Green capitalism: the god that failed

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Abstract

In rejecting the antigrowth approach of the first wave of environmentalists in the 1970s, pro-growth "green capitalism" theorists of the 1980s-90s like Paul Hawken, Lester Brown, and Francis Cairncross argued that green technology, green taxes, eco-conscious shopping and the like could "align" profit-seeking with environmental goals, even "invert many fundamentals" of business practice such that "restoring the environment and making money become one and the same process." This strategy has clearly failed. I claim first, that the project of sustainable capitalism was misconceived and doomed from the start because maximizing profit and saving the planet are inherently in conflict and cannot be systematically aligned even if, here and there, they might coincide for a moment. That's because under capitalism, CEOs and corporate boards are not responsible to society, they're responsible to private shareholders. CEOs can embrace environmentalism so long as this increases profits. But saving the world requires that the pursuit of profits be systematically subordinated to ecological concerns: For example, the science says that to save the humans, we have to drastically cut fossil fuel consumption, even close down industries like coal. But no corporate board can sacrifice earnings to save the humans because to do so would be to risk shareholder flight or worse. I claim that profit-maximization is an iron rule of capitalism, a rule that trumps all else, and this sets the limits to ecological reform -- and not the other way around as green capitalism theorists supposed.

Secondly, I claim that contrary to green capitalism proponents, across the spectrum from resource extraction to manufacturing, the practical possibilities for "greening" and "dematerializing" production are severely limited. This means, I contend, that the only way to prevent overshoot and collapse is to enforce a massive economic contraction in the industrialized economies, retrenching production across a broad range of unnecessary, resource-hogging, wasteful and polluting industries, even virtually shutting down the worst. Yet this option is foreclosed under capitalism because this is not socialism: no one is promising new jobs to unemployed coal miners, oil-drillers, automakers, airline pilots, chemists, plastic junk makers, and others whose jobs would be lost because their industries would have to be retrenched -- and unemployed workers don't pay taxes. So CEOs, workers, and governments find that they all "need" to maximize growth, overconsumption, even pollution, to destroy their childrens' tomorrows to hang onto their jobs today because, if they don't, the system falls into crisis, or worse. So we're all onboard the TGV of ravenous and ever-growing plunder and pollution. And as our locomotive races toward the cliff of ecological collapse, the only thoughts on the minds of our CEOS, capitalist economists, politicians and labor leaders is how to stoke the locomotive to get us there faster. Corporations aren't necessarily evil. They just can't help themselves. They're doing what they're supposed to do for the benefit of their owners. But this means that, so long as the global economy is based on capitalist private/corporate property and competitive production for market, we're doomed to collective social suicide and no amount of tinkering with the market can brake the drive to global ecological collapse. We can't shop our way to sustainability because the problems we face cannot be solved by individual choices in the marketplace. They require collective democratic control over the economy to prioritize the needs of society and the environment. And they require national and international economic planning to re-organize the economy and redeploy labor and resources to these ends. I conclude, therefore, that if humanity is to save itself, we have no choice but to overthrow capitalism and replace it with a democratically-planned socialist economy.

I. Saving the earth for fun and profit

In rejecting the antigrowth "limits" approach of the first wave of environmentalism in the 1970s, pro-market, pro-growth "green capitalism" theorists of the 1980s and 90s such as Paul Hawken, Lester Brown and Francis Cairncross argued that green technology, green taxes, green labeling, eco-conscious shopping and the like could "align" profit-seeking with environmental goals, even "invert many fundamentals" of business practice such that "restoring the environment and making money become one and the same process." [1] This

[1] Paul Hawken, *Ecological Commerce* (New York: HarperCollins, 1993); Paul Hawken, Amory Lovins, L. Hunter Lovins, *Natural Capitalism* (Boston: Little Brown and Co.: 1999); Lester R. Brown, *Eco-Economy*

turn to the market was an expression of broader trends from the 1980s in which activists retreated from collective action to change society in favor of individualist approaches to trying to save the world by embracing market forces -- "shopping our way to sustainability."[2] In the market mania of the Reagan-Clinton era, Herman Daly's plea for imposing "limits to growth" came to seem dated -- like Birkenstocks and Bucky Fuller's geodesic dome houses. Many American environmentalists bought into the "doing well by doing good" message of green capitalism because there had never been much of a left or socialist presence in the American environmental movement beyond a small anarchist fringe, unlike Europe where many if not most greens were also reds. So it was easy for American environmentalists to go with the market, and there were jobs. Protesting didn't pay the rent. Some became eco-entrepreneurs or signed on with one of the hundreds of new green businesses from organic foods to eco-travel to certifying fair-trade coffee that sprang up in the eighties and nineties. Others connected with mainstream environmental NGOs like the Sierra Club to focus on petitioning and lobbying efforts. In these and other ways, protesting gradually gave way to lobbying and green capitalism.

"There is no polite way to say that business is destroying the world"

Of all the eco-economic futurist writers of the 1980s and 90s, entrepreneur and "Natural Capitalism" guru Paul Hawken has probably been the most influential voice for eco-capitalism. Hailed by *Inc.* magazine as "the poet laureate of American capitalism," Hawken says he was inspired to pen his best seller *Ecology of Commerce* (1993) when his company Smith & Hawken won the prestigious Environmental Stewardship Award from the Council on Economic Priorities in 1991. When George Plimpton presented the award to Smith & Hawken at New York's Waldorf-Astoria Hotel, Hawken says he "looked out over the sea of pearls and black ties, suddenly realizing two things: first that my company did not deserve the award and second, that no one else did either. What we had done was scratch the surface of the problem. . . but in the end the impact on the environment was only marginally different than if we had done nothing at all. The recycled toner cartridges, the sustainably harvested woods, the replanted trees, the soy-based inks, and the monetary gifts to nonprofits were all well and good, but basically we were in the junk mail business, selling products by catalogue. All the recycling in the world would not change the fact that [this] is an energy intensive endeavor that gulps down resources." For the reality, Hawken said, was that:

> Despite all this good work, we still must face a sobering fact. If every company on the planet were to adopt the best environmental practices of the "leading" companies – say, the Body Shop, Patagonia, or 3M – the world would still be moving toward sure degradation and collapse. . . Quite simply, our business practices are destroying life on earth. Given current corporate practices, not one wildlife preserve, wilderness, or indigenous culture will survive the global market economy. We know that every natural system on the planet is disintegrating. The land, water, air, and sea have

(New York: Norton, 2001); Jonathan Porrit, *Capitalism as if the World Mattered* (London: Earthscan, 2005); Frances Cairncross, *Costing the Earth* (Boston: Harvard Business School Press, 1992) and *Green, Inc.* (Washington D.C.: Island Press, 1995); James Gustave Speth, *The Bridge at the End of the World* (New Haven: Yale University Press, 2008). See also Al Gore, *Earth in the Balance* (New York: Rodale, 1992), chapter 10. Nicholas Stern, *The Economics of Climate Change* (Cambridge: CUP, 2007) restates this green eco-economic orthodoxy.

[2] On this history see Andrew Szaz, *Shopping Our Way to Safety: How We Changed From Protecting the Environment to Protecting Ourselves* (Minneapolis: University of Minnesota Press, 2007).

> been functionally transformed from life-supporting systems into repositories for waste. There is no polite way to say that business is destroying the world.[3]

So business is destroying the world. But, for Hawken, the problem wasn't capitalism as such but just bad "business practices" of corporations which, he thought, could be fundamentally "inverted" to save the world: "[T]his behavior is not the inherent nature of business, nor the inevitable outcome of a free-market system." The problem was that "the expense of destroying the earth is largely absent from the prices set in the marketplace. A vital and key piece of information is therefore missing in all levels of the economy." [4] The key was to get the market to "tell the ecological truth." In her Harvard Business School manifesto for green capitalism, *Costing the Earth*, the *Economist* magazine's environmental editor Francis Cairncross said "Governments need to step in to align private costs with social costs . . . [as] embodied the 'polluter pays' principle.'" [5] And in his book *Eco-Economy*, Worldwatch Institute founder Lester Brown explained that "Ecologists and economists – working together – can calculate the ecological costs of various economic activities. These costs could then be incorporated into the market price of a product or service in the form of a tax." So carbon taxes and the like would "discourage such activities as coal burning," "the generation of toxic waste, the use of virgin raw materials," "the use of pesticides, and the use of throwaway products." [6] Paul Hawken even went so far as to claim that "*there is no question that we could introduce a steady, incremental phase-in of a carbon tax on coal, one that would eventually tax coal out of business in two decade's time."* "The whole key to redesigning the economy is to shift incrementally most if not all of the taxes presently derived from 'goods' to 'bads,' from income and payroll taxes to taxes on pollution, environmental degradation, and nonrenewable energy consumption." "The resulting changes in the marketplace would be dramatic. Every purchase would become more constructive and less destructive." Hawken described his vision of "Natural Capitalism" thusly:

> The restorative economy described in this book . . . unites ecology and commerce into one sustainable act of production and distribution that mimics and enhances natural processes. In such an economy . . . restoring the environment and making money would be the same process. Business . . . needs a plan, a vision, a basis – a broad social mandate that will turn it away from the linear, addictive, short-term economic activities in which it is enmeshed and trapped. . . Rather than argue about where to put our wastes, who will pay for it, and how long it will be before toxins leak out into the groundwater, we should be trying to design systems that are elegantly imitative of climax ecosystems found in nature. Companies must re-envision and re-imagine themselves as cyclical corporations, whose products either literally disappear into harmless components, or [produce] no waste [at all.]" [7]

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[3] *The Ecology of Commerce* (New York:Harper, 1993), preface and p.3 (my italics).

[4] Ibid. pp. 15, 13

[5] *Costing the Earth*, p. 89.

[6] *Ecological Economics*, p. 234-36, my italics

[7] *Ecology of Commerce*, pp. 3, 11-12, 54-55, 87, 171.

NRDC founder and Yale Dean Gus Speth summed up this utopian vision of the market in green capitalism as well as anyone:

> The market can be transformed into an instrument for environmental restoration; humanity's ecological footprint can be reduced to what can be sustained environmentally; the incentives that govern corporate behavior can be rewritten; growth can be focused on things that truly need to grow and consumption on having enough, not always on more; the rights of future generations and other species can be respected. [8]

The "sustainable" "green" "natural" capitalism movement took off in the 1980s and 90s: Organic farming came into the mainstream and Whole Foods became the fastest growing sector of the grocery industry. Green businesses sprouted up in every sector from renewable energy to organic cottons to eco-travel. Stores added green products in every aisle. Hip, eco-conscious businesses like Patagonia gave "1% to nature." (Ben & Jerry's gave 7 ½%!) "Sustainable investing" mutual funds looked to fund renewable energy. "Green certification" outfits sprung up to save the tropical forests and the sea turtles. Even big corporations like 3M and Wallmart eventually embraced green "business practices" cutting waste, recycling, producing and adopting less toxic products. Europe introduced the first large-scale cap and trade system in January 2005. Finland introduced the first carbon tax in 1990 and many other countries followed suit including Sweden, Germany, Britain, South Korea, South Africa, some provinces of Canada, and even some American states including Maryland, Colorado, and California.

The green capitalist god that failed

There can be no doubt that we are better off for many of these initiatives. But two decades on, for all the organic groceries, the energy efficient lightbulbs, appliances and buildings, the carbon trading and carbon taxes, still, the global ecology is collapsing faster than ever. Climate change, as Bill McKibben tells us in his new book, *eaarth*, is no longer a distant threat; it's already upon us. CO2 and other greenhouse gas emissions are currently growing at *four times* the rate they grew in the 1990s. Two thousand ten was the hottest year on record and the 2000s were the hottest decade on record. From peat fires around Moscow to huge floods in Pakistan, super hurricanes, super storms, super winter snowfalls, and floods or, alternately, extended drought (even both in Australia), are becoming the norm. Seas are rising and ice is melting faster than scientists imagined possible even as recently as 2007. Tropical forests continue to fall. Glacier melt is accelerating around the world with dire implications for agriculture from India to China, California to Peru. Rivers are drying up. Soil depletion continues unabated. Water tables are falling relentlessly around the world. Drought has become a permanent feature of the American southwest, of Australia, of regions of Africa and the Middle East, and northern China. Ocean fisheries are collapsing right and left. Coral reefs, scientists now think, could die off in many places by mid-century and over the entire planet by 2100. Penguin colonies are at risk. The collective impact of nearly 7 billion humans pumping their emissions into the atmosphere and dumping their excreta and runoff and toxics into drains and rivers that eventually issue into the seas is not only changing the climate but, incredibly, changing the chemical composition of the world's vast oceans, threatening the future both of living creatures in the oceans and those who live off the oceans. We're destroying life and wiping out species so fast that, in Bill McKibben's words, "We're running

[8] *Bridge at the End of the World,* p. 12. See also pp. 180-191.

Genesis backward, decreating." [9] In short, for all the green initiatives, corporate business practices have changed little -- or the little they've changed has had no great effect. From Kyoto to Cancun, governments have all made it abundantly clear that they will not accept binding limits on greenhouse gas emissions. They will not sacrifice growth today to save the planet tomorrow. Europe's cap and trade scheme, the first large scale effort, enriched traders and polluters but failed to put the brakes on the relentless rise of greenhouse gas emissions. What few carbon taxes governments actually imposed have likewise failed to stem emissions. At the end of the day, the project of green capitalism is in disarray.

II. Delusions of "Natural Capitalism"

Paul Hawken was right: We need a "restorative economy," an economy that lives within nature's limits, that minimizes and even eliminates waste from production, and so on. But he was completely wrong to imagine that we could ever get this under capitalism. In what follows I will explain why this is so then discuss what I think are the implications of this critique. To start with, I'm going to state five theses about green capitalism and then develop these arguments in the rest of this paper.

1. First, the project of "sustainable" "green" "natural" capitalism was misconceived and doomed from the start because maximizing profit and saving the planet are inherently in conflict and cannot be systematically aligned even if, here and there, they might coincide for a moment. That's because, under capitalism, CEOs and corporate boards are not responsible to society; they're responsible to private owners and shareholders. CEOs might embrace environmentalism so long as this also increases profits but they're not free to subordinate profit maximizing to saving the world because to do so would be to risk shareholder flight or worse. I claim that profit-maximization is an iron rule of capitalism, a rule that trumps all else and sets the possibilities and limits of ecological reform -- and not the other way around as green capitalism theorists suppose.

2. Second, no capitalist government on earth can impose "green taxes" that would drive the coal industry or any other industry out of business, or even force major retrenchments by suppressing production because, among other important reasons, given capitalism, this would just bring on recession and mass unemployment if not worse. This means the carbon tax strategy to stop global warming is a non-starter. And without green taxes, the entire green capitalist project collapses.

3. Third, green capitalism theorists vastly underestimate the gravity, scope, and speed of the global ecological collapse of we face. They imagine that growth can continue forever if we just tweak the incentives and penalties a bit here and there with green taxes and such. I claim that the capitalist economic system is inherently eco-suicidal, that endless growth can only end in catastrophic global eco-collapse, that no amount of tinkering can alter the market system's suicidal trajectory, and that, therefore, like it or not, humanity has no choice but to try to find a way to replace capitalism with a post-capitalist ecologically sustainable economy.

[9] See Bill McKibben's review of our current status in *earth* (New York:Henry Holt, 2010), chapter one, from which much of this paragraph is drawn.

4. Fourth, green capitalism theorists grossly overestimate the potential of "clean" "green" production and "dematerializing," the economy whereas, in reality, much if not most of the economy from resource extraction like mining and drilling to metals smelting and chemicals production, as well as most manufacturing, cannot be greened in any meaningful sense at all. This means that the only way to reduce greenhouse gas emissions by the 80% that scientists say we need to do to save the humans, is to enforce a *drastic contraction of production* in the industrialized countries, especially in the most polluting and wasteful sectors. Most industries will have to be sharply retrenched. Some, the very worst polluting and wasteful, will have to be closed down entirely. Since, under capitalism, industries can't be expected to voluntarily commit economic suicide, even to save the humans, the only way to carry out these necessary contractions and closures is to nationalize industry and socialize the losses, redeploy labor to sectors society does actually need to develop, like renewable energy, public transit, decent housing for all, and so on, and shorten the working day to spread the remaining work around.

5. Fifth, consumerism and overconsumption are not "dispensable" and cannot be exorcised because they're not just "cultural" or "habitual." They are built into capitalism and indispensable for the day-to-day reproduction of corporate producers in a competitive market system in which capitalists, workers, consumers and governments alike are all locked into an endless cycle of perpetually increasing consumption to maintain profits, jobs, and tax revenues. We can't shop our way to sustainability because the problems we face cannot be solved by individual choices in the marketplace. The global ecological crisis we face cannot be solved by even the largest individual companies. Problems like global warming, deforestation, overfishing, species extinction, the changing ocean chemistry are even beyond the scope of nation states. They require national and international cooperation and global economic planning. This requires collective bottom-up democratic control over the entire world economy. And since a global economic democracy could only thrive in the context of a rough economic equality, this presupposes a global redistribution of wealth as well.

A. The folly of cap & trade and carbon taxes

Green capitalism's problems start with the failure of cap and trade schemes and the refusal to of countries to adopt green taxes of real significance. By the end of the first decade of the twenty-first century, it was evident that the world's first efforts at CO2 and other greenhouse gas mitigation, the voluntary approach embodied in the 1997 Kyoto Protocols, was a failure. The Kyoto Protocol obliged the industrialized countries to cut carbon emissions by an average of 5.2 percent below 1990 levels by 2008-2012. Virtually no country honestly lived up to its promises. For example, Japan, the strongest promoter of the Kyoto Protocol, promised to reduce emissions 6 percent below 1990 levels by 2008. Instead, by 2009 Japan's emissions *exceeded* its 1990 levels by 9 percent. Most of the rest of the world did much worse than that. Emissions skyrocketed.[10] By 2006, scientists reported that global emissions were then rising *four times faster* than they were a decade earlier. Thirteen of the 15 original EU signers of the accords increased their emissions, many sharply. Germany did better, almost meeting its target, but only because it incorporated East Germany and thus bettered

[10] See James Hansen's summary of Kyoto's failures in his *Storms of My Grandchildren* (New York: Bloomsbury, 2010), pp. 182-83, and p. 206.

its average by closing down dirty, inefficient communist-era plants. The U.K. also did better but only because North Sea gas discoveries enabled it to close coal mines and replace coal-fired power with gas – a situation that is unlikely to last because North Sea gas peaked in 1999 and will be two-thirds gone by 2015.[11]

No green capitalism in one country

Kyoto failed because, given a competitive globalized world market, for some countries to sign on these obligations while others – conspicuously the U.S., China, and India – did not, was to commit economic suicide. Analysts predicted that if they abided by Kyoto's requirements, the UK's GDP would fall by 1 percent by 2010, Italy's by 2 percent, Spain's by 3 percent and all three countries would lose at least 200,000 jobs each.[12] This is why, already by 2005, even ardent advocates of Kyoto were bailing out. So Tony Blair, erstwhile hardcore Kyoto fan, told the Clinton Global Initiative in September 2005 that *"I'm changing my thinking on this. . . No country is going to cut its growth or consumption substantially in the light of a long-term environmental problem."* [13]

1. Cap and trade: the market solution to Kyoto's failed voluntary limits solution

In the wake of Kyoto's failures, many economists and environmentalists embraced "cap and trade" schemes which, they claimed, would overcome the weaknesses of Kyoto's voluntary approach by relying instead on market incentives and penalties. The cap and trade idea was that governments would set ceilings on maximum allowable CO2 emissions – the cap – for a given set of polluting industries. Then, for every ton of CO2 that a polluter reduces under the cap, it is awarded one "permit" to pollute. Permits could be bought, sold, traded, or banked for the future. Any plant that cut its emissions below the mandated level could sell their excess allowances to overpolluters. Overpolluters could buy these indulgences and keep on polluting. But over time, governments would ratchet down the cap, restricting allowances. This would drive up the cost of permits. Dirty plants would face rising costs to keep buying permits to keep operating. Efficient plants would profit from clean technology. Eventually, as permit prices rose, fossil fuel costs would exceed renewable energy prices and fossil fuels use would pass from the scene. The theory had a certain elegance. But all the same, greenhouse gas cap and trade schemes failed just like Kyoto. The problem this time was that the "cap" was really a tax, therefore an added and growing cost to producers.[14] In a globalized market, governments were loathe to undermine the competitiveness of their own industries by imposing additional financial burdens. So in Europe, where the world's first mandatory trading market was established in 2005, governments, according to one report, were "beseeched by giant utilities and smokestack industries that feared for their competitiveness . . . "[15] In Germany, industry lobbyists badgered the government for higher

[11] Cited in Mark Lynas, *Six Degrees* (New York: National Georgraphic/Harpers, 2008), pp. 269-70.

[12] Dana Joel Gattuso, "Kyoto's anniversary: little reason to celebrate," February 2006 (Washington D.C.: The National Center for Public Policy Research) at http://www.nationalcenter.org/NPA537EuropeKyoto206.html.

[13] Tony Blair, Remarks, Clinton Global Initiative, Special Opening Plenary Session (New York), September 15, 2005, quoted in ibid.

[14] Hansen, *Storms*, p.213.

[15] James Kanter and Jad Mouawad, "Money and lobbyists hurt European efforts to curb gases," *New York Times*, December 11, 2010

caps, special exceptions of all sorts, they warned of unemployment, threatened to pack up and leave Germany, and so on. In the end, governments caved. Jürgen Tritten, former Green Party leader and German minister of environment from 1998 to 2005, recalled being lobbied by executives from power companies and by politicians from the former East Germany seeking special treatment for lignite, a highly polluting soft brown coal common in central Europe. Handing out permits he says he felt "like a grandfather with a large family deciding what to give his favorite children for Christmas." Mr. Trittin recalled a five-hour "showdown" with Wolfgang Clement, then economy minister, in which he lost a battle to lower the overall limit. Clement reproached the Greens saying that "at the end of their policy there is the de-industrialization of Germany."[16] Similarly, in confrontation with the Federation of German Electricity Companies, "good sense triumphed in the end" and industry won: whereas under EU commitments, German electricity companies were supposed to receive 3 percent fewer permits than they needed to cover their total emissions between 2005 and 2007, which would have obliged them to cut emissions by that amount, instead the companies got 3 percent *more* than they needed – a windfall worth about $374 billion dollars at that time. As governments caved, emissions soared, and the profits went to the polluters and the traders. As the *New York Times* described the process:

> The European Union started with a high-minded ecological goal: encouraging companies to cut their greenhouse gases by making them pay for each ton of carbon dioxide they emitted into the atmosphere. But that plan unleashed a lobbying free-for-all that led politicians to dole out favors to various industries, undermining the environmental goals. Four years later, it is becoming clear that system has so far produced little noticeable benefit to the climate — *but generated a multibillion-dollar windfall for some of the Continent's biggest polluters.*[17]

Cap and trade may as well have been designed to fail: Poland, which depends on coal-fired plants for 95 percent of electricity generation has threatened to block the next phase of Europe's emissions plan unless it gets an "exception." [18] Everyone needs higher caps, special exemptions, temporary relief. And so it goes. With Europe's cap and trade plans in tatters, Obama dropped his own cap and trade plan, once the centerpiece of his environmental campaign platform. In 2010 Japan and South Korea shelved their proposed plans to start cap and trade schemes in 2013 under heavy pressure from businesses that complained it was unfair to burden them with such costs when the U.S. and China refused to do the same.[19] Australia has officially put off any decision on carbon-trading till 2013. And so it goes.

2. Carbon taxes: the market solution to the failed cap and trade market solution

Critics of cap and trade, like Al Gore and NASA's James Hansen,[20] have argued for a simpler, more transparent direct approach that supposedly cuts out all the profiteering – a flat

[16] Ibid.

[17] Ibid., my italics.

[18] Ibid.

[19] "East Asian cap and trade plans hit the wall," January 18, 2011, *Carbonpositive* at http://www.carbonpositive.net/viewarticle.aspx?articleID=2235.

[20] See Jim Hansen's arguments for a carbon tax in *Storms*, p. 215ff. For Al Gore's arguments see his *Our Choice* (Emanus, PA: Rodale, 2009), pp. 342-45.

carbon tax. No more lobbying. No more loopholes. In James Hansen's words: "All sweet deals will be wiped off the books by a uniform carbon fee at the sources, which will affect all fossil fuel uses."[21] But carbon taxes are no more a solution to curbing greenhouse gases than cap and trade. Contradictions abound. For a start, green taxes have proven no more immune to "sweet deals" than were the cap and trade schemes. Dozens of nations and local governments have introduced carbon taxes since 1990 but these have not led to significant declines in emissions. That's because, everywhere, industries lobbied to keep taxes low (instead of caps high), various groups demanded exemptions, unions resisted taxes that could cost jobs, consumers resisted new taxes. So when finally introduced, after all the negotiations, carbon taxes have been too low to effect much change: Pollution is taxed but not enough to stop it, or even reduce it by much. The French case illustrates all of these contradictions: Nicolas Sarkozy sought to push France into the lead of the fight "to save the human race" (after all, this is France) by implementing a carbon tax in 2009. But days before the tax was to take effect, a French court ruled it unconstitutional because it would have let off most industrial polluters entirely plus it allowed generous discounts and exceptions to various sectors such as truckers, farmers, fishing fleets, while placing a disproportionately heavy burden on ordinary households. The court said that more than 1,000 of France's biggest polluters could have been exempted from the charges, and that 93 percent of industrial emissions would not have been taxed at all.[22] But even if Sarkozy had successfully imposed his carbon tax, this tax would have raised the price of gasoline by just 25 US cents per gallon. Given that the French already pay nearly $9 per gallon for gasoline, it's hard to see how an additional 25 cents would seriously discourage consumption let alone "save the human race." James Hansen proposes a carbon tax of $1 per gallon of gasoline in the U.S. But given that gasoline prices in the U.S. are only a third the cost of those in Europe, so cheap that that gas-guzzling SUVs, light trucks and bloated luxury cars are the best selling vehicles in the U.S., it's hard to imagine how tacking another buck onto a gallon of gas is going to change consumption patterns here either.

Hansen, like most environmentalists, blames the "special interests" and spineless political leadership for the failure to enact carbon taxes:

> Today we are faced with the need to achieve rapid reductions in global fossil fuel emissions and to nearly phase out fossil fuel emissions by the end of the century. Most governments are saying that they recognize these imperatives. And they say they will meet these objectives . . . Ladies and gentlemen, your governments are lying through their teeth. . . Moreover, they are now taking actions that, if we do not stop them, will lock in guaranteed failure to achieve the targets that they have nominally accepted. . . First, they are allowing construction of new coal-fired plants. Second, they are allowing construction of coal-to-liquids plants that will produce oil from coal. Third, they are allowing development of unconventional fossil fuels such as tar sands. Fourth, they are leasing public lands and remote areas for oil and gas exploration to search for the last drop of hydrocarbons. Fifth, they are allowing companies to lease land for hydraulic fracturing, an environmentally destructive mining technique . . . to extract every last bit of gas . . . Sixth, they are allowing

[21] *Storms*, p. 210.

[22] Lizzy Davies, "Humiliation for green convert Sarkozy as carbon tax ruled unconstitutional," *Guardian*, December 30, 2009.

> highly-destructive mountain-top removal and long-wall mining of coal . . . And on and on.
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> The problem is that our governments, under the heavy thumb of special interests, are not pursuing policies that would restrict our fossil fuel use . . Quite the contrary, they are pursuing policies to get every last drop of fossil fuel, including coal, by whatever means necessary, regardless of environmental damage. [And this is despite the fact] that we have all the ingredients we need to meet this challenge – except leadership willing to buck the special financial interests benefiting from business as usual."[23]

But the problem is not just special interests, lobbyists and corruption. And courageous political leaders could not turn the situation around. Because that's not problem. The problem is capitalism. Because, *given capitalism*, it is, perversely, in the *general interest*, in *everyone's immediate interests* to do all we can to maxmize growth right now, therefore, unavoidably, to maximize fossil fuel consumption right now – because practically every job in the country is, in one way or another, dependent upon fossil fuel consumption. And any cutback, particularly the massive and urgent cuts that climate scientists like James Hansen say we have to make to save the humans in the decades and centuries to come, can only come at the expense of massive layoffs for the humans in the here and now. There is no way to cut CO2 emissions by anything like 80 percent without imposing drastic cuts across the board in industrial production. But since we live under capitalism, not socialism, no one is promising new jobs to all those coal miners, oil drillers, gas frackers, power plant operators, farmers and fertilizer manufacturers, loggers and builders, autobuilders, truck drivers, airplane builders, airline pilots and crews and the countless other occupations whose jobs would be at risk if fossil fuel use were really seriously curtailed.[24] So rational people can understand the science, grasp the implications of the failure to act right now, *and still find they have to "live in denial" to carry on*. Given capitalism, they have little choice but to focus on the short-term, to prioritize saving their jobs in the here and now to feed their kids today – and worry about tomorrow, tomorrow. That's why, when in 2009 President Obama tried to eliminate some tax credits and deductions tied to coal, oil and natural gas, there was furious protest from coal states and Congress never enacted the changes. That's why UAW autoworkers have often joined their bosses in protesting against EPA efforts to impose higher CAFE fuel economy standards. It's not that *personally* those workers don't understand that we all need to consume less oil.[25] But what other choice do they have given that, today, Detroit's best defense against the Asian invasion is to concentrate on its niche market building giant gas-hog Ticonderogas, Escalades, Suburbans, Dodge Ram and Ford F150 trucks? Given

[23] *Storms*, pp. 185-86.

[24] Eg. Elizabeth Rosenthal, "Grim local choices as Europe goes green," *International Herald Tribune*, September 16, 2010. The EU passed its first law to phase out coal in 2002, especially in the coal-dependent East European states, but deadlines have been repeatedly moved back because, with the transition to capitalism, workers just face unemployment as state job guarantees have been capitalist-rationally eliminated. And as one worker told Rosenthal: "After 20 years in the mine, your body is pretty damaged and so you're not so employable."

[25] There have been conspicuous exceptions to this pattern. For example, in the midst of the 2009 recession, a UAW caravan brought UAW workers from Detroit to Washington D.C. to demand that shuttered auto plants be converted to making much-needed mass transit and light rail vehicles, or alternative energy equipment like windmill turbines. See "Auto caravan voices grievances of union autoworkers" by Wendy Thompson, Detroit Green Party and UAW convention delegate, in *Green Pages,* February 5, 2009 at http://gp.org/greenpages-blog/?p=992.

capitalism, tragically, the autoworkers' best hope for job security today is to work to destroy their childrens' tomorrows.

The science vs. the political economy

This is the awful choice workers face in every industry under capitalism. That's why, with the world's leading industrial economies locked in ferocious global competition, especially against China's capitalist police-state advantage, with unemployment levels at 10 percent in the U.S. and Europe, 20 to 40 percent or more for youth, and half the youth population from Mexico to Egypt to India unemployed, the last thing any capitalist government wants to do right now is impose a carbon tax because the first consequence of making fossil fuels more expensive would be to threaten the extremely fragile global "recovery" and compound their already severe unemployment problems, if not actually provoke revolt. And given the state of global competition today, with their economies already half de-industrialized, American and European industrialists not unreasonably protest that, why should their industries be so burdened when everyone knows that China is never going to impose any such tax? In today's world, American industrialists would not be wrong to say, like their German counterparts, that at the end of the day, a carbon tax would just bring on "the de-industrialilzation of America." And yet even in the best of boom times, when America ruled the world economy, every president from Ronald Reagan to Bill Clinton to George Bush père and fils and all their congresses, Democratic and Republican alike, refused to support legislation that would in any way threaten growth and "the American way of life." In an economy where after more than half a century of efforts, we can't even get a lousy 5 cent bottle deposit bill passed in more than a handful of states (9 to be precise), let alone a serious gasoline tax anywhere, why would Paul Hawken imagine that congress would pass a carbon tax that would "drive the coal industry out of business in two decades time?"

3. The inevitable failure of market solutions

Since no government is going to impose carbon taxes, the entire green tax strategy collapses because, as Hawken, Brown and Cairncross freely concede, profit-seeking and environmental protection are irreconcilably opposed. Yet the worst problem with the carbon tax idea is that even if serious carbon taxes were actually imposed, *there is no guarantee whatsoever that they would reduce greenhouse gas emissions* because they would do little if anything to stop overall growth and consumption. That's why, even though in the U.S., calls for green taxes have elicited fierce opposition from many quarters, nevertheless, many in government, many businesses, and a long list of industrial CEOs including Rex Tillerson, CEO of ExxonMobil and Paul Anderson, CEO of Duke Energy, *support* carbon taxes – because they understand that unlike cap and trade, carbon taxes would add something to the cost of doing business, like other taxes, but they pose no finite limit to growth. [26] Worse, because carbon taxes are transparently a tax (whereas cap and trade is a disguised tax), most carbon tax advocates have tendered their proposals as "revenue neutral" to make them more palatable to politicians, business and consumers. Paul Hawken and Al Gore call for "offsetting" carbon taxes by reducing income taxes. James Hansen's "tax and dividend" plan proposes "returning 100 percent of the collected tax" back to the public in the form of a "dividend." [27] Yet, as ecological economist William E. Rees, co-founder of the science of

[26] For the list of CEOs who support carbon taxes, see The Carbon Tax Center at http://www.carbontax.org/who-supports/opinion-leaders/.

[27] Hawken, above, p. 4. Al Gore, *Our Choice* (Emmaus PA: Rodale Press, 2009), p. 343. Hansen, *Storms,* p. 209.

ecological footprint analysis, points out, if carbon tax offsets are revenue neutral, then they are also "impact neutral." Money returned to consumers will likely just be spent on something else that consumes and trashes the planet. So, says Rees if, for example, a consumer, say, takes an eco-car rebate from the government to junk his/her clunker for a Prius, this could save a several hundred bucks in fuel costs each year. But if the consumer then spends the savings on, say, a round trip air ticket to some vacation destination (which s/he could do every year with the fuel savings) or buys a new heavily polluting flat-screen TV, the carbon "savings" would evaporate. And, meanwhile, s/he's added more to the global waste heap by junking the clunker. [28] In the end, to coin a phrase, taxing pollution is a problem, not a solution.

Of course, the government could just drop these market approaches and directly regulate CO2 output by imposing fixed limits on greenhouse gas emitters, like governments already regulates many toxic chemicals. Legally, President Obama has the authority under clean air legislation to do just that, and since his election, the somewhat reenergized E.P.A. has asserted its right to do so. But where fossil fuels are concerned we're not just talking about banning or restricting a single chemical here or there. If we're talking about 80 percent cuts in CO2 and other greenhouse emissions, then we're talking about the need to impose huge cuts in everything from farming to fashions – which is why business is fiercely resisting Obama's emboldened E.P.A.[29]

B. The economics vs. the science on the scope of the problem

When climate scientists like James Hansen tell us to stop global warming we have to "shut down the coal industry" and "leave most of the fossil fuels in the ground," it's only natural that, like those autoworkers, *none of us really want to think about the full implications of this imperative.* The tendency is to think about this issue in isolation from the rest of economy, as if fossil fuels are just in the "energy sector" which we could fix by switching to renewables, trading in the gas hog for a Prius, and then go on driving and consuming as before while, hopefully, the economy keeps on growing. But this is a delusion because in our economy, fossil fuels are in virtually everything we depend upon. Today, most of the fossil fuels we extract are burned directly to produce energy in power plants, to provide heating, and to propel our cars, planes, trains and ships. The rest become chemical feedstocks embodied in everything we consume from food to clothes to manufactures of every sort. And we use gargantuan quantities of the stuff. Right now, adding up the coal, oil and natural gas, the world is consuming some 200 million barrel equivalents of oil every day just to produce energy. That's equal to more than 23 times the daily output of Saudi Arabia, the world's largest producer.[30] Currently, renewables like solar and wind provide a grand total of about 0.6 percent of global energy consumption. So "leaving fossil fuels in the ground" is going to require radical changes in consumption and lifestyles of Americans. Indeed, the Australian

[28] See William Rees and Mathis Wackernagel, *Our Ecological Footprint: Reducing Human Footprint on the Earth* (Gabriola Island, BC, Canada: New Society Publishers, 1996). See also, Rees, "BC's carbon tax shell game," in *The Tyee* (British Columbia) February 26, 2008 at http://thetyee.ca/Views/2008/02/26/TaxShellGame/.

[29] Louise Radnofsky, "Business groups' target: EPA," *Wall Street Journal*, February 7, 2011. And, predictably, given capitalist governments' perennial subservience to business: "After business outcry, E.P.A. significantly revises emission rules for boilers," John M. Broder, *New York Times*, February 24, 2011. Also: John M Broder and Sheryl Gay Stolberg, "E.P.A. delays tougher rules on emissions," *New York Times*, December 10, 2010.

[30] Robert Bryce, *Power Hungry* (New York:Public Affairs, 2010), p. 75.

social scientist Ted Trainer argues that "The greenhouse problem cannot be solved without large scale reductions in the volumes of economic production and consumption taking place, and therefore cannot be solved at any cost within a society committed to affluent 'living standards,' maximum levels of economic output, and economic growth." [31]

But you would not get that impression from listening to the optimistic scenarios of mainstream economists. Thus the UK's Sir Nicolas Stern, former World Bank Chief Economist and author the widely publicized *Stern Review* commissioned by the UK government, concluded that "climate-change mitigation is technically and economically feasible at a cost of around 1% of GDP." [32] Paul Krugman, echoing Stern and citing figures from a U.S. Congressional Budget Office survey of models concludes that "strong climate-change policy would leave the American economy between 1.1 percent and 3.4 percent smaller in 2050 than it would be otherwise." [33] Stern, Krugman and a host of mainstream economists, politicos and the media have trumpeted this happy face win-win message that "tackling climate change is a pro-growth strategy" (Tony Blair). The whole process, they reassure us, will be fairly painless. Best selling *New York Times* columnist Thomas Friedman, cheerleader for globalization and author of *Hot, Flat and Crowded* (2008), even claims that if we transition to solar and other renewable energies, then we can even *increase* growth, turn clean energy into a "new growth driver" and produce all the consumer goodies that the billions of Chinese and Indians and the whole world could want, so the whole planet can enjoy "the American way of life."

Cooking the climate numbers to support GDP growth

The science, however, sharply contradicts these optimistic scenarios. Stern's *Review* has been criticized on many grounds, not least for overestimating the mitigation potentials of renewable and underestimating rising future demands in a misguided effort to support perpetual growth when the science clearly demonstrates that perpetual growth is unsustainable.[34] For a start, when the *Stern Review* claims that the cost of reducing green house gas emissions to three-quarters of current levels by 2050 will cost around $1 trillion or roughly -1.0 percent of GDP in that year, *it says this is to stabilize CO2 emissions at between 500 and 550 ppm* (*which would cause average temperatures to increase at least 3˚ C (5.4˚F) above pre-industrial levels).*[35] But this target is well above what climate scientists consider safe. In 2008 James Hansen and his colleagues at NASA's Goddard Institute for Space Studies wrote that: "If humanity wishes to preserve a planet similar to that on which civilization developed and to which most life on earth is adapted, paleoclimate evidence and ongoing climate change suggest that CO2 will need to be reduced from its current 385 ppm to at most

[31] "A critical discussion of the Stern and IPCC analyses of carbon emission mitigation possibilities and costs," *Energy & Environment* vol. 21, no. 2, 2010, pp. 49-73.

[32] Stern, *The Economics of Climate Change: the Stern Review* (Cambridge: CUP, 2007), p. 239.

[33] Nicolas. Paul Krugman, "Green economics," *New York Times Magazine*, April 11, 2010, p. 39.

[34] See, for example, Ted Trainer, "A short critique of the Stern Review," *real-world economics review*, issue no. 45, March 2008, at http://www.paecon.net/PAEReview/issue45/Trainer45.pdf. Yet Stern has also been criticized for proposing any GDP cut at all: Frank Ackerman, "Debating climate economics: the Stern Review vs. its critics," Report to the Friends of the Earth England, Wales and Northern Ireland, July 2007 at http://sei-us.org/Publications_PDF/SEI-FOE-DebatingClimateEcon-07.pdf.

[35] Stern, op cit., pp. xvi-xvii, 227, 234, 239, 260.

350 ppm." [36] Climate scientists have been strenuously lobbying governments to do everything possible to suppress CO2 emissions in order to contain average temperature increases to no more than 2˚C, beyond which scientists fear feedback loops including reduced carbon absorption capacity of warmer seas, methane release from melting tundra and methane hydrates at the bottom of the Arctic ocean, loss of reflectivity from retreating Arctic ice, and so on, could sharply accelerate global warming with catastrophic implications.[37] In his powerful new book *Storms of My Grandchildren* James Hansen, generally considered the world's pre-eminent climate scientist, writes that the speed of climate change, especially the speed of temperature increase in relation to CO2 ppm levels, and the shocking speed of Arctic and Antarctic melting, has taken even climate scientists by surprise such that they have had to their revise worst-case scenarios of only a few years ago, in 2007. Whereas scientists used to think that we could tolerate warming up to 2˚C without too much damage, "Unfortunately, what has since become clear is that a 2-degree Celsius global warming, or even a 1.7 degree warming, is a disaster scenario." Hansen now believes that we have to have "a carbon dioxide target of no more than 350 ppm" in order to avoid ice sheet disintegration, loss of mountain glaciers and fresh water supplies, expansion of the subtropics, increasingly extreme forest fires and floods, massive species loss, and destruction of the great biodiversity of coral reefs.[38] Three degrees is not a world we want to see:

> [T]he last time the Earth was 2 or 3 degrees warmer than today, which means the Middle Pliocene, about three million years ago, it was a rather different planet. Sea level was about 25 meters (80 feet) higher than today. Florida was under water. About a billion people now live at elevations less than 25 meters. It may take a long time for such large a sea level rise to be completed – but if we are foolish enough to start the planet down that road, ice sheet disintegration likely will continue out of our control.[39]

Given the enormous dangers that such a high target implies, critics have asked why is Stern so reluctant to aim for a safer target? Marxist ecologist John Bellamy Foster and his colleagues suggest that the answer is to be found in Stern's economics, not the science:

> The *Stern Review* is very explicit, however, that such a radical mitigation of the problem *should not be attempted.* The costs to the world economy of ensuring that atmospheric CO2e stabilized at present levels or below would be prohibitive, destabilizing capitalism itself. "Paths requiring very rapid emissions cuts, " we are told, "are unlikely to be economically viable." If global greenhouse gas emissions peaked in 2010, the annual emissions reduction rate necessary to stabilize CO2e at 450 ppm, the *Stern Review* suggests, would be 7 percent, with emissions dropping by

[36] Hansen et al. "'Target atmospheric CO□: Where should humanity aim?" *Open Atmospheric Science Journal* 2 (2008), p. 217 at http://pubs.giss.nasa.gov/docs/2008/2008_Hansen_etal.pdf.

[37] Malte Meinshausen et al., "Greenhouse emission targets for limiting global warming to 2˚C," *Nature* vol. 458 April 30, 2009, pp. 1158-1163 at http://www.ecoequity.org/wpcontent/uploads/2009/07/meinshausen_nature.pdf.

[38] *Storms*, pp. 142, 164-165, 180.

[39] Ibid., p. 141. For summaries of what climate scientists think a 3˚C or 4˚C world would look like, see Lynas, *Six Degrees*, chapters 3 and 4.

about 70 percent below 2005 levels by 2050. This is viewed as economically insupportable.[40]

Stern asserted that "the world does not have to choose between averting climate change and promoting growth and development." [41] But if the climate science is right that we need to keep emissions below 400 ppm, or even below 350 ppm, then not only can't we keep on growing but we would have to make radically deeper cuts in GDP than even the -7 percent per year Stern calculates would be necessary just to get us down to 450 ppm. Since, under capitalism, anything like an economic contraction on the order of -7% would mean economic collapse and depression, *it is difficult to see how we can make the reductions in green house gasses the scientists tell us we have to make to avoid climate catastrophe unless we abandon capitalism.* This is the dilemma. So far, scientists have tended to avoid getting into the contentious economic side of the question. But with respect to the issue of growth, the science is unequivocal: never-ending growth means the end of civilization, if not humanity itself – and in the not-so-far distant future. For a summary of the peer-reviewed science on this subject, read a few chapters of Mark Lynas' harrowing *Six Degrees*. [42]

No pain, no gain

Global warming is surely the most urgent threat we face, but it is far from the only driver of global ecological collapse. For even if we switched to clean renewable electric power tomorrow, this would not stop the overconsumption of forests, fish, minerals, fresh water. It would not stop pollution, or solve the garbage crisis, or stop the changes in ocean chemistry. Indeed, given the Jevons paradox I discussed elsewhere, the advent of cheap, clean energy could even *accelerate* these trends.[43] Numerous credible scientific and environmental researchers back up what the climate scientists have been telling us to demonstrate why perpetual growth is the road to collective social suicide. For example:

In 2005 the *United Nations Millennium Ecosystem Assessment* team of 1300 scientists from 95 countries issued a landmark report on humanity's overconsumption of "natures' services." The scientists reported that 60% (15 of 24) of the ecosystems examined that are critical for human survival are being "degraded or used unsustainably" including fresh water, capture fisheries, coral reefs, wetlands, drylands, and forests. Around the world, many of these are deteriorating and on the verge of collapse. Thus nature's ability to provide the resources for growing future populations is very much in doubt unless radical steps are taken very soon. [44] World population is expected to rise to at least 9 billion by 2050 while demand for fossil fuels to support unsustainable lifestyles is expected to multiply by several times this increment.[45] How can "nature's services" support this exponential growth in demand?

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[40] John Bellamy Foster, Brett Clark, and Richard York, *The Ecological Rift* (New York: Monthly Review Press, 2011), p. 155 and the sources cited therein. Their powerful critique should be read in its entirety.

[41] Stern, *Review*, p. xvii.

[42] *Six Degrees* (Washington D.C.: National Georgraphic Society, 2008).

[43] See my "Beyond growth or beyond capitalism," *Real-World Economics Review*, no. 53, May 2010, pp. 28-42.

[44] *Millennium Ecosystem Assessment, Synthesis Report* (New York: United Nations, 2005), available at http://www.maweb.org/.

[45] Again, see Trainer, "A critical discussion," op. cit., pp. 51-52.

In its *Living Planet Report 2010*, the World Wide Fund for Nature (WWF) similarly concluded that people are plundering the world's resources at a rate that far outstrips the planet's capacity to sustain life. As of 2007, the planet's 6+ billion people have been using 50 percent more natural resources and sinks per year than the earth can sustain. Put another way, humanity's current "global footprint" is equal to 1.5 planets. Under a "business as usual" scenario, even with modest projections for population growth, consumption and climate change, the UN predicts that by 2030 humanity will need the capacity of two Earths to absorb CO2 waste and support natural resource consumption. Of course we don't all consume equally: The footprint of high income countries is three times that of middle income countries and five times that of low-income countries. Americans have the biggest footprint of all, consuming the most energy and producing the most waste. If everyone lived like Americans do, we would need 5.3 planets to support all this. James Leape, Director General of WWF, concludes that "The implications are clear. Rich nations must find ways to live much more lightly on the Earth – to sharply reduce their footprint, in particular their reliance on fossil fuels. The rapidly-growing emerging economies must also find a new model for growth – one that allows for them to improve the wellbeing of their citizens in ways the Earth can actually sustain." [46]

> And in its own *2010 State of the World Report* the World Watch Institute says that:
>
> As consumerism has taken root in culture upon culture over the past half-century, it has become a powerful driver of the inexorable increase in demand for resources and production of waste that marks our age. . . More than 6.8 billion human beings are now demanding ever greater quantities of material resources, decimating the world's richest ecosystems, and dumping billions of tons of heat-trapping gases into the atmosphere each year. Despite a 30-percent increase in resource efficiency, global resource use has expanded 50 percent over the past three decades. And those numbers could continue to soar for decades to come as more than 5 billion people who currently consume one tenth as many resources per person as the average European try to follow the trail blazed by the world's affluent. [47]

In short, as Erik Assadourian, the lead author concludes: *"the American or even the European way of life is simply not viable."*

> Add to this fact that population is projected to grow by another 2.3 billion by 2050 and . . . it becomes clear that while shifting technologies and stabilizing population will be essential in creating sustainable societies, neither will succeed without considerable changes in consumption patterns, *including reducing and even eliminating the use of certain goods, such as cars and airplanes, that have become important parts of life today for many*.[48]

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[46] WWF, *Living Planet Report 2010* at http://wwf.panda.org/about_our_earth/all_publications/living_planet_report/.

[47] (New York: Norton, 2010) pp. xvii-xviii.

[48] *State of the World 2010*, pp. 6-7 (my italics). Also: Michael T. Klare, *Resource Wars* (New York: Holt: 2001).

Got 4 more planets?

These are to say the least, rather different conclusions about the implication of endless growth than that drawn by Krugman, Stern and Friedman. The world's leading scientists, scientific bodies and environmental think tanks have warned us that not only that growth just can't go on, but that, at least in the industrialized economies, *we have to stop and go into reverse*. This is a message not many of us really want to hear despite the benefits of such sacrifices – like our children's survival. But if the science is right, we don't have much choice. Either we completely transform our economic system or we face the collapse of civilization. It's that simple. But of course the problem is, as always, how can we "cut back" under capitalism?

C. Natural limits to "greening" any economy

Green capitalism proponents often take it as an article of faith that technological breakthroughs will enable us to sharply cut resource use, to "dematerialize" production and, in the words of the *Stern Review*, to "decouple growth from greenhouse gas emissions" such that production can grow forever while resource consumption declines.[49] While no doubt there are many green technological miracles on the horizon, they cannot save us so long as we live in a capitalist economy. That's because, first, as noted above, under capitalism, there is no assurance that greater energy efficiency or materialist conservation would mean less consumption or less pollution *so long as there is no extra market limit set to the growth of overall production.* Efficiency gains could just as easily enable producers to use saved resources to expand production even more instead of "saving" resources. And, given capitalism, there is every incentive to do just that and every penalty for failing to do so. Secondly, the prospects for "dematerialization" are extremely limited, often completely impossible, outside of a very few industries. Thirdly, in many instances where companies actually adopt clean production technologies or waste minimization, such "green practices" are beside the point since the main cause of pollution are the products the company produces, such as toxic pesticides, not the process of producing them. And fourthly, "green" industries very often just create new problems in the place of old. Taking the last first:

1. Certified organic: green gone wrong

Many "green" start-ups have found that it's hard to go green in the real world. Even when it's theoretically possible to shift to greener production, given capitalism, as often as not, "green" industries just replace old problems with new problems: So burning down tracts of the Amazon rainforest in order to plant sugarcane to produce organic sugar for Whole Foods or ethanol to feed cars instead of people, is not so green after all. Neither is burning down Indonesian and Malaysian rainforests to plant palm-oil plantations so Britons can tool around London in their obese Landrovers. But such examples are what Heather Rogers calls "green gone wrong" instead of the "win-win "solutions touted by pro-market environmentalists just a few years ago. [50] Aquaculture was supposed to save wild fish. But this turns out to be just another case of "green gone wrong" because, aside from contaminating farmed fish (and fish eaters) with antibiotics to suppress disease in fish pens, most farm-raised fish are carnivores.

[49] Elaborated most fully in *Natural Capitalism*. See also Stern, op cit., p. xvii.

[50] Heather Rogers, *Green Gone Wrong* (New York: Scribner, 2010).

Feeding ever-more farmed fish requires capturing ever-more wild forage fish to grind up for fishmeal for the farm-raised fish which leaves ever-fewer fish in the ocean, starving those up the food chain like sharks, seals, dolphins and whales. So instead of saving wild fish, fish farming has actually *accelerated* the plunder the last remaining stocks of wild fish in the oceans.[51] "Green certification" schemes were supposed to reduce tropical deforestation by shaming Home Depot and similar big vendors into sourcing their wood and pulp from "certified" "sustainable" forests – i.e. wood plantations. But such wood plantations are never planted on land that was previously unforested. Instead, they just replace natural forest. There's nothing sustainable about burning down huge tracts of native tropical forests, killing off or running off all the wild animals and indigeneous people that lived there, in order to plant sterile eucalyptus plantations to harvest pulp for paper. To make matters worse, market demand from overconsuming but guilt-ridden Americans and Europeans has forced green certifiers to lower their standards so much to keep up with demand such that, today, in most cases, ecological "certification" is virtually meaningless.

For example, the Forestry Stewardship Council (FSC), the largest such organization, has come under fire for allowing its tree-with-checkmark logo to be used by rainforest-raping lumber and paper companies, for taking the word of auditors paid by the companies, for loosening its standards to allow just 50 percent certified pulp to go into paper making, and other problems. The problem is that *the FSC is not an international government body with a universal mandate and authority to certify the world's lumber.* It's just a self-funding NGO environmental organization like the NRDC or the WWF or Greenpeace. Such organizations live on voluntary contributions from supporters, on contributions from corporate funders, and/or on payment for services. As these organizations grew in size and ambition, they sought bigger budgets to better fufill their "missions" -- more than they could solicit from individual contributors. With few exceptions, nearly all these organizations eventually adopted "business" models that drove them into the arms of their corporate contributors, in this case, lumber companies. When the FSC was founded in 1993 it certified just three producers whose lumber was 100 percent sustainable and not many more in the following years. But by 1997, as the organization faced competition from new "entrants" into the green product-labeling "field" (to use capitalist lingo), the FSC faced the problem, as the *Wall Street Journal* reported, of "how to maintain high standards while promoting their logos and increasing the supply of approved products to meet demand from consumers and big retailers." This is ever the contradiction in our capitalist world. They started off, seeking to protect the forest from rapacious consumers. But demand by luxury consumers in the North is insatiable. To make matters worse, because no one certifier has a monopoly, new certifiers could come into the market, and if they were not so fussy about their criteria for "green certification," they might be more attractive to big retailers hungry for "product." So competition ensued, and in the end, the FSC could only hold onto its dominant position, aka "share of the market," by caving in: introducing more relaxed labeling standards, letting producers use just 50 percent sustainable pulp in paper manufacture, letting industry pay for "independent" FSC auditors, and so on. In the end, "green" lumber certification, like so many other nominally "green"

[51] Daniel Pauly, et al. "Fishing down marine food webs" *Science,* 279, 1998 pp. 860-863. Nancy Baron, "Global appetite for farmed fish devouring world's wild fish supplies," *Environmental News Network,* February 19, 2001. Rosamond L. Naylor, et al. "Feeding Aquaculture in an Era of Finite Resources" *Proceedings of the National Academy of Sciences*, Vol. 106 no. 36, pp. 1503-15110.

NGOs has steadily drifted away from its mission and become more and more co-partners in corporate plunder of world's remaining forests. [52]

2. Fantasies of de-coupling and dematerialization

In the 1980s and 90s eco-futurists like Paul Hawken and Amory Lovins predicted that big technological fixes would make it possible to "de-link" or "de-couple" growth from pollution. Nicolas Stern makes the same claim in his 2006 *Stern Review*.[53] Some governments and industries have tried. For example, in the 1990s, the British government under Tony Blair tried to get serious about climate change. Parliament passed a major climate-change bill in 2007 that mandated a 26 percent reduction below 1990 levels of greenhouse gases by 2020, and a 60 percent cut by 2050. But as Boston University economist Juliet Schor reports, so far "the British approach is failing and dramatically so." That's because while calling for emissions reductions the Labour government was also "*adamant about growth*, arguing that efficiency, clean energy, and a market for carbon would sever the link between emissions and GDP." [54] So the environment ministry enacted programs to reduce food waste, plastics consumption and other measures to reduce the "carbon footprint." But to no avail. U.K. CO2 emissions actually fell during the 2008-09 recession and the U.K was one of the only European successful cases under the first round of the Kyoto agreements. But virtually all those reductions came from phasing out coal, which has been displaced by North Sea oil, and all agree that this gain can't last once the oil runs out. During the Blair period from 1997-2006, despite government efforts, carbon dioxide emissions actually rose. As Schor says, "Refusal to reconsider their stance on growth has doomed efforts to meet even the now scientifically inadequate targets of the 2007 bill. Projected growth in one sector alone, aviation, will likely account for the entire country's carbon budget in 2050." And, as Schor further describes, "de-linking" has fared even worse in the United States:

> Since 1975, the U.S. has made substantial progress in improving energy efficiency. Energy expended per dollar of GDP has been cut in half. But rather than falling, energy demand has increased, by roughly 40 percent. Moreover, demand is rising fastest in those sectors that have had the biggest efficiency gains – transport and residential energy use. Refrigerator efficiency improved by 10 percent but the number of refrigerators in use rose 20 percent. In aviation, fuel consumption per mile fell by more than 40 percent, but total fuel use grew by 150 percent because passenger miles rose. Vehicles are a similar story. And with soaring demand, we've had soaring emissions. Carbon dioxide from these two sectors has risen 40 percent, twice the rate of the larger economy.[55]

So time and again, growth outstrips efficiency gains. It almost seems like a law of nature: Making more stuff uses more stuff. Who'd have thunk it?

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[52] See Tom Wright and Jim Carlton, "FSC's 'green' label companies cut virgin forest," *Wall Street Journal*, October 30, 2007. More generally, see also, *Green, Inc*. (Guilford Conn.: The Lyons Press, 2008).

[53] *Stern Review*, p. xvii and chapter 16.

[54] *Plenitude,* p. 91, my italics.

[55] Ibid., pp. 89-90, 92, my italics.

3. The electric/hybrid car solution to what?

In the same way, green tech enthusiasts like Amory Lovins have argued that huge efficiency gains, super-light materials, hybrid-electric propulsion systems and such could revolutionize auto transportation and clear the air. But the first problem with this scenario is, as Lovins himself points out, the advent of his hypercars could just as easily "worsen traffic and road congestion by making driving even cheaper and more attractive." Because that's exactly what's happened with every other advance: "The fuel saved by the 1980s doubling of U.S. new-car efficiency was promptly offset by the greater number of cars and more driving. . . . Global car registrations have been growing more than twice as fast as the population – 50 million cars in 1954, 350 million in 1989, 500 million in 1997."[56] And they're growing even faster now that China has become the world's biggest car market. So we cannot assume that even the advent of super fuel efficient cars would lessen pollution at all *if there is no extra-market limit on the number of automobiles produced.* Yet for Lovins and his green capitalist colleagues, imposing any sort of "limit" to car production is anathema because this would defeat their whole vision of endlessly "making money and saving the planet."

To make matters worse, vehicle pollution is not confined to what comes out of the tailpipe. A life cycle study of the automobile by the Umwelt-und Prognose-Institut of Heidelberg Germany in 1993 found that only 40 percent of an average car's pollution is emitted during the car's "driving" life stage. The other 60 percent results from other life stages: Most of the pollution any car will ever cause is generated in the production process *before the car even arrives at the showroom* – in the production of all the steel, aluminum, copper and other metals, glass, rubber, plastic, paint and other raw materials and inputs that go into every automobile, and in the manufacturing process itself. Cars produce 56 percent of all the pollution they will ever produce before they ever hit the road, and 4 percent after they are retired and junked. So even if automakers could produce dramatically lighter and more fuel efficient cars, *so long as they are free to produce automobiles without limit, more cars will just mean more pollution, even if the cars are hybrids or plug-in electric cars.* [57]

Those coal powered cars of the future

To further confound green hopes for an electric car tech fix, it turns out that electric cars could be even be *more polluting* than the current generation of gasoline-powered cars. That's because electric cars are only as clean as the fuel used to produce the electricity they run on. And in the real world, plug-in electric cars are in most countries largely *coal-powered cars* and likely to become increasingly so. Thus, paradoxically, in the real world of today, gasoline-powered cars produce fewer emissions than electric cars. Scientists at Oxford University recently modeled projected emissions from battery electric vehicles given different power generation mixes and concluded that if countries like India and China power their automobilization booms with battery electric vehicles, this would be actually produce more

[56] Hawken, *Natural Capitalism*, p. 40

[57] See John Whitelegg, "Dirty From Cradle to Grave," (1993) a translated summary of the German study. Available at http://www.worldcarfree.net/resources/free.php

CO2 emissions than if they did so with conventional petroleum powered vehicles.[58] That's because coal is the dirtiest of fossil fuels, far dirtier than gasoline, but according to the International Energy Agency (I.E.A.), the share of coal used for global electricity generation is likely to increase. According to the I.E.A., in 2006, coal comprised 41 percent of electricity generation fuel, natural gas 20 percent, hydropower 16 percent, nuclear 15 percent, and "other" (solar and other renewables) 2 percent. By 2030 the I.E.A. predicts that coal's share will rise to 44 percent of electricity generation, gas will account for 20 percent, hydropower 14 percent, nuclear 10 percent, with "other" rising only to 9 percent. [59] And since oil is slated to run out long before coal, coal's share could rise still further. So electricity generation is still likely to remain a very dirty business for a long time, and indeed, the share of electricity generated by the dirtiest fuel, coal, may increase.

Finally, if we turn to the actual production of electric vehicles, it turns out that this process is heavily polluting as well. That's because producing those endless nickel and lithium batteries, mining the iron and copper and rare earths that go into the motors and controls, not to mention the as-yet-barely-discussed problem of what to do with all the millions and eventually billions of large, toxic, worn out batteries that have to end up somewhere, creates somewhat different resource consumption and pollution problems from those of gasoline and diesel engines, but by no means fewer problems.[60] For example, each of the one million Priuses that Toyota has sold in the United States has a battery that contains 32 pounds of nickel. Just the production of that one car, at current rates, is said to consume fully 1 percent of all the world's annually produced nickel. And the mining and smelting of nickel is one of the most polluting of all industrial operations. Norilsk Nickel, a Russian company in northern Siberia, is the world's largest producer of nickel and largest smelter of heavy metals. According to WorstPolluted.org, Norilsk ranks no. 7 of the 10 most polluted industrial sites on the planet. The city (founded as a slave labor camp under Stalin), where the snow is black, the air tastes of sulphur and the life expectancy of workers is 10 years less than the Russian average is one of the most unhealthy places in an unhealthy country. Production at that plant has poisoned the soil for 60 kilometers around the plant, local adults and children suffer from numerous respiratory diseases, cancer, etc.[61] A Norwegian government study reports that Norilsk's SO2 emissions (2,000,000 tons a year) produce acid rain around the Arctic circle. The company also discharges large amounts of copper, nickel, as well as cobalt, vanadium and other metals into freshwater lakes, streams, and much ends up in the Arctic Sea.[62] And that's just the nickel nightmare. Lithium mining is another nightmare.[63] And then there's the 'rare earths' nightmare.[64]

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[58] Reed T. Doucette and Malcom D. McCulloch, "Modeling the CO emissions from battery electric vehicles given the power generation mixes of different countries," *Energy Policy* 39.2, February 2011, pp. 803-811.

[59] These figures are quoted in Robert Bryce, *Power Hungry* (New York: Public Affairs, 2010), p. 58 Figure 5.

[60] Don Sherman, "When electric-car batteries die, where will they end up?" *New York Times,* June 13, 2010.

[61] "Top 10 Most Polluted Places, 2007," at http://www.worstpolluted.org/projects_reports/display/43.

[62] "To the Ministry of Finance, Recommendation of 16 February 2009" by the Council on Ethics, Norwegian Government Pension Fund (2009) at http://www.regjeringen.no/upload/FIN/Statens%20pensjonsfond/recommendation_norilsk.pdf.

[63] See, for example, the excellent report by Dan McDougal: "In search of Lithium: the battle for the third element," *Daily Mail Online* (London) April 5, 2009 at http://www.dailymail.co.uk/home/moslive/article-

In short, efforts to decrease air pollution by getting "old, polluting" cars off the road to only replace them with new, "cleaner" cars can be misguided because such efforts have typically focused on pollution emitted solely during the driving stage and thus have missed 60 percent of the problem, and also because they have tended to overlook the pollution resulting from electricity generation. Seen in this light, I would not be surprised if the most ecological cars on the planet today are not those Toyota Priuses or even the Chevy Volts with their estimated 7-10 lifespan, but those ancient Fords, Chevrolets, and Oldsmobiles cruising around the streets of Havana. For even if their gas mileage is lower than auto producer fleet averages today, they were still only produced *once*, whereas American "consumers" have gone through an average of seven generations of cars since 1960 (when the U.S. embargo ended car imports to Cuba), with all the manufacturing and disposal pollution that entailed. Surely an ecological society has to come up with cars, gas or electric or whatever, that that can be rebuilt, reused, upgraded, shared, and completely recycled when it's most rational to do so instead of just junked every few years so new ones can be sold.

4. The clean, green energy solution to what?

Energy generation is probably the one field where there are substantial possibilities for greening industry. The prospect of "clean green energy" – solar, wind, and other renewable -- is everybody's favorite green tech innovation. Shifting most electricity generation to solar, wind and other renewables could radically dematerialize this sector and reduce the largest single demand for coal as well as oil and natural gas, and so could, in principle, dramatically reduce greenhouse gas emissions, acid rain, and also bring wide health benefits. But, the first problem with this tech fix is that it's difficult to produce "base-load" power – consistent 24/7 power generation -- with renewables.[65] Sunlight, wind, and water flow are all variable and unpredictable. But trainloads of coal and oil can normally be depended upon. Renewable energy scientists argue that integrated comprehensive systems can solve the problem of base-load generation. The I.E.A. estimates that solar power alone could produce almost a quarter of the world's electricity needs by 2050.[66] But as Ted Trainer points out, given the variable and intermittent output of renewables like solar and wind, even if sun and wind were to be large contributors to electricity supply, given the need for backup reserve capacity, little or no reduction in the amount of coal or nuclear capacity would be feasible. [67] This is one reason why scientists like James Hansen and James Lovelock, who are skeptical about the base-load potential of renewables, have called for a radical shift to nuclear power as the only way to get 24/7 power in the near future. But of course, nuclear reactors pose a different set of problems. For a start, there is the virtually inevitable threat of accidents

1166387/In-search-Lithium-The-battle-3rd-element.html. Also, Damian Kahya, "Bolivia holds key to electric car," *BBC News Online*, November 9, 2008 at http://news.bbc.co.uk/2/hi/7707847.stm.

[64] Keith Bradsher, "A new reckoning on costs of rare earths," *New York Times*, November 1, 2010; and idem, "In China, illegal rare earth mines face crackdown," *New York Times*, December 29, 2010.

[65] On this see Hansen, *Storms,* chapter 9, and Vaclav Smil, *Energy Transitions: History, Requirements, Prospects* (Santa Barbara, CA: Praeger, 2010).

[66] Joel Kirkland, "IEA: Solar power could produce nearly one-quarter of global electricity by 2050," *Scientific American,* May 12, 2010 at http://www.scientificamerican.com/article.cfm?id=solar-power-global-electricity. Also: "Beyond fossil fuels: David Mills on solar power," interview in *Scientific American*, April 28, 2009, at http://www.scientificamerican.com/article.cfm?id=energy-mills-ausra..

[67] Trainer, "A critical discussion," op. cit. pp. 64-65.

somewhere, sometime. Then there is the as-yet-unsolved problem of what to do with all the spent fuel. But in addition, it is also not clear that uranium fuel is any less an inexhaustible resource than oil was once thought to be. And the potential tech fix for the tech fix – the thesis that "next generation" "fast" nuclear reactors could recycle their own fuel or run on spent fuel, has a certain familiar "too-cheap-to-meter" ring to it, but remains for the moment hypothetical, and in any event, will certainly be a hugely expensive and dangerous way to boil water.[68]

Yet even if we could get a dramatic shift to solar and other renewables for energy generation, given the Jevons paradox noted above, we cannot assume that this would necessarily lead to large permanent reductions in overall pollution. For if there are no non-market constraints on production, then the advent of cheap clean energy production could just as easily encourage the production of endless electric vehicles, appliances, lighting, laptops, phones, iPads and new toys we can't even imagine yet.[69] The expanded production all this stuff, on a global scale, would just consume ever more raw materials, more metals, plastics, rare earths, etc., produce more pollution, destroy more of the environment, and all end up in some landfill somewhere someday. In short, at the end of the day, *the only way society can really put the brakes on overconsumption of electricity is to impose non-market limits on electricity production and consumption, enforce radical conservation, rationing, and stop making all the unnecessary gadgets that demand endless supplies of power.*

5. Green resource extraction?

And energy generation is one of the very few industries where dematerialization is seriously possible on a significant scale. For most of the economy, there are few possibilities of dematerialization at all. Start with resource extraction. Virtually everything we consume starts with primary extraction of raw materials – oil, natural gas, minerals, lumber, food, fiber and oil crops, fresh water, and so on. These are either consumed directly or become the basis of further processing and manufacturing. But logging can't really be "dematerialized" in any meaningful way. Fishing can't be dematerialized. Farming can't be dematerialized. And I am still trying to figure out how chopping and burning down Javanese rainforests and replacing them with "teak plantations" to furnish so-called "sustainably harvested wood" for the signature *Teak for Life* lawn furniture that Smith & Hawken flogs to overconsuming American suburbanites, squares with Paul Hawken's notion of a "restorative economy." [70] Again, drilling for oil and gas are polluting industries. Same with refining. Accidents happen. Regularly. [71] And as easily tapped sources are exhausted, oil companies have to go further offshore, taking on additional risks to drill in deep water. [72] They have to turn to tar sands in Canada and Venezuela which are both heavily polluting and energy intensive to develop. Gas

[68] See the options discussed in "The Future of the Nuclear Cycle, an Interdisciplinary MIT Study" published in Septermber 2010 and available at http://web.mit.edu/mitei/docs/spotlights/nuclear-fuel-cycle.pdf. Also, Hansen, op cit. pp. 194-204.

[69] "Beyond Growth" in op cit.

[70] Smith & Hawken, *Teak For Life* (Summer 1999 catalogue), wood source noted on p. 6.

[71] Tom Knudson, "Quest for oil leaves trail of damage across the globe," *McClatchy Newspapers*, May 16, 2010, at www.quest-for-oil-leaves-trail-of.html. Joe Brock, "Africa's oil spills are far from U.S. media glare," *Reuters*, May 19, 2010, at http://www.commondreams.org/headline/2010/05/19-3.

[72] Jad Mouawad and Barry Meier, "Risk-taking rises to new levels as oil rigs in Gulf drill deeper," August 30, 2010. Russell Gold, "Exxon dives deep into high-risk exploration," *Wall Street Journal*, February 2, 2010. Guy Chazan, "BP taps deep water to grow," *Wall Street Journal*, March 12, 2010. Clifford Krauss, "Accidents don't slow Gulf of Mexico drilling," *New York Times*, April 23, 2010.

drillers are turning to "fracking" to reach deeper gas supplies in the United States. Coal mining is just destructive and polluting. There's no way around it. Metals mining, smelting and refining is heavily polluting. There is just no way to extract metals from their ores in any way that "mimics nature." It's just a "linear" process, period. But coal is not only burned to generate electricity (a "bad" for Paul Hawken), coal is critical for steel, aluminum, copper and other metals. Coal is used in thousands of products from paper manufacture to pharmaceuticals. Coal by-products are used for chemicals, carbon fibres, rayon and nylon, carbon filters and silicon. So no coal, no steel and aluminum windmills, no copper wiring, no silicon solar panels, no computers or cellphones, no carbon fibre hyper cars. So "taxing coal out of business" would undermine some of Paul Hawken's other environmental goals. Same with oil. Oil and oil-byproducts are indispensable for petrochemicals, plastics, plastic film for solar panels, plastic insulation for electric wires and countless thousands of other products. Oil is so critical for so many industrial products and processes that it is just inconceivable to imagine a modern industrial society without oil. Rare earths mining is no less a dirty process. But no rare earths, no windmill generators, no electric cars, no cell phones or iPads. Lithium is crucial for the batteries for all those electric cars but it threatens fragile ecologies from Bolivia to Finland, Mexico to Canada.[73] In short, in any conceivable economy, resource extraction and processing are bound to be destructive and polluting. There is just no way around it.

In an effort to get around this dilemma, Lester Brown actually argued that we could dramatically reduce, even almost stop producing some metals, like steel and aluminum, because these metals are, in principle, endlessly recyclable. So he wrote that

> Advanced industrial economies will come to rely primarily on the stock of materials already in the economy rather than on virgin raw materials. For metals such as steel and aluminum, the losses through use will be minimal. With the appropriate policies, metal – once it is invested in the economy – can be used indefinitely. [74]

This is a perfect example of the unreal, other-worldly, a-historical thinking that is rife in eco-futurist writing. How could we ever do this in a capitalist economy*?* Are Toyota or General Motors looking to produce the same number of steel cars next year as this year? Is Airbus Industries looking to sell the same number of aluminum airplanes in the next decade as in this decade? To ask the question is to answer it. Is Suntech, China's largest manufacturer of solar panels, planning to manufacture the same number of steel and aluminum-framed solar panels next year as it made this year? Well, actually, I imagine Lester Brown would want Suntech to make *more* panels next year -- a lot more. But *there will be environmental costs to that*, of course. Many metals are recyclable, but world demand for aluminum, copper, steel, nickel and other metals, not to mention "rare earths," is soaring as more and more of the world modernizes and industrializes. That's why resource-starved China is "buying up the world," snapping up Australian coal mines, Afghani and Peruvian copper mines, Indonesian forests, Mozambiquan farmland, and more to feed its huge and rapidly growing economy – an economy that the West is pushing the Chinese to grow even faster to pull the rest of the world out of recession -- and to feed its huge and growing population as more and more of its

[73] Cliford Krauss, "The lithium chase," *New York Times*, March 10, 2010.

[74] *Eco-Economy*, p. 138 (my italics).

farmland is planted with factories.[75] It is scarcely necessary to point out that there are not enough soda cans on the planet to melt down to support such exponentially increasing demand. So here again, *unless humanity places some non-market constraints on the consumption and use of coal, metals and other minerals, then drilling and mining with all their associated destruction and pollution, will grow exponentially as well*. And some of this growing destruction will be directly attributable to the production of all the "green technology" that Hawken, Stern and others claim is going to save us.

6. Green manufacturing?

Much the same can be said for most manufacturing. Manufacturing and processing industries can't help but consume natural resources and produce pollution. The whole point of manufacturing is to turn raw materials into products. And there is hardly any manufacturing process that does not produce some waste and pollution as a byproduct. In addition, many products themselves are also toxic and polluting and some, like pesticides, deliberately so. In *Natural Capitalism*, Hawken and the Lovins rhapsodized about the potential of miracle tech fixes, huge potential gains in efficiency, dematerialization of production. Lovins predicted (in 1999) that his designs for super efficient "hybrid-electric hypercars" which could weigh two or three times less than a conventional car, use 92 percent less iron and steel, one-third less aluminum, three-fifths less rubber, and up to four-fifths less platinum and "last for decades" would soon be adopted by industry. Lovins even declined to patent his designs, offering his design ideas to the auto industry for free to encourage their adoption.[76] They called for transforming industry to "mimic nature" and recycle its own waste.[77] They lionized eco-capitalist heroes like John Browne, the CEO of British Petroleum who broke ranks with the oil industrial complex in 1997 declaring that man-made climate change was indeed a threat and announced that BP was no longer an oil company but an "energy company" that would transition into renewables like solar. They applauded when BMW promised to make its cars completely recyclable. They hailed The Body Shop, Patagonia, Herman Miller, 3M Company, Wal-Mart, even Dow Chemical and Dupont for their environmental initiatives. Above all, they celebrated Ray Anderson, founder and CEO of Interface, the world's largest modular carpet manufacturer, born-again environmentalist and hero of Joel Bakan's film *The Corporation* who credits reading Paul Hawken's *The Ecology of Commerce* with an epiphany that prompted him to remodel his company. In a message to his customers and employees in 1997, published in the *Interface Sustainability Report* of 1997 Anderson explained how he envisions "natural capitalism" in his own carpet factories:

> As I write this, there is not an industrial company on earth that is sustainable in the sense of meeting its current needs without, in some measure, depriving future generations of the means of meeting their needs. When earth runs out of finite, exhaustible resources or ecosystems collapse, our descendants will be left holding the empty bag. But, maybe, just maybe, we can change this.

[75] See eg., the cover stories: David Leonhart, "Shop China Shop! Can the Chinese discover the urge to splurge?" *New York Times Magazine*, November 28, 2010; and "Buying up the World," *The Economist* for November 13-19, 2010.

[76] *Natural Capitalism*, chapter 2.

[77] Hawken, *Ecology of Commerce*, p. 38 (my italics). Brown, *Eco-Economy* chaps. 4 and 12. Hawken and Lovins, *Natural Capitalism*, pp. 37-38 and passim.

> At Interface, we are on a quest to become the first sustainable corporation in the world . . . creating the technologies of the future – kinder, gentler technologies that emulate nature. . .
>
> The technologies of the future will enable us to feed our factories with closed loop, recycled raw materials that come from harvesting the billions of square yards of carpets and textiles that have already been made – nylon face pile recyled into new nylon yard to be made into new nylon carpet; backing material recycled into new baking materials for new carpet; and in our textile business . . . polyester fabrics recycled into polyester fiber, then to be made into new fabrics – closing the loop; using those precious organic molecules over and over in cyclical fashion, rather than sending them to landfills . . . Linear must go; cyclical must replace it. That's nature's way. In nature there is no waste; one organism's waste is another's food. For our industrial process, so dependent on petro-chemical, man-made raw materials, this means technical "food" to be reincarnated by recycling into the product's next life cycle. Of course, the recycling operations will have to be driven by solar energy, too. . .
>
> We look forward to the day when our factories have no smokestacks and no effluents. If successful, we'll spend the rest of our days harvesting yesteryear's carpets, recycling old petro-chemicals into new materials, and converting sunlight into energy. There will be zero scrap going into landfills and zero emissions into the ecosystem. Literally, it is a company that will grow by cleaning up the world, not by polluting or degrading it.[78]

Ray Anderson is as sincere as he is eloquent and I will come back to discuss the results of his company's efforts below. But for all the eco-capitalist innovations of the 1980s and 90s, not much has changed in corporate board rooms. BP's Board fired John Browne in 2007, sold off his boutique solar power outfit, cashiered the *"**B**eyond **P**etroleum"* ads, and reassured investors that BP would not be deserting its core business in a misguided attempt to become an "energy" company. Rest assured, BP is emphatically an ***OIL*** company -- as we've recently been reminded. Shell Oil, Chevron and other oil companies likewise sold off their solar power ventures and ramped up fossil-fuel exploitation, including tar sands and gas fracking.[79] Anita Roddick was forced out as CEO of the Body Shop after shareholders rebelled and demanded that management prioritize the bottom line over her political and environmental agenda. Ben and Jerry's sold out in 2000 to Unilever so no more 7 ½ % for the planet. Patagonia still gives "1% for the planet" but why bother since, like Smith & Hawken, Patagonia is just another resource-hogging mail order company and almost all of its products are made of unsustainable synthetics. Herman Miller seems to have abandoned re-manufacturing customers' chairs, I would guess because, on second thought, there was more money to be made in the "linear" process of selling new ones and junking the old ones than in remanufacturing old ones. And from Detroit to Stuttgart to Tokyo, the world's auto makers have studiously ignored Amory Lovin's advice that "light and small is beautiful" in favor of the traditional industry wisdom which holds that "big car big profit, small car small profit." For all the hybrid hype, the auto show plug-ins, the Leafs and Volts, automakers still slight production of econoboxes and Priuses in favor of giant Toyota "Sequoias," Nissan Tundras,

[78] Quoted in *Natural Capitalism*, pp. 168-169. See also Ray C. Anderson, *Mid-Course Correction* (Atlanta: The Peregrinzilla Press, 1998), and Eileen P. Gunn, "The Green CEO," *Fortune*, May 24, 1999, pp. 190-200.

[79] Jad Mouawad, "Not so green after all: alternative fuel still a dalliance for oil giants," *New York Times* April 8, 2009.

GM Sierras, Yukons and Escalades, oversize and overaccessorized luxury Mercedes and BMWs – which remain everywhere the key to profitability.[80] Ten years after their introduction, hybrid cars accounted for just 2.5% of vehicle sales in the United States in 2008.[81] And even with the recent rampup, auto industry analyst J.D. Power and Associates predicts that global sales of hybrid electric and battery electric vehicles will reach just 5.2 million vehicles in 2020, or only 7.3 percent of the 70.9 million autos expected to be sold in that year. [82] And "hybrid" is an overstatement for most of these vehicles: Few electric hybrids are really fuel-efficient like the Toyota Prius. Most are just bloated luxury cars with a hybrid add-on that gets them a few miles per gallon better mileage than their non-hybrid equivalents – a little sales cachet but nowhere near enough to make any serious dent in global gasoline consumption, especially given that the global fleet of gasoline consuming cars on the road is growing by tens of millions every year. European automakers, *The Independent* reported, have "failed miserably" to meet their Kyoto pledges to tackle climate change by reducing emissions. Instead of focusing on boosting fuel economy, Landrover, Jaguar, Porche, BMW, Mercedes and even Volvo lobbied to win exceptions from EU-wide fuel economy standards in order to keep producing their profitable luxury gas guzzlers, some of which put out more than double the target fleet emissions level.[83] Finally, given the global glut of cars, the last thing the world's automakers want to do is make are cars that "last for decades." If anything, the auto makers' Holy Grail would be to get their customers to junk their clunkers and buy a new one *every year*. The problem with eco-futurist inventors like the Lovins is that they understand technology but they don't understand capitalist economics.

7. Saint Ray Anderson and the limits of the possible

The seeming exception to the dismal trends reviewed above proves the rule: CEO Ray Anderson has probably pushed the limits of industrial environmentalism as far as it's humanly possible to go in an actual factory operating within the framework of capitalism. Ray Anderson is everybody's favorite eco-capitalist and he and his company Interface Inc. have been applauded by virtually every eco-futurist book written since the 1990s as *the* eco-capitalist example to emulate. But what Ray Anderson's case really shows us is the *limits of the possible*, especially under capitalism. For after almost two decades of sustained effort, the

[80] Vanessa Fuhrmans, "Land yachts launch unexpected revival," *Wall Street Journal*, September 23, 2010. Nick Bunkley, "Sales of larger vehicles bring automakers an upbeat start for 2011," *New York Times*, February 2, 2011. Edward Niedermeyer, writing in the *New York Times* at the end of 2010 notes that for all the bailout promises by Obama that Detroit would "lead the world in building the next generation of clean cars," Detroit's sales of fuel efficient cars actually dropped in 2010. In fact, sales of *actual* cars has fell by about 6% even over 2009's anemic numbers while sales of light trucks, SUVs, minivans and crossovers were up by 16%: "Despite the rolling out of the much-hyped Cruze compact and the Volt plug-in hybrid, G.M. still sells half again as many trucks and SUVs as it does cars. This year, 73 percent of Chrysler's sales have been light trucks." He found the same trends with the imports. "The impressive per-unit profit margins" still gives automakers big incentives to push their luxury gas guzzlers over their gas-sipping hybrids and econoboxes. See Edward Niedermeyer, "A green Detroit? No, a gulping one," *New York Times*, December 16, 2010. Also: Mike Spector and Joseph B. White, "Horsepower nation: new car models boast speed, size, power," *Wall Street Journal*, April 5, 2007; and idem, "Car-show dilemma: future isn't now," *Wall Street Journal*, April 5, 2007. And, to make matters worse: "Drivers offer a collective ho-hum as gasoline prices soar," *New York Times*, March 30, 2007.

[81] "2009 hybrid cars – year in review" post July 21,2009 post at http://www.hybridcars.com/2009-hybrid-cars#market.

[82] J.D. Power and Associates, "Drive Green 2020: More Hope Than Reality," November, 2010, available at http://businesscenter.jdpower.com/news/pressrelease.aspx?ID=2010213.

[83] Cahal Milmo, "Car makers failing on emissions targets," *The Independent*, April 24, 2006. Vanessa Fuhrmans, "Porche presses for easier fuel rules," *Wall Street Journal,* March 26, 2010.

goal of "zero pollutants" is still as unreachable as ever at Interface Inc. It is not in the least to diminish Ray Anderson's sincerity, his passionate dedication, his efforts or his impressive achievements. But the fact is, according to *The Interface Sustainability Report* of 2009, Interface has "cut waste sent to landfills by more than half while continuing to increase production," "reduced greenhouse gas emissions by more than 30%," "reduced energy intensity by 45%," while "over 25% of raw materials used in interface carpet are recycled and biobased materials in 2007," and non-sustainable materials consumed per unit of product have declined from 10.2 lbs/yd2 in 1996 to 8.6 lb/yd2 in 2008.[84] *Read that last sentence again*. Make no mistake: These are impressive, even heroic industrial-environmental achievements. But if after more than fifteen years of sustained effort, the most environmentally dedicated large company in the United States, if not the entire world, can only manage to cut non-sustainable inputs from 10.2 to 8.6 pounds per square yard of finished product, to inject a mere *25%* recycled and biobased feedstock into its production process, so still requiring 75% of new, mostly petroleum-based nonsustainable feedstock in every unit of production, then the inescapable conclusion must be that *even the greenest businesses* are also on course to "destroy the world." So if the reality is that, when all is said and done, there is "only so much you can do" in most industries, *then the only way to bend the economy in an ecological direction is to sharply limit production, especially of toxic products, which means completely redesigning production and consumption – all of which is certainly doable, but impossible under capitalism.*

8. Tax the polluters but let them pollute?

Perhaps nowhere are the contradictions of the "tax the polluters" strategy more evident than with respect to the problem of taxing toxics. In his *Ecology of Commerce* Paul Hawken says that *"Nothing* is more central to the argument of this book than the proposition that disposal of hazardous waste is *not* the root problem. Rather, it is the root symptom. The critical issue is the *creation* of toxic wastes." Hawken says we need a "restorative economy that thinks cradle-to-cradle, so that every product or by-product is imagined in its subsequent forms even before it is made. . . Rather than argue about where to put our wastes, who will pay for it, and how long it will be before the toxins leak into the groundwater, we should be trying to design systems that are elegantly imitative of climax ecosystems found in nature."[85] I couldn't agree more. But how can we ever get this under capitalism? For a start, who is the "we" Hawken is talking about? "We" ordinary citizens don't design manufacturing systems for the benefit of humankind, the natural world, and future generations. Corporations design manufacturing systems for the benefit of shareholders and their shareholders profit by manufacturing, spraying, pumping and dumping all those toxics all over the world and pushing the environmental costs of all this onto us. "We" have no vote in the boardrooms and "we" do not tell the boards of directors what technologies to use or not use. Nor in fact does Hawken think "we" ought to either (see below). Corporate decisions are private decisions. Of course we have a theoretically representative government which ought to express the will of the people, if necessary, against the corporations. But as Hawken himself recounts at some length, in our dollar democracy, governments more often represent the interests of the corporations against the people than the people against the corporations. [86] So the problem is

[84] These quotations and data are from the Interface Corporation website: http://www.interfaceglobal.com/Sustainability/Progress-to-Zero.aspx accessed 12/30/2009.

[85] Op cit., pp. 49, 54, and 71, my italics.

[86] Ibid., pp. 108-119.

that, since in Hawken's restorative economy, corporations would still rule production, CEOs and corporate boards would still make all the critical decisions, how can "we" redesign the system to serve the needs of humanity instead of the needs of investors?

"Natural Capitalist" hypocrisy

What then is Paul Hawken's solution to the nightmare of toxic chemical contamination? Ban or regulate their production like the government used to do in the 1970s? Compel industry to "redesign manufacturing systems so that they do not create hazardous and biologically useless waste in the first place"? Not at all. For it turns out that, just like regular capitalists, "natural capitalist" Paul Hawken is more concerned to keep the government out of the market than he is to use government regulation to solve the problems caused by the market's "efficient" and "optimal" allocation of resources to poison people with toxic chemicals. Hawken says we should "Honor market principles. No 'plan' to reverse environmental degradation can be enacted if it requires a wholesale change in the dynamics of the market." [87] So on this Paul Hawken, Ronald Reagan, and Milton Friedman agree: "Capitalism good. Government bad." Even if "business is destroying the world," *still* Hawken says "the guardian [his locution for 'the government'] of human and natural systems must *recognize its own limitations* in relation to commerce. *It cannot tell companies what to make and how. It does not have the ability to allocate resources in an efficient manner*." [88] Neither we the citizenry nor our nominal representative, the government, should tell polluters to stop producing all these hideously toxic chemicals and redesign their production. So what should the "guardian" do about the problem? Hawken says what the government should do is just *tax the polluters:* "not only should energy use be taxed more heavily, but so too, should all agricultural chemicals, from artificial fertilizers to toxic pesticides." [89] So it turns out that even in Hawken's "restorative economy," toxic polluters would still be free to spread their carcinogens everywhere -- if they just *pay to pollute.* It is hard to imagine a more bankrupt strategy, guaranteed to fail, nor for that matter, a more hypocritical and *immoral* strategy. And the fact is Hawken knows very well that this tax-the-polluters strategy is just a "toll road for polluters," "a license to kill and maim." [90] If he read his own book, he would find this on page 66: *"The problem with pollution permits is that they do just that – permit pollution.* Illinois Power Company, which had been building a $350 million scrubber to remove sulfur dioxide at its plant, has decided to scrap the scrubber and buy pollution permits instead. . . By purchasing pollution credits, it can save $250 million over a 20-year period, and continue to buy high-sulfur coal from Illinois." [91] Let's be clear about exactly what this means: It means that even in Hawken's "restorative economy," those living downwind from this plant would continue to breathe in sulfur laden air *for decades*. And, not only sulfur. For burning coal also releases mercury, arsenic and other toxic pollutants. That means their kids will continue to suffer from increased birth defects, impaired intelligence, develop respiratory problems, asthma, and cancer rates will continue to rise – and all this just so that investor-owners can maximize returns on the investments they have so "efficiently allocated" to this sector for more decades to come. So it turns out that in Hawken's eco-capitalist utopia, the role of the

[87] *Ecological Commerce,* p. xv, italics in original.

[88] Ibid. p. 168.

[89] Ibid., p. 185.

[90] Ibid., p. 83.

[91] Ibid., p. 66, my italics.

"guardian" is to guard business, not "we" the public. This is not quite what one would hope to hear from new-age thinking "restorative economy" eco-futurists like Paul Hawken.

And if this weren't enough, as part and parcel of their anti-government, anti-regulatory program, Paul Hawken, Lester Brown and Francis Cairncross also call for "tax shifting" – shifting from taxing income and capital (what they call "goods") to taxing "bads" like pollution.[92] Aside from the fundamental unfairness of such flat taxes, one wonders if it ever occurred to these thinkers that if governments were actually to become dependent on pollution taxes for revenue, would they not then find it in their interest to let the pollution continue, if not actually grow, to augment revenues? What am I missing here?

III. Capitalism without consumerism?

Paul Hawken naturally looked to CEOs like himself who he imagined would be the prime agents of change "from above" as they revolutionized their mind-sets and redesigned production. Other eco-economic futurists have looked to bottom-up "consumer choice" as the driver forcing corporate producers to change. Still others, most recently Juliet Schor and Bill Mckibben, duck the question of what to do about capitalism altogether, and argue that we should get out of the market to the extent we can, retreat to the periphery and thereby reduce consumerism and overconsumption. So the Worldwatch Institute, Juliet Schor, Bill McKibben -- even Martha Stewart -- all tell us to get off the treadmill of consumerism and "live simply." [93] They're right. We have to do this. Our very survival is at risk if we don't. Thus in its 2010 Report, subtitled "Transforming Cultures From Consumerism to Sustainability," The Worldwatch Institute tells us that:

> Preventing the collapse of human civilization requires nothing less than a wholesale transformation of dominant cultural patterns. This transformation would reject consumerism . . . and establish in its place a new cultural framework centered on sustainability. In the process, a revamped understanding of "natural" would emerge: it would mean individual and societal choices that cause minimal ecological damage or, better yet, that restore Earth's ecological systems to health.[94]

But how can we "reject consumerism" when we live in a capitalist economy where, in the case of the United States, more than *two-thirds of market sales, and therefore most jobs, depend on direct sales to consumers* while most of the rest of the economy, including the infrastructure and not least, the military, is dedicated to propping up this super consumerist "American way of life?" Indeed, most jobs in industrialized countries critically depend not just on consumerism but on ever-increasing *overconsumption.* We "need" this ever-increasing consumption and waste production because, without growth, capitalist economies collapse and unemployment soars, as we've seen. The problem with the Worldwatch Institute is that, on this issue, they're looking at the world upside down, as idealists rather than as materialists. They think its consumerist culture that drives corporations to overproduce. So their solution is to "transform the culture," get people to read their Worldwatch reports and educate

[92] Hawken, *Ecology of Commerce*, pp.183-184 and passim. Brown, *Eco-Economy*, pp. 235-239. Cairncross, op. cit., pp. 97-100.

[93] Bill McKibben, *Eaarth* (New York: Henry Holt, 2010), Juliet Schor, *Plenitude* (New York: Penguin, 2010).

[94] Op cit., pp. 3-4.

themselves so they understand the folly of consumerism and resolve to forego unnecessary consumption – *without transforming the economy itself*. But it's not the culture that drives the economy so much as, *overwhelmingly*, the economy that drives the culture: It's the insatiable demands of shareholders that drive corporate producers to maximize sales, therefore to constantly seek out new sales and sources in every corner of the planet, to endlessly invent, as the Lorax had it, new "thneeds" no one really needs, to obsoletize those thneeds just as soon as they've been sold, so the cycle can begin all over again. *This* is the driving engine of consumerism. Frank Lloyd Wright's apprentice Victor Papenek had it right: *"Most things are not designed for the needs of people, but for the needs of manufacturers to sell to people."* [95] This means that *pace* the Worldwatch Institute, "consumerism" is not just a "cultural pattern," it's not just "commercial brainwashing" or an "infantile regression" as Benjamin Barber has it.[96] Insatiable consumerism is an everyday *requirement* of capitalist reproduction, and this drives capitalist invention and imperial expansion. No overconsumption, no growth, no jobs. And no voluntarist "cultural transformation" is going to overcome this fundamental imperative so long as the economic system depends on overconsumption for its day-to-day survival.

IV. Climate Change or System Change?

The green capitalist project crucially rested on the assumption that the capitalists' goal of endless growth and profit maximizaton and society's goal of saving the world from never-ending plunder and pollution could be "aligned" by imposing green taxes to discourage the generation of toxic waste, overconsumption of raw materials, the use of pesticides, the production of throwaway products, and could even, so Paul Hawken thought, "tax coal out of business." But this vision, as I have argued throughout this article, was always a delusion (albeit a profitable one for some) because, not only is it impossible to "align" these inherently contradictory interests, but to save the world, corporations would have to subordinate profit making to environmental goals: the coal industry, the makers of toxics pesticides, the generators of toxic wastes, the consumers of raw materials, the producers of throwaway products would have to agree, in effect, to commit economic suicide. But how could they do this? How could they be responsible to society and their shareholders at the same time? The problem is always the private property form, especially the corporate form, and competitive production for market. Once capital is sunk into a given industry, staff and workers trained, markets secured, producers have every incentive and little choice but to grow their business or see their share prices fall as investors seek greener pastures. So Massey Coal has no choice but to mine and sell ever more coal till the ice caps melt because that's the company's fiduciary and legal responsibility to its shareholders. Monsanto has no choice but to produce and sell as many ghastly pesticides as possible no matter the consequences for life on earth. Formosa Plastics has no choice but to trash the world with plastic bags, and so on. Same with "green" businesses. Biofuels, windpower and organic crops – all might be environmentally rational here or there, but not necessarily in every case or forever. But once investments are sunk, green industries have no choice but to seek to maximize profits and grow forever regardless of social need and scientific rationality, just like any other for-profit business. So for

[95] Quoted in Giles Slade, *Made to Break* (Cambridge: Harvard, 2006), p. 52 (my italics). On this very interesting subject of the colossal waste of designed-in obsolescence and "forced consumption," Slade's book is excellent but Vance Packard's brilliantly ironic *The Wastemakers* remains unsurpassed (New York: David McKay, 1960).

[96] Bejamin R. Barber, *Consumed: How Markets Corrupt Children, Infantalize Adults, and Swallow Citizens Whole* (New York: Norton, 2007).

example: Horizon Organic Dairy started out as a group of cooperatives paying premium prices to its small organic farmer suppliers. But once it was bought out by Dean Foods, the country's biggest milk distributor, and became a big publicly-traded corporation with its own centralized large-scale production operations, it dispensed with its founding pro-farmer ethic, cut payments to small suppliers, even used its scale of operations to undercut and drive them out of business while simultaneously adding to the nation's pollution by refrigerator-trucking its milk thousands of miles all over the country instead of buying it from local farmers. As one observer noted: "Dean's goal is to maximize shareholder value. That's not the same as maximizing farmer value." Nor is it the same as maximizing consumer value either, as Horizon is now ditching its organic commitment as well, adding synthetic additives to its milk.[97] And so it goes down the slippery slope. Sustainable production is certainly possible but not under capitalism. To get a little ahead of the argument of this paper, I wouldn't think it's necessary to eliminate all markets in a sustainable ecological, even socialist, society. Offhand, I don't see the harm in small producers producing for market – family farmers, farmers markets, artisans, co-operatives, mom-and-pop restaurants, and so on. The problem is capitalist private property, especially in the corporate form: When owners become abstract anonymous "shareholders," concerned only to maximize profits, then all the evils of capitalism inevitably follow. To put it in Marxist terms, C-M-C (petty commodity production) seems harmless enough. The problem is M-C-M' -- capitalism. I just don't see how large-scale production can be geared to the needs of society and the environment, and both for present and future generations, unless it is socialized and managed by democratic social institutions. But I'll take this up elsewhere.

One world, one people, one economy

We can't shop our way to sustainability because the problems we face cannot be solved by individual choices in the marketplace. In fact most of the ecological problems we face from global warming to deforestation, to overfishing, to pollution, to species extinction and many others, are way beyond the scope of companies, industries, even countries. They require concerted, large-scale national and international action. And they require direct economic planning at global, national and local levels. For example, the world's climate scientists tell us we're doomed unless we shut down the coal industry and sharply reduce our consumption of all fossil fuels. But even the world's largest corporations, such as Exxon Mobil, can't afford to take such losses, to sacrifice its owners -- merely to save the humans. Corporations can't make the socially and ecologically rational decisions that need to be made to save the humans because they represent only private particular interests, not the social and universal interests of humanity, the environment, and future generations. But society can afford to close down coal, retrench oil production and socialize those losses. Society can ration oil, like we did during World War II, and society can redeploy labor and resources to construct the things we do need to save the humans, like renewable energy, public transit, energy efficient housing for all, and many other social needs that are currently unmet by the market system. In the final analysis, the only way to align production with society's interests and the needs of the environment is *to do so directly.* The huge global problems we face require the visible hand of direct economic planning to re-organize the world economy to meet the needs of humans and the environment, to enforce limits on consumption and pollution, to fairly ration and distribute the goods and services we produce for the benefit of each and

[97] Noel C. Paul, "Horizon Organic, now Dean Foods, threatens livelihood of organic farmers, *The Christian Science Monitor*, September 15, 2003 at http://www.csmonitor.com/2003/0915/p16s01-wmcn.html. Cornucopia Institute: "New organic milk contains illegal synthetic additive," February 23, 2011 at http://www.cornucopia.org/.

every person on the planet, and to conserve resources so that future generations of humans and other life forms can also live their lives to the full. All this is inconceivable without the abolition of capitalist private property in the means of production and the institution of collective bottom-up democratic control over the economy and society. And it will be impossible to build functioning national and global economic democracies unless we also abolish global economic inequality. This is both the greatest moral imperative of our time and it is also essential to winning world-wide popular support for the profound changes we must make to prevent the collapse of civilization. A tall order to be sure. But we will need even taller waterproof boots if we don't make this happen. If Paul Hawken, Lester Brown, Francis Cairncross and Paul Krugman have a better plan, where is it? [98]

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SUGGESTED CITATION: Richard Smith, "Green capitalism: the god that failed", *real-world economics review*, issue no. 56, 11 March 2011, pp. 112-144, http://www.paecon.net/PAEReview/issue56/Smith56.pdf

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[98] I would like to thank Nancy Holmstrom and Ted Trainer for reading an earlier version of this manuscript and offering many helpful suggestions.