

**Petersen, Lloyd**

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**From:** Leslie Glustrom [lglustrom@gmail.com]  
**Sent:** Sunday, May 04, 2008 7:47 PM  
**To:** Web, PUC  
**Subject:** 08I-113EG Glustrom Request to Be on Notice List Plus Comments on Scope

Dear PUC Staff--Thank you for the opportunity to participate in the 08I-113EG Docket. Please add me to the notification list for this Docket.

Also, I ask that the following two issues be included in the scope of the study.

- **Non-energy benefits:** Both CRS 40-2-123 (1) and Rule 3651 include a number of non-energy benefits and I request that the Commission include consideration of these in this investigation. \
- **Externalities:** There are a host of externalities (e.g. climate change, mercury emissions, particulate emissions, SO2 and NOX emissions. environmental and economic impacts of natural gas drilling etc.etc.) that I am hoping will also be included in the investigation.

Thank you for this opportunity to comment.

Leslie Glustrom  
[lglustrom@gmail.com](mailto:lglustrom@gmail.com)  
303-245-8637

**BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF COLORADO****DOCKET NO. 08I-113EG****IN THE MATTER OF THE INVESTIGATION OF REGULATORY AND RATE INCENTIVES FOR GAS AND ELECTRIC UTILITIES.**

This investigatory docket is opened concerning regulatory and rate incentives that influence electric and gas utility actions under existing regulatory structures in Colorado and concerning alternative incentives and alternative regulatory and rate structures that may alter or influence utility actions.

April 29, 2008

Decision No. C08-0448, ORDER OPENING INVESTIGATORY DOCKET AND NOTICE OF INQUIRY - [DOC](#)

- Interested persons are encouraged to submit comments on the scope of the proceeding on or before May 29, 2008. In addition to the filing of written comments, interested persons may submit comments electronically by compact disk (CD), or e-mail to [puc@dora.state.co.us](mailto:puc@dora.state.co.us).

**Petersen, Lloyd**

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**From:** Leslie Glustrom [lglustrom@gmail.com]  
**Sent:** Sunday, May 04, 2008 8:47 PM  
**To:** Web, PUC  
**Subject:** 08I-113EG Lovins Testimony  
**Attachments:** Hunter\_Lovins\_Testimony-withAttachments-FINAL[1].doc

Dear PUC--Please note the attached testimony from Hunter Lovins. It should be useful in the 08I-113EG Docket.

Many thanks. Leslie

Leslie Glustrom  
[lglustrom@gmail.com](mailto:lglustrom@gmail.com)  
303-245-8637

**BEFORE THE PUBLIC UTILITIES COMMISSION  
OF THE STATE OF COLORADO**

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IN THE MATTER OF THE  
APPLICATION OF PUBLIC SERVICE  
COMPANY OF COLORADO FOR )  
AUTHORITY TO IMPLEMENT AN )  
ENHANCED DEMAND SIDE )  
MANAGEMENT PROGRAM AND TO )  
REVISE ITS DEMAND-SIDE )  
MANAGEMENT COST ADJUSTMENT )  
MECHANISM TO INCLUDE CURRENT )  
COST RECOVERY AND INCENTIVES )

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DOCKET NO. 07A-420E

**ANSWER TESTIMONY OF HUNTER LOVINS  
ON BEHALF OF  
RATEPAYERS UNITED OF COLORADO**

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**March 10, 2008**

1           **PLEASE STATE YOUR NAME, ADDRESS, EDUCATION AND BACKGROUND.**

2           My name is L. Hunter Lovins. My business address is P.O. Box 398 in Eldorado Springs,  
3 Colorado. I am the President and founder of Natural Capital Solutions (NCS), which educates  
4 senior decision-makers in business and government. My educational background is in sociology  
5 and law (Juris Doctorate). I have co-authored eleven books on energy and climate policy and  
6 hundreds of articles in these areas. One of my areas of expertise is energy and resource policy,  
7 which this docket addresses. A more complete biography can be found in Attachment A.

8           **WHY ARE YOU TESTIFYING IN THIS DOCKET?**

9           I am testifying on behalf of Ratepayers United of Colorado (RUC) on how quickly and  
10 cost-effectively energy efficiency could be implemented in Colorado. I will discuss how  
11 investing in energy efficiency (“efficiency”) will provide the customers of Public Service  
12 Company of Colorado (“PSCo”) with cheaper energy services, and deliver to PSCo more earned  
13 revenue and greater shareholder value at less risk. Efficiency will also create ten times more  
14 jobs for consumers than an equal investment in fossil generation.

15           **DO INVESTMENTS IN ENERGY EFFICIENCY ACTUALLY *CREATE* JOBS?**

16           Yes. There are many studies showing that investing in energy efficiency and renewable  
17 energy creates more American jobs than comparable investment in fossil fuel plants; for  
18 example, see Dr. Dan Kammen’s 2006 Report of the Renewable and Appropriate Energy  
19 Laboratory of the University of California.

20           My testimony today will focus more on the *economic benefits of efficiency*. Increasing  
21 the efficiency with which buildings, appliances and machines use energy can generate immediate  
22 and ongoing savings. Durable measures to reduce the energy use of lighting, HVAC, appliances,  
23 and all other end uses in buildings enable utility customers to meet their needs for energy

1 services at far lower cost than can any proposed or even existing fossil power plant.  
2 Implementing these savings will deliver economic development by creating new manufacturing  
3 companies, new jobs in building retrofits, and new, decentralized energy systems to complement  
4 the efficiency measures. These investments will spur the creation of a dynamic, transformative  
5 clean energy economy that saves money, generates jobs and confers economic opportunity.

6 In 2006, there were 3,498 direct jobs from energy efficiency (EE), and 8,046 direct and  
7 indirect jobs in EE, for a total of \$932.6 billion in revenue.<sup>1</sup> The American Solar Energy  
8 Society's 2007 report, "Renewable Energy and Energy Efficiency: Economic Drivers for the 21st  
9 Century," describes how unleashing the new energy economy is already generating about 8.5  
10 million green collar jobs and almost \$1 trillion in revenue. The number could increase to 40  
11 million jobs and \$4.5 trillion in revenues "with the appropriate public policy, including a  
12 renewable portfolio standard, renewable energy incentives, public education and research and  
13 development," the report found. One in four Americans could work in a "green collar job" by  
14 2030.<sup>2</sup>

15 A 2006 study by the University of California Berkeley<sup>3</sup> found that jobs in the fossil-fuel  
16 industry have been steadily declining for reasons that "have little to do with environmental  
17 regulation," such as mechanization and mergers. Although U.S. coal production increased 32%  
18 between 1980 and 1999, coal-mining employment *decreased 66%*, from 242,000 to 83,000  
19 workers. The report found that while some sectors would lose jobs, policy interventions can  
20 minimize the impact of a transition,<sup>4</sup> and that the clean energy sector produces more jobs per

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<sup>1</sup> *Putting Renewables to Work: How Many Jobs Can the Clean Energy Industry Generate?* by Daniel Kammen, Kamal Kapadia and Matthias Fripp, of the Energy and Resources Group Goldman School of Public Policy, initially published April 13, 2004, corrected January 31, 2006, p. 31.

<sup>2</sup> American Solar Energy Society, "Renewable Energy and Energy Efficiency: Economic Drivers for the 21st Century," 2007, p. iv and vii. <http://www.ases.org/ASES-JobsReport-Final.pdf>

<sup>3</sup> *Putting Renewables to Work*.

<sup>4</sup> *Id.*, pp. 2, 14.

1 MW of power installed, per unit of energy produced, and per dollar of investment, than the fossil  
2 fuel sector.<sup>5</sup>

### 3 **HOW MUCH MONEY DOES ENERGY EFFICIENCY SAVE?**

4 DuPont found that using energy more efficiently saves money because it costs less to  
5 implement the energy savings measures than it does to buy and burn fossil fuel. In 1999, the  
6 company estimated that every ton of carbon it displaced through energy efficiency saved it \$6,  
7 because, although it was achieving the same energy services, it no longer had to purchase the  
8 carbon fuel, which had it been burned would have released the carbon. Wal-Mart realized that  
9 just changing the incandescent bulbs in its ceiling fan displays throughout its 3,230 stores (10  
10 models of ceiling fans on display, each with four bulbs. Forty bulbs per store, 3,230 stores) could  
11 save the company \$6 million a year. Chuck Kerby, the Wal-Mart employee who did the math  
12 said, "That, for me, was an 'I got it' moment."<sup>6</sup>

### 13 **HOW DOES THE COST OF EFFICIENCY COMPARE WITH OTHER GREENHOUSE** 14 **GAS REDUCING STRATEGIES?**

15 A December 2007 report from consulting group McKinsey & Company on the cost of  
16 reducing U.S. Greenhouse Gas ("GHG") emissions provides detailed information on the relative  
17 economics of various programs, and includes a cost curve by region and sector.<sup>7</sup> By far, the  
18 biggest return comes from efficiency.<sup>8</sup> Exhibit 1 from this study shows that reducing GHGs  
19 from improved efficiency of air conditioning and lighting will save money, and essentially has a

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<sup>5</sup> *Id.*, p. 3.

<sup>6</sup> Fishman, Charles, "How Many Lightbulbs Does it Take to Change the World? One. And You're Looking At It." *Fast Company Magazine*, Issue 108 | Sept 2006, Pg 74  
[http://www.fastcompany.com/magazine/108/open\\_lightbulbs.html](http://www.fastcompany.com/magazine/108/open_lightbulbs.html)

<sup>7</sup> See Attachment B, Enkvist, Per-Anders, Naucler, Tomas, Rosander, Jerker, "A Cost Curve for Greenhouse Gas Reduction, *The McKinsey Quarterly*, 2007 #1, Exhibit 1, p. 38.  
[http://www.mckinsey.com/client-service/ccsi/pdf/Cost\\_Curve\\_for\\_Greenhouse\\_Gas\\_Reduction.pdf](http://www.mckinsey.com/client-service/ccsi/pdf/Cost_Curve_for_Greenhouse_Gas_Reduction.pdf)

<sup>8</sup> *Id.*, Exhibit 1 from "A Cost Curve For Greenhouse Gas Reduction," *The McKinsey Quarterly*, 2007 #1, p. 38.

1 “negative” abatement cost.<sup>9</sup> This McKinsey report also finds that about half the low-cost  
2 potential for GHG reduction comes from demand reduction in power generation and  
3 manufacturing.<sup>10</sup> Demand reduction can potentially reduce GHGs more than renewables or  
4 carbon sequestration.<sup>11</sup>

5 **CAN YOU PROVIDE CONCRETE EXAMPLES OF REDUCED ENERGY USE?**

6 The world’s sixth largest economy – the State of California – provides a great example.  
7 Since 1974, Californians have achieved zero growth in energy consumption and cut per capita  
8 carbon emissions 30% since 1975 (See Attachment C). During the same time frame, national per  
9 capita energy consumption grew 50%, By one estimate, the average family in California is  
10 paying about \$800 less for energy each year than it would have had the state not actively pursued  
11 energy efficiency.<sup>12</sup> In 2004, California ranked 12<sup>th</sup> in the nation in energy prices, but only 45<sup>th</sup> in  
12 energy costs per person.<sup>13</sup> California’s energy use more closely mirrors European cities.<sup>14</sup>

13 **HAVE U.S. BUSINESSES REDUCED ENERGY?**

14 Yes. American businesses were among the earliest actors to undertake aggressive climate  
15 protection programs. For example:

- 16 • Alcoa Aluminum’s North American Extrusion set a goal to reduce its energy consumption  
17 by 15 percent from its 1999 production baseline of 19 gigajoules per metric ton (GJ/MT).  
18 Meeting this goal across its 18 manufacturing locations would save 2.85 GJ/MT,  
19 resulting in an annual decrease of 2 million gigajoules of energy and a reduction of  
20 65,000 metric tons of CO2 emissions. This would significantly improve company

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<sup>9</sup> *Id.*, p. 38.

<sup>10</sup> *Id.*, p. 40.

<sup>11</sup> *Id.*, p. 43.

<sup>12</sup> Greg Kats of Capital E, quoted in *The Washington Post* Feb. 17, 2007

<sup>13</sup> U.S. Energy Information Administration, State Energy Data 2004.

<sup>14</sup> See Attachment D, California and U.S. Carbon Intensity, 2004, Arthur Rosenfeld, California Energy Commission.

1 profitability and greatly reduce the environmental impact of production. The efficiency  
2 identified (and in most cases, implemented) are saving NAE more than \$2.5 million  
3 annually.<sup>15</sup>

- 4 • Concerned by increasingly volatile energy markets and deregulation, Unilever HPC's  
5 corporate energy management (CEM) initiative combines energy-use targets with an  
6 energy service outsourcing strategy. A simple budget-to-actual spreadsheet compares  
7 energy performance at 14 facilities. From 2000 – 2002, this program has resulted in  
8 savings in excess of \$4 million.<sup>16</sup>
- 9 • DuPont pledged in 1999 to reduce its GHGs 65% below its 1990 levels by 2010, and to  
10 get 10% of its energy and 25% of its feedstocks from renewables. It made this  
11 announcement in the name of increasing shareholder value and delivered on that promise,  
12 when, during the same period the value of DuPont stock increased 340% as the company  
13 had reduced global emission reductions 67% for a savings to date of \$3 billion.<sup>17</sup>
- 14 • ST Microelectronics pledged carbon neutrality (zero net CO2 emissions) by 2010 with a  
15 40-fold increase in production. Figuring out how to do this drove the company's  
16 innovation, taking it from the number twelve microchip manufacturer in the world to the  
17 number six. ST gained market share, won awards and reckons it will save almost a billion  
18 dollars by the time it meets its goal.
- 19 • The business group, New Voice of Business, instrumental in getting both the million  
20 solar roofs bill and the California Climate Protection legislation (mandatory carbon caps)  
21 passed in California, testified that there are two kinds of businesses now: those from the

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<sup>15</sup> <http://www1.eere.energy.gov/industry/bestpractices/pdfs/conservation.pdf>

<sup>16</sup> [http://www.ase.org/uploaded\\_files/industrial/Unilever%20Case%20v04.pdf](http://www.ase.org/uploaded_files/industrial/Unilever%20Case%20v04.pdf)

<sup>17</sup> Gary Pfeiffer, DuPont CFO, 340% increase in share value paralleling 60% reduction in environmental footprint personal communication at speech he gave at a Conference Board conference 2005.

1 last century and the businesses of the future. New Voice, stating that it represents the  
2 latter, called for strong government programs to drive a transition away from carbon fuels  
3 to energy efficiency and renewable energy.<sup>18</sup>

- 4 • In December 2004, Chicago Climate Exchange began trading carbon in a country with no  
5 legal mandate. Inaugural members DuPont, ST, Baxter Health Care, the City of Chicago  
6 and 13 other businesses contracted to *reduce their emissions by 1% a year*. To the extent  
7 that they reduced even further, they created tradable Carbon Financial Instruments  
8 (CFI's), which they then sold to such members as World Resources Institute or Natural  
9 Capitalism, who wished to become carbon neutral, but lacked direct emissions to reduce  
10 (both organizations implemented energy efficiency measures and purchased wind credits,  
11 in addition). CCX now has over 330 members, companies, cities, states, counties,  
12 universities, NGOs and others, who have *reduced their emissions an average of 9%*.  
13 *New members are required to reduce their emissions 2% a year.*
- 14 • In 2006, the world's largest retailer, Wal-Mart, announced goals to reduce energy use at  
15 its stores 30% over three years, become carbon neutral, 100% powered by renewable  
16 energy, to double the fleet efficiency of its vehicle fleet, build hybrid-electric long-haul  
17 trucks, and sell millions of compact fluorescent light bulbs (CFLs). The company  
18 calculates that its campaign to sell 100 million CFLs in 2007 would save its customers as  
19 much at \$3 billion.<sup>19</sup> Wal-Mart CEO Lee Scott observed that a corporate focus on  
20 reducing greenhouse gases as quickly as possible was just a good business strategy.<sup>20</sup>

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<sup>18</sup> [www.newvoiceofbusiness.org/](http://www.newvoiceofbusiness.org/)

<sup>19</sup> Andy Ruben, Wal-Mart's Vice President of Corporate Strategy and Sustainability, 29 Oct 2006

<sup>20</sup> Jonathan Lash and Fred Wellington, "Competitive Advantage on a Warming Planet," *Harvard Business Review*, March 2007

1 To sum up, these companies realize that cutting energy use, and carbon emissions is a  
2 “no regrets” strategy. Using energy more efficiently just saves money.

3 **CAN YOU EXPLAIN HOW THIS APPROACH CONSIDERS MORE THAN JUST**  
4 **SHORT-TERM PROFITS?**

5 Corporate managers are increasingly realizing that value returned to the owners, the real  
6 metric of success, derives from more than just attention to next quarter’s profits – indeed the  
7 Financial Accounting Standards Board (FASB) has recently announced that it will revise its  
8 definition of “profit” away from this short-term fixation.<sup>21</sup> Governor Ritter has used the phrase  
9 “New Energy Economy” to explain his vision for Colorado. In a November 2007 speech to the  
10 U.S. Conf. of Mayors' Climate Protection Summit, President Bill Clinton stated, “Creating the  
11 low-carbon economy will lead to the greatest economic boom in the U.S. since we mobilized for  
12 World War II.”<sup>22</sup> Whether this Commission is concerned about the overall health of the  
13 economy, a serious matter as the country slides into recession, the health of Colorado businesses,  
14 the financial health of PSCo, or the ability of Colorado ratepayers to obtain the energy services  
15 that they desire at least cost, it is in everyone’s interest to drive implementation of energy  
16 efficiency just as aggressively as we can.

17 **HOW DOES CUTTING ENERGY USE ADD TO SHAREHOLDER VALUE?**

18 Businesses that cut their energy bills strengthen every aspect of shareholder value.  
19 Shareholder value is enhanced when a company cuts its costs, better manages its risks, enhances  
20 labor productivity, drives innovation, grows top-line sales, and better manages its supply chains  
21 and stakeholders. These constituent elements of what is now known as *The Integrated Bottom*

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<sup>21</sup> Reilly, David, “Profit as We Know It Could Be Lost With New Accounting Statements, *Wall Street Journal*, 12 May 2007, Page A1.

<sup>22</sup> Speech to the U.S. Conf. of Mayors' Climate Protection Summit, 2 Nov 2007, Reuters.

1 *Line*<sup>23</sup> are all enhanced by saving energy and cutting greenhouse gas emissions. Companies that  
2 implement efficiency programs enhance financial performance from energy and materials cost  
3 savings in industrial processes, facilities design and management, and fleet management. They  
4 enhance core business value through sector performance leadership and first-mover advantage,  
5 gain greater access to capital, improve corporate governance, and strengthen their ability to drive  
6 innovation, and improve government relations. Doing this helps a company retain competitive  
7 advantage, enhance its reputation and brand equity, increase its ability to capture market share  
8 and differentiate its product. Such programs increase a company's ability to attract and retain the  
9 best talent, increase employee productivity and health, improve communication, creativity, and  
10 morale in the workplace, and better stakeholder relations.

11 The validity of this management approach is borne out by a recent report from Goldman  
12 Sachs, which found that companies that are leaders in environmental, social and good  
13 governance policies are outperforming the MSCI world index of stocks by 25% since 2005.<sup>24</sup>  
14 Seventy two percent of the companies on the list outperformed industry peers.<sup>25</sup> This  
15 conclusion was bolstered by the recent release from the Economist Intelligence Unit, which  
16 stated:

17 There is a link between corporate sustainability and strong share price  
18 performance. In our survey, companies with the highest share price  
19 growth over the past three years paid more attention to sustainability  
20 issues, while those with the worst performance tended to do less.  
21 Causality is difficult to establish, but the link appears clear: the  
22 companies that rated their efforts most highly over this time period saw  
23 annual profit increases of 16% and share price growth of 45%, whereas  
24 those that ranked themselves worst reported growth of 7% and 12%

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<sup>23</sup> From the article "Sustainable Executives", <http://www.natcapsolutions.org/resources.htm#ART> .

<sup>24</sup> MSCI World is a stock market index of 'world' stocks, maintained by Morgan Stanley Capital International. It includes a collection of stocks from the developed markets of 23 countries, and is a common benchmark for 'world' or 'global' stock funds.

<sup>25</sup> Alderton, Margo, "Recent report finds corporations that lead in corporate responsibility also lead in the market," Socially Responsible Investing 07-11 17:57, also at <http://www.csrwire.com/companyprofile?id=4489> .

1            respectively. In general, these high-performing companies put a much  
2            greater emphasis on social and environmental considerations at board  
3            level, while the poorly performing firms are far more likely to have  
4            nobody in charge of sustainability issues.<sup>26</sup>

5  
6    **HOW DOES ENERGY EFFICIENCY IMPROVE WORKER PRODUCTIVITY?**

7            Even if energy savings are not sufficient to attract scarce management attention, labor  
8            costs, which are typically 100 times as high as energy costs, should. Even a one percent increase  
9            in labor productivity will dwarf the energy savings, but it was the attention to better energy  
10           efficiency that produced the labor saving.<sup>27</sup> A suite of energy efficiency measures implemented  
11           in buildings have been shown to increase worker productivity by six to 16 percent. Better  
12           indoor air quality, a frequent result of more energy efficient building technology has been shown  
13           to improve worker productivity by 0.5 to 5 percent, with estimated savings of \$20 to \$200  
14           billion.<sup>28</sup>

15           In addition, investment in energy efficiency can cut healthcare costs. The decrease in  
16           productivity from “sick building syndrome” is estimated at around 2 percent nationwide,  
17           resulting in an annual cost to the United States of approximately \$60 billion.<sup>29</sup>

18    **CAN YOU GIVE ME AN EXAMPLE OF *DECREASED* ENERGY USE AND**  
19    ***INCREASED* WORKER PRODUCTIVITY?**

20           Yes. For example, when Lockheed Martin commissioned Building 157 in Sunnyvale,  
21           CA., the green designers produced a building that would cut 75% of the lighting energy, saving  
22           \$500,000 a year worth of energy, and produce a much more comfortable space. They had to  
23           convince value-engineers who wanted to eliminate the atrium at the center of the building,

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<sup>26</sup> Doing Good: Business and the Sustainability Challenge, Economist Intelligence Unit, Feb 2008,  
<http://www.eiu.com/index.asp?rf=0>

<sup>27</sup> “Greening the Building and the Bottom Line”, [http://www.greenerbuildings.com/tool\\_detail.cfm?linkadvid=8527](http://www.greenerbuildings.com/tool_detail.cfm?linkadvid=8527)

<sup>28</sup> William J. Fisk, "How IEQ Affects Health, Productivity," *ASHRAE Journal*, May 2002.

<sup>29</sup> William J. Fisk, "Health and Productivity Gains from Better Indoor Environments" in *The Role of Emerging Energy-Efficient Technology in Promoting Workplace Productivity and Health*, a report by Lawrence Berkeley National Laboratory, February 2002

1 calling it an expensive worker amenity, that it was essential to the building’s performance.  
2 Calling the lighting feature a “Literium,” and defending it as structural, they cut the building’s  
3 energy consumption to half that of a comparable standard building. The extra \$2 million that it  
4 cost to achieve this paid for itself in four years. Such metrics were predicted. What came as a  
5 surprise, however, was that the better lighting and the other green features led to a drop in  
6 employee absenteeism of 15 percent, and a productivity increase of the same amount. This  
7 enabled the company to win a hotly contested contract, the profits of which paid the costs of the  
8 entire building.

9 Boeing implemented a lighting retrofit that cut lighting energy costs by 90 percent. This  
10 investment returned itself with a less than 2-year payback, but because the workers could see  
11 better, the error rate went down by 20 percent—very good news for everyone who flies on  
12 airplanes. It also avoided re-work, and increased on-time delivery and customer satisfaction.

### 13 **HOW MUCH ENERGY COULD BE SAVED FROM MORE STRINGENT EFFICIENCY** 14 **REQUIREMENTS FOR BUILDINGS?**

15 Roughly 6 billion square feet of buildings are constructed each year in the U.S.<sup>30</sup> Due to  
16 the emissions from heating and cooling, buildings are the No. 1 cause of greenhouse gas  
17 emissions in the U.S., emitting at least 48% nationally. Making the building sector carbon-  
18 neutral is not only possible, it will produce buildings that are cheaper to build, to operate, and as  
19 shown above higher performance properties. A Real Estate consultant, writing in the Harvard  
20 Business Review stated, “In fact, owners of standard buildings face massive obsolescence. They  
21 must act now to protect their investments.” He quotes Che Wall, Chair of the World Green  
22 Building Council, “Building owners are starting to do reviews of their portfolios to see how  
23 green their buildings are and what they need to do to meet growing market demand.” Citygroup,

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<sup>30</sup> Untitled study by the Alliance to Save Energy, 2007, commissioned by PCAP.

1 for example has already begun looking at how its 100 largest building stack up against accepted  
2 green standards...to create a green road map to help improve the efficiency of its buildings.”<sup>31</sup>

3 The American Institute of Architects has endorsed the Architecture 2030 Challenge, a  
4 global initiative stating that all new buildings and major renovations reduce their fossil-fuel  
5 GHG-emitting consumption by 50% by 2010, incrementally increasing the reduction for new  
6 buildings to carbon neutral by 2030. They are joined by the US Conference of Mayors  
7 (Resolution #50), US Green Building Council (USGBC), Leadership in Energy and  
8 Environmental Design (LEED), Environmental Protection Agency (EPA/Target Finder), Royal  
9 Architecture Institute of Canada (RAIC), World Business Council for Sustainable Development  
10 (WBCSD), Union Internationale des Architectes (UIA), and many, many others.<sup>32</sup>

11 **WE UNDERSTAND THAT NEW BUILDINGS CAN BE SIGNIFICANTLY MORE**  
12 **EFFICIENT, BUT WHAT ABOUT RETROFITTING EXISTING BUILDINGS?**

13 It is possible and cost effective to retrofit an existing building to net zero standards.  
14 Integrated Design Associates (IDeAs) Inc. created the first commercial office building retrofit to  
15 meet a net-zero energy/net-zero carbon emissions goal. IDeAs bought a 7,200-square-foot  
16 former bank branch to retrofit for its new headquarters, combining energy efficiency (40% more  
17 efficient than California’s already strict Title 24 building standards) and renewable energy  
18 solutions to deliver power back to the grid when more energy is generated than is being used  
19 during the day, but to be able draw power at night or when there is no sunlight.<sup>33</sup>

20 Frito Lay is retrofitting its 1984 Casa Grande production facility to be a net zero building.  
21 The retrofit of the Casa Grande factory, scheduled to be completed by 2010, would reduce  
22 electricity and water consumption by 90 percent and its natural gas use by 80 percent.

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<sup>31</sup> Lockwood, Charles, Building the Green Way, Harvard Business Review, 2006.

<sup>32</sup> <http://www.architecture2030.org/>.

<sup>33</sup> [http://www.edcmag.com/CDA/Articles/Web\\_Exclusive/BNP\\_GUID\\_9-5-2006\\_A\\_1000000000000244365](http://www.edcmag.com/CDA/Articles/Web_Exclusive/BNP_GUID_9-5-2006_A_1000000000000244365) .

1 Greenhouse gas emissions would be cut by 50 percent to 75 percent, the company said.<sup>34</sup> The  
2 company will then replicate its experience at all of its U.S. facilities.

3 The Colorado Governor's Energy Office (GEO) and Johns Manville are teaming up to  
4 insulate GEO's new office space as part of Colorado Governor Ritter's "Greening Government"  
5 plan, which seeks a 20-percent reduction in state government energy use by June 30, 2012.<sup>35</sup>

6 **HAVE ANY STUDIES BEEN DONE TO DETERMINE THE AMOUNT OF**  
7 **INCREASED ECONOMIC OUTPUT PER MW?**

8 Yes. A 2007 report by the Energy Trust of Oregon showed that per megawatt saved,  
9 economic output increases by over \$2 million, wages increase by over \$648,000, business  
10 income increases by over \$125,000, and 22 jobs are created.<sup>36</sup>

11 **YOUR EXAMPLES ARE FROM LARGE, HIGH-ENERGY USE COMPANIES. WHAT**  
12 **ABOUT SMALL BUSINESSES?**

13 Small businesses are the economic engine of the country, generating more than half of  
14 non-farm private gross domestic product. They represent 99.7 percent of non-governmental  
15 employers, employing nearly 60 million workers, about half of all private employees. For the  
16 past decade they have generated 60 to 80 percent of net new jobs each year. Small businesses  
17 consume half the electricity in the country, but only about a third have invested in any sort of  
18 energy efficiency. Less than half of the small business owners are aware that the EPA's Energy  
19 Star program can help them lower their energy usage. The Agency expends just \$1 million and  
20 two staff positions on its programs to get information to small businesses.<sup>37</sup>

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<sup>34</sup> <http://www.worldchanging.com/archives/007586.html> .

<sup>35</sup> <http://www.reuters.com/article/pressRelease/idUS188948+01-Feb-2008+BW20080201> .

<sup>36</sup> [www.econw.com/reports/renewableenergy6779.pdf](http://www.econw.com/reports/renewableenergy6779.pdf) .

<sup>37</sup> Burnham, Michael, "ENERGY POLICY: Kerry, Snowe slam agencies for work on small businesses, *Environment and Energy Daily*, Friday, March 9, 2007.

1 I am currently producing the *Business Climate Protection Manual* to help small  
2 businesses cut their energy use and reduce carbon emissions. The manual, delivered through a  
3 state of the art web-based learning platform, will enable business owners to cut their costs, and  
4 increase.

5 Small business has a critical role to play in unleashing the new energy economy. There is  
6 a rapidly growing demand by consumers for environmentally sustainable choices in every line of  
7 consumer item, including foods, clothing, and household and recreational items.<sup>38</sup> *As Business*  
8 *Week* noted, “reducing energy waste in U.S. homes, shops, offices, and other buildings must, of  
9 necessity, rely on tens of thousands of small concerns that design, make, sell, install, and service  
10 energy-efficient appliances, lighting products, heating, air-conditioning, and other equipment.  
11 Small businesses can also save as much as 20-30 percent on their own energy bills by making  
12 their own workplace more energy-efficient.”<sup>39</sup>

13 **ARE OTHER ORGANIZATIONS INCREASING ENERGY EFFICIENCY MEASURES?**

14 Yes. Hundreds of churches, synagogues, mosques and houses of worship are reducing  
15 energy bills and carbon footprints as a sacred duty. The Interfaith Power and Light (IP&L)  
16 campaign, representing over 1,000 congregation members in eighteen states, encourages a  
17 religious response to global warming through promotion of energy efficiency, renewable energy,  
18 and conservation in congregations. For example the Michigan chapter of IP&L helped St.  
19 Elizabeth’s Catholic Church conduct an energy audit and implement the suggested changes. The  
20 Church invested \$150,000 in a new boiler, energy efficient lighting and appliances, window  
21 insulation, and a solar thermal hot water heater. Their annual savings are \$20,000 a year, a 50%  
22 reduction in their annual energy budget.

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<sup>38</sup> Anna Clark, “Practical Advice for Greening the SME [Small and Medium-sized Enterprise],”  
[http://www.greenerbuildings.com/news\\_detail.cfm?NewsID=34996](http://www.greenerbuildings.com/news_detail.cfm?NewsID=34996).

<sup>39</sup> *Id.*

1 **CAN ENERGY EFFICIENCY REPLACE ‘BASELOAD POWER’?**

2 In 1989, Sacramento, California shut down its 1,000-megawatt nuclear plant. Rather than  
3 invest in a new conventional centralized fossil fuel plant, the local utility met its citizens’ needs  
4 through energy efficiency and distributed generation, including such renewable energy as wind,  
5 solar, biofuels, as well as co-generation and fuel cells. In 2000, an econometric study showed  
6 that the program had increased the regional economic health by over \$180 million, compared to  
7 just running the existing nuclear plant. The utility was able to hold rates level for a decade,  
8 retaining 2,000 jobs in factories that would have been lost under the 80% increase in rates that  
9 just operating the power plant would have caused. The program generated 880 new jobs, and  
10 enabled the utility to pay off all of its debt.

11 **HAS AN INVESTMENT IN ENERGY EFFICIENCY EVER DISPLACED THE NEED**  
12 **FOR A NEW POWER PLANT?**

13 Yes. In 1974, the Municipal Utility in Osage, Iowa, faced the need to build a new power  
14 plant to meet growing demand. The Utility’s general manager, Wes Birdsall, realized that  
15 building the plant would increase rates. He also understood that what his customers wanted was  
16 not more raw kilowatt-hours, but the energy “services” of comfort in their homes, shaft-power in  
17 factories, illumination, cold beer, hot showers and the other services that energy delivers. If  
18 people can get the same or improved service more cheaply using efficiency, that is the business  
19 he should offer. By meeting customers’ desires for energy services at lower cost, Birdsall began  
20 one of the most remarkable economic development stories in rural America.

21 Birdsall was able to reduce electric bills to half the state average and unemployment to  
22 half the national average, because lower rates meant new factories came to town. New factories  
23 increased demand, necessitating more efficiency. But in this way Birdsall held electric growth

1 level until 1984. The program was profiled in the Wall Street Journal, and replicated by other  
2 utilities. According to a USDA study of Osage, “The local business people calculated that every  
3 \$1 spent on ordinary consumer goods in local stores generated \$1.90 of economic activity in the  
4 town’s economy. By comparison, petroleum products generated a multiplier of \$1.51; utility  
5 services, \$1.66; and energy efficiency, \$2.23. Moreover, the town was able to attract desirable  
6 industries because of the reduced energy operating costs resulting from efficiency measures put  
7 in place. Energy efficiency has a long and successful track record in Osage as a key economic  
8 development strategy.”<sup>40</sup>

9 The Osage energy efficiency program saved over a million dollars a year in Osage, a  
10 town of 3,800 people, generating over 100 new jobs. A report on the program found that  
11 “Industries are expanding and choosing to remain in Osage because they can make money  
12 through employees who are highly productive and through utility rates that are considerably  
13 lower than neighboring cities.”<sup>41</sup>

14 **DOES ENERGY EFFICIENCY ALWAYS COST LESS THAN NEW POWER PLANTS?**

15 Every competent analysis has shown that efficiency costs far less than new supply. This  
16 conclusion was reaffirmed by a recent report by the U.S. Department of Energy, Oak Ridge  
17 National Laboratory, and Lawrence Berkeley National Laboratory. The study analyzed results  
18 from four engineering-economic studies of the potential for energy technologies to reduce GHG  
19 emissions, including a sector-by-sector assessment of specific technology opportunities and their  
20 costs, as estimated by the Five National Laboratories, the Tellus Institute, The National Academy  
21 of Sciences, and The Office of Technology Assessment.

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<sup>40</sup> “The Jobs Connection: Energy Use and Local Economic Development”, Tomorrow’s Energy Today, US Department of Energy, 1994.

<sup>41</sup> Sourced from website of Health and Energy Company, a Nebraska energy testing company, February 2005. [http://healthandenergy.com/osage\\_energy\\_efficiency.htm](http://healthandenergy.com/osage_energy_efficiency.htm)

1           The study found that large carbon reductions are possible at marginal costs that are lower  
2 than the value of the energy saved. Energy efficiency, the report concluded, remains underused  
3 in every sector of the economy and is by far the cheapest option. New renewable supply, it  
4 found, has a net cost, but when combined with efficiency, can deliver climate protection at a  
5 profit. “In combination,” the study concluded, “Large carbon reductions are possible at  
6 incremental costs that are less than the value of the energy saved.”<sup>42</sup>

7 **WHAT DOES EFFICIENCY COST IN CENTS PER KWH?**

8           Good efficiency programs, for example, retrofitting light bulbs, cost about 1/2 - 2¢ per  
9 kilowatt hour (kWh) saved. Just running a coal plant (without construction, fuel or  
10 transportation cost) costs 4 – 6 ¢. New wind, in good sites can cost as low as 3¢, and is, on  
11 average, competitive with the running cost of existing coal plants. Running an existing gas plant  
12 typically costs 5 – 6¢. The average price of electricity from the grid is at least 9¢ per kWh, and  
13 building a new nuclear plant can cost as much as 20¢. New IGCC coal plants will cost at least  
14 10¢. These numbers do not count the cost of the nuclear fuel cycle, or the cost from coal or gas  
15 plants of emitting carbon, mercury, other air pollutants, threatening the climate.

16 **ARE THERE OTHER BENEFITS FROM INVESTING IN EFFICIENCY?**

17           Investing in efficiency will also clean up our air and water. A 2000 Worldwatch Institute  
18 study found that mining and utility companies are responsible for substantial toxic pollution. In  
19 1998, the Environmental Protection Agency (EPA) reported that 48% of the 7.3 billion pounds of  
20 toxic pollution tracked by its Toxic Release Inventory (TRI) are released by mining companies,  
21 which includes metals extraction, coal, oil and gas. Another 15% of the TRI releases were from

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<sup>42</sup> <http://arjournals.annualreviews.org/doi/abs/10.1146/annurev.energy.23.1.287;jsessionid=oG8-m21d8Po-dHtuiH?cookieSet=1&journalCode=energy>

1 the utility industry. These two industries accounted for 63% of toxic releases, but only account  
2 for 1.4 million – or 1.3% – of all U.S. private sector jobs for that year.<sup>43</sup>

3 **NOT USING ENERGY MORE EFFICIENTLY MEANS RELEASING MORE CARBON**  
4 **EMISSIONS. WHAT ABOUT INCREASING RISKS DUE TO CLIMATE CHANGE?**

5 In 2003 The Wall Street Journal reported, “With all the talk of potential shareholder  
6 lawsuits against industrial emitters of greenhouse gases, the second largest re-insurance firm,  
7 Swiss Re, has announced that it is considering denying coverage, starting with directors and  
8 officers liability policies, to companies it decides aren’t doing enough to reduce their output of  
9 greenhouse gases.”<sup>44</sup> Insurance companies are being battered by losses from the increase in the  
10 storm violence. 2005 was the costliest year on record for weather related damage, costing  
11 insurers over \$65 billion, Claims from weather related disasters are now rising twice as fast as  
12 those from all other mishaps.<sup>45</sup>

13 A single catastrophic event can cause insolvency or a precipitous drop in earnings,  
14 liquidation of assets to meet cash needs, or a downgrade in the market ratings used to evaluate  
15 the soundness of companies in the insurance industry.<sup>46</sup> Weather-related insurance losses in the  
16 United States are growing 10 times faster than premiums, the population, or economic growth,  
17 and many smaller events have not yet been included in official totals.<sup>47</sup> Attachment E shows the

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<sup>43</sup> *Working for the Environment: A Growing Source of Jobs*, by Michael Renner, Worldwatch Institute, Worldwatch Paper 152, pages 22-23.

<sup>44</sup> Jeffrey Ball, *Wall Street Journal*, May 7, 2003.

<sup>45</sup> Douwe Miedema, “Climate Change Means Big Business for Reinsurers,” Reuters, 14 Nov 2006,,  
<http://www.planetark.com/dailynewsstory.cfm/newsid/38964/story.htm> .

<sup>46</sup> General Accounting Office (GAO), *Climate Change: Financial Risks to Federal and Private Insurers in Coming Decades Are Potentially Significant*, Report to the Committee on Homeland Security and Governmental Affairs, U.S. Senate, March 2007, pp. 1-2, 30. <http://www.gao.gov/new.items/d07285.pdf> .

<sup>47</sup> Evan Mills, Richard J. Roth, Jr., and Eugene Lecomte, *Availability and Affordability of Insurance Under Climate Change: A Growing Challenge for the U.S.*, Ceres, December 2005.  
[http://www.ceres.org/pub/docs/Ceres\\_insure\\_climatechange\\_120105.pdf](http://www.ceres.org/pub/docs/Ceres_insure_climatechange_120105.pdf) .

1 economic and insured costs of natural disasters worldwide from 1950 through 2005.<sup>48</sup> The graph  
2 shows a clear upward trend in economic damage.

### 3 **WILL CLIMATE CHANGE DIRECTLY AFFECT COLORADANS?**

4 As the 2007 firestorms in Southern California showed, the convergence of climate  
5 change with rapid growth in population in some of the nation's most disaster-prone areas—and  
6 the accompanying real estate development and increasing real estate values—is leaving areas  
7 with an urban/ wildland interface exposed to higher insured losses.

8 While it is hard to establish absolute causality, Science Daily reported in the fall of 2007:  
9 The catastrophic fires that are sweeping Southern California are consistent with what climate  
10 change models have been predicting for years, experts say, and they may be just a prelude to  
11 many more such events in the future -- as vegetation grows heavier than usual and then ignites  
12 during prolonged drought periods. "This is exactly what we've been projecting to happen, both  
13 in short-term fire forecasts for this year and the longer term patterns that can be linked to global  
14 climate change," said Ronald Neilson, a professor at Oregon State University and  
15 bioclimatologist with the USDA Forest Service. "You can't look at one event such as this and  
16 say with certainty that it was caused by a changing climate," said Neilson, who was also a  
17 contributor to publications of the Intergovernmental Panel on Climate Change, "But things just  
18 like this are consistent with what the latest modeling shows," Neilson said, "and may be another  
19 piece of evidence that climate change is a reality, one with serious effects."<sup>49</sup> Colorado is  
20 similarly susceptible to wildfires, drought and other changes related to climate change, such as  
21 exploding bark beetle populations in Colorado forests.

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<sup>48</sup> © 2003 GeoRisikoForschung, Müncheneruck

<sup>49</sup> "Massive California Fires Consistent With Climate Change, Experts Say" Science Daily, 24 Oct 2007  
<http://www.sciencedaily.com/releases/2007/10/071024103856.htm>

1 Federal and state forestry officials say at current rates, mountain pine beetles will kill the  
2 majority of Colorado's large-diameter lodgepole pine forests within three to five years. In his  
3 report on the problem, Howard Pankratz explained that although bark beetles are a natural part of  
4 the lodgepole pine ecosystem, warm winters and the drought of recent years have intensified the  
5 problem. The report stated that, "Areas full of dead trees would be susceptible to fires for the  
6 next 15 or 20 years."<sup>50</sup> Forest Service entomologists have concluded that climate change is  
7 responsible for the beetle outbreak.<sup>51</sup>

## 8 **WHO BEARS THE LOSSES FROM DISASTERS SUCH AS HURRICANES, FLOODS** 9 **AND FIRES?**

10 Disaster losses not carried by owners are typically borne by private insurers and by two  
11 federal insurance programs established by Congress to provide coverage where voluntary  
12 markets do not exist: the National Flood Insurance Program (NFIP), which insures properties  
13 against flooding,<sup>52</sup> and the Federal Crop Insurance Corporation (FCIC), which insures crops  
14 against drought or other weather disasters. Increasingly, private companies are taking steps to  
15 limit their catastrophic risk exposure, transferring some of the risk to policyholders<sup>53</sup> and to the  
16 public sector. Federal insurers may see losses grow by many billions of dollars from climate  
17 change related disasters in coming decades.

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<sup>50</sup> Pankratz, Howard, "Beetles on Track to Kill Lodgepole Forests in 3 - 5 Years," Denver Post, 14 January 2008

<sup>51</sup> Sheldon, R. H., "The Silent Epidemic, Climate Change Extends the Range of Forest-Killing Beetles," May June 2007, <http://www.emagazine.com/view/?3694> .

<sup>52</sup> NFIP provides insurance for flood damage to homeowners and commercial property owners in more than 20,000 communities. Congress established the NFIP in 1968, partly to provide an alternative to disaster assistance for flood damage. Participating communities are required to adopt and enforce floodplain management regulations, thereby reducing the risks of flooding and the costs of repairing flood damage. FEMA, within the Department of Homeland Security, is responsible for, among other things, oversight and management of the NFIP. Under the program, the federal government assumes the liability for covered losses and sets rates and coverage limitations.

<sup>53</sup> Insurance companies can transfer risk to policyholders by increasing premiums and deductibles, by setting lower coverage limits for policies, and by passing along the mandatory participation costs of state-sponsored insurance plans. General Accounting Office (GAO), *Climate Change: Financial Risks to Federal and Private Insurers in Coming Decades Are Potentially Significant*, Report to the Committee on Homeland Security and Governmental Affairs, U.S. Senate, March 2007, pp. 1-2, 30, 33. <http://www.gao.gov/new.items/d07285.pdf>

1 **WHAT ARE INVESTORS DOING TO PROTECT THEMSELVES FROM THE RISKS**  
2 **OF CLIMATE CHANGE?**

3 In October 2007 18 leading investors, including the \$250 billion California Public  
4 Employees Retirement System, filed a petition to the Securities and Exchange Commission  
5 (SEC) asking the SEC to require companies to assess and disclose "material" financial risks from  
6 climate change. Such risks would include financial impacts from emerging carbon-reducing  
7 regulations, extreme weather and other climate-related physical events, or growing global  
8 demand for low-carbon technologies and products.<sup>54</sup> This trend will significantly penalize  
9 companies such as PSCo that are heavily carbon dependent.

10 **WHAT IS THE ‘CARBON DISCLOSURE PROJECT’ AND HOW DOES IT WORK?**

11 Since 2002, the Carbon Disclosure Project, a British non-governmental organization  
12 (NGO), has surveyed the Financial Times 500, the largest companies in the world. Initially, few  
13 of the recipients bothered to answer. In 2005, 60 percent answered. In 2006, 70 percent  
14 participated, and in 2007, 77 percent answered the survey. Ford Motor Company produced a  
15 major report detailing its emissions.

16 **WHY DID THE NUMBER OF U.S. COMPANIES DISCLOSING THEIR CARBON**  
17 **EMISSIONS INCREASE SO QUICKLY?**

18 The threat of Sarbanes Oxley liability clearly played a role. If as a corporate manager,  
19 you fail to disclose to shareholders information that can significantly impact share price, you can  
20 be personally, criminally liable. In a carbon-constrained world, a company’s carbon footprint is  
21 clearly material information. But perhaps more significantly, the Carbon Disclosure Project  
22 (CDP) represents institutional investors with assets of over \$31.5 trillion, up more than \$10  
23 trillion since 2006 and now representing almost a third of all global institutional investor assets.

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<sup>54</sup> [http://www.ceres.org/news/news\\_item.php?nid=344](http://www.ceres.org/news/news_item.php?nid=344) .

1 In September 2007, the CDP released its fifth annual report. It found that the world's major  
2 companies are increasingly focused on climate change and that many see cutting their emissions  
3 of carbon as an opportunity for profit. The report noted that US firms are beginning to view  
4 climate change as a risk to their bottom line.

## 5 **ARE CITIES REDUCING GHGs?**

6 Farsighted leaders in U.S. cities, states and campuses are implementing energy efficiency  
7 programs to drive their climate protection efforts, cut costs, create jobs and enhance their  
8 economies by *reducing* their energy use. As of October 2007 almost 750 American Mayors have  
9 pledged their cities to meet the Kyoto Protocol (“Kyoto”) goals. Some cities have committed  
10 even more aggressive targets than the Kyoto’s goal of reducing GHGs 7% by 2012. For  
11 example, Portland’s goal is a 20% reduction in GHGs, while the City of Sebastopol, California  
12 has committed to a 42% reduction of its GHGs over a 10-year period.<sup>55</sup>

13 Kansas City identified these benefits from its climate protection plan:

- 14 • Reduced energy costs to households, recognized by a certified rating system, increases  
15 property values. Reduced energy costs also strengthen one of Kansas City’s calling cards—  
16 low cost of living.
- 17 • Reduced cost of energy to businesses through efficiency would lower the hurdle for our  
18 ongoing Economic Development efforts to bring new business to Kansas City.
- 19 • Reduced economic dependence on oil, natural gas and coal and reduced vulnerability to  
20 market fluctuations.
- 21 • Economic benefits from the production and use of regional renewable fuels.

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<sup>55</sup> “US Grassroots Tackle Climate Change,” BBC, 11 July 2007 <http://news.bbc.co.uk/2/hi/americas/6288172.stm> .

- 1 • Lower maintenance costs of alternative technologies such as efficient fluorescent lights,  
2 compared with conventional products.
- 3 • Increased worker productivity from improved indoor air quality, and efficient lighting.
- 4 • Job creation through development and deployment of new technologies.
- 5 • Increased success in attracting business to Kansas City’s overall low cost of operation and  
6 clean environment.<sup>56</sup>

7 St. Paul, MN, saved \$59 million in annual energy costs through energy retrofits in its  
8 municipal buildings, recycling and waste reduction, and equipment and lighting upgrades;  
9 reducing St. Paul’s carbon emissions by 8% from 1988 levels by 2004. Toledo, OH, saved  
10 \$710,208 in the first year after retrofitting 20 city buildings with energy efficient lighting and  
11 replacing old HVAC units with new, digitally-controlled boilers and chillers. These efforts cut  
12 electricity use by nearly 6 million kWh and eliminated 5,250 tons of CO<sub>2</sub>.<sup>57</sup>

13 **ARE CITIES IN THE WESTERN U.S. REDUCING GHGs?**

14 Yes. Salt Lake City set a goal to reduce GHG emissions by 3% per year for the next 10  
15 years, and to reduce emissions in city operations 21% below its 2001 baseline by 2012. Its long-  
16 term goal is to reduce emissions 70% by 2040. By 2007 the city had achieved a 31-percent  
17 reduction in carbon dioxide emissions in its municipal operations over the 2001 baseline,  
18 surpassing its goal to meet the Kyoto Protocol standard by 148%, seven years early. Salt Lake  
19 required LEED silver for all new City buildings, purchased wind power, and implemented a  
20 comprehensive community education campaign. Among other efforts, it replaced incandescent  
21 bulbs with compact fluorescent lamps, and changed out all city traffic lights to LED’s. These

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<sup>56</sup> <http://www.kcmo.org/manager/OEQ/cpr.pdf#page=18>

<sup>57</sup> <http://www.coolmayors.com/common/news/reports/detail.cfm?Classification=report&QID=3488&ClientID=11061&BrowseFlag=1&Keyword=&StartRow=1&TopicID=314>

1 measures and others are saving the city \$248,000 a year in energy costs.<sup>58</sup>

2 San Francisco Mayor Gavin Newsome estimated that installing LED traffic signals across  
3 the city will reduce electricity use by an estimated 7.7 million kilowatt/hours and save the city  
4 \$1.2 million per year. Xcel's KEMA Market Potential Study, by the way, offered no  
5 consideration of this measure. San Francisco has already saved six megawatts (MW) of  
6 electricity by retrofitting lighting systems in over 4, 000 small businesses thanks to the Power  
7 Savers Program. The city's Peak Energy Program saved twelve megawatts by retrofitting  
8 residential and commercial buildings. Peak demand was reduced by 18 megawatts through  
9 successful programs operated by the SF Environment Department.<sup>59</sup>

10 **IF ENERGY EFFICIENCY IS SUCH A GOOD INVESTMENT, WHY AREN'T**  
11 **UTILITIES DOING MORE?**

12 It is in everyone's interests to pursue efficiency first, but few utility programs achieve  
13 this outcome. Until recently, utilities have tended to pursue only as much efficiency as  
14 regulators require them to.<sup>60</sup>

15 **WHAT WOULD ENCOURAGE UTILITIES TO INVEST MORE IN EFFICIENCY?**

16 Utilities must be helped away from the current system under which they only make  
17 money from *selling electricity*. This should be done in two steps: decouple sales from revenues,  
18 and incentivise the utility to implement all cost effective efficiency.

19 Decoupling means breaking the link between electricity sales and the utility's profits, so  
20 utilities are no longer rewarded for selling more electricity, or penalized for selling less  
21 electricity. Decoupling removes disincentives for utilities to invest in efficiency.

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<sup>58</sup> <http://www.slcgreen.com/CAP/default.htm> .

<sup>59</sup> <http://www.sfenvironment.org/downloads/library/peakenergyprogram.pdf> .

<sup>60</sup> Western Area Power Administration, <http://www.wapa.gov/powerm/pmipr.htm> , 30 November 2006.

1 In addition, financial incentives are necessary to allow utilities to make a profit from *not*  
2 *selling, but rather saving, electricity.*

3 **DO ANY STATES CURRENTLY ALLOW UTILITIES TO MAKE MONEY FROM**  
4 **SAVING, RATHER THAN SELLING, ELECTRICITY?**

5 Yes. Idaho actively rewards utilities for cutting their customers' bills through efficiency  
6 by giving utilities a share of the savings for their shareholders. California used to do this, under  
7 what I call the Batinovich plan, after the Public Utility Commissioner Robert Batinovich, who  
8 developed this approach. California implemented this form of regulation in the late 1980s. In  
9 the first year of the program, California-based Pacific Gas & Electric, the country's biggest  
10 private utility, spent \$150 million in 1991 to help make its customers more efficient. PG&E kept  
11 15 percent of the resulting savings, boosting its 1990 profits by \$40-50 million.

12 **YOU SAY THAT PG&E KEPT 15 PERCENT OF ITS CUSTOMERS' SAVINGS , BUT**  
13 **HOW MUCH DID THE CUSTOMERS SAVE?**

14 The program caused PG&E to pay for customers' energy efficiency measures that  
15 leveraged customer savings worth nine times as much as what the utility earned. The California  
16 Public Utilities Commission (PUC) found that these 1990 – 93 efficiency measures saved  
17 customers a net present value of almost \$2 billion.<sup>61</sup> The program worked spectacularly.  
18 California utilities realized that their highest rates of return would come from enabling their  
19 customers to become more efficient. Within a few years, no utility in California projected the  
20 need to build any more power plants, and all utilities projected that they would meet future  
21 demand growth through renewable generation.

22 **WHAT ELSE CAN REGULATORS DO TO ENCOURAGE ENERGY EFFICIENCY?**

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<sup>61</sup> Hawken, Lovins Lovins, *Natural Capitalism*, P 273 – 74, Little Brown, 1999.

1 In the early 1990's there were a variety of experiments underway to help the market give utility  
2 customers better value. Eight states implemented programs to allow vendors to compete in an  
3 open auction for various ways to make or save electricity.

#### 4 **HOW DO AUCTIONS WORK?**

5 Such auctions would typically ask who could make or save electricity at 1¢ per kilowatt-  
6 hour. The utilities would then sign contracts for the bids received. If they needed more capacity,  
7 they then reopen bidding for efficiency or supply at 2¢ per kWh, then 3¢. At around 2 – 3¢  
8 utilities typically met all of their required capacity, dramatically cheaper than building a new  
9 fossil fired plant.

10 And it can happen quickly. Maine used auctions and other competitive processes to  
11 increase its private share of power generation from 2% in 1984 to 20% in 1989 to 36% in 1995 –  
12 and more than two-thirds of that new production was renewable.

#### 13 **HOW HAVE UTILITIES RESPONDED TO THESE PROGRAMS?**

14 Investor-owned utilities, when rewarded for cutting bills, sold efficiency ever faster and  
15 more skillfully despite falling electricity prices. In 1990, New England Electric System captured  
16 90% of a small-commercial pilot retrofit market in two months. PG&E captured 25% of its  
17 entire new-commercial-construction market—150% of the year's target—in three months, so it  
18 raised its target...and captured all of that in the first nine days of January, 1991.

#### 19 **IS THE “NEW ENERGY ECONOMY SIGNIFICANTLY DIFFERENT FROM OUR** 20 **CURRENT ENERGY ENONOMY?**

21 Yes, and in fundamental ways. Combining efficiency programs with renewable energy  
22 enables communities and companies to achieve truly large reductions in fossil energy use. This  
23 combination is also key to unleashing the new energy economy of clean manufacturing and good

1 jobs.<sup>62</sup> A recent article by utility regulator S. David Freeman, once Chair of the Tennessee  
2 Valley Authority, and Jim Harding of the Washington State Energy Office announced that the  
3 company Nanosolar is building a \$100 million manufacturing facility in the San Francisco Bay  
4 area to produce solar cells very cheaply. Nanosolar cells recently shipped at 33¢ per watt.  
5 Cheap solar cells "...would bring the cost to or below that of delivered electricity in a large  
6 fraction of the world." Backed by a powerful team of private investors, including Google's two  
7 founders and the insurance giant Swiss Re, Nanosolar announced plans to produce 215  
8 megawatts of solar energy next year, and soon thereafter capable of producing 430 megawatts of  
9 cells annually.

10 S. David Freeman notes that "the prospect of this technology creates a conundrum for the  
11 electric utility industry and Wall Street. Can—or should—any utility, or investor, count on the  
12 long-term viability of a coal, nuclear or gas investment? The answer is no."<sup>63</sup> In short, although  
13 this is an example of developments in renewable energy rather than efficiency, rapidly  
14 developing factors are creating a situation in which energy efficiency combined with renewable  
15 energy can displace the need for any future fossil plants, and enable us to begin retiring the  
16 inefficient ones now in service.

17 **IF INCREASING ENERGY EFFICIENCY HAS SO MANY BENEFITS, WHY HASN'T**  
18 **IT BEEN IMPLEMENTED MORE OFTEN?**

19 Utility policy has been held hostage to a presumption that if saving a lot more energy  
20 were possible at an affordable price, it would already have been implemented. That's like not  
21 picking up a \$100 bill from the sidewalk because if it were real, someone would previously have

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<sup>62</sup><http://www.coolmayors.com/common/news/reports/detail.cfm?Classification=report&QID=3488&ClientID=11061&BrowseFlag=1&Keyword=&StartRow=1&TopicID=314> .

<sup>63</sup> Dave Freeman and Jim Harding, "Solar Cells Change Electricity Distribution," *The Seattle Post Intelligencer*, Thursday 10 August 2006, [http://seattlepi.nwsourc.com/opinion/280625\\_solarcell10.html](http://seattlepi.nwsourc.com/opinion/280625_solarcell10.html) .

1 picked it up; or like an entrepreneur who abandons a good business idea because if it were sound,  
2 it would have been done earlier. Economists know that real markets are far from theoretical  
3 perfection. But most utility models assume that almost all profitable energy savings must  
4 already have been bought – as if a perfect market did exist. On this basis, the modelers suppose,  
5 buying significantly bigger savings *will be worthwhile only at higher energy prices*. Modelers  
6 use computer models to calculate how high an energy tax is needed (based on historic  
7 elasticities), how much that will depress the economy, and hence the “cost” to protect the  
8 climate.

9 **WOULDN'T RAISING ELECTRICITY PRICES THROUGH CARBON TAXES OR**  
10 **OTHER MEANS MORE EFFICIENTLY INCREASE CUSTOMER PARTICIPATION**  
11 **IN EFFICIENCY PROGRAMS?**

12 No. It is true that for a market to work properly, prices must tell the truth, and our  
13 electricity prices today do not fully signal market actors of such real costs of coal-fired electricity  
14 as carbon emissions or air pollution. But higher prices alone, will not change customer behavior,  
15 and will unfairly impact lower income customers. There are far better ways to elicit efficiency,  
16 and the best is to make it the most profitable activity for the utility.

17 There's a dramatic demonstration that the price of electricity does not necessarily impact  
18 customers' willingness to participate. During 1990–96, utility programs in Seattle—which then  
19 had the cheapest electricity of any major U.S. city—gave customers information on how to save  
20 electric load. Seattle residents saved energy nearly 12 times as fast as citizens in Chicago, and  
21 electric energy more than 3,600 times as fast, even though Seattle electricity prices are about half  
22 of Chicago's. Seattle City Light achieved measured savings of 313 gigawatt-hours per year and  
23 38 average megawatts—3.2 percent of 1996 energy sales and average load per year. Seattle's

1 1990–96 investments in demand-side management emphasized reducing energy use rather than  
2 peak-load.<sup>64</sup> By 1996, the nearly tenfold larger Chicago utility Commonwealth Edison saved 51  
3 peak megawatts (0.27 percent of its 19-gigawatt peak load), or an 11.8-fold smaller fraction of  
4 load. ComEd had made essentially no effort to save electrical *energy*, and only achieved savings  
5 of 800 megawatt-hours per year, or 0.00088 percent of its sales<sup>65</sup>—a 3,640-fold smaller fraction  
6 than in Seattle. Big customers in Seattle in 1996 paid 1.9 times less and small customers paid  
7 2.3–2.4 times less per kilowatt-hour than in Chicago.

8 Building an informed, effective, and efficient market in energy-saving devices and  
9 practices can fully substitute for a bare price signal, and indeed can influence energy-saving  
10 choices even more than can price alone.

11 **WHAT DO THE SAVINGS IN THE SEATTLE MARKET V. THE CHICAGO MARKET**  
12 **TELL YOU ABOUT USING PRICE ALONE TO REDUCE ENERGY USE?**

13 Economists agree that in a free market energy prices should accurately signal customers  
14 about the full cost of using the resource. However, experience shows that merely raising  
15 customers' rates will not necessarily achieve the reductions in energy use that economic theory  
16 suggests. Similarly, giving people information, incentives and an opportunity to act can elicit  
17 significantly greater reductions of energy use and carbon emissions than purely price-based  
18 theory might suggest.

19 **WHAT ARE THE MARKET BARRIERS TO ENERGY EFFICIENCY?**

20 The report I helped write titled *Climate: Making Sense and Making Money*,  
21 commissioned in 1996 by the President's Council on Sustainable Development, described eight

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<sup>64</sup> J. Todd, personal communication, 7 August 1997, documented in annual *EMSD Accomplishment Reports*.

<sup>65</sup> M. Brandt, personal communications, 13 and 21 August 1997.

1 categories of barriers that are slowing wider implementation of climate protection.<sup>66</sup> Many  
2 economically rational things don't happen because real-world obstacles and complexities aren't  
3 reflected in the "perfect-market" economic models. These models come to the conventional  
4 conclusion that saving much energy will require much higher energy prices.<sup>67</sup> In fact, those  
5 barriers block economically optimal investment in efficient use of energy in the following ways:

- 6 1. *Capital Misallocation* – most executives believe that because energy costs are a small  
7 part of overall costs, it is not worth management time to reduce them. About four-fifths  
8 of firms don't assess potential energy savings using discounted-cashflow criteria, as  
9 sound business practice dictates; instead, they require a simple payback whose median is  
10 1.9 years.<sup>68</sup> At, for example, a 36% total marginal tax rate, a 1.9-year payback means a  
11 71% real after tax rate of return, or around six times the marginal cost of capital. Many  
12 supposedly sophisticated firms count lifecycle cost only for big items and make routine  
13 "small" purchases based on first cost alone. Power plant investments typically attract  
14 cheap 40 year money, while most citizens pay credit card interest rates to weatherize their  
15 homes or install renewable energy. The Batinovich plan is particularly relevant to this  
16 discussion.
- 17 2. *Tight timelines* preventing energy efficient design. Most real estate projects are rushed to  
18 market with no time to enable architects or builders to bring what may be unfamiliar  
19 options to the table, even if the efficiency measures would cost less and work better.

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<sup>66</sup> Lovins, Amory and Lovins, Hunter, "Climate: Making Sense *and* Making Money", Report commissioned by the President's Council on Sustainable Development, 1997, [www.natcapsolutions.org/resources/htm#ART](http://www.natcapsolutions.org/resources/htm#ART) .

<sup>67</sup> Jaffe & Stavins 1994, Sanstad & Howarth 1994, Krause 1996.

<sup>68</sup> DeCanio, S.J. 1993: "Barriers within firms to energy-efficient investments," *En. Pol.* **21**(9):906—914, September, and DeCanio, S.J. 1994: "Why Do Profitable Energy-Saving Investment Projects Languish?," *J. Genl. Mgt.* **20**(1), Autumn.

- 1       3. *Lack of adequate information* – few citizens know where to get more energy efficient  
2       devices, how to shop for them, how to optimize their energy use, how to get devices  
3       properly installed, or who would stand behind it. Few understand such losses as phantom  
4       loads, or even what energy use is really costing them. “Hassle factors” and transaction  
5       costs prevent effective energy decisions in day-to-day life.
- 6       4. *Risks to manufacturers and distributors* – Industry lacks information too – about what  
7       customers really want and whether they’ll put their money where their mouths are.  
8       Manufacturers often hesitate to take the risk of developing and making new energy-  
9       saving products, because of limited confidence that customers will buy them in the face  
10      of all the obstacles listed here. Often the more efficient equipment is not available when  
11      and where it may be desired, leading companies and consumers to settle for less.
- 12     5. *Perverse incentives* – Most buildings are designed by architects rewarded with a share of  
13     the mechanical systems they spec, and no incentive to spend extra time to produce a truly  
14     efficient structure. Split incentives between landlords and tenants, between builders and  
15     buyers, and many other actors keep a great deal of worthwhile efficiency from being  
16     implemented. Appraisers rarely credit efficient buildings for their actual energy savings,  
17     so efficiency’s value isn’t capitalized. Most leasing brokers base pro forma financials on  
18     average assumed operating costs, not actual ones. Few buildings have efficiency labels.  
19     Few renters have access to past energy bills.
- 20     6. *Incomplete markets and property rights* – There is no market in saved energy:  
21     “negawatts” aren’t yet a fungible commodity subject to competitive bidding, arbitrage,  
22     secondary markets, derivatives, and all the other mechanisms that make efficient markets  
23     in copper, wheat, and soybeans. There is no ability to go bounty-hunting for wasted

1 energy, trade negawatt futures and options (or bid them in a spot market against  
2 megawatts), or bid them fairly against expansions of energy supply. You can seldom sell  
3 reduced demand or reduced uncertainty of demand; yet both are valuable resources that  
4 deserve markets. Property rights in most forms of depletion-and-pollution avoidance are  
5 incomplete or absent and hence cannot be traded.

6 7. Market prices don't include many environmental costs and risks: the Clean Air Act, for  
7 example, created a cap-and-trade regime for sulfur but not for carbon emissions.

8 8. Tax asymmetries further distort energy choices. For example, energy purchases are  
9 deductible business expenses, but investments to save energy get capitalized.

10 **WHAT ARE THE BEST MODELS FOR REWARDING UTILITIES SO THEY CAN**  
11 **GET THE BIGGEST RETURNS FROM ENERGY EFFICIENCY?**

12 California's programs can teach us a lot. If all Americans saved electricity as quickly and  
13 cheaply as ten million people served by Southern California Edison Company did during 1983—  
14 85, then each year they'd decrease the forecast need for power supplies a decade hence by about  
15 7%, at a cost to the utility around one-tenth that of today's cheapest new power stations.<sup>69</sup>

16 In the early 1990's, there were a number of experiments underway to help utilities deliver  
17 better value. Eight states implemented programs to allow vendors to compete in an open auction  
18 for ways to make or save electricity. Even paying 3 cents/kWh for efficiency measures was  
19 drastically less expensive than building new power plants. From 1975 to 1985, energy-using  
20 devices – buildings, refrigerators, lighting systems, etc. – doubled their efficiency, improving at  
21 an annual rate of 7%.

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<sup>69</sup> Fickett, A.P., Gellings, C.W., & Lovins, A.B. 1990: "Efficient Use of Electricity," *Sci. Amer.* **263**(3):64—74, September.

1 **WHAT ARE THE RISKS TO COLORANDANS IF WE DON'T REDUCE GHGs, AND**  
2 **HOW ARE THEY RELEVANT TO THIS DOCKET?**

3 We are just starting to realize the enormous risks due to the direct and indirect effects of  
4 global warming. I have described above the economic opportunities that can be captured by  
5 transitioning rapidly to a low-carbon economy. Failing to capture these economic advantages  
6 will make the state, its industries and its citizens far less competitive. Second, we are already in  
7 an era in which companies that do not manage their carbon footprint will be targets of litigation.  
8 For example, PSCo's parent company, Xcel Energy was sued in July 2004 for its carbon dioxide  
9 (CO2) emissions. The states of California, Connecticut, Iowa, New Jersey, New York, Rhode  
10 Island, Vermont and Wisconsin, along with the City of New York, filed suit against the five  
11 largest global warming polluters in the United States, including Xcel Energy,<sup>70</sup> the 4<sup>th</sup> largest  
12 emitter of CO2 in the nation at 75 million tons yearly. More recently, New York Attorney  
13 General Andrew Cuomo sued Xcel and four other companies for failure to disclose the risks of  
14 GHG emissions from new coal plants to shareholders. Cuomo filed suit on behalf of the NY  
15 State Common Retirement Fund.<sup>71</sup> A lawsuit was filed in February 2008 by the Alaskan coastal  
16 city of Kivalina due to damage from global warming, against large GHG emitters including Xcel.  
17 Kivalina is slowly sinking into the sea, and as global warming continues to shrink the barrier  
18 island the city is located on, the entire town must be relocated.<sup>72</sup>

19 **CAN THE U.S. REDUCE ELECTRICITY USE AND GROW THE ECONOMY AT THE**  
20 **SAME TIME?**

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<sup>70</sup> This suit is the first time state and local governments have sued private companies to require reductions in CO2.  
[http://www.oag.state.ny.us/press/2004/jul/jul21a\\_04.html](http://www.oag.state.ny.us/press/2004/jul/jul21a_04.html).

<sup>71</sup> <http://www.legalnewslines.com/news/contentview.asp?c=201086> .

<sup>72</sup> In addition to Exxon, BP and Conoco, the Kivalina lawsuit names Chevron Corp., Shell Oil Co., Peabody Energy Corp., AES Corp., American Electric Power Co., DTE Energy Co., Duke Energy Corp., Dynegy Holdings Inc., Edison International, MidAmerican Energy Holdings Co., Mirant Corp., NRG Energy, Pinnacle West Capital Corp., Reliant Energy Inc., Southern Co., Xcel Energy Inc. and a few other affiliated companies.  
<http://www.commondreams.org/archive/2008/02/27/7313/>.

1           Yes. In the 2000–2001 “energy crisis” that resulted from the mismanagement of the  
2 California electricity market, Californians cut peak electricity demand per dollar of gross  
3 domestic product (adjusted for weather) by 14 percent in six months—a third of customers cut  
4 their usage by 20-plus percent. In just the first six months of 2001, customers wiped out  
5 California’s previous five to 10 years of demand growth, taking away new plants’ market before  
6 they could even be finished. This abruptly ended the crisis that the White House claimed would  
7 require 1,300 to 1,900 more power plants nationwide.<sup>73</sup>

8           More efficient use is already America’s biggest energy source—not oil, gas, coal, or  
9 nuclear power. There are many ways to measure progress in saving energy, but even by the  
10 broadest and crudest measure—lower primary energy consumption per dollar of real GDP—  
11 progress has been dramatic. By 2000, reduced “energy intensity” (compared with 1975) was  
12 providing 40 percent of all U.S. energy services. It was 73 percent greater than U.S. oil  
13 consumption, five times domestic oil production, three times total oil imports, and 13 times  
14 Persian Gulf oil imports. The lower intensity was mostly achieved by more productive use of  
15 energy (such as better-insulated houses, better-designed lights and motors, and cars that were  
16 safer, cleaner, more powerful, and got more miles per gallon), partly by shifts in the economic  
17 mix, and only slightly by behavioral change. Since 1996, saved energy has been the nation’s  
18 fastest-growing major “source.”<sup>74</sup>

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<sup>73</sup> R. Smith, “Power Industry Cuts Plans for New Plants, Posting Risks for Post-Recessionary Period,” *Wall St. J.*, p. A3, January 4, 2002, reports data from Energy Insight (Boulder, CO), showing that at least 18%, or 91 out of a total announced portfolio of 504 billion watts planned for construction, had been cancelled or tabled by the end of 2001. (The 504-billion-watt portfolio included longer-term projects than those summarized at the beginning of this paragraph.) Ms. Smith interpreted the reductions as likely to create power shortages; in fact, they reduced financial losses when demand assumptions proved exaggerated. This would be especially true if saving electricity were allowed to compete fairly with producing it.

<sup>74</sup> Lovins and Lovins, “Mobilizing energy Solutions”, Feb 02, *The American Prospect*, Lovins and King, Energy Efficiency, Spoiler or Enabler, American Association for the Advancement of Science, Feb 2003.

1 Reducing energy waste and growing the economy at the same time is what my company, Natural  
2 Capital Solutions, specializes in. It is why we are asked to consult for such companies as Royal  
3 Dutch Shell, Wal-Mart and the International Finance Corporation. The challenge for policy is to  
4 design a comprehensive approach to energy policy that implements efficiency for buildings,  
5 appliances and machines, and reduces *negative* cost opportunities in ways that make us more  
6 competitive *and* also puts 100's of billions of dollars back into the economy from savings.

7 Natural Capitalism is based on three principal strategies:

- 8 1.) buy time by radically using resources more effectively,
- 9 2.) Redesign all industrial processes and the delivery of products and services to do  
10 business as nature does, an approach known as biomimicry,<sup>75</sup> and
- 11 3.) manage institutions to restore natural and human capital.

12 In this testimony, I am only addressing the first principle: *buying time by using resources*  
13 *much more effectively*. Efficient use of resources like energy will slow resource depletion,  
14 reduce pollution, and increase employment with meaningful jobs. Efficiency can lower costs for  
15 business and society, halt the degradation of the biosphere, make it more profitable to employ  
16 people, and preserve vital living systems and social cohesion. But very soon we must commit, as  
17 Germany already has, to the transition to 100% renewable energy, and to doing business in  
18 fundamentally more sustainable ways. China has pledged to reduce energy *intensity* by 4 percent  
19 a year through the rest of the decade, and has set a target to reduce energy consumption per unit  
20 GDP by 20 percent during the 2006-2010 period.<sup>76</sup> In 2007, the Chinese announced the creation

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<sup>75</sup> Biologist Janine Benyus asserts that certain principles from nature hold insight for humans in the design of sustainable solutions, among them: nature runs on sunlight; nature uses only the energy it needs; nature fits form to function; nature recycles everything; nature rewards cooperation; nature banks on diversity; nature demands local expertise; nature curbs excesses from within; and nature taps the power of limits. Janine M. Benyus, *Biomimicry* (William Morrow and Company, 1997), p. 7.

<sup>76</sup> "China vows to take due responsibility to curb global warming," *People's Daily – English*, March 06, 2007

1 of over a billion dollars of funds to encourage energy efficiency and renewables.<sup>77</sup> The world's  
2 first green billionaire is a Chinese solar entrepreneur.

3 Efficiency will only buy time. If we waste that time, we will find that such challenges as  
4 the global climate crisis will destroy our economy, and our options for a relatively painless  
5 transition to an economy based on renewable energy.

6 **CAN YOU PLEASE SUMMARIZE YOUR TESTIMONY?**

- 7 1. Decoupling profits from sales is only half the battle; the utilities must be regulated in  
8 such a way that their greatest rate of return comes from implementing the efficiency that  
9 is so manifestly in everyone's economic interest;
- 10 2. Efficiency is much cheaper than new plants, or even running existing plants;
- 11 3. Maximizing the incentives for utilities to invest in efficiency is good for everyone – the  
12 utility, shareholders, ratepayers and all Colorado citizens;
- 13 4. Market forces alone will not incentivize utilities and customers into increasing efficiency,  
14 but good programs will.

15 Energy efficiency has proven to cost less than new supply in many studies. Good  
16 efficiency programs cost ½ -2 cents/kWh saved, running a coal plant costs 4-6 cents/kWh, and  
17 running an existing gas plant costs 5-6 cents/kWh. The California PUC found from 1990 to  
18 1993 that efficiency measures saved customers a net present value of almost \$2 billion.<sup>78</sup>  
19 Unfortunately, deregulation – which was actually a re-regulation – derailed U.S. investment in  
20 efficiency.

21 Finally, consumer advocates must realize that it is in the best interest of everyone –  
22 ratepayers, investor-owned utilities and government – to allow utilities to make the maximum

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<sup>77</sup> “China Plans US\$925 Million Energy Efficiency Fund.” Reuters, August 28, 2007  
<http://www.planetark.com/dailynewsstory.cfm/newsid/43964/story.htm> .

<sup>78</sup> Hawken, Lovins, Lovins, *Natural Capitalism*, p.273-274, Little Brown, 1999.

1 return possible on energy efficiency. When utilities are eager to implement efficiency because  
2 doing that will give them the greatest profit, we all win. The transformation of the U.S. economy  
3 already is underway, and there is a strong business case for acting even more aggressively to  
4 protect the climate.<sup>79</sup>

5 **DOES THIS CONCLUDE YOUR TESTIMONY?**

6 Yes it does. Thank you.

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<sup>79</sup>The details of this are presented in Natural Capitalism Solutions, *Climate Protection Manual for Cities*, p. 15, [www.natcapsolutions.org/climateprotectionmanual.htm](http://www.natcapsolutions.org/climateprotectionmanual.htm)

## Attachment A



L. Hunter Lovins is the founder and President of Natural Capitalism, Inc. and Natural Capitalism Solutions, a 501(c)3 non-profit in Eldorado Springs, Colorado. A renowned author and champion of sustainable development for over 30 years, Hunter has managed international non-profits and corporations. A professor of business at Presidio World College, she has taught at major universities, consulted for citizens' groups, governments and corporations. She co-founded of Rocky Mountain Institute and led it for 20

years. In great demand as an inspirational speaker and effective consultant, she has addressed the World Economic Forum, the U.S. Congress, the World Summit on Sustainable Development, and hundreds of major conferences. Named millennium Hero for the Planet by Time Magazine, she has received the Right Livelihood Award, the Leadership in Business Award and dozens of other honors. Hunter believes that citizens, communities and companies, working together within the market context, are the most dynamic problem-solving force on the planet. She has devoted herself to building teams that can create and implement practical and affordable solutions to the problems facing us in creating a sustainable future.

### Areas of Expertise

- Natural Capitalism
- Climate Change
- Green Development
- Governance
- Land Management
- Strategic Planning
- Energy (efficiency and renewable)
- Community Economic Development
- Sustainable Business Management
- Corporate Social Responsibility
- Natural Resource Management
- International Development
- Leadership Development
- Partnerships for Sustainability
- Water (provision and treatment)
- Human Dimensions of Natural Capitalism
- Non-profit Management
- Fire Rescue and Emergency Medicine

### Education & Background

Awarded a double Bachelors of Arts (Political Science and Sociology) from Pitzer College, in Claremont, Hunter got her Juris Doctor from Loyola University School of Law, Los Angeles, CA, 1975. She passed the California Bar and received Loyola's Alumni Award for Outstanding Service in 1975. Hunter also received an Honorary LHD, University of Maine, and later was also awarded an honorary doctorate from Kalamazoo and a Doctor of Public Service from Northland College in 2001.



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Hunter helped establish, and was for six years Assistant Director of the California Conservation Project (Tree People), an innovative urban forestry and environmental education group. She then served as policy advisor for Friends of the Earth under David Bower. In 1982 she founded the Rocky Mountain Institute (RMI), a 50-person research center with a \$7 million annual budget, half of it earned through programmatic enterprise. She served as RMI's CEO for strategy until 2002, when she left to join the Global Academy and form Natural Capitalism Solutions (awarded its own non-profit status by the U.S. Internal Revenue Service in October 2004). She was Henry R. Luce Distinguished visiting professor at Dartmouth College, taught at numerous other universities, and is currently professor of Sustainable Management at Presidio World College, the first accredited MBA in sustainable management, and co-Chair of Sustainability.

Hunter was one of four people from North America to serve as a delegate to the UN's prep conference for Europe and North America for the World Summit on Sustainable Development, and lead a delegation to the World Summit. She was a commissioner in the State of the World Forum's Commission on Globalization, co-chaired by Mikhail Gorbachev, Jane Goodall, George Soros and others. In 2003, she created Natural Capitalism Inc. and the non-profit Natural Capitalism Solutions to implement the ideas of sustainable development on a global scale.

## Corporate Service

Hunter has served on the boards of one government, several corporations and many public interest groups. She is currently on the Engineers Without Borders and International Center for Sustainable Development Boards. She advises numerous companies and non-profits, including E Magazine, Portfolio 21, GreenMountain.com and The Natural Edge Project. She was a founding director of RMI's for-profit spin-off, E SOURCE, until its 1999 sale for \$18 million to the Financial Times.

## Selected International Audiences

- U.S. Congress
- World Summit on Sustainable Development
- World Economic Forum
- Global Economic Forum
- Daughters of the American Revolution Continental Congress
- World's Fair Energy Symposia
- State of the World Forum
- St. John the Divine Cathedral Epiphany Service
- Industrial Designers Society's WorldDesign
- United Nations Development Program
- Institution of Engineers Australia
- United Nations Industrial Development Organizations Annual General Conference
- Hundreds of conferences & college symposia
- Queensland EPA Sustainable Industries Division
- New Zealand Parliamentary Commissioner for the Environment
- Western Australia Environmental Policy Unit
- IPENZ National Convention / Newnham Lecture Australian Conservation Foundation
- European Climate Exchange

## Awards & Media Appearances

Hunter shared a 1982 Mitchell Prize for an essay on reallocating utility capital, a 1983 Right Livelihood Award (often called the "alternative Nobel Prize"), a 1993 Nissan Award for an article on Hypercars, the 1999 Lindbergh Award for Environment and Technology, and several honorary doctorates. In 2000 she was named a Hero of the Planet by Time Magazine, and received the Loyola University Award for Outstanding Community Service. In 2001 she received the Leadership in Business Award and shared the Shingo Prize for Manufacturing Research. In 2005 she received the Distinguished Alumni Award of Pitzer College.

- 60 Minutes (USA)
- Good Morning America
- Bill Moyers' NOW
- Pat Robertson's "700 Club"



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- Australian Broadcasting Company
- The Merv Griffin Show
- Hundreds of TV and radio news programs
- Award-winning film “Lovins On the Soft Path”
- Chicago Manufacturing Center [online training course for the Sustainability Helix](#)

## Publications

- Hunter has co-authored nine books including *Natural Capitalism* ('99), and the upcoming publication *The Natural Advantage of Nations* ('05), *Green Development* ('98) and *Least Cost Energy: Solving the CO<sub>2</sub> Problem* ('81)
- Dozens of professional papers including Harvard Business Review, Foreign Affairs, the American Association for the Advancement of Science, the Journal of the American Bar Association, Natural Resources Journal and Journal of the U.S. Green Building Council
- Recent articles have appeared in World Link, World Business Academy Review, The Guardian, American Prospect, Los Angeles Times, Yes! Magazine (see photo), and In-Business Magazine



## Strategic Consulting

*You made an important contribution to both the Business and Environment Seminars and the Opening Ceremony of the Exposition itself. You stimulated our minds and motivated us to keep doing what we are doing—only more effectively...Thank you for being such a patient, gracious, and easy-going guest...*

—Susan Otuokon, M. Sc.  
Executive Director  
Jamaica Conservation  
and Development Trust

### Private Sector:

Hunter has consulted extensively to the private sector, briefing and working with senior management at such groups as Interface, Chicago Climate Exchange, Bank of America, Allstate, Calvert Social Investment Fund, Royal Dutch/Shell Group, Invensys, the International Finance Corporation, utility companies, and hundreds of non-profits.

### Public Sector:

Clients have included the U.S. Defence Civil Preparedness Agency, Environmental Protection Agency, The Pentagon, UNIDO, the Bonneville Power Administration, the Solar Energy Research Institute, the German Federal Environment Agency, the Government of Jamaica, the Government of Western Australia, the Government of Afghanistan and dozens of communities.

## Sessions, Services & Workshops

**Lectures:** Hunter delivers almost 100 lectures a year at leading universities and colleges in the United States and across the world. The lectures are tailored to specific course content.

**MBA Curriculum:** Hunter and her team create and deliver curriculum content in sustainable business with an emphasis on the principles of Natural Capitalism. Hunter also works with universities and professional schools to redesign degree programs to incorporate sustainability expertise. Hunter and her colleague, Walter Link, are the lead consultants for Presidio World College in the design of their new MBA in Sustainable Management, now in its second year.

**Corporate Training Programs:** These programs complement the strategic consulting services of Natural Capitalism, but can also stand alone. When a company shifts focus, effective communication of the new priorities is critical to a smooth transition. Corporate training can be developed for an entire workforce or specific teams. Each program is customized in response to the individual needs of each client. The principles of Natural Capitalism are explored in relation to their impact on business strategy, process and job roles using the Natural Capitalism Sustainability Helix.



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## Speaking/Workshop Topics by Title

- Natural Capitalism: Creating the Next Industrial Revolution
- Implementing Natural Capitalism: Unleashing Natural Competitive Advantage
- International Reconstruction and Development: Building a Green Afghanistan
- Sustainable Business Practice: A Natural Capitalism Fieldguide
- The Management Helix for the Sustainable Organization (Sustainability Helix)
- Human Dimensions of Natural Capitalism
- Sustainable Business Education: An MBA in Sustainable Business Management
- Engineering Sustainable Solutions (in partnership with The Natural Edge Project)
- Innovation, Creativity and Best Practices: Hope for the Future
- Partnerships for Sustainability
- Sustainable Economic Development Planning
- Climate: Making Money, Making Sense
- Energy Policy: Solutions for the Future
- Energy Efficiency: Harnessing the Power
- Energy Strategies for National Security
- Energy Options in Sustainable Agriculture
- Globalization: Living in a Tri-Partite World
- Sustainable Land Management: Integrating Community, Ecology and Profit
- Sustainable Management
- Water Policy: Profitable Solutions to the Next Resource Crises
- Green Development: Integrating Real Estate and Ecology
- Create a 'Sustainability Dream Team'
- Sustainability Reporting
- Eco-Efficiency Review
- Business Plan Consultation
- Corporate Training



## Educational Programs

The business education programs developed by Hunter and her colleagues demonstrate how socially and environmentally responsible business decisions benefit performance in corporate, government, and non-profit organizations. Her team draws upon expertise in international business, education, engineering, architecture, law, economics, and natural resources to design custom programs. Universities in Europe, Australia and North America are responding to the challenge of achieving sustainable development. University leaders increasingly acknowledge their responsibility in this arena through networks such as the 'UNESCO Global Higher Education Sustainability Partnership'.

Progress is reflected in the growth of the number of signatories to declarations of sustainability, such as the Talloires Declaration, the development of national and international networks of university staff devoted to improvement in sustainability, such as the 'University Leaders for a Sustainable Future Network and the impressive innovation globally in environmentally sustainable design and practice. A shift is occurring in Universities in Japan, New Zealand, Taiwan, China and in most countries of the Asia Pacific. Most encouraging has been the leadership shown by the Japanese Government in proposing and developing the UN Decade of Education in Sustainable Development starting in 2005.

In August 2003, Hunter and her colleague, Walter Link, delivered the first class of the first accredited business school of sustainable management at Presidio World College in San Francisco. Unlike traditional MBA programs that may offer an elective in corporate responsibility, Presidio World College weaves sustainability throughout such conventional business topics as economics, accounting, finance and strategy.

Hunter has also delivered lectures in courses at leading universities and colleges in the United States and abroad, including:

- UC Berkeley, Haas School of Business and Boalt School of Law (CA)
- Stanford University (CA)
- Williams College (MA)
- University of Maine
- Imperial College (London)
- University of Iowa, College of Engineering
- Presidio World College (CA)
- University of Wyoming
- United World College
- Victoria Univ. of Wellington (New Zealand)
- University of Canberra (Australia)
- Griffith University (Australia)
- Royal Melbourne Institute of Technology (Australia)
- National Collegiate Innovators and Inventors Alliance (MA)
- Iowa State University

Hunter and her team are exploring other venues of masters-level education. To share the momentum created with this current success, now her team is working to package the materials so far created and to identify new partners and opportunities in order to expand its reach.



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## Projects on the Go!

Current projects include:

- 1. International Sustainable Economic Development:** Work in this area includes a range of sustainable economic development planning and implementation activities, ranging from local/regional projects to national plans for developing and post-conflict countries. NCS is focused on improving the competitiveness of industry and businesses through sustainability and natural capitalism principles. Following a hands-on engagement in Jamaica working with 'The Dolphin Head Trust' on their eco-tourism and sustainable agriculture planning, the team is now working in Afghanistan with partners, 'On the Frontier Group' and 'Engineers Without Borders' to assist the country to realize their unique opportunity to rebuild a sustainable Afghanistan.
- 2. Organizational Implementation of Sustainability Strategies:** Hunter and her team help private businesses, communities and governments implement sustainability strategies. The work ranges from providing sustainability education for decision-makers and stakeholders to designing and implementing sustainability management systems. Current work is with the Chicago Manufacturing Center, implementation of sustainability at the Fort Carson Mountain Post, 'greening' the University of Colorado at Boulder, the MBA program in Sustainable Management at Presidio World College and a variety of private business initiatives.
- 3. Profitable Climate Change Solutions:** NCS is providing solutions to industry that profitably reduce the emission of greenhouse gases. Implementation strategies reduce the load on the environment and capture the benefits of improving efficiency and productivity along with emerging opportunities in international emissions trading markets. As a founding member of the Chicago Climate Exchange, Natural Capitalism "walks the talk" through its own operations as well as its services.
- 4. Energy Efficiency and Distributed Generation:** Hunter and her team assists industry to increase energy efficiency in its operations and make the transition to a broader portfolio of energy generation options such as distributed sources like solar, hydro, fuel cell, etc.
- 5. Sustainable Manufacturing:** In partnership with The Natural Edge Project (TNEP), Hunter and her team are undertaking the first industry-wide trial of the recently developed 'Sustainability Helix' through work with a range of small to medium sized manufacturers and businesses in the Chicago area. Working with the Chicago Manufacturing Center, the team is tailoring the Sustainability Helix to provide tangible options for business development to achieve more sustainable outcomes and improve competitive advantages in Chicago.

## Publications in the Works

Hunter Lovins and her team are currently developing publications focusing on a range of topics such as assisting business and industry to develop sustainable practices and making the transition towards becoming sustainable organizations.

*Sustainable Business Practice—The Fieldguide to Natural Capitalism* presents a whole-systems approach for implementing sustainability in an organization. It expands on the ideas in *Natural Capitalism* and answers many practical questions. This book is being co-developed with the Australian team at The Natural Edge Project, authors of *The Natural Advantage of Nations: Business Opportunities, Innovation and Governance in the 21st Century* (available Dec. 2004). The Fieldguide Provides the next



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level of detail for what an organization can do on Monday morning to use the Natural Capitalism principles and benefit from the emerging consensus on how to achieve sustainable development at a profit.

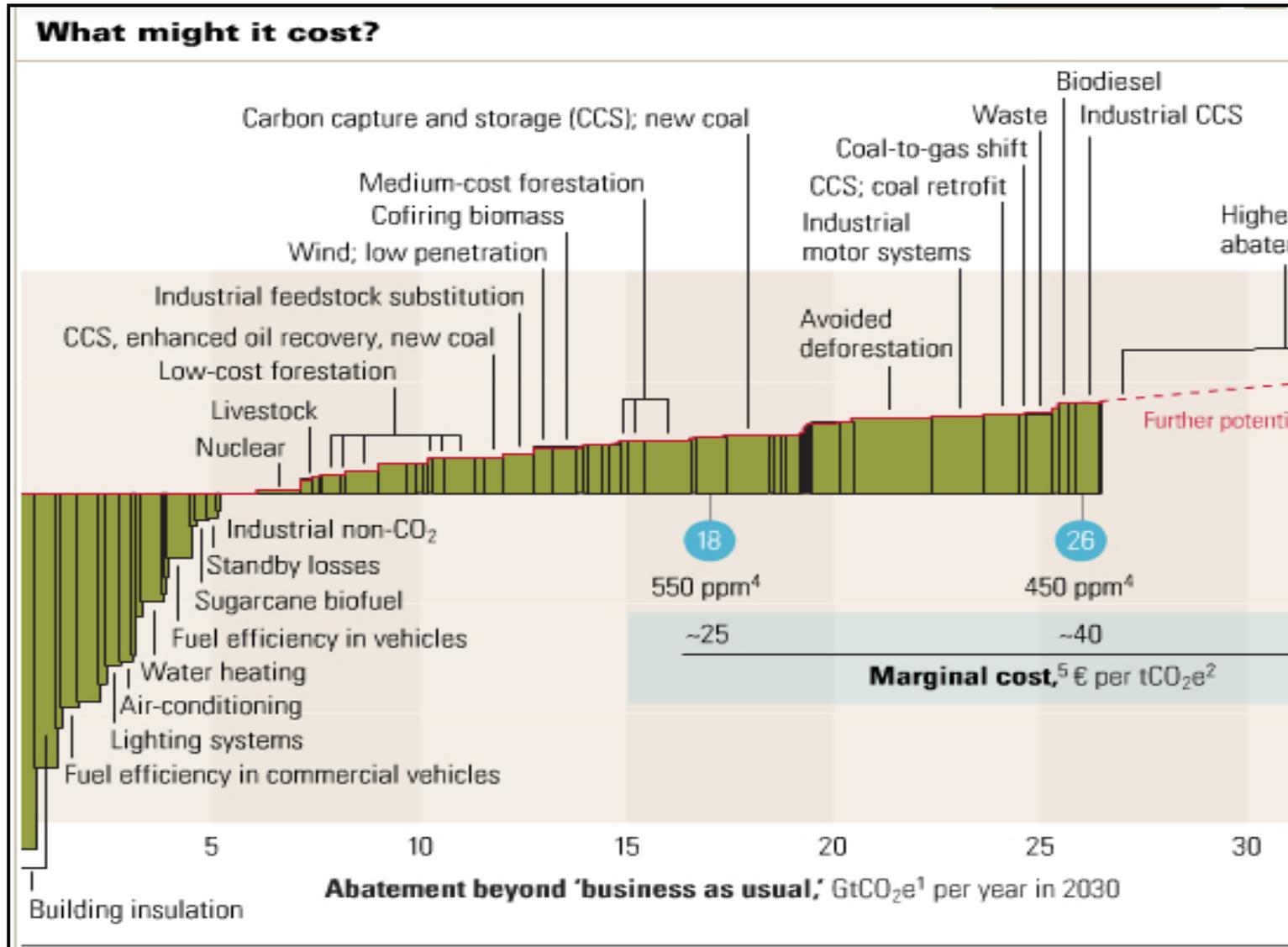
*Human Dimensions of Natural Capitalism*, Hunter Lovins and Walter Link will incorporate expertise gained since the 1999 publication of *Natural Capitalism* and answer the question: “If Natural Capitalism makes so much sense, why isn't it happening faster?” *Natural Capitalism* showed that tomorrow's successful businesses will profit from behaving in more environmentally responsible ways. People, individually and collectively, resist change. *Human Dimensions of Natural Capitalism* will explore what makes people want to change, what motivates them and what hinders them from changing.

*Sustainable Solutions for Critical Public Policy Challenges: The Elements of a Sustainable Economy* is a compendium of sustainability-based solutions for the critical challenges that businesses, non-profits, governments and public policy-makers face.

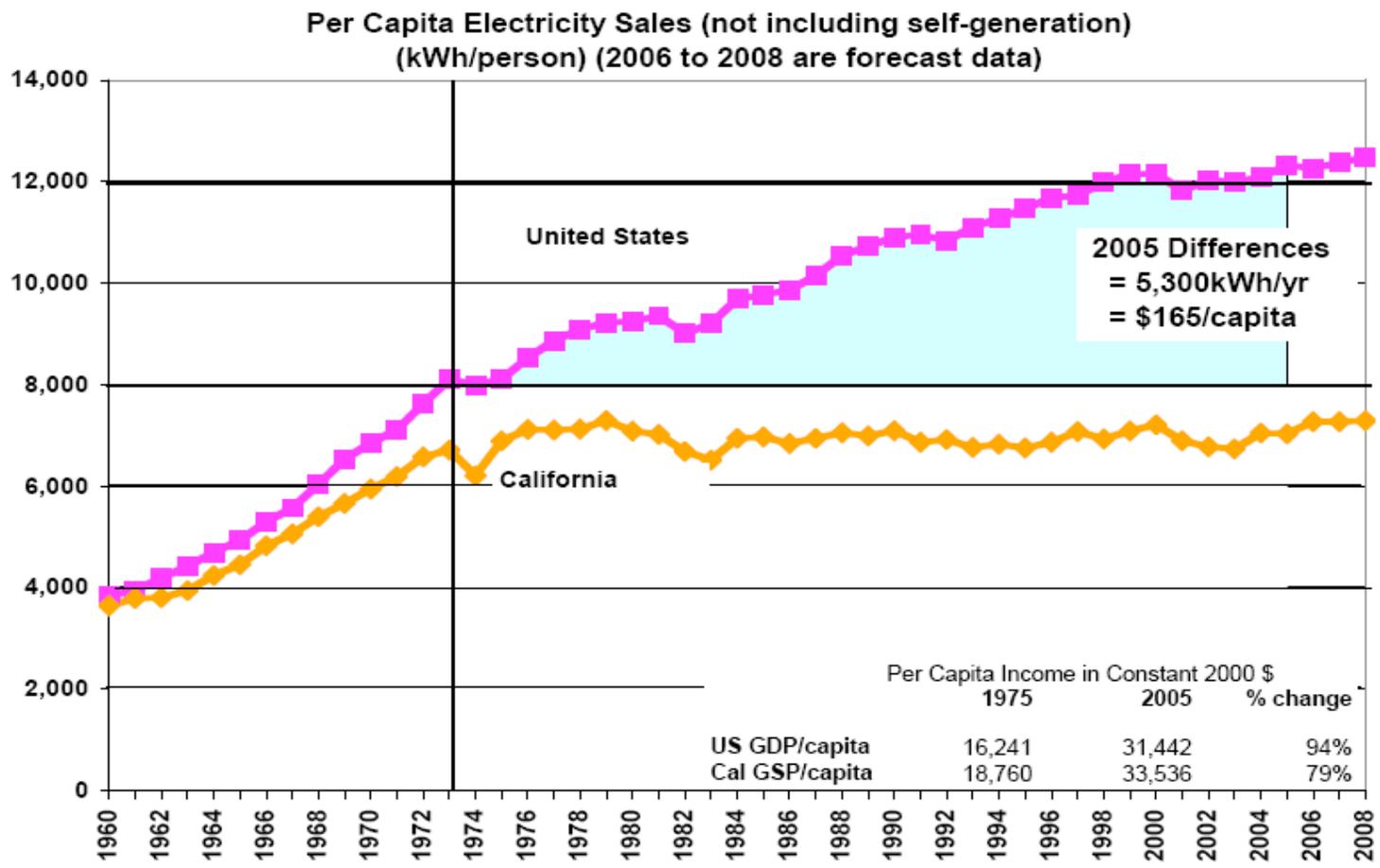


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## Attachment B



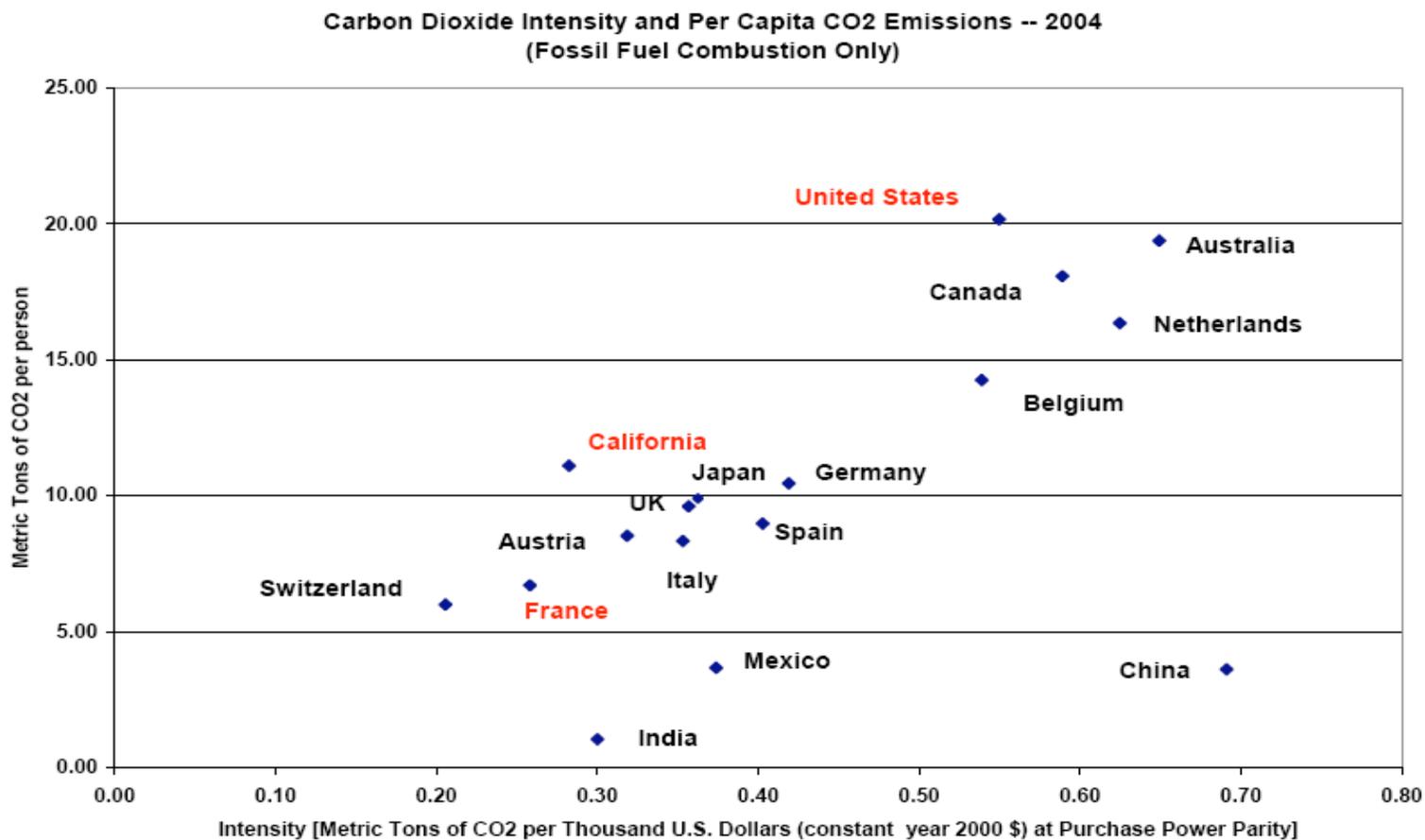
# Attachment C



## California v. U.S. Energy Demand

Source: Arthur Rosenfeld, California Energy Commission

## Attachment D



### California and U.S. CO<sub>2</sub> Intensity

Source: Arthur Rosenfeld, California Energy Commission

# Attachment E

