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ESSAY

Climate Capitalism: The Business Case for Climate Protection

L. HUNTER LOVINS*

I. INTRODUCTION

The current economic crisis is an extremely fluid situation that could go in any of several directions. Commitments by global leaders to a green economy could turn the world around. Conversely, delay in implementing sustainable measures could deepen the current depression, now recognized as the worst since the 1930s.¹

The one thing that is clear is that business as usual will not endure and would be a recipe for disaster. Change will occur because past behaviour is no longer sufficient to deal with the very serious challenges facing the world. Businesses and industrial policy will implement the measures described in this paper or the world will face crises far exceeding what this young century has already brought.²

*Hunter Lovins, co-founder of the widely respected Rocky Mountain Institute, author and champion of sustainable development for over 30 years, was a Woodrow Wilson Visiting Fellow at Pace University in October 2009 and spoke at Pace Law School on November 18, 2009 on issues of energy policy, sustainable business practice, and water policy. This article is an expansion and refinement of the author's remarks under the same title presented at the 2009, COP-15 in Copenhagen, *available at* http://www.natcapsolutions.org/cop15/3_TheBusinessCaseforClimateProtection_HLovins_DEC09.pdf.

1. The New York Times, Credit Crisis—The Essentials, http://topics.nytimes.com/topics/reference/timestopics/subjects/c/credit_crisis/ (last visited Aug. 18, 2010).

2. *See* DONELLA H. MEADOWS ET AL., BEYOND THE LIMITS 236 (1992) (noting that the converging crises now facing the globe are not caused by any one event. They reflect a systemic breakdown that can only be understood and responded to by a whole systems approach.) *See also* DONELLA MEADOWS, THINKING IN SYSTEMS 6-7(2008).

The choices you make this year and next will determine whether you, your community and ultimately your country come out of the economic collapse prosperous and in a position to secure the future we want, or whether life will become an unending reaction to emergencies that relentlessly defeat our ability to cope. We've done it before. The 2030 project points out that,

[d]uring the 1970's oil crisis (an 11-year period from 1973 to 1983), this country, drawing on American determination and ingenuity, increased its real GDP by over \$1 trillion (in year 2000 dollars) and added 30 billion square feet of new buildings and 35 million new vehicles, while decreasing total US energy consumption and CO₂ emissions. This was accomplished with increased efficiency and with cost-effective, readily available, off-the-shelf materials, equipment and technology.³

This reality, now recognized as "the sustainability imperative,"⁴ is inexorably driving companies to implement practices that are more responsible to people and the planet because they are more profitable. Goldman Sachs reports that the companies that are the leaders in environmental, social and good governance policies have a 25% higher stock value than other world stock indices.⁵ This shows that change is underway. Walmart has begun to require its 60,000 to 90,000 suppliers to answer a sustainability scorecard tracking their carbon footprint, their impact on water and other resources, and their engagement with local communities.⁶ Behaving in more sustainable ways has moved from a chic, niche position to an imperative.

3. EDWARD MAZRIA & KRISTINA KERSHNER, NATION UNDER SIEGE: SEA LEVEL RISE AT OUR DOORSTEP 11 (2007), *available at* http://www.architecture2030.com/pdfs/nation_under_siege_lr.pdf.

4. This phrase was introduced by L. Hunter Lovins in speeches in 1999.

5. ANTHONY LING ET AL., INTRODUCING GS SUSTAIN 8 (2007), *available at* http://www.unglobalcompact.org/docs/summit2007/gs_esg_embargoed_until030707pdf.pdf.

6. AMARNATH SHETE, "GREENING" A SUPPLY CHAIN 10 (2005), *available at* <http://www.wipro.com/resource-center/wipro-council-for-industry-research/pdf/greening-a-supply-chain.pdf>.

II. MELTING CAPITAL AND THE WARMING CLIMATE

Two words define our age: climate and capitalism. People raised on images of limitless possibilities, muscle cars, western superiority in world markets and a rising standard of living watched in shock as General Motors, the iconic American business, melted into bankruptcy in 2008.⁷ For many, the magnitude of that collapse has yet to sink in. Nor has the recognition that Toyota became the world's largest car company,⁸ riding to pre-eminence on a fuel-efficient vehicle seems an affront to everything that made America great. The economic collapse of 2008 that devastated communities and families, throwing over 5 million people out of work, sending unemployment over 25% in cities like Detroit, and a shattering prosperity raised hopes of a recovery to almost everyone's top priority.

Another meltdown, however, poses an even greater threat. In fall 2009, the United Nations (U.N.) warned that even if the nations of the world delivered on existing promises to cut emissions of greenhouse gases (GHGs), the globe would still warm beyond levels ever experienced by humankind by the end of the century, perhaps sooner. Unless man made emissions of carbon dioxide (CO₂), now higher than at any time in human existence, and the five other gases that are causing what has come to be known as *climate chaos* are immediately reduced, we'll lose a lot more than jobs in Detroit. Dr. Rajendra Pachauri, the chairman of the U.N.'s Intergovernmental Panel on Climate Change (IPCC), told an international gathering of 114 governments, "Climate change is for real. We have just a small window of opportunity and it is closing rather rapidly. There is not a moment to lose."⁹ He concluded, "We are risking the ability

7. Chris Isidore, *General Motors Bankruptcy: End of an Era*, CNN MONEY, June 1, 2009, http://money.cnn.com/2009/06/01/news/companies/gm_bankruptcy (last visited Aug. 18, 2010).

8. Kendra Marr, *Toyota Passes GM as World's Largest Automaker*, WASH. POST, Jan. 22, 2009, <http://www.washingtonpost.com/wpdyn/content/article/2009/01/21/AR2009012101216.html>.

9. Alex Kirby, *Aid Agencies' Warning on Climate*, BBC NEWS, Oct. 20, 2004, <http://news.bbc.co.uk/1/hi/sci/tech/3756642.stm>. What makes Pachauri's comment noteworthy is that he was put into his position by the Bush administration as a Chairman who would not make climate an issue.

of the human race to survive.”¹⁰ Former U.N. Secretary General Kofi Annan put it a bit more simply, “The very basis for life on earth is declining at an alarming rate.”¹¹

Climate chaos is not a future threat. It is real, it is here today and it is already causing misery around the globe. Left unchecked, it will get far worse. As devastating fires sweep Russia, Australia, Greece, and the western United States (U.S.), and droughts cripple agriculture in India, China, and California, climate change is fuelling heat waves across the world, worsening outbreaks of diseases, and causing a scary litany of impacts.¹² At the same time, major storms have increased causing floods from Pakistan and China to Europe to the U.S.¹³ Hurricanes sweep the Caribbean and Latin America, as cyclones batter the Philippines and Burma.¹⁴ Even the conflict raging in Darfur has been recognized by the U.N. as the result of the 40-year drought caused by the warming climate.¹⁵ If left unchecked, climate change will overwhelm most nations’ abilities to cope. Its impacts

A memorandum from Exxon to the White House in early 2001 specifically asked it to get the previous chairman, Dr. Robert Watson, the chief scientist of the World Bank, ‘replaced at the request of the U.S.’ The Bush administration then lobbied other countries in favor of Dr. Pachauri—whom the former vice-president Al Gore called the “let’s drag our feet” candidate—and got him elected to replace Dr. Watson, who had repeatedly called for urgent action.

Geoffrey Lean, *Global Warming Approaching Point of No Return, Warns Leading Climate Expert*, THE INDEPENDENT, Jan. 23, 2005, <http://www.commondreams.org/headlines05/0123-01.htm>.

10. Precise Energy Ltd., *The Global Warming Problem*, <http://www.preciseenergy.com/greenenvironment.htm> (last visited Aug. 18, 2010).

11. Alister Doyle, *Human Damage to Earth Worsening Fact-Report*, PLANET ARK, Mar. 30, 2005, <http://www.planetark.com/dailynewsstory.cfm/newsid/30136/story.htm>.

12. See National Geographic, *Global Warming Effects Information*, <http://environment.nationalgeographic.com/environment/global-warming/gw-effects> (last visited Aug. 18, 2010).

13. See, e.g., *China Begins Major Flood Clean-up*, BBC NEWS, Sept. 8, 2004, <http://news/bbc.co.uk/2/hi/asia-pacific/3639480.stm>; *Violent Storm Wreaks Havoc in France*, TORONTO SUN, Mar. 1, 2010, <http://www.torontosun.com/news/world/2010/03/01/13072196.html>.

14. National Hurricane Center, *Archive of Hurricane Seasons*, <http://www.nhc.noaa.gov/pastall/shtml> (last visited Aug. 18, 2010).

15. The Associated Press, *U.N. Chief: Darfur a Victim of Climate Change*, MSNBC, June 16, 2007, <http://www.msnbc.msn.com/id/19268452/>.

are being felt now around the world, especially on the poor, for whom environmental degradation is always most severe.¹⁶

The drastic melt-off of glaciers in Greenland and the polar regions threatens to raise sea levels¹⁷ at the same time that the loss of glaciers in the Himalaya will deny water to 40% of people on earth, from China to India.¹⁸ United Nations Development Programme (UNDP) warns that agricultural systems will begin to fail due to increasingly variable weather patterns, leaving increasingly large numbers of people facing malnutrition.¹⁹ Water losses could affect 1.8 billion more people by 2080, and retreating glaciers in the Himalaya could disrupt ecological systems in China and South Asia.²⁰

The shift in the monsoon rains has already caused crop losses on a massive scale, leading over 1,500 farmers in India to commit suicide together in the summer of 2009.²¹ The Murray Darling River basin in Australia no longer carries the water that used to irrigate rice fields that supplied the second largest rice mill in Southeast Asia.²² It recently was forced to shut down, triggering food riots on three continents.²³

Climate chaos is now scientifically undeniable. In March 2009, the International Alliance of Research Universities convened an international scientific congress, *Climate Change: Global Risks, Challenges and Decisions*, to review the state of

16. *Climate Disasters Threaten to 'Overwhelm'*, ONE WORLD, Apr. 22, 2009, <http://us.oneworld.net/article/361990-climate-disasters-threaten-overwhelm-aid-systems>.

17. Jeff St. John, *Climate Change: Best-Case Scenarios Still Threaten Coasts*, GREENTECHMEDIA, Mar. 11, 2009, <http://www.greentechmedia.com/articles/read/climate-change-best-case-scenarios-still-threaten-coasts-5879/>.

18. Claire Grooms, *Melting Himalayan Glaciers Threaten 1.3 Billion Asians*, GOOGLE, Dec. 5, 2009, http://www.google.com/hostednews/afp/article/AleqM5jczH-T-kiI7zhA6nD5mwB2vH_pGXA.

19. KEVIN WATKINS ET AL., HUMAN DEVELOPMENT REPORT 2007/2008 9 (2007), available at <http://hdr.undp.org/en/reports/global/hdr2007-2008/chapters/>.

20. *Id.*

21. *1,500 Farmers Commit Mass Suicide in India*, BELFAST TELEGRAPH, Apr. 15, 2009, <http://www.belfasttelegraph.co.uk/news/world-news/1500-farmers-commit-mass-suicide-in-india-14268995.html>.

22. Keith Bradsher, *A Drought in Australia, a Global Shortage of Rice*, N.Y. TIMES, Apr. 17, 2008, <http://www.nytimes.com/2008/04/17/business/world-business/17warm.html>.

23. *Id.*

global climate science and to update the science that underpinned previous IPCC reports.²⁴

Most of the 2,500 people attending the Copenhagen Congress were scientific researchers; many had contributed to the IPCC report.²⁵ Participants came from nearly eighty different countries, giving more than 1,400 scientific presentations.²⁶ The Congress agreed that, “[t]he scientific evidence has now become overwhelming that human activities, especially the combustion of fossil fuels, are influencing the climate in ways that threaten the well-being and continued development of human society.”²⁷ The Report concluded:

greenhouse gas emissions and many aspects of the climate are changing near the upper boundary of the IPCC range of projections. Many key climate indicators are already moving beyond the patterns of natural variability within which contemporary society and economy have developed and thrived . . . Societies and ecosystems are highly vulnerable to even modest levels of climate change, with poor nations and communities, ecosystem services and biodiversity particularly at risk. Temperature rises above [two degrees Celsius] will be difficult for contemporary societies to cope with, and are likely to cause major societal and environmental disruptions through the rest of the century and beyond.²⁸

It calls for:

24. International Human Development Programme, *Congress: Climate Change: Global Risks, Challenges and Decisions, International Human Dimensions Programme on Global Environmental Change*, Sept. 1, 2008, <http://www.ihdp.unu.edu/article/496>.

25. KATHERINE RICHARDSON, ET AL., SYNTHESIS REPORT: CLIMATE CHANGE: GLOBAL RISKS, CHALLENGES & DECISIONS (2009), *available at* <http://www.pik-potsdam.de/news/press-releases/files/synthesis-report-web.pdf>.

26. Abstracts for all of the scientific presentations made are available online. *See* IOP Conference Series: Earth and Environmental Science, <http://www.iop.org/EJ/volume/1755-1315/6> (last visited Aug. 18, 2010). Similarly, a transcript of the closing plenary session can be found online. *See* Environmental Research Web, <http://environmentalresearchweb.org/cws/article/opinion/39126> (last visited Aug. 18, 2010).

27. RICHARDSON, *supra* note 25, at 6.

28. *Id.* at 8-12.

[r]apid, sustained, and effective mitigation based on coordinated global and regional action . . . required to avoid ‘dangerous climate change’ regardless of how it is defined. Weaker targets for 2020 increase the risk of serious impacts, including the crossing of tipping points, and make the task of meeting 2050 targets more difficult and costly.²⁹

In light of this and similar science coming in from around the world, NASA scientist, Dr. Jim Hansen advises, “Don’t ask what’s possible, ask what’s necessary.”³⁰ What is necessary, he has been warning for several years, is 350 parts per million.³¹ That is the concentration to which CO₂ in the atmosphere, the most plentiful of the gasses that are warming the climate, must be limited.³² Recently, Dr. Rajendra Pachauri, the head of the IPCC, confirmed that Hansen is right, stating, “What is happening, and what is likely to happen, convinces me that the world must be really ambitious and very determined at moving toward a 350 target.”³³

But CO₂ concentrations in the atmosphere now stand at 385 to 387 parts per million, well beyond the 350 level leading scientists believe is safe. By safe, they mean that humanity will have a 50-50 chance of avoiding climate catastrophe. If a friend said to you, “Come drive with me. There’s a 50-50 chance you won’t get in a fatal car wreck,” you would choose another car. Even at 350 parts per million, the world would still be well above the historic level of CO₂ concentration under which the earth’s ecosystems evolved. Even if the world stopped burning fossil fuels today, concentrations and warming would still increase due to time lags in the ecological systems, which would restore this imbalance.³⁴

29. *Id.* at 18.

30. Debra Birkinshaw, *Close to Home: Sonoma County's Role in the Push for 350*, PRESS DEMOCRAT, Sept. 29, 2009, <http://www.pressdemocrat.com/article/20090929/OPINION/909289900?Title=CLOSE-TO-HOME-Sonoma-County-s-role-in-the-push-for-350>.

31. *Id.*

32. *Id.*

33. Keith Johnson, *Climate Debate: IPCC Head Pachauri Joins the 350 Club*, WALL STREET JOURNAL, Aug. 25, 2009, <http://blogs.wsj.com/environmentalcapital/2009/08/25/climate-debate-ipcc-head-pachauri-joins-the-350-club/>.

34. Eric Steig, *The Lag Between Temperature and CO₂. (Gore's got it right.)*, REAL CLIMATE, Apr. 27, 2007, <http://www.realclimate.org/index.php/archives/2007/04/the-lag-between-temp-and-co2/>.

Dr. Hansen, Dr. Pachauri and essentially all of the world's climate scientists now state that if the nations of the world fail to act decisively in the next few years, it may become impossible to prevent runaway climate change that will end life as we know it on earth.³⁵ Dr. Pachauri stated, "If there's no action before 2012, that's too late. What we do in the next two to three years will determine our future. This is the defining moment."³⁶

Any sober look at the climate chaos now ravaging the globe makes it clear that we need a miracle. Sydney Harris once penned a cartoon in which two scientists are scribbling equations on a chalkboard; in the middle one writes, "Then a miracle occurs" and the other scientist says, "I think you should be more explicit here in step two."³⁷

Bill Becker, Executive Director of the Presidential Climate Action Project, said, "If we insist on ruining the planet we're going to have to stop claiming we're a superior species."³⁸ Ray Anderson, a business leader who chaired the President's Council on Sustainable Development, put it bluntly, "What is the business case for ending life on earth?"³⁹

What is little recognized is that the twin threats to the climate and to the economy are linked in both cause and cure. Unless nations move aggressively to implement energy efficiency and renewable energy, key elements of the transition away from the fossil fuels that are driving climate change, it is difficult to see how our economy can recover or avoid further crises. Solving the climate crisis *is the way out* of the economic crisis.

35. *Climate Change Will End Life on Earth by 2100 Unless Engineers Act*, NEW CIVIL ENGINEER, Nov. 28, 2006, <http://www.nce.co.uk/climate-change-will-end-life-on-earth-by-2100-unless-engineers-act/67073.article>.

36. Elisabeth Rosenthal, *U.N. Report Describes Risks of Inaction on Climate Change*, N.Y. TIMES, Nov. 17, 2007, <http://www.nytimes.com/2007/11/17/science/earth/17climate.html>.

37. Sidney Harris, *I Think You Should Be More Explicit Here in Step Two*, THE NEW YORKER, <http://www.newyorkerstore.com/all-industry-cartoons/i-think-you-should-be-more-explicit-here-in-step-two/invt/118181/> (last visited Aug. 18, 2010).

38. Bill Becker, Executive Dir. of the Presidential Climate Action Project, Presentation at the Meeting of the President's Council on Sustainable development in Wingspread Wis. (June 2008).

39. L. Hunter Lovins, *Forward to HAZEL HENDERSON & SIMRAN SETHI, ETHICAL MARKETS: GROWING THE GREEN ECONOMY* ix, x (2006).

The fossil fuel industries, along with various others, have spent at least 63 million trying to make you believe that any reduction in the use of their product will cripple the economy and ruin business.⁴⁰ The U.S Chamber of Commerce funded teams to visit every local chamber of commerce across the country to argue that the science of climate change is not settled, there is no proof, but even if the climate is changing, the real issue is jobs for Americans right here in our cities.⁴¹ The U.S. Chamber of Commerce claims that any legislation to reduce the amount of energy that nations use will strangle our way of life, and be ruinous to business.⁴²

The truth is quite to the contrary. Unless everyone, homeowners, businesses and governments capture every opportunity to save money by saving energy and other resources, no economic measures will bring real prosperity. The evidence, presented below demonstrates this point. So long as Americans continue borrowing \$1 billion a day to buy fossil oil from distant and unstable parts of the globe, no durable recovery will be possible.⁴³ The blowout that has destroyed the Gulf and an entire way of life is proof that “drill, baby, drill,” is no solution.

In early 2009, Jonathan Porritt, a member of the British Parliament and advisor to the Prince of Wales, warned that, “People seem blind to the fact that the causes of the economic

40. SourceWatch.org, Global Climate Coalition, http://www.sourcewatch.org/index.php?title=Global_Climate_Coalition (last visited Aug. 18, 2010).

41. Jonathan Porritt, *Perfect Storm of Environmental and Economic Collapse Closer than You Think*, GUARDIAN, Mar. 23, 2009, <http://www.guardian.co.uk/environment/2009/mar/23/jonathon-porritt-recession-climate-crisis>.

42. The author sat through one such briefing sponsored by the U.S. Chamber of Commerce in which a man from the Heartland Institute stated that there was no scientific evidence of climate change. Representatives from the coal industry, specifically Peabody Coal, stated that the only way to meet our energy needs was to burn coal and that clean coal was available today, even though no commercial carbon capture and storage facility has yet been built, and a representative of the U.S. Chamber stated that any attempt to regulate the use of fossil fuels would bankrupt the economy. It is in part for this reason that companies such as GE, Apple, Nike, and the utilities Pacific Gas and Electric, Public Service of New Mexico, and Excelon resigned from the U.S. Chamber of Commerce in fall of 2009.

43. David M. Dickson, *Oil Woes Mask Improvement in Deficit Demand for Imported Goods Slows; Exports have Increased*, WASH. POST Aug. 17, 2008, <http://www.washingtontimes.com/news/2008/aug/17/oil-costs-mask-improvement-in-deficit/>.

collapse are exactly the same as those behind today's ecological crisis—and behind accelerating climate change in particular.”⁴⁴ Porritt cited the United Kingdom government's chief scientific adviser, John Beddington, who predicted,

[a] ‘perfect storm’ of food shortages, scarce water and high-cost energy will hit the global economy before 2030. Factor in accelerating climate change and this lethal cocktail leads to public unrest, cross-border conflict and mass migration—in other words, an economic and political collapse that will make today's economic recession seem very tame indeed.⁴⁵

Porritt agreed, but predicted that the storm would hit by 2020, and was linked to the current economic collapse.⁴⁶ He observed:

[o]n the environment front, as our financial debts have built up, so have our debts to nature—in terms of the unsustainable depletion of natural resources, measured by the loss of topsoil, forests, fresh water and biodiversity. Everybody knows that liquidating capital assets to fuel consumption is crazy but nobody seems to know how to stop it.

There is a simple conclusion here: the self-same abuses of debt-driven ‘casino capitalism’ that have caused the global economy to collapse are what lie behind the impending collapse of the life-support systems on which we all ultimately depend.⁴⁷

III. CAPITALISM TO THE RESCUE

Critics argue that the science is uncertain. Absolutely. Scientists do not know how bad it may be, or how fast climate chaos will proceed. Observed reality is now outrunning the

44. Porritt, *supra* note 41.

45. *Id.*

46. *Id.*

47. *Id.*

scientific models, happening even faster than the most alarmed scientists predicted.⁴⁸

But, with all due respect to the great climate scientists, let us assume that the skeptics are correct. They are not, and you would be a fool to go to Las Vegas on the odds that they might be. But, in a sense, the science is irrelevant. If all you are is a profit maximizing capitalist, you will do exactly the same thing you would do if you were scared to death about climate change because we know how to solve this problem at a profit. Smart companies are “getting it.”

DuPont was one of the early leaders; about a decade ago they pledged to cut carbon emissions 65% below their 1990 levels by 2010.⁴⁹ That is a little bit more ambitious than the U.S., which still refuses to ratify the Kyoto protocol agreeing to cut emissions by only 7% below 1990 level by 2010.

Has DuPont joined Greenpeace?

No. The company made its announcement in the name of increasing shareholder value and it has delivered on that promise. The value of DuPont stock increased 340% while the company reduced global emissions by 67%. DuPont’s programs have now reduced emissions by 80% below 1990 levels.⁵⁰ This created a financial savings for the company between 2000 and 2005 of 3 billion.⁵¹ The company’s climate protection program showed it costs less to implement energy savings measures than it does to buy and burn fuel and emit other gasses. In 1999, DuPont estimated that every ton of carbon it displaced saved it \$6.⁵² By 2007, DuPont’s efforts to squeeze out waste were saving the company \$2.2 billion a year.⁵³ The company’s profits that year

48. Jim Lobe, *Climate Change Faster Than Expected*, INTER PRESS SERVICE, Sept. 24, 2009, <http://www.ipsnews.org/news.asp?idnews=48580>.

49. Gary Pfeiffer, Chief Financial Officer of DuPont, Address at Board Conference (2005). (noting a 340% increase in share value paralleling 60% reduction in environmental footprint).

50. Mark Hertsgaard, *A Global Green Deal*, THE NATION, Feb 25, 2009, at 2, available at <http://www.thenation.com/article/global-green-deal>.

51. *Id.*

52. L. Hunter Lovins, *The Economic Case for Climate Action*, AWARENESS INTO ACTION, <http://www.awarenessintoaction.com/whitepapers/the-economic-case-for-climate-action.html> (last visited Aug. 18, 2010).

53. *Id.*

were also \$2.2 billion.⁵⁴ Dupont is a company that's profitable because it's protecting the climate.

DuPont, however, is not the edge of the envelope. Back in the 1990s, ST Microelectronics set, what Jim Collins, a business author, refers to as a big hairy audacious goal, or BHAG,⁵⁵ when they pledged to achieve zero net CO₂ emissions and become carbon neutral by 2010 while increasing production 40 fold.⁵⁶ When the company made this pledge, they had no earthly idea how to achieve it. Figuring it out drove their corporate innovation, taking them from the number twelve chip maker in the world to the number six.⁵⁷ They won awards and reckon by the time they're done, they will have saved about \$1 billion.⁵⁸

Natural Capitalism Solutions (NCS)⁵⁹ and other sustainability consultants work with companies like ST Microelectronics to help them cut waste, transform how they make products, and implement more sustainable ways of doing business. One company that NCS worked with had a practice of leaving its 6,300 computers and monitors turned on 24/7. This policy was driven by various urban myths about shortening the life of the computer by turning it off and claims that the IT department required them to be left on; this practice caused the company to waste energy and money. NCS pointed out that, by simply publishing a policy requiring employees to turn computers off when no one is in front of them, they would save \$700,000 in the first year.⁶⁰ In the U.S., \$2.8 billion a year is wasted by

54. Interview with Andrew Winston, Founder Winston Eco-Strategies (Mar. 1, 2010) (on file with author). For more information on Mr. Winston, see <http://www.andrewwinston.com>.

55. BHAGS: Big Hairy Audacious Goals (n.d.), available at http://www.bonner.org/resources/modules/modules_pdf/BonCurBHAGS.pdf.

56. The European Business Network For CSR, Carbon Strategy STMicroelectronics, http://www.csreurope.org/solutions.php?action=show_all_solutions&page=22 (last visited Aug. 18, 2010).

57. *Id.*

58. STMICROELECTRONICS, SUSTAINABLE DEVELOPMENT REPORT 49 (2003), available at <http://www.st.com/stonline/company/environm/sustdev/sustdev03.pdf>.

59. For more information on National Capital Solutions, see <http://www.natcapsolutions.org>.

60. Interview with Jeff Hohensee, Senior Consultant, National Capital Solutions (Dec. 2008) (on file with author).

leaving computers on when no one is using them.⁶¹ Such IT costs can represent a quarter of the cost of running a modern office building.⁶²

A team from NCS worked with a large distribution center, a seven million square foot warehouse, in which 500 Watt light bulbs shined down on the tops of boxes stacked floor to ceiling. The workers below used task lighting so they could see where they were going. Simply flipping a switch would save \$650,000 a year.⁶³

These savings are free—or better than free—and they exist throughout American businesses.

Even where achieving the energy savings that will protect the climate requires an upfront investment of money, it is one of the best investments a company can make in the entire economy. Diversey projects a 160% return on their investments aimed at cutting their carbon footprint by saving energy.⁶⁴ That is a little better than you're going to get in your 401K.

Given these examples of waste, it should come as little surprise that American businesses use twice as much energy to produce a unit of Gross National Product (GNP) as do our competitors in parts of the world like Europe and Asia, where adherence to the Kyoto Protocol is driving their competitiveness.⁶⁵ But then, all of the other nations in the world have signed the Kyoto Protocol,⁶⁶ obliging them to save energy to cut carbon emissions. They are innovating to do this, saving money in the process and enhancing their competitiveness.

61. Jon Swartz, *Leaving PCs On Overnight Costs Companies \$2.8B a Year*, USA TODAY, http://www.usatoday.com/tech/science/environment/2009-03-25-pc-power-company-costs_N.htm.

62. The 2009 1E PC Energy Report: 1E Study, <http://www.1e.com/energycampaign/index.aspx> (last visited Aug. 18, 2010).

63. Interview with Jeff Hohensee, *supra* note 60.

64. Sustainable Life Media, *JohnsonDiversey Expects 160% ROI on Climate Spending*, SUSTAINABLE LIFE MEDIA, Sept. 12, 2008, http://www.sustainablelifemedia.com/content/story/strategy/johnsondiversey_expects_160_percent_roi_on_climate_spending.

65. Stephen Leahy, Development, Answer to Energy Crisis: Waste Not Want Not, INTER PRESS SERVICE, Oct. 23, 2006, <http://ipsnews.net/news.asp?idnews=35195>.

66. Status of Ratification of the Kyoto Protocol, http://unfccc.int/kyoto_protocol/status_of_ratification/items/2613.php (last visited Aug. 18, 2010).

IV. RISK MANAGEMENT IN A WORLD OF CLIMATE CHAOS

Smart segments of the business world have now recognized that tolerating wasteful energy use and carbon emissions is a high-risk strategy for a company. Volatility of energy supply, increasing prices, geopolitical volatility, threats to business from extreme weather events, and the risk of liability claims for failing to manage carbon all make carbon reduction simply better business.

The Financial Times and Stock Exchange (FTSE) Index, the British equivalent of the Dow Jones, states:

[t]he impact of climate change is likely to have an increasing influence on the economic value of companies, both directly, and through new regulatory frameworks. Investors, governments and society in general expect companies to identify and reduce their climate change risks and impacts, and also to identify and develop related business opportunities.⁶⁷

In 2003, the Wall Street Journal reported that the second largest re-insurance firm, Swiss Re, “has announced that it is considering denying coverage, starting with directors and officers liability policies, to companies it decided aren’t managing their output of greenhouse gases.”⁶⁸ The prescience of this statement came clear as claims from weather related disasters rose twice as fast as those from all other mishaps.⁶⁹ 2008 was the third worse year on record for loss-producing events, with losses jumping from \$82 billion in 2007 to over \$200 billion, with more than 220,000 dead. The all time record remains 2005 with \$232 billion

67. FTSE THE INDEX COMPANY, MARK CONSULTATION ON THE FTSE4GOOD CLIMATE CHANGE CRITERIA, FTSE 4 GOOD INDEX SERIES (2006), *available at* http://www.ftse.com/Indices/FTSE4Good_Index_Series/Downloads/FTSE4Good_Climate_Change_Consultation_Aug_06.pdf.

68. Jeffrey Ball, *Swiss Re Factors GHG Policies into Liability Coverage*, WALL STREET J., May 7, 2003.

69. Douwe Miedema, *Climate Change Means Big Business for Reinsurers*, REUTERS, Nov. 14, 2006, <http://www.planetark.com/dailynewsstory.cfm/newsid/38964/story.htm>.

in insured losses, with costs now growing ten times faster than premiums, the population, or economic growth.⁷⁰

In 2007, the *Washington Post* reported that,

[n]ervous investors have begun asking similar questions of the insurers, asking them to disclose their strategies for dealing with global warming. At a meeting of the National Association of Insurance Commissioners, Andrew Logan, insurance director of the investor coalition, representing \$4 trillion in market capital, warned that ‘insurance as we know it is threatened by a perfect storm of rising weather losses, rising global temperatures and more Americans living in harm’s way.’⁷¹

John Dutton, Dean Emeritus of Penn State’s College of Earth and Mineral Sciences, estimated that \$2.7 trillion of the \$10-trillion-a-year U.S. economy is susceptible to weather-related loss of revenue, increasing companies’ off-balance-sheet risks.⁷²

Investors have banded together to influence how companies address climate change. Large institutional investors are conducting shareholder campaigns urging companies to disclose climate risk and implement mitigation programs.⁷³

The Investor Network on Climate Risk includes over 50 institutional investors collectively managing more than \$3 trillion in assets.⁷⁴ They announced a 10-point action plan that calls on investors, leading financial institutions, businesses, and governments to address climate risk and seize investment opportunities. U.S. companies, Wall Street firms, and the Securities and Exchange Commission (SEC) were asked to

70. Evan Mills et al., *Availability and Affordability of Insurance Under Climate Change: A Growing Challenge for the U.S.*, CERES, Dec. 2005, http://www.ceres.org/pub/docs/Ceres_insure_climatechange_120105.pdf.

71. John Morrison & Alex Sink, *The Climate Change Peril That Insurers See*, WASH. POST, Sept. 27, 2007, http://www.washingtonpost.com/wp-dyn/content/article/2007/09/26/AR2007092602070.html?nav=rss_opinions/outlook?nav=slate.

72. Eugene Linden, *Cloudy with a Chance of Chaos*, FORTUNE MAGAZINE, Jan. 17, 2006, http://money.cnn.com/2006/01/17/news/economy/climate_fortune/index.htm.

73. See Investor Network on Climate Risk, <http://www.incr.com/index.php?page=ia&nid=186> (last visited Aug. 18, 2010) (providing a comprehensive list of climate-related shareholder resolutions).

74. See *id.*

provide investors with comprehensive analysis and disclosure about the financial risks presented by climate change. The group pledged to invest \$1 billion in prudent business opportunities emerging from the drive to reduce GHG emissions.

On January 27, 2010, they succeeded, as the SEC issued an “interpretive guidance” advising that public companies should warn investors of any serious risks that global warming might pose to their businesses. Mary Shapiro, Chair of the SEC stated,

[i]t is neither surprising nor especially remarkable for us to conclude that of course a company must consider whether potential legislation—whether that legislation concerns climate change or new licensing requirements—is likely to occur. Similarly, a company must disclose the significant risks that it faces, whether those risks are due to increased competition or severe weather. These principles of materiality form the bedrock of our disclosure framework.⁷⁵

In the U.S., the Sarbanes-Oxley Act makes it a criminal offence for the Board of Directors of a company to fail to disclose information, including such environmental liabilities as carbon emissions that could alter a reasonable investor’s view of the organization.⁷⁶ In France, Holland, Germany, and Norway, companies are already required to report their GHG emissions.⁷⁷

Since 2002, the British NGO, the Carbon Disclosure Project (CDP) has surveyed the Financial Times 500, the largest companies in the world. The CDP, which represents 315 global institutional investors with assets of \$55 trillion, now receives annual corporate carbon footprint reports from most of the Financial Times’ 1,800, the largest companies in the world.⁷⁸

75. John Broder, *Companies Must Disclose Climate Risk*, N. Y. TIMES, Jan. 27, 2010, <http://www.nytimes.com/2010/01/28/business/28sec.html?emc=eta1>.

76. Francis X. Lyons, *Sarbanes-Oxley and the Changing Face of Environmental Liability Disclosure Obligations*, TRENDS, Vol.35 No. 2, Nov/Dec. 2003, available at www.gcd.com/db30/cgi-bin/pubs/Sarbanes2.pdf. Francis X. Lyons is a former U.S. EPA regional administrator now with Gardner, Carton & Douglas LLP.

77. In Germany, only “heavy” industry is currently required to report greenhouse gas emissions.

78. Association of Climate Change Officers, ACCO Webinar Series, The Relevance of Climate Change for Investors June 9, 2009, available at <http://www.accoonline.org/webinars.html> (scroll down to view).

Institutional investors use the CDP database to make investment decisions based a company's GHG emissions, emission reduction goals and strategies to combat climate change.⁷⁹ Companies that do not responsibly manage their carbon footprint are deemed not worthy of investment.

Initially, however, only 10% of the recipients answered. After all, who died and named the CDP God? In 2005, 60% of the surveyed companies answered. A number of large companies (Anadarko Petroleum, Apache, Chevron, Cinergy, DTE Energy, Duke Energy, First Energy, Ford Motor Company, General Electric, JP Morgan Chase, and Progress Energy) made such commitments as supporting mandatory limits on green house gasses, voluntarily reducing their emissions, or disclosing climate risk information to investors.⁸⁰

Now, well over 80% of the world's largest companies complete the survey. Why the change? The threat of Sarbanes-Oxley liability or shareholder action clearly played a role. But perhaps more significantly, the CDP represents institutional investors with assets of over \$55 trillion, now representing almost a third of all global institutional investor assets. Any company that might want to go to the capital markets would be advised to answer CDP's questions.

The 2007 CDP report found that the world's major companies are increasingly focused on climate change and that many see it as an opportunity for profit. Nearly 80% of respondents around the world considered climate change a commercial risk, citing extreme weather events and tightening government regulations. Some 82% said that they recognized commercial opportunities for existing or new products, such as investments in renewable energy. Globally, 76% said they had instituted targets and plans to reduce emissions. But only 29% of U.S. respondents had

79. Carbon Disclosure Project, <http://www.cdproject.net> (last visited Aug. 18, 2010).

80. Written Testimony: Prepared for the U.S. Senate Banking Subcommittee on Securities, Insurances and Investment 110th Congress 1 (Oct. 31, 2007) (statement of Dr. Russell Read, Chief Investment Officer, California Public Employees Retirement System), *available at* <http://www.incr.com/NETCOMMUNITY/Document.Doc?id=204>.

implemented GHG reduction programs with timelines and specific targets.⁸¹

In 2008, Walmart hired the CDP to go to China to survey Walmart suppliers, asking them to report their carbon footprint if they wished to remain a supplier to the world's largest retailer.⁸²

V. WALMART: CAPITALISM'S 800-POUND GORILLA

The new wisdom that cutting a company's carbon footprint is simply better business is perhaps most convincingly demonstrated by the commitment of Walmart to implement more sustainable practices. In 2005, Walmart pledged:

- 1) To use 100% renewable energy;
- 2) To create zero waste and;
- 3) To sell products that sustain resources and the environment.

That same year, Lee Scott, then CEO of Walmart, announced goals to reduce energy use at Walmart stores 30% over three years, double the efficiency of its vehicle fleet, and build hybrid-electric long-haul trucks.⁸³ The company projects that this will save \$300 million each year by 2015. A device that limits truck idling is already saving the company millions each year.⁸⁴

In 2006, Walmart, announced goals to sell millions of compact fluorescent light bulbs (CFLs).⁸⁵ Walmart realized that replacing the incandescent bulbs in its own ceiling fan displays with CFLs throughout its 3,230 stores (10 models of ceiling fans on display, each with four bulbs, forty bulbs per store, 3,230 stores) could save the company \$7 million a year.⁸⁶ Chuck Kerby,

81. Carbon Disclosure Project, *CDP Overview*, <http://www.escinst.org/pdf/CDP.pdf> (last visited Aug. 18, 2010).

82. Ylan Q Mui, *Walmart Aims to Enlist Suppliers In Green Mission*, WASH. POST, Sept. 25, 2007.

83. Lela Davidson, *Walmart Meeting Focused on Sustainability*, EVERY JOE, June 7, 2009, <http://www.bizzia.com/articles/Walmart-meeting-focused-on-sustainability/>.

84. John Addison, *Wal-Mart to Save \$300 Million with Hybrids*, CLEAN FLEET REPORT, Aug. 4, 2009, <http://www.cleanfleetreport.com/fleets/wal-mart-to-save-300-million-with-hybrids/>.

85. *Id.*

86. *Id.*

the Walmart employee who did the math, reflected, “[t]hat, for me, was an ‘I got it’ moment.”⁸⁷ The company quickly realized that the same logic would benefit its customers by helping to retain its image as the low cost store. It set out to sell 100 million CFLs in 2007 to save its customers \$3 billion.⁸⁸ The company calculates that this measure also saved enough electricity to run the city of Philadelphia.⁸⁹

Walmart, which if it were a country would be the 20th largest in the world, is not making these moves out of the goodness of its heart.⁹⁰ In the two years after Walmart began its waste reduction program, it reduced unnecessary packaging by just 5% and saved \$11 billion globally.⁹¹ Walmart’s goal of reducing overall packaging by 5% by 2013 would be equal to removing 213,000 trucks from the road, saving about 324,000 tons of coal and 77 million gallons of diesel fuel per year.⁹²

In October 2008, Walmart called its 1,000 largest Chinese suppliers to a meeting with representatives of the Chinese government, the CDP, and others.⁹³ Walmart executives described a new set of aggressive goals that the company has established to build a more environmentally and socially responsible global supply chain.⁹⁴ They announced that the

87. Charles Fishman, *How Many Lightbulbs Does It Take to Change the World? One. And You're Looking At It*, FAST COMPANY MAGAZINE, Sept. 1, 2006, at 74, 75, available at http://www.fastcompany.com/magazine/108/open_lightbulbs.html.

88. Letter from Andy Ruben, Vice President of Corporate Strategy and Sustainability, Walmart, to author (Oct. 29, 2006) (on file with author).

89. Ann Monroe, *Wal-Mart Jolly Green Giant*, MSN, Jan. 18, 2008, <http://articles.moneycentral.msn.com/Investing/StockInvestingTrading/Wal-MartJollyGreenGiant.aspx#pageTopAchor>.

90. Kevin Hassett, *Unions Wage Vicious, Misguided War on Walmart*, AM. ENTERPRISE INST. FOR PUBLIC POL’Y RES., Dec. 19, 2009, <http://www.aei.org/article/23594>.

91. Amy Gillentine, *Wal-Mart Pulls Suppliers Onto Sustainability Train*, COLO. SPRINGS BUS. J., Apr. 13, 2007, available at http://findarticles.com/p/articles/mi_qn4190/is_20070413/ai_n19012931/.

92. Press Release, Walmart, Sustainability 360: Doing Good, Better, Together (Feb. 1, 2007), available at <http://walmartstores.com/pressroom/news/6238.aspx>.

93. *The Green Wave Marches On: Wal-mart in China*, ANDREW WINSTON, Nov. 19, 2008, http://www.andrewwinston.com/blog/2008/11/the_green_wave_marches_on_walm.php.

94. *Id.*

requirements would be phased in for all of its suppliers in China in 2009 and expanded to suppliers around the world by 2011.⁹⁵

The criteria required that the top 200 factories from which Walmart sources its materials achieve a 20% improvement in energy efficiency by 2012.⁹⁶ Walmart stated that by 2010 it would source 95% of its production from the factories with the highest ratings in environmental and social practice audits.⁹⁷ It further revealed that Walmart-China will design and open a new store prototype that uses 40% less energy.⁹⁸

Walmart was one of only two companies in the Dow Jones Industrial Average whose stock price rose in 2008—by 18%—and its sustainability efforts were credited, in part, with this performance.⁹⁹ When he announced the sustainability initiative, Walmart CEO Lee Scott observed that a corporate focus on reducing GHGs as quickly as possible was just a good business strategy, stating, “It will save money for our customers, make us a more efficient business, and help position us to compete effectively in a carbon-constrained world.”¹⁰⁰ In 2009, Reuters quoted the company’s new CEO Mike Duke expressing his desire to accelerate the sustainability efforts; he stated, “I am very serious about it. This is not optional. It’s not something of the past. This is all about the future.”¹⁰¹

In July 2009, Walmart rolled out the comprehensive environmental and social scorecard to its several thousand largest suppliers worldwide, asking them to complete an environmental scorecard relating to product packaging and waste reduction in order to improve product design and delivery.¹⁰²

95. *Id.*

96. *Id.*

97. *Id.*

98. Walmart 2009 Sustainability Report, Achievements in Building Design, United States, http://walmartstores.com/sites/sustainabilityreport/2009/en_b_achievements.html (last visited Aug. 18, 2010).

99. Nicole Maestri, *Walmart’s New CEO Duke Needs to Build on Momentum*, REUTERS, Jan. 29, 2009.

100. Jonathan Lash & Fred Wellington, *Competitive Advantage on a Warming Planet*, HARV. BUS. REV., March 2007, at 3.

101. E. Bruce Harrison, *McDonald’s, Walmart: Lessons in Green Lift*, ENVIROCOMM, Feb. 1, 2009, http://www.envirocomm.com/comm_lessons_green_lift_020109.php.

102. Mui, *supra* note 82.

Globally, Walmart has 60,000 to 90,000 suppliers, all of whom are now on notice that they will also have to comply.¹⁰³

Walmart is not the only company now requiring its supply chain to document more environmentally responsible practices. Hundreds of major European and American companies are establishing supplier codes of conduct and hiring third-party verifiers to audit their factories in order to ensure compliance with social and environmental standards. As companies such as Walmart recognize that their survival depends on behaving in more sustainable ways, they are changing how the world does business.

The next initiative Walmart will undertake is to will work with its suppliers to help them design more sustainable products to offer to customers. Recognizing that lighting in its stores represented about a third of its electricity costs, the company formed a partnership with General Electric to innovate lower costs for light emitting diodes (LEDs).¹⁰⁴ LEDs last longer, produce less heat, contain no mercury, and use significantly less energy than other types of lights.¹⁰⁵ Over a three-year period Walmart invested about \$17 million in developing an LED lighting system for its refrigerator cases.¹⁰⁶ Installing these bulbs in its coolers in more than 500 Walmart stores saved about \$3.8 million per year and reduced carbon dioxide emissions by 65 million pounds.¹⁰⁷

The real gain for the company, though, is the market that selling these bulbs represents. Lee Scott stated,

[t]he greatest potential is in creating a new market for LED lighting. Tens of thousands of grocery stores and other retailers will be able to take advantage of this new technology. So multiply the cost savings. Multiply the

103. *Id.*

104. H. Lee Scott, Jr., CEO and President of Wal-mart Stores, Inc., Sustainability 360: Doing Good, Better, Together, Lecture to the Prince of Wales's Business & the Environment Programme (Feb. 1, 2007), *available at* <http://walmartstores.com/pressroom/news/6238.aspx>.

105. *Id.*

106. *Id.*

107. *Id.*

savings in carbon dioxide emissions. And just think about the impact on our economy and the environment.¹⁰⁸

Scott observed that a corporate focus on reducing GHGs as quickly as possible was just a good business strategy: "It will save money for our customers, make us a more efficient business, and help position us to compete effectively in a carbon-constrained world."¹⁰⁹

VI. BUILDINGS: A GOOD PLACE TO START

If you run a company, where do you start? If you sell to Walmart, you had better get a copy of the Sustainability Index and begin figuring how to answer the questions. The first question asks if you are measuring your carbon footprint. The second asks whether you are reporting it to the CDP.¹¹⁰

If you are not a Walmart supplier, and even if you are, one of the best places to start saving energy is in buildings. American buildings are responsible for 39% of total U.S. energy use, 70% of electricity use, 40% to 60% of GHG emissions, and 30% of waste output.¹¹¹ Ed Mazria, architect and founder of the Architecture 2030 Project states, "Seventy-six percent of the energy produced in this country goes just to operating buildings."¹¹² For all of this waste, buildings then generally have indoor air quality that's worse than the outdoor air we claim to regulate.¹¹³ Yet it is possible to take any existing building and make it 3 to 4 times more efficient, and to make a new building 10 times as efficient, while making it work better and sometimes even cost less to build and certainly less to maintain.¹¹⁴

Pacific Gas and Electric, the largest utility on the North American continent, found that putting green features like day

108. *Id.*

109. Lash & Wellington, *supra* note 100, at 3.

110. *See generally* Carbon Disclosure Project, <https://www.cdproject.net/en-US/Pages/HomePage.aspx> (last visited Aug. 18, 2010).

111. U.S. Green Building Council, <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=1718> (last visited Aug. 18, 2010).

112. Clayton Sandell, *What Global Warming Looks Like*, ABC NEWS, Sept. 14, 2007, <http://abcnews.go.com/Technology/TenWays/story?id=3602227&page=1>.

113. *See* ALEX WILSON, ET AL., GREEN DEVELOPMENT: INTEGRATING ECOLOGY AND REAL ESTATE 173 (1999).

114. *See id.*

lighting into schools resulted in higher test scores.¹¹⁵ It's also one of the reasons that Walmart is going green. About a decade ago the company conducted an inadvertent controlled experiment. Setting out to build a green building, they got halfway through, lost interest and wound up with a building that had a green half and a not so green half. Surprise! The green side posted 40% higher retail sales and all the associates wanted to work there.¹¹⁶ Walmart now has an excellent green building department.

Implementing cost-effective energy efficiency in buildings also increases labour productivity 6% to 16%.¹¹⁷ Doing this throughout the economy would add over \$200 billion per year to American GNP.¹¹⁸ It would also eliminate \$58 billion now lost in sick time.¹¹⁹

These measures have a far greater return on investment (ROI) than any other use of the money. For example, changing out inefficient incandescent bulbs with high quality compact fluorescents delivers greater than 40% annual ROI.¹²⁰ The return on investment for common stocks, might achieve 1.5%, a money market account gives 3.5% if you commit the money for a long term.¹²¹ Compare this to a 40% or greater ROI from duct sealing or a 30% ROI from programmable thermostats. Even the lower ROI energy efficiency investments such as increasing wall or attic insulation come in at twice the return on a 30-year bond.¹²² Saving energy is simply the best investment you can make. If

115. HESCHONG MAHONE GROUP, WINDOWS AND CLASSROOMS: AN INVESTIGATION INTO THE RELATIONSHIP BETWEEN DAYLIGHTING AND HUMAN PERFORMANCE 3 (1999), available at http://www.h-m-g.com/downloads/Daylighting/order_daylighting.htm.

116. Letter from Bill Browning to author (1999) (on file with author); HESCHONG MAHONE GROUP, *supra* note 115, at 2.

117. JOSEPH J. ROMM & WILLIAM D. BROWNING, GREENING THE BUILDING AND THE BOTTOM LINE: INCREASING PRODUCTIVITY THROUGH ENERGY-EFFICIENT DESIGN 13 (1998).

118. William J. Fisk, *How IEQ Affects Health, Productivity*, 44 ASHRAE J. 56, 57-58 (2002).

119. William J. Fisk & Satish Kumar, *Health and Productivity Gains from Better Indoor Environments*, in THE ROLE OF EMERGING ENERGY-EFFICIENT TECHNOLOGY IN PROMOTING WORKPLACE PRODUCTIVITY AND HEALTH: FINAL REPORT, 20 (2002), available at <http://escholarship.org/uc/item/0sw558qr>.

120. The Profitability of Energy Efficient Upgrades, http://hes.lbl.gov/hes/profitable_dat.html (last visited Aug. 18, 2010).

121. *Id.*

122. *Id.*

you have money and you're not investing in increasing the efficiency of your home, your office, the buildings in your community, you are simply throwing it away.

VII. THE IMPACT ON COMMUNITIES

Such investments improve the overall well being of our communities, as well. Typical communities are bleeding to death trying to buy energy, typically fossil energy, from outside. 20% of gross income goes out of a community to buy imported energy and 80% of those dollars never return. This is reverse economic development.

We are like someone who wants to take a bath, but the water keeps running out, so people are trying to sell us bigger water heaters. We do not need a bigger water heater, whether it be a nuclear or a coal one; we need a plug.

A man named Wes Birdsall invented one. As the general manager of the Osage Iowa Municipal Utility, Birdsall helped his customers use less of his product by helping them plug energy leaks in their houses.¹²³ Birdsall realized that his customers didn't want kilowatt-hours of electricity, what most electric utilities believe they are in business to produce. Birdsall realized that his customers were only using raw kilowatt-hours of electricity to obtain the energy 'services' of comfort in their homes, such as humming machines in factories, illumination, and the other services that they really wanted: cold beer, hot showers, industrial shaft power.

Birdsall understood that building a new coal plant, the proposed way to meet increasing customer demands, would increase rates. If, instead, he could help people can get the same or improved service more cheaply by employing efficiency measures, they would jump at it. By meeting customers' desires for energy services at lower cost, Birdsall began one of the most remarkable economic development stories in rural America.

The Osage program reduced electric bills to half the state average and unemployment to half the national average because

123. Smart Communities Network Success Stories, http://www.smartcommunities.ncat.org/success/osage_muni.shtml (last visited Aug. 18, 2010).

lower rates attracted new factories to town.¹²⁴ New factories increased demand, so Birdsall implemented more efficiency, holding the electric growth level steady for years. The program was profiled in the *Wall Street Journal* and replicated by other utilities. Birdsall's work saved over \$1 million a year in a town of 3,800 people, generating over 100 new jobs.¹²⁵ According to a USDA study of Osage,

[t]he local business people calculated that every \$1 spent on ordinary consumer goods in local stores generated \$1.90 of economic activity in the town's economy. By comparison, petroleum products generated a multiplier of \$1.51; utility services, \$1.66; and energy efficiency, \$2.23. Moreover, the town was able to attract desirable industries because of the reduced energy operating costs resulting from efficiency measures put in place. Energy efficiency has a long and successful track record in Osage as a key economic development strategy.¹²⁶

Another report on the program found that "[i]ndustries are expanding and choosing to remain in Osage because they can make money through employees who are highly productive and through utility rates that are considerably lower than neighbouring cities."¹²⁷

Community leaders agree. Over 1,000 American Mayors pledged their cities to meet the goals set forth in the Kyoto Protocol or reduce their emissions of GHGs by at least 7% by 2012.¹²⁸ Some have already met even more aggressive targets, ranging from a goal of 20% reduction by Portland to a goal of 42%

124. International Institute for Economic Conservation, http://www.iiec.org/index.php?option=com_content&task=view&id=166&Itemid=105 (last visited Aug 18, 2010).

125. *Id.*

126. MICHAEL V. RUSSO, ENVIRONMENTAL MANAGEMENT: READINGS AND CASES 30 (2008).

127. HEALTH AND ENERGY COMPANY, OSAGE MUNICIPAL UTILITIES ENERGY EFFICIENCY PROGRAM, http://healthandenergy.com/osage_energy_efficiency.htm (last visited Aug. 18, 2010).

128. Mayors Climate Protection Center, <http://usmayors.org/climateprotection/ClimateChange.asp> (last visited Aug. 18, 2010).

reduction over the same time frame by Sebastopol, California.¹²⁹ Communities that are implementing climate protection programs are finding that smart, comprehensive approaches to climate planning make them more competitive and put hundreds of billions of dollars back into the economy from savings.

Programs to help buildings use less energy and encourage the use of efficient cars, appliances and machines stimulate new manufacturing ventures, increase farm income, and generate increased community income. A local government Commissioner from Portland, Oregon, stated, "We've found that our climate change policies have been the best economic development strategy we've ever had. Not only are we saving billions of dollars on energy, we are also generating hundreds of new sustainable enterprises as a result."

A 2003 study of the impact of energy efficiency and renewables in Oregon found that one average megawatt saved increases:

- 1) annual economic output in Oregon by \$2,230,572,
- 2) wage income in Oregon by \$684,536 and
- 3) business income in Oregon by \$125,882.¹³⁰

Each average megawatt saved creates 22 new jobs in Oregon.¹³¹ The study found that over 12 megawatts were saved as a result of Energy Trust program activities in 2002, with the number growing to 125 average megawatts by 2006.¹³²

Over a seven-month period in 2008, the City of San Francisco created 180 new jobs by enabling 640 residents and enterprises to install 2 megawatts in small rooftop solar electric systems.¹³³

129. *U.S. Grassroots Tackle Climate Change*, BBC NEWS, July 11, 2007, <http://news.bbc.co.uk/2/hi/americas/6288172.stm>.

130. Randall Pozdena & Stephen Grover, *Economic Impact Analysis of Energy Trust of Oregon Program Activities*, 11,12, ECONORTHWEST (2003), available at <http://www.econw.com/reports/renewableenergy6779.pdf>.

131. *Id.* at 14.

132. *Id.* at 11.

133. Gavin Newsome, *Local Greed Jobs Rise as SF Solar and Energy Efficiency Incentive Programs Expand*, CLEANTECHNICA, Mar. 26, 2009, <http://cleantechnica.com/2009/03/26/local-green-jobs-rise-as-sf-solar-and-energy-efficiency-incentive-programs-expand/>.

Workforce trainees filled 83% of the jobs.¹³⁴ The City's SF Energy Watch helped 1,500 businesses and multifamily properties save over \$5.7 million in energy bills, delivering 6 megawatts of energy efficiency savings.¹³⁵

Small businesses are the economic engine of the country and generate more than half of non-farm private gross domestic product.¹³⁶ They represent 99.7% of all employer firms, employing nearly 60 million workers or about half of all private employees.¹³⁷ For the past decade, they have generated 60% to 80% of net new jobs each year.¹³⁸ Small businesses consume half the electricity in the country but only about a third have invested in energy efficiency.¹³⁹ Less than half of the small business owners are aware that the EPA's Energy Star program can help them lower their energy usage.¹⁴⁰ The Agency expends just \$1 million and two staff positions on its programs to get information to millions of small businesses.¹⁴¹

NCS's web-based learning tool, *Solutions at the Speed of Business*, shows small businesses how they can benefit from programs to reduce carbon emissions.¹⁴² Small businesses can cut their own costs and increase sales to others who are implementing emissions reduction programs. For example, a RE/MAX real estate office in Florida, implemented a weatherization program, caulking windows, and weatherstripping doors. These simple measures cut their need

134. *Id.*

135. *Id.*

136. Michael Burnham, *ENERGY POLICY: Kerry, Snowe Slam Agencies for Work on Small Businesses*, ENV'T & ENERGY DAILY, Mar. 9, 2007, <http://www.eenews.net/EEDaily/2007/03/09/8/>.

137. The Great American Small Business Challenge, Small Business Statistics, <http://www.tgasbc.org/Public/Buzz/SmallBusinessStatistics/index.cfm> (last visited Aug. 18, 2010).

138. *Id.*

139. Burnham, *supra* note 136.

140. *Id.*

141. *Id.*

142. Natural Capital Solutions, *Solutions at the Speed of Business*, <http://www.natcapsolutions.org/solutions/solutions.pdf> (last visited Aug. 18, 2010).

for air-conditioning and put \$7,900 of savings into their pocket the first year.¹⁴³

As Business Week noted, such programs not only cut direct energy but drive prosperity throughout the economy: “reducing energy waste in U.S. homes, shops, offices, and other buildings must, of necessity, rely on tens of thousands of small concerns that design, make, sell, install, and service energy-efficient appliances, lighting products, heating, air-conditioning, and other equipment.”¹⁴⁴ “Small businesses can also save as much as 20-30 percent on their own energy bills by making their own workplace more energy-efficient.”¹⁴⁵

VIII. ADD IT UP: THE IMPACT ON THE STATES

Studies have assessed the larger economic impact. In Florida, the Republican Governor commissioned a task force to look at what it would cost the state to implement measures to cut GHG emissions.¹⁴⁶ Even under the most optimistic projections of climate change, much of Florida floods.¹⁴⁷ Governor Crist wanted to know what it would cost to prevent this.¹⁴⁸ He was surprised to find that implementing aggressive measures to reduce Florida’s carbon footprint would add \$28 billion to the state economy between now and 2025.¹⁴⁹

In the world’s sixth largest economy, Californians have held their energy consumption to zero growth since 1974 while national per capita energy consumption grew 50%. This has enabled the average family there to pay about \$800 less for

143. The Profitability of Energy Efficiency Upgrades, http://hes.lbl.gov/hes/profitable_dat.html (last visited Aug. 18, 2010).

144. Byron Kennard & Scott Hauge, *Global Warming on Main Street*, BUSINESSWEEK, June 27, 2006, http://www.businessweek.com/smallbiz/content/jun2006/sb20060626_603752.htm.

145. Anna Clark, *Practical Advice for Greening the SME [Small and Medium-sized Enterprise]*, EARTH PEOPLE, Apr. 2007, <http://www.earthpeopleco.com/pages/31->.

146. Governor’s Action Team on Energy and Climate Change Policy Actions to Date August 2007, http://www.dep.state.fl.us/ClimateChange/team/file/policy_actions_to_date.pdf (last visited Aug. 18, 2010).

147. *Id.*

148. *Id.*

149. Draft Final Report EX-1 2008 Center for Climate Strategies Executive Summary, <http://www.climatestrategies.us> (last visit Apr. 29, 2010).

energy each year than it would if the state had not pursued energy efficiency.¹⁵⁰ In 2004, California ranked 12th in the nation in energy prices but only 45th in energy costs per person.¹⁵¹ A 2008 Study by the University of California found that California's programs to reduce energy dependence and increase energy productivity three decades ago directed a greater percentage of its consumption to in-state, employment-intensive goods and services whose supply chains largely reside within the state.¹⁵² This created a strong "multiplier" effect of job creation, generating 1.5 million full time equivalent (FTE) jobs with a total payroll of over \$45 billion, saving California consumers over \$56 billion in energy costs.¹⁵³

Similarly, a University of California study found that California's programs to reduce energy dependence and increase energy productivity three decades ago directed a greater percentage of its consumption to in-state, employment-intensive goods and services whose supply chains largely reside within the state.¹⁵⁴ This also created a strong "multiplier" effect of job creation, generating 1.5 million FTE jobs with a total payroll of over \$45 billion, saving California consumers over \$56 billion in energy costs.¹⁵⁵ Going forward, achieving 100% of the GHG emission reduction targets mandated by AB 32, the legislation that Republican Governor Schwarzenegger championed to reduce carbon emissions 80% by 2050, would increase the Gross State Product by \$76 billion, increase real household incomes by \$48 million, and create as many as 403,000 new efficiency and climate action jobs.¹⁵⁶

This should not come as a surprise to Californians. They've done it before. In 1989, the voters in Sacramento, California shut

150. Stephen Mufson, *In Energy Conservation, Calif. Sees Light*, WASH. POST, Feb. 17, 2007.

151. David Sassoon, *Florida Renewable Energy Plan a Job and Economy Juggernaut*, SUSTAINABLOG, May 29, 2009, <http://blog.sustainablog.org/florida-renewable-energy-plan-jobs-economy/>.

152. David Roland-Holst, *Energy Efficiency, Innovation and Job Creation in California*, NEXT 10, Oct. 20, 2008, http://www.next10.org/research/research_eeijc.html.

153. *Id.*

154. *Id.*

155. *Id.*

156. *Id.*

down the city utility's 1,000-megawatt nuclear plant.¹⁵⁷ Rather than invest in a new conventional centralized fossil fuel plant, the local utility met its citizens' needs through energy efficiency and renewable energy, including wind, solar, biofuels and distributed technologies like co-generation and fuel cells.¹⁵⁸ "In 2000, an econometric study showed that the program had increased the regional economic health by over \$180 million, compared to just running the existing nuclear plant."¹⁵⁹ The utility was able to hold rates level for a decade, retaining 2,000 jobs in factories that would have been lost under the 80% increase in rates that just operating the power plant would have caused. The program generated 880 new jobs, and enabled the utility to pay off all of its debt.

The town of Braddock, Pennsylvania, went from 20,000 people to 2,000. A rustbelt town outside of Pittsburgh, the mayor allegedly said, "we're not going die, we're going to go green." They are recruiting companies making renewable energy, they are growing organic vegetables on the vacant lots to sell to high-end restaurants in Pittsburgh, and they are growing feedstock for biofuels on vacant lots. These tactics are keeping a third generation in business in a 100-year-old oil company town.¹⁶⁰ The people of Braddock are re-building their town using renewable energy.

In Colorado, over the last 10 years, more new jobs have been created in the clean tech sector than all other sectors in the state combined.¹⁶¹ In 2008, green industries generated 8.5 million jobs

157. Letter from Ed Smeloff, General Manager SMUD, to L. Hunter Lovins (Oct. 2000) (on file with author).

158. *Id.*

159. U.S. DEPT. OF ENERGY, THE JOBS CONNECTION: ENERGY USE AND LOCAL ECONOMIC DEVELOPMENT (1996), available at <http://www.localenergy.org/pdgs/Documents%20Library/The%20Connection.pdf>.

160. See generally *Pittsburgh Renews Itself With 'Green' Technologies*, PBS NEWSHOUR, Apr. 25, 2008, http://www.pbs.org/newshour/bb/environment/jan-june08/green_04-25.html.

161. Andrew Burger, *Green Jobs Watch: Solar in Colorado, Small Wind in Michigan*, GLOBAL WARMING IS REAL, Apr. 16, 2009, <http://www.globalwarmingisreal.com/blog/2009/04/16/green-jobs-watch-solar-in-colorado-small-wind-in-michigan/>.

and over \$1 trillion in revenues. By 2030, this is predicted to rise to at least 40 million jobs.¹⁶²

A 2006 study by the University of California Berkeley found that jobs in the fossil-fuel industry have been steadily declining for reasons that “have little to do with environmental regulation,” such as mechanization and mergers.¹⁶³ Although U.S. coal production increased 32% between 1980 and 1999, coal-mining employment decreased 66%, from 242,000 to 83,000 workers. The report found that while some sectors would lose jobs, policy interventions can minimize the impact of a transition.¹⁶⁴ It also found that the clean energy sector produces ten times as many jobs per megawatt of power installed, per unit of energy produced, and per dollar of investment, than the fossil fuel sector.¹⁶⁵

Twenty states, representing over two-thirds of the U.S. economy and population, are implementing comprehensive, multi-sector GHG reduction plans. Such programs will expand employment, income and investment and contribute to national economic recovery, while achieving net savings of at least \$85 billion in 2020. From 2009 to 2020, these programs will produce a cumulative savings of \$535.5 billion. The programs will also deliver co-benefits such as energy independence, enhanced health and environmental protection.¹⁶⁶

This is not a Red or a Blue issue. R. James Woolsey, who used to run the CIA, drives a plug in hybrid car, which he powers from the solar panels on his roof. It has a bumper sticker on the back that says, “Osama Bin Laden hates my car.” He sees this as a national security issue.

162. American Solar Energy Society, *Green Collar Jobs: The New Cash Crop*, Nov. 6, 2007, http://www.ases.org/index.php?option=com_content&view=article&id=29&Itemid=16.

163. DANIEL KAMMEN ET AL., PUTTING RENEWABLES TO WORK: HOW MANY JOBS CAN THE CLEAN ENERGY INDUSTRY GENERATE? 2 (2006), *available at* <http://rael.berkeley.edu/sites/default/files/very-old-site/renewables.jobs.2006.pdf>.

164. *Id.*

165. *Id.* at 2-3.

166. CENTER FOR CLIMATE STRATEGIES, CLIMATE CHANGE POLICY AS ECONOMIC STIMULUS: EVIDENCE AND OPPORTUNITIES FROM THE STATES, Nov. 2008 (Draft), *available at* <http://www.climatestrategies.us>; *see also* ROBERT POLLIN ET AL. GREEN RECOVERY A PROGRAM TO CREATE GOOD JOBS AND START BUILDING A LOW-CARBON ECONOMY 1-4 (Sept. 2008) *available at* http://www.americanprogress.org/issues/2008/09/pdf/green_recovery.pdf.

IX. NEW ENERGY SUPPLY

The transition away from fossil fuels to the energy system of the future can actually happen fairly rapidly. In 2008, the wind industry added 17 gigawatts of new wind capacity around the world.¹⁶⁷ In 2009, the number jumped to 37 gigawatts. A gigawatt is roughly the amount of electricity produced by a nuclear power plant. Did you notice? If we had built 17 nuclear plants, you would have noticed.

There are people claiming that nuclear power is necessary to displace coal and slow global warming. Those people forget a few facts. A recent study by Craig Severance, a retired utility commission employee, found that new nuclear plants will cost 25¢ to 30¢ per kilowatt hour of power produced (¢/kWh).¹⁶⁸ Changing out inefficient light bulbs costs half a cent per kWh.¹⁶⁹ Wind in good sites can cost as little as 3¢/kWh, solar as low as 12¢/kWh. Nuclear is simply too expensive.

Nuclear is also too slow. If Dr. Hansen is correct, we need to act in the next couple of years. It takes 10 years or more to bring a nuclear plant on line, once all of the permits have been secured. The Chinese can do it in four; but in the U.S., the only units now under construction have already cost over \$17 billion and, after a decade, are well behind schedule.¹⁷⁰

Replacing all of the coal plants around the world with nuclear would make it impossible to prevent any country that wanted them (or any serious sub-national group like al Qaeda) from obtaining nuclear bombs. Not a nice prospect. Nuclear also requires large amounts of water to cool the plants. During droughts, which are likely to become more common as we begin to feel the effects of climate change, nuclear plants may have to be

167. Global Wind Energy Council, *Wind is a Global Power Source*, <http://www.gwec.net/index.php?id=13> (last visited Aug. 18, 2010).

168. See generally Craig A. Severance, *Business Risks and Costs of New Nuclear Power*, CLIMATE PROGRESS, Jan. 5, 2009, <http://climateprogress.org/2009/01/05/study-cost-risks-new-nuclear-power-plants/>.

169. See generally John Farrell, *Energy Self-Reliant States: Second and Expanded Edition*, Oct. 2009, NEW RULES PROJECT, <http://www.newrules.org/energy/publications/energy-selfreliant-states-second-and-expanded-edition>.

170. Jerome R. Stockfish, *New Nuclear Plant Would Boost Electric Bills For A Decade*, THE TAMPA TRIB., Mar. 12, 2008, <http://www2.tbo.com/content/2008/mar/12/bz-new-nuclear-plant-would-boost-electric-bills-fo/>.

shut down. Additionally, there remains no technical solution for the waste. Perhaps most disturbing, nuclear power, because it is so dangerous, requires a technological “priesthood” to look after the technology. This is profoundly undemocratic.

Oh, yes, and an accident anywhere in the world would shut down the entire industry. . .Oops. . .

This is not an encouraging litany for a technology that has cost American taxpayers more than the Vietnam War and the space program combined and now delivers to us about as much energy as wood.

There are far better ways to meet whatever needs for energy remain, after we have done the cost effective efficiency improvements. The renewable forms of energy can deliver all of the energy that a dynamic industrial society requires, and the marginal investments in them are better buys than building any more of the sunset industries like coal or nuclear. In good sites, wind power actually costs less than just running an existing coal plant. Almost any decent site will deliver wind power at less than building a new coal plant. As a result utilities have cancelled well over 100 proposed new coal plants across the U.S. Some utility commissions have even ruled that a coal plant is no longer the cheapest power but wind is.¹⁷¹ (Of course, efficiency is even cheaper still.)

Solar power is now the world’s fastest growing form of energy supply. Solar electricity is nearing competitiveness with coal and is already cheaper than nuclear power. Southern California independent power producers were building a megawatt a week, prior to the economic collapse.¹⁷² Southern California Edison built a 250 megawatt power plant on roofs spread around the county at a price point, \$875 million, that is eerily close to the cost of a coal

171. See generally John Miller, *Idaho Power Gives Up on Coal-fired Plant*, INDUSTRIAL WIND ACTION GROUP, <http://www.windaction.org/news/12551>; see also Dustin Bleizeffer, *Utility Snuffs Coal Projects*, CASPER STAR-TRIB., Dec. 11, 2007, <http://www.casperstartribune.net/articles/2007/12/11/news/wyoming/dd57370122353e84872573ae00074a79.txt>.

172. See generally Jeremy Elton Jacquot, *Largest Solar Farm Ever to be Built in California*, TREEHUGGER, July 7, 2007, http://www.treehugger.com/files/2007/07/largest_solar_farm_ever.php; see also Michael Graham Richard, *Turning Big Box Stores into Solar Power Plants in California*, TREEHUGGER, Mar. 27, 2008, <http://www.treehugger.com/files/2008/03/big-box-stores-roofs-solar-power-california.php>.

plant that was recently cancelled up in Montana, which would have cost \$800 million.¹⁷³ This means that solar electricity, one of the more expensive of the renewable forms of energy, is coming very close to the cost of producing energy using dirty dangerous coal.

In 2007, the U.S. renewable energy and energy efficiency industries generated over \$1 trillion in sales and created over 9 million jobs, representing substantially more than the combined 2007 sales of the three largest U.S. corporations—Walmart, ExxonMobil, and General Motors (\$905 billion). If the federal stimulus policies are implemented, these industries could generate over 37 million jobs per year in the U.S. by 2030.¹⁷⁴

But, at present, American energy policy (more practiced by its absence) is allowing leadership in renewable power to go elsewhere. For years the dominant solar country was not the American Southwest, but cold and cloudy Germany, where the renewables industry was adding more jobs than all other German industries combined. The Germans put in place a national Feed-in Tariff policy that paid anyone who produced renewable energy an attractive and predicable price for their power.¹⁷⁵ As a result, wind turbines sprouted on the approach to Munich, whole villages became entirely renewably powered¹⁷⁶ and the German solar market continues to grow at over 25% a year.¹⁷⁷ German renewable energy now delivers over 15% of all German electricity.¹⁷⁸ Germany is now the first nation in the world to entirely power its Parliament with renewable energy and plans to become the world's first industrial power to use 100% renewable

173. Jacquot, *supra* note 172.

174. *Defining, Estimating and Forecasting the Renewable Energy and Energy Efficiency Industries in the U.S. and Colorado*, GREENBIZ, Jan. 15, 2009, <http://www.greenbiz.com/resources/resource/defining-estimating-and-forecasting-renewable-energy-and-energy-efficiency-indust>.

175. Solar Buzz, <http://www.solarbuzz.com/fastfactsgermany.htm> (last visited Aug. 18, 2010).

176. Justin Thomas, *German Town Will Soon Use 100% Renewable Power*, METAEFFICIENT, Apr. 29, 2007, <http://www.metaefficient.com/renewable-power/german-town-will-soon-use-100-renewable-power.html>.

177. Tech Pulse 350, *Despite Downturn German Solar Market Will Grow 25% This Year*, <http://techpulse360.com/2009/08/31/despite-downturn-german-solar-market-will-grow-25-this-year/> (last visited Aug. 18, 2010).

178. *Renewables Made in Germany*, <http://www.renewables-made-in-germany.com/index.php?id=108&L=1> (last visited Aug. 18, 2010).

energy. At current rates, it could reach that green goal by 2050, generating 800,000 to 900,000 new cleantech jobs by 2030.¹⁷⁹

The Germans are not alone. Denmark aims to get 60% of its energy from renewables by 2010. Japan was first-to-market with hybrid vehicles, enabling Toyota to surpass General Motors as the world largest car company in 2008. It expects hybrid vehicles to rise from 6% of its U.S. vehicle sales in 2005 to 20% by 2012.¹⁸⁰

Calling climate change “one of the most pressing global challenges,” venture capitalist John Doerr predicted that the resulting demand for innovation would create the “mother of all markets.”¹⁸¹ Investment in the renewable energy projects market could reach \$50 billion by 2011, with double-digit annual growth rates.¹⁸² The U.N. described it as “[a] gold rush of new investment into renewable power,” concluding that clean energy could provide almost a quarter of the world’s electricity by 2030.¹⁸³ The European Renewable Energy Council (EREC) was even more optimistic, claiming that 50% of the world’s energy supply can come from renewable energy sources by 2040.¹⁸⁴

Business success and national stature demand innovation especially in a time of technological transformation. Since the First Industrial Revolution, there have been at least six waves of innovation, each shifting the technologies underpinning economic prosperity, political influence and military domination in the world. In the late 1700s textiles, iron mongering, waterpower,

179. Jane Burgermeister, *Germany: The World's First Major Renewable Energy Economy*, RENEWABLE ENERGY WORLD, Apr. 3, 2009, <http://www.renewableenergyworld.com/rea/news/article/2009/04/germany-the-worlds-first-major-renewable-energy-economy>.

180. THE CLIMATE GROUP, *IN THE BLACK: THE GROWTH OF THE LOW CARBON ECONOMY 11* (2007), available at <http://www.theclimategroup.org/publications/2007/8/31/in-the-black-the-growth-of-the-low-carbon-economy--summary-report/>.

181. *Id.*

182. *New Report Projects \$50 Billion in Renewable Energy Investment by 2011*, RENEWABLE ENERGY WORLD, Nov. 20, 2007, <http://www.renewableenergyaccess.com/rea/news/story?id=50622>.

183. Terry Macalister, *Renewable Revolution Is Here, Says UN Report*, GUARDIAN, June 21, 2007, <http://www.commondreams.org/archive/2007/06/21/2016/>.

184. *Renewables Can Meet 50 Percent of Energy Needs by 2040, Claims Report*, TIMES HIGHER EDUC., June 1, 2004, <http://www.timeshighereducation.co.uk/story.asp?storyCode=189068§ioncode=26>.

and mechanization enabled modern commerce to develop in Britain, and the British Navy to rule the waves.

The second wave of innovation, also British, saw the introduction of steam power, trains and steel. In the mid 1980s oil was discovered in the U.S. The sun never set on the British Empire. By the 1900s, electricity, chemicals and cars began to dominate. America came to rule the world, militarily, politically and economically. German and Japanese industrial machines sought to challenge American dominance but Yankee ingenuity prevailed.

By the middle of the century it was petrochemicals, and the space race, along with electronics. The Soviets challenged but American innovation and entrepreneurial excellence won out. The most recent wave of innovation has been the introduction of computers, iPods and the rest of the digital or information age, and America is now the lone superpower.

If the planet is to survive, the next wave of innovation will surely center on clean technology and the transition to more sustainable ways of manufacturing products and delivering the services that humans desire. As the industrial revolution plays out and economies move beyond iPods, older industries will suffer dislocations, unless they join the increasing number of companies implementing the array of sustainable technologies that will make up the next wave of innovation.¹⁸⁵

The U.S. is still debating whether to require power companies and others to generate more electricity from renewable sources. China already has already done so and is investing hundreds of billions of dollars to make itself the green energy superpower.¹⁸⁶ The China Greentech Initiative reported in September 2009 that China's market for energy efficiency, renewable energy and other green technology could become \$1 trillion market by 2013.¹⁸⁷ The report cites:

185. *See generally* KARLSON HARGROVES & MICHAEL H. SMITH, *THE NATURAL ADVANTAGE OF NATIONS: BUSINESS OPPORTUNITIES, INNOVATION AND GOVERNANCE IN THE 21ST CENTURY* (2005) (this concept was first presented in the Economist).

186. Keith Bradsher, *Green Power Takes Root in the Chinese Desert*, N.Y. TIMES, July 3, 2009, at B1, available at http://www.nytimes.com/2009/07/03/business/energy-environment/03renew.html?_r=1&emc=eta1.

187. World Business Council for Sustainable Development, *Environmental Finance, China's Green-tech Market Could Reach \$1 Trillion by 2013*,

the fast pace of renewables growth as one example—wind capacity has doubled every year for the last four years to reach 12.2 gigawatts in 2008 and one in 10 households has a solar water heater installed. The government has a target of deriving 20% of energy from renewable sources by 2020.¹⁸⁸

China broke ground in 2009 on what will be the world's largest and cheapest wind farm, delivering 20 gigawatts and perhaps twice that. The plant is expected to deliver five gigawatts in 2010, and will reach 20 gigawatts by 2020; another six wind farms are also planned, each on a similar scale.¹⁸⁹ China will surpass the U.S. in wind power in 2010 and could well have 30 gigawatts of wind power installed by year's end, investing \$440 to \$660 billion in solar and wind power over the next 10 years.¹⁹⁰

In article after article, Tom Friedman warns of the loss of American competitiveness if we let China go unchallenged. In an article harking back to the space race¹⁹¹ he writes:

China's leaders, mostly engineers, wasted little time debating global warming. They know the Tibetan glaciers that feed their major rivers are melting. But they also know that even if climate change were a hoax, the demand for clean, renewable power is going to soar as we add an estimated 2.5 billion people to the planet by 2050, many of whom will want to live high-energy lifestyles. In that world, E.T.—or energy technology—will be as big as I.T., and China intends to be a big E.T. player. . . .

. . . .

<http://www.wbcsd.org/plugins/DocSearch/details.asp?type=DocDet&ObjectId=MzU2Njk> (last visited Aug. 18, 2010).

188. *Id.*

189. Keith Johnson, *Wind Power: China's Massive—and Cheap—Bet on Wind Farm*, WALL STREET J., July 6, 2009, <http://bx.businessweek.com/wind-power/view?url=http%3A%2F%2Ftwurl.nl%2Fxyko0x>.

190. *Investment In New Energy Promotion Plan*, NETEASE FINANCIAL, May 26, 2009, <http://money.163.com/09/0526/16/5A8JM34S00252G50.html>.

191. Thomas Friedman, *The New Sputnik*, N.Y. TIMES, Sept. 26, 2009, at WK12, available at <http://www.nytimes.com/2009/09/27/opinion/27friedman.html?emc=eta1>.

. . . China's going clean-tech. The view of China in the U.S. Congress—that China is going to try to leapfrog us by out-polluting us— is out of date. It's going to try to out-green us. Right now, China is focused on low-cost manufacturing of solar, wind and batteries and building the world's biggest market for these products. . . .

. . . “If they invest in 21st-century technologies and we invest in 20th-century technologies, they'll win,” says David Sandalow, the assistant secretary of energy for policy. “If we both invest in 21st-century technologies, challenging each other, we all win.”

Unfortunately, we're still not racing. It's like Sputnik went up and we think it's just a shooting star. Instead of a strategic response, too many of our politicians are still trapped in their own dumb-as-we-wanna-be bubble, where we're always No. 1, and where the U.S. Chamber of Commerce, having sold its soul to the old coal and oil industries, uses its influence to prevent Congress from passing legislation to really spur renewables.¹⁹²

In a prior article, entitled “Have a Nice Day,” Friedman railed that solar panel fabrication manufacturer, Applied Materials, a U.S. company, is opening 14 new panel-manufacturing plants, none in America. Friedman writes, “Let's see: five are in Germany, four are in China, one is in Spain, one is in India, one is in Italy, one is in Taiwan and one is even in Abu Dhabi. I suggested a new company motto for Applied Materials' solar business: ‘Invented here, sold there.’”¹⁹³ He continues:

If we want to launch a solar industry here, big-time, we need to offer the kind of long-term certainty that Germany does or impose the national requirement on our utilities to generate solar power as China does or have the government build giant solar farms, the way it built the Hoover Dam, and sell the electricity.

192. *Id.*

193. Thomas Friedman, *Have a Nice Day*, N.Y. TIMES, Sept. 16, 2009, at A31, available at <http://www.nytimes.com/2009/09/16/opinion/16friedman.html>.

O.K., so you don't believe global warming is real. I do, but let's assume it's not. Here is what is indisputable: The world is on track to add another 2.5 billion people by 2050, and many will be aspiring to live American-like, high-energy lifestyles. In such a world, renewable energy—where the variable cost of your fuel, sun or wind, is zero—will be in huge demand.

China now understands that. It no longer believes it can pollute its way to prosperity because it would choke to death. That is the most important shift in the world in the last 18 months. China has decided that clean-tech is going to be the next great global industry and is now creating a massive domestic market for solar and wind, which will give it a great export platform.

In October, Applied will be opening the world's largest solar research center—in Xian, China. Gotta go where the customers are. So, if you like importing oil from Saudi Arabia, you're going to love importing solar panels from China.

Have a nice day.¹⁹⁴

X. THE BUSINESS CASE: THE INTEGRATED BOTTOM LINE

And then you get the inevitable question: “Ah, but is there a business case. . .?”

Yes. In fact the business case for acting to protect the climate, to make the transition to more sustainable business, is now so robust that you ignore it at your peril. Despite overwhelming evidence to the contrary, many people believe that implementing climate protection, energy efficiency, renewable energy and any form of environmental protection is costly to business. They reach this conclusion in part because of a well-coordinated campaign run by the fossil fuel industries that

194. *Id.*

alleges this.¹⁹⁵ An approach called the triple bottom line also played a part in their beliefs. The triple bottom line, a true innovation when John Elkington first introduced it, turned out to be a dead end concept because it asks businesspeople to bolt people and the planet onto their profit. They become cost centers, which is not an attractive concept.¹⁹⁶

A better approach is Natural Capitalism's Integrated Bottom Line. Companies around the world are recognizing that drivers of change like global warming will require that they shift the way they do business. They are also recognizing a related driver that has been called, "The Sustainability Imperative." This "imperative" is the discovery that companies that behave more responsibly towards people and the planet cut their costs, are a better investment risk, and enhance all aspects of shareholder value. Over the past decade, more than a dozen studies have shown that companies that focus on and implement sustainability programs achieve greater profitability than their industry peers. Actions taken to make a company more sustainable also make it less exposed to value erosion and strengthen every aspect of business value.

Shareholder value is enhanced when a company cuts its costs, as DuPont did, maintaining profitability because it was committed to squeezing out waste. A company that grows its top-line sales through innovation, as ST Microelectronics did, captures superior market advantage. As the Investor Network on Climate Risk shows, responsible management of a company's carbon footprint enables it to secure better access to capital from socially responsible investors and better manage risks. Cutting carbon emissions in buildings enhances labour productivity, increases a company's ability to attract and retain the best talent, and improves creativity and morale in the workplace.

A corporate commitment to use energy more efficiently, to cut its carbon footprint, and to act to protect the climate strengthens every aspect of core business values and shareholder equity. This

195. Union of Concerned Scientists, Global Warming Skeptic Organizations, http://www.ucsusa.org/global_warming/science_and_impacts/global_warming_contrarians/global-warming-skeptic.html (last visited Aug. 18, 2010).

196. John Elkington, *Towards the Sustainable Corporation: Win-Win-Win Business Strategies for Sustainable Development*, 36 CALIFORNIA MANAGEMENT REV. 90, 90-100 (1994).

Integrated Bottom Line approach shows that companies that implement sustainability programs not only reduce expenses now but also position themselves for better long-term performance, and better management of their supply chains and stakeholders.¹⁹⁷ Such businesses enjoy enhanced government relations, reputation and brand equity.¹⁹⁸ Over time, a commitment to behave more sustainably enhances core business value by delivering sector performance leadership and first-mover advantage. The companies that get it right will be first to the future; we're talking about the billionaires of tomorrow. Bob Willard, in the book *The Sustainability Advantage*, put real numbers to the value of counting just seven of the thirteen or more aspects of the Integrated Bottom Line. His results show an increase in profitability of 38% from implementing sustainability in a company.

These conclusions are borne out by the 2007 report from Goldman Sachs, showing that companies that are leaders in environmental, social and good governance policies outperformed the MSCI world index of stocks by 25% since 2005.¹⁹⁹ Seventy-two percent of the companies on the list out performed industry peers, were financially healthier, and achieved enduring value.²⁰⁰ A study by the Economist Intelligence Unit repeated these findings and further found that the worst performing companies in the economy were most likely to have nobody in charge of sustainability.

Even in the economic collapse, companies that make a serious commitment to behave in more sustainable ways fared better than their peers in the same industry. From 2006 through 2007, companies on the Dow Jones Sustainability World Index performed 10 points above the S&P 500.²⁰¹

197. *Id.*

198. David Reilly, *Profit as We Know It Could Be Lost With New Accounting Statements*, WALL STREET J., May 12, 2007, at A1.

199. *Id.*

200. Margo Alderton, *Recent Report Finds Corporations that Lead in Corporate Responsibility also Lead in the Market*, SOCIALLY RESPONSIBLE INVESTING, <http://www.csrwire.com/companyprofile?id=4489> (last visited Aug. 18, 2010).

201. Tim Carey, *Sustainability—An Economic Imperative in the Current Economy*, ENVIRONMENTAL LEADER, Dec. 1 2008, <http://www.environmental>

In 2009, A.T. Kearney released the findings of their report, Green Winners, comparing the economic performance of companies with a commitment to sustainability to companies in the same industry without such a commitment.²⁰² The report tracked the stock price of 99 firms on Dow Jones Sustainability Index and the Goldman Sachs list of green companies over six months prior to November 2008. The results from the report showed that, in 16 out of the 18 industries evaluated, businesses deemed “sustainability focused” outperformed industry peers over three and six month periods and were “well protected from value erosion.” In the study period of three months, the differential between the companies with and without a commitment to sustainability was 10%, and over six months the differential was 15%. “This performance differential,” the Report stated, “translates to an average of \$650 million in market capitalization per company.”²⁰³

In 2009, a study of European companies by ATOS consulting stated, “There is a strong business case for environmental excellence. Companies with more mature sustainability programs enjoy higher profit. . . .”²⁰⁴ “Companies will implement more sustainable processes and procedures or they will risk losing competitiveness in a world that can no longer tolerate unsustainable behaviour. A 2009 article in Harvard Business Review concluded,

Sustainability isn’t the burden on bottom lines that many executives believe it to be. In fact, becoming environment-friendly can lower your costs and increase your revenues. That’s why sustainability should be a touchstone for all innovation. In the future, only companies that make sustainability a goal will achieve competitive advantage.

leader.com/2008/12/01/sustainability-an-economic-imperative-in-the-current-economy.

202. *Id.*

203. *Id.* at 2.

204. PIERFRANCESCO MANENTI ET AL., THE BUSINESS CASE FOR ENVIRONMENTAL EXCELLENCE IS REAL 8 (2009), available at http://www.atosorigin.com/NR/rdonlyres/56C51085-B33B-4B2D-A2C8-80D5DCA74768/0/idc_report.pdf.

That means rethinking business models as well as products, technologies and processes.²⁰⁵

Acting to protect the climate can unleash a new energy economy creating the greatest prosperity ever in history. As Sir Nicholas Stern stated, “If we fail to act, it will represent the greatest market failure ever in history.”

Business-as-usual is changing. The economic collapse of 2008-2009 had many well-discussed causes, but it stemmed from the fundamental unsustainability, not only of the global financial system, but of the entire way business is conducted across the globe. Overcoming the financial crisis, avoiding the next collapse, and creating a society in which all people can prosper will require rethinking how industry is conducted.

If the world wishes to overcome the financial crisis, avoid the next collapse, and lift its people out of poverty, the way business is done must change. Reducing environmental damage and restoring intact ecosystems is the essential basis for creating future prosperity. Businesses and governments can either drive change in ways that allow companies and economies to flourish or they will be forced to respond to resultant crises and hope for the best.

The challenges facing modern industry go far beyond the usual task of ensuring sufficient cash flow to stay in business. They pose systemic challenges that will alter most everything about the world in which business is done. They will shift how essentially everything is made and delivered. This is, in part, because the economic collapse of 2008-2009 is the tip of a much larger iceberg. Even if nations could roll back the clock to early 2008 and act differently given foreknowledge of what was to come, the forces that drove the collapse would have to be overcome before the world could choose a course that would not inevitably lead to collapse.

If the massive stimulus packages now being rushed to the market are “successful,” and the economy returns to the boom days of the early 21st century, challenges like climate change will inexorably force the system into the next collapse.

205. Ram Nidumolu et al., *Why Sustainability is Now the Key Driver of Innovation*, HARV. BUS. REV., Sept. 2009, at 3.

XI. LEADERSHIP FOR A WORLD THAT WORKS

There remains a very important role for Government. We have been under a campaign, the last thirty years or so, to delegitimize the role of Government. It's like a bad light bulb joke . . . How many economists does it take to screw in a more efficient light bulb? None, the free market will do it. Markets make very good servants, but they're not such good masters, and they're a lousy religion. There's also a very important role for communities of faith. Go back and read Alan Smith; all markets do is allocate scarce resources efficiently in the short term. Markets were never intended to take care of grandchildren. That is our job. That is the job of a free people coming together and saying, what kind of a world do we want to leave? What will our legacy be? Ray Anderson is fond of saying, "When you meet your maker, what will your conversation be? Will it be last quarter's share price?" I don't think so. We need leadership. And I rather like the line from Lord of the Rings, in which Gandalf says,

[t]he rule of no realm is mine . . . [b]ut all worthy things that are in peril as the world now stands, those are my care. And for my part, I shall not wholly fail of my task . . . if anything passes through this night that can still grow fair and bear fruit and flower again in the days to come. For I am also a steward, did you not know?²⁰⁶

Not a bad maxim of leadership. It does not matter if you are the head of Walmart or an elected official.²⁰⁷ Remember, in the book it was the fun loving unassuming little hobbits, who liked their second breakfasts, who took on their shoulders the awesome task of meeting the challenges that threatened the world.²⁰⁸ They were scared and they did not know where they were going. But in the end, all the kings and warriors and wizards could only stand by as the little people saved the world.

Real leadership is extraordinary courage by ordinary people.

Earth, this little blue marble hung in space, is the only place in all the universe we know of, where there is life. Those who act

206. J.R.R. TOLKIEN, *THE RETURN OF THE KING* 16 (1965).

207. *Id.*

208. *Id.*

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to protect it will not only give life to all generations to follow, but will establish the foundations of an enduring prosperity: the business case for climate protection.