy is likely to run both north-south and up-down. North-south? Suppose climate change made Brazil less habitable, while bringing an agreeable mild clime to the vast and fertile Argentinean pampas to Brazil's south. São Paulo is already one of the world's largest cities. Would a desperate, overheated Brazil of the year 2037—its population exploding—hesitate to attack Argentina for cool, inviting land? Now consider the up-down prospect: the desire to leave low-lying areas for altitude. Here's an example: Since its independence, in 1947, Pakistan has kept a hand in the internal affairs of Afghanistan. Today Americans view this issue through the lens of the Taliban and al-Qaeda, but from Islamabad's perspective, the goal has always been to keep Afghanistan available as a place for retreat, should Pakistan lose a war with India. What if the climate warms, rendering much of Pakistan unbearable to its citizens? (Temperatures of 100-plus degrees are already common in the Punjab.) Afghanistan's high plateaus, dry and rocky as they are, might start looking pleasingly temperate as Pakistan warms, and the Afghans might see yet another army headed their way.

A warming climate could cause other landgrabs on a national scale. Today Greenland is a largely self-governing territory of Denmark that the world leaves in peace because no nation covets its shivering expanse. Should the Earth warm, Copenhagen might assert greater jurisdiction over Greenland, or stronger governments might scheme to seize this dwarf continent, which is roughly three times the size of Texas. Today Antarctica is under international administration, and this arrangement is generally accepted because the continent has no value beyond scientific research. If the world warmed for a long time—and it would likely take centuries for the Antarctic ice sheet to melt completely—international jockeying to seize or conquer Antarctica might become intense. Some geologists believe large oil deposits are under the Antarctic crust: In earlier epochs, the austral pole was densely vegetated and had conditions suitable for the formation of fossil fuels.

And though I've said to this point that Canada would stand to become more valuable in a warming world, actually, Canada and Nunavut would. For centuries, Europeans drove the indigenous peoples of what is now Canada farther and farther north. In 1993, Canada agreed to grant a degree of independence to the primarily Inuit population of Nunavut, and this large, cold region in the country's northeast has been mainly self-governing since 1999. The Inuit believe they are ensconced in the one place in this hemisphere that the descendants of Europe will never, ever want. This could turn out to be wrong.

For investors, finding attractive land to buy and hold for a warming world is fraught with difficulties, particularly when looking abroad. If considering plots on the pampas, for example, should one negotiate with the current Argentinian owners or the future Brazilian ones? Perhaps a safer route would be the contrarian one, focused on the likelihood of falling land values in places people may leave. If strict carbon-dioxide regulations are enacted, corporations will shop for "offsets," including projects that absorb carbon dioxide from the sky. Growing trees is a potential greenhouse-gas offset, and can be done comparatively cheaply in parts of the developing world, even on land that people may stop wanting. If you jump into the greenhouse-offset business, what you might plant is leucaena, a rapidly growing tree species suited to the tropics that

metabolizes carbon dioxide faster than most trees. But you'll want to own the land in order to control the sale of the credits. Consider a possible sequence of events: First, climate change makes parts of the developing world even less habitable than they are today; then, refugees flee these areas; finally, land can be snapped up at Filene's Basement prices—and used to grow leucaena trees.

WATER

If Al Gore's movie, *An Inconvenient Truth*, is to be believed, you should start selling coastal real estate now. Gore's film maintains that an artificial greenhouse effect could raise sea levels 20 feet in the near future, flooding Manhattan, San Francisco, and dozens of other cities; Micronesia would simply disappear below the waves. Gore's is the doomsday number, but the scientific consensus is worrisome enough: In 2005, the National Academy of Sciences warned that oceans may rise between four inches and three feet by the year 2100. Four inches may not sound like a lot, but it would imperil parts of coastal Florida and the Carolinas, among other places. A three-foot sea-level rise would flood significant portions of Bangladesh, threaten the national survival of the Netherlands, and damage many coastal cities, while submerging pretty much all of the world's trendy beach destinations to boot. And the Asian Tigers? Shanghai and Hong Kong sit right on the water. Raise the deep a few feet, and these Tiger cities would be abandoned.

The global temperature increase of the last century—about one degree Fahrenheit—was modest and did not cause any dangerous sea-level rise. Sea-level worries turn on the possibility that there is some nonlinear aspect of the climate system, a "tipping point" that could cause the rate of global warming to accelerate markedly. One reason global warming has not happened as fast as expected appears to be that the oceans have absorbed much of the carbon dioxide emitted by human activity. Studies suggest, however, that the ability of the oceans to absorb carbon dioxide may be slowing; as the absorption rate declines, atmospheric buildup will happen faster, and climate change could speed up. At the first sign of an increase in the rate of global warming: Sell, sell, sell your coastal properties. Unload those London and Seattle waterfront holdings. Buy land and real property in Omaha or Ontario.

An artificial greenhouse effect may also alter ocean currents in unpredictable ways. Already there is some evidence that the arctic currents are changing, while the major North Atlantic current that moves warm water north from the equator may be losing energy. If the North Atlantic current falters, temperatures could fall in Europe even as the world overall warms. Most of Europe lies to the north of Maine yet is temperate because the North Atlantic current carries huge volumes of warm water to the seas off Scotland; that warm water is Europe's weathermaker. Geological studies show that the North Atlantic current has stopped in the past. If this current stops again because of artificial climate change, Europe might take on the climate of present-day Newfoundland. As a result, it might depopulate, while the economic value of everything within its icy expanse declines. The European Union makes approximately the same contribution to the global

economy as the United States makes: Significantly falling temperatures in Europe could trigger a worldwide recession.

While staying ready to sell your holdings in Europe, look for purchase opportunities near the waters of the Arctic Circle. In 2005, a Russian research ship became the first surface vessel ever to reach the North Pole without the aid of an icebreaker. If arctic sea ice melts, shipping traffic will begin transiting the North Pole. Andrew Revkin's 2006 book, *The North Pole Was Here*, profiles Pat Broe, who in 1997 bought the isolated far-north port of Churchill, Manitoba, from the Canadian government for $7. Assuming arctic ice continues to melt, the world's cargo vessels may begin sailing due north to shave thousands of miles off their trips, and the port of Churchill may be bustling. If arctic polar ice disappears and container vessels course the North Pole seas, shipping costs may decline—to the benefit of consumers. Asian manufacturers, especially, should see their costs of shipping to the United States and the European Union fall. At the same time, heavily trafficked southern shipping routes linking East Asia to Europe and to America's East Coast could see less traffic, and port cities along that route—such as Singapore—might decline. Concurrently, good relations with Nunavut could become of interest to the world's corporations.

Oh, and there may be oil under the arctic waters. Who would own that oil? The United States, Russia, Canada, Norway, and Denmark already assert legally complex claims to parts of the North Pole seas—including portions that other nations consider open waters not subject to sovereign control. Today it seems absurd to imagine the governments of the world fighting over the North Pole seas, but in the past many causes of battle have seemed absurd before the artillery fire began. Canada is already conducting naval exercises in the arctic waters, and making no secret of this.

Then again, perhaps ownership of these waters will go in an entirely different direction. The 21st century is likely to see a movement to create private-property rights in the ocean (ocean property rights are the most promising solution to overfishing of the open seas). Private-property rights in the North Pole seas, should they come into existence, might generate a rush to rival the Sooners' settlement of Oklahoma in the late 1800s.

Whatever happens to our oceans, climate change might also cause economic turmoil by affecting freshwater supplies. Today nearly all primary commodities, including petroleum, appear in ample supply. Freshwater is an exception: China is depleting aquifers at an alarming rate in order to produce enough rice to feed itself, while freshwater is scarce in much of the Middle East and parts of Africa. Freshwater depletion is especially worrisome in Egypt, Libya, and several Persian Gulf states. Greenhouse-effect science is so uncertain that researchers have little idea whether a warming world would experience more or less precipitation. If it turns out that rain and snow decline as the world warms, dwindling supplies of drinking water and freshwater for agriculture may be the next resource emergency. For investors this would suggest a cautious view of the booms in China and Dubai, as both places may soon face freshwater-supply problems. (Cost-effective desalinization continues to elude engineers.) On the other hand, where water rights are available in these areas, grab them.

Much of the effect that global warming will have on our water is speculative, so water-related climate change will be a high-risk/high-reward matter for investors and societies alike. The biggest fear is that artificially triggered climate change will shift rainfall away from today's productive breadbasket areas and toward what are now deserts or, worse, toward the oceans. (From the human perspective, all ocean rain represents wasted freshwater.) The reason Malthusian catastrophes have not occurred as humanity has grown is that for most of the last half century, farm yields have increased faster than population. But the global agricultural system is perilously poised on the assumption that growing conditions will continue to be good in the breadbasket areas of the United States, India, China, and South America. If rainfall shifts away from those areas, there could be significant human suffering for many, many years, even if, say, Siberian agriculture eventually replaces lost production elsewhere. By reducing farm yield, rainfall changes could also cause skyrocketing prices for commodity crops, something the global economy has rarely observed in the last 30 years.

Recent studies show that in the last few decades, precipitation in North America is increasingly the result of a few downpours rather than lots of showers. Downpours cause flooding and property damage, while being of less use to agriculture than frequent soft rains. Because the relationship between artificially triggered climate change and rainfall is conjectural, investors presently have no way to avoid buying land in places that someday might be hit with frequent downpours. But this concern surely raises a red flag about investments in India, Bangladesh, and Indonesia, where monsoon rains are already a leading social problem.

Water-related investments might be attractive in another way: for hydropower. Zero-emission hydropower might become a premium energy form if greenhouse gases are strictly regulated. Quebec is the Saudi Arabia of roaring water. Already the hydropower complex around James Bay is one of the world's leading sources of water- generated electricity. For 30 years, environmentalists and some Cree activists opposed plans to construct a grand hydropower complex that essentially would dam all large rivers flowing into the James and Hudson bays. But it's not hard to imagine Canada completing the reengineering of northern Quebec for hydropower, if demand from New England and the Midwest becomes strong enough. Similarly, there is hydropower potential in the Chilean portions of Patagonia. This is a wild and beautiful region little touched by human activity—and an intriguing place to snap up land for hydropower reservoirs.

ADAPTATION

Last October, the treasury office of the United Kingdom estimated that unless we adapt, global warming could eventually subtract as much as 20 percent of the gross domestic product from the world economy. Needless to say, if that happens, not even the cleverest portfolio will help you. This estimate is worst-case, however, and has many economists skeptical. Optimists think dangerous global warming might be averted at surprisingly low cost (see "Some Convenient Truths," September 2006). Once regulations create a profit incentive for the invention of greenhouse-gas-reducing technology, an outpouring of

innovation is likely. Some of those who formulate greenhouse- gas-control ideas will become rich; everyone will benefit from the environmental safeguards the ideas confer.

Enactment of some form of binding greenhouse-gas rules is now essential both to slow the rate of greenhouse-gas accumulation and to create an incentive for inventors, engineers, and businesspeople to devise the ideas that will push society beyond the fossil-fuel age. *The New York Times* recently groused that George W. Bush's fiscal 2007 budget includes only $4.2 billion for federal research that might cut greenhouse-gas emissions. This is the wrong concern: Progress would be faster if the federal government spent nothing at all on greenhouse-gas-reduction research—but enacted regulations that gave the private sector a significant profit motive to find solutions that work in actual use, as opposed to on paper in government studies. The market has caused the greenhouse-gas problem, and the market is the best hope of solving it. Offering market incentives for the development of greenhouse-gas controls—indeed, encouraging profit making in greenhouse-gas controls—is the most promising path to avoiding the harm that could befall the dispossessed of developing nations as the global climate changes.

Yet if global-warming theory is right, higher global temperatures are already inevitable. Even the most optimistic scenario for reform envisions decades of additional greenhouse-gas accumulation in the atmosphere, and that in turn means a warming world. The warming may be manageable, but it is probably unstoppable in the short term. This suggests that a major investment sector of the near future will be climate-change adaptation. Crops that grow in high temperatures, homes and buildings designed to stay cool during heat waves, vehicles that run on far less fuel, waterfront structures that can resist stronger storms—the list of needed adaptations will be long, and all involve producing, buying, and selling. Environmentalists don't like talk of adaptation, as it implies making our peace with a warmer world. That peace, though, must be made—and the sooner businesses, investors, and entrepreneurs get to work, the better.

Why, ultimately, should nations act to control greenhouse gases, rather than just letting climate turmoil happen and seeing who profits? One reason is that the cost of controls is likely to be much lower than the cost of rebuilding the world. Coastal cities could be abandoned and rebuilt inland, for instance, but improving energy efficiency and reducing greenhouse-gas emissions in order to stave off rising sea levels should be far more cost-effective. Reforms that prevent major economic and social disruption from climate change are likely to be less expensive, across the board, than reacting to the change. The history of antipollution programs shows that it is always cheaper to prevent emissions than to reverse any damage they cause.

For the United States, there's another argument that is particularly keen. The present ordering of the world favors the United States in nearly every respect—political, economic, even natural, considering America's excellent balance of land and resources. Maybe a warming world would favor the United States more; this is certainly possible. But when the global order already places America at No. 1, why would we want to run the risk of climate change that alters that order? Keeping the world economic system and the global balance of power the way they are seems very strongly in the U.S. national

interest—and keeping things the way they are requires prevention of significant climate change. That, in the end, is what's in it for us.

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