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Climate Change Budget/Finance FY2000 Appropriations

Stack:	Row:	Section:	Shelf:	Position:
S	61	7	11	2

Climate Change Technology Initiative Funding

7/19/99 15:30

			FY 1999		FY 2000			
	FY97 App	FY98 App	Request	Omnibus	Submitted	302(b) Est.	Senate	House
Energy & Water Appropriation	272	409	350		436.921	292.737	339.258	317.350
Energy Supply Account	270	272	382	336	403.921	270.627	306.258	284.350
Solar & Renewable Energy	270	272	372	336	398.921	267.277	301.258	279.350
Outlays					354.714	295.475	310.766	300.908
Nuclear Energy	0	0	10	0	5.000	3.350	5.000	5.000
Outlays		272	321	301	356.964	296.982	313.016	303.158
Science Account		0	27	13.5	33.000	22.110	33.000	33.000
Biological & Envir Research				8.0	20.000	13.400	20.000	20.000
Basic Energy Sciences				5.5	13.000	8.710	13.000	13.000
Energy Research total		0	27					
Outlays		0	16	8	23.595		23.595	23.595
Interior Appropriation	457	650	552		686.315	507.873	556.617	570.222
Outlays					578.864		539.655	543.953
Energy Conservation R&D	420	457	617	526	646.515	478.421	516.817	531.252
Outlays					551.584		512.675	517.005
Non-CCTI (tracking only):								
(State Grants -- non-add)	150	155	191	166	191.000	141.340	166.000	165.203
(Energy Conservation Total)	570	612	809	692	837.515	619.761	682.817	696.455
(PODRA and transfers)	-30	-21	-35	-64	-25.000	-25.000	-25.000	-25.000
(Energy Conservation Net)	540	591	774	628	812.515	594.761	657.817	671.455
Outlays	565				723.449		677.039	681.130
Fossil Energy R&D Account	0	0	30	24	36.800	27.232	37.300	35.970
Outlays (40,40,20)	0			4	24.280		24.480	23.948
(Coal & Gas Utiliz -- non-add)								
Energy Information Administra	0	0	3	3	3.000	2.220	2.500	3.000
Outlays					3.000		2.500	3.000
DOE CCTI TOTAL	729	1,059	902 0		1,123.236	800.610	895.875	887.572
EPA	90	205	109		216.000	185.760		
HUD	0	10	10		10.000	8.600		
USDA	0	10	0		16.000	15.360	0.000	0.000
DOC	0	7	0		2.000	1.560	2.000	
CCTI TOTAL	819	1,291	1,021		1,367.236	1,011.890	897.875	887.572
Increase over FY99		472	202		347	-9	-123	-133
Relative to Previous Approp		58%	25%		34%	-1%	-12%	-13%
Relative to CCTI 5-Yr Plan			-21%		3%	-24%	-32%	-33%
Relative to FY00 Request								
Dollars						-355.346	-469.361	-479.664
Percentage						-26%	-34%	-35%

STATEMENT OF
JOSEPH ROMM

EXECUTIVE DIRECTOR
CENTER FOR ENERGY AND CLIMATE SOLUTIONS

before the

SUBCOMMITTEE on
NATIONAL ECONOMIC GROWTH,
NATURAL RESOURCES, AND REGULATORY AFFAIRS

of the

COMMITTEE on GOVERNMENT REFORM

HOUSE OF REPRESENTATIVES

February 2, 2000

Mr. Chairman, members of the Subcommittee, I am delighted to appear before you today to discuss the Energy Implications of the Digital Economy. My non-profit Center for Energy and Climate Solutions recently completed one of the most comprehensive analyses done to date on this exact subject—the possible impact of the Internet on energy consumption and greenhouse gas emissions. That report "The Internet Economy and Global Warming: A Scenario of the Impact of E-commerce on Energy and the Environment," is available online at www.cool-companies.org. Let me review the principal findings and conclusions of that analysis:

- The nation experienced remarkable economic growth in 1997 and 1998, over 4% per year, driven to a significant extent by industries that produce information technology (IT). The resulting increase in electronic business

transactions also played a role. The overall productivity of the economy appears to have increased substantially, driven by the IT sector.

- During those same two years, the nation's energy consumption—the principal source of air pollution and the gases linked to global warming—hardly grew at all. In the previous 10 years, U.S. energy intensity, measured in energy consumed per dollar of gross domestic product (GDP) declined (i.e., improved) by under 1% per year. In both 1997 and 1998, it improved by 4%—an unprecedented change during a time of low energy prices. In 1998, U.S. emissions of greenhouse gases rose only 0.2%, the smallest rise since 1991 (which was a recession year).
- Preliminary analysis by EPA and Argonne National Laboratory suggests that one third to one half of the recent improvements in energy intensity are "structural." Structural gains traditionally occur when economic growth comes in sectors of the economy that are not particularly energy intensive, such as the IT-producing sector, which includes computer manufacturing and software (as opposed to more energy-intensive sectors, including chemical manufacture, the pulp and paper industry, and construction).
- The remaining one half to two-thirds improvement comes from gains in the energy efficiency of all sectors. In traditional energy efficiency, a computer factory would use more efficient motors, a software company might using more efficient lighting in its buildings, or a chemical manufacturer might redesign a process for making a chemical to cut the energy used per pound of product.
- Traditional structural gains will likely continue, since the IT-producing industries continue to show high growth rates. The EPA has performed a preliminary analysis of the potential impact of structural changes driven by rapid growth of the IT-producing industries. The analysis suggests that mainstream forecasts, such as those by the Energy Information Administration (EIA) may be significantly underestimating overall U.S. economic growth while overestimating U.S. energy and carbon dioxide emissions in the year 2010 by up to 5 quads and 300 million metric tons of carbon dioxide. This is about 5% of the nation's projected energy use and GHG emissions.
- Traditional energy efficiency will also likely accelerate for two reasons. First, more and more companies are developing and implementing strategies to reduce their greenhouse gas (GHG) emissions and these strategies include investing in energy efficiency. Second, major energy service companies are increasingly offering "energy outsourcing" deals in which they take over corporate energy management for Fortune 1000 companies and invest in energy efficiency to a much higher degree than those companies had. These deals eliminate many of the barriers that have slowed more widespread adoption of energy efficiency technologies and strategies in the past decade.
- Equally important, the Internet economy itself seems to be generating both structural gains and efficiency gains. Internet structural gains will occur, for instance, if the manufacturing of software on disks and CDs (delivered by plane and/or truck) continues to shift toward purely electronic files delivered over the Internet. If companies put their stores on the Internet using software, rather than constructing new retail buildings, that would also represent an Internet structural gain. Dematerialization saves energy. The Internet makes possible what might be called e-materialization. By 2003, e-materialization of paper alone holds the prospect of cutting energy consumption by about 0.25% of total industrial energy use and net GHG emissions by a similar percentage. By 2008, the reductions are likely to be more than twice as great. We also believe the Internet Economy could render unnecessary as much as 3 billion square feet of buildings—some 5% of U.S. commercial floor space—which would likely save a considerable amount of construction-related energy. By 2010, e-materialization of paper, construction, and other activities could reduce U.S. industrial energy and GHG emissions by more than 1.5%.
- Internet energy efficiency gains potentially cover a broad spectrum of activity. In business-to-consumer e-commerce, for instance, a warehouse can contain far more products like books per square foot than a retail store. Warehouses themselves also typically use far less energy per square foot than a retail store. So books and other products sold over the Internet would likely consume less energy per book than traditional retail-based sales.
- More important is business-to-business e-commerce, which is estimated at 5 to 10 times the size of business-to-consumer e-commerce. As traditional manufacturing and commercial companies put their supply chain on the Internet, and reduce inventories, overproduction, unnecessary capital purchases, paper transactions, mistaken orders, and the like, they achieve greater output with less energy consumption. Federal Reserve Board Chairman Alan Greenspan told Congress in June "Newer technologies and foreshortened lead-times have, thus, apparently made capital investment distinctly more profitable, enabling firms to substitute capital for labor and other inputs far more productively than they could have a decade or two ago." Imagine the Internet energy efficiency gains if electronic commerce leads "to a reduction in overall inventories of \$250-\$350 billion, or about a 20% to 25% reduction in current U.S. inventory levels." Few things have a larger environmental benefit than pollution prevention, especially in the energy-intensive manufacturing sector. Not making products that wouldn't have been sold or not building manufacturing plants that aren't needed is pure prevention.
- Another important effect is that the Internet appears to be promoting greater use of home offices, allowing telecommuters to spend less time at the office and also spawning many purely home-based businesses. The Internet provides home-based workers more access to more useful information and increasingly high-speed connections to coworkers and/or customers. And as e-commerce itself grows, both business-to-consumer and business-to-business, more jobs will involve spending a considerable amount of time on the Internet, jobs that can perhaps be done as easily from home as from traditional workplaces. This shift will increase energy consumption in homes, but will

likely save far greater energy in avoided office building construction and utility bills, as well as reduced commuting energy.

- There are aspects of the Internet that will probably entail more energy use, such as greater small-package delivery by truck. These cases may not, however, result in a net increase in energy use; efficient package delivery by truck may replace at least in part inefficient personal driving to malls, supermarkets, bookstores and the like. This will be particularly true if most of the packages are delivered by the Post Office, which already passes virtually every home in the country daily. The great unknown question at this point is whether or not a significant fraction of Americans will change their driving habits over the next few years once it is possible to make a critical mass of cyber-trips on the Internet. That is, will the Internet be the mall of the 21st Century?
- The Internet is growing so quickly, and data on it remain so inadequate, that it is certainly not possible to draw more than tentative conclusions at this point (particularly in areas as difficult to analyze as the possible substitution of Internet use for transportation). That is why we have labeled this analysis a scenario, and not a prediction. We believe the Internet may already be reducing the energy intensity of the industrial sector, and that it holds the potential to have its most significant impact in this area. If so, this would be the Internet's biggest impact on the environment, since this sector is responsible for a third of the nation's air pollution and the vast majority of its hazardous waste and other pollutants. We believe the Internet could significantly reduce the contribution of the commercial building sector to the nation's energy intensity and that gains in this sector will likely outweigh increases in electricity use in residential buildings. We suspect the Internet economy will be no worse than neutral in the transportation sector, but could well have a large positive impact.
- If, indeed, the Internet is already reducing energy intensity, then it is likely to have a very big impact in the years to come. The Internet economy is projected to grow more than ten-fold—from its current level of tens of billions of dollars today to more than \$1 trillion in a few years. Moreover, while the Internet economy remains a small share of the total U.S. economy, it represents a much higher fraction of the *growth* in the economy. That is the essential point for this paper, which explores the likely impact of the Internet on the relationship between the growth in the economy and the growth in energy use.
- We believe the combination of trends described above makes it likely that the years 1997 to 2007 (and probably beyond), will not see the same low-level of energy intensity gains that the previous 10 years saw, which were under 1% per year. We expect annual improvements in energy intensity of 1.5%—and perhaps 2.0% or more. If this comes to pass, most major economic models used in the country will need to be modified. For instance, EIA uses a figure of 1.0% for its projection of annual energy intensity improvements. If the actual number is closer to 1.5% to 2%, then a number of related forecasts may need to be changed, such as the number of power plants the United States will need to build in the next decade, and the cost to the nation of achieving greenhouse gas reductions. Already, preliminary data make clear that energy intensity in 1999 will drop by more than 2.0%.
- It may be that many other factors widely used in economic models—building construction per GDP, paper use per GDP, and the like—also need to be changed. This might in turn affect the impact of GDP growth on the inflation rate. The Internet economy could well allow a very different type of growth than we have seen in the past. In other words, the scenario we are presenting in this paper is that if there is a so-called "New Economy," as many apparently now believe, there is also a "New Energy Economy," which would have profound impacts on energy, environmental, and economic forecasting.

I would like to expand on some of the key trends affecting how the nation uses energy today and in the future.

KEY TRENDS IN ENERGY EFFICIENCY

Energy technologies have improved dramatically over the past decade. In particular, the application of IT to traditional energy technologies has resulted in quantum improvements even in the two classical technologies that are responsible for most electricity consumption, lighting and motors. We have seen steady advances in solid-state electronic ballasts for running fluorescent lamps; they not only save considerable energy compared to magnetic ballasts, but also eliminate the annoying flicker and hum. Further, these ballasts can be run with sophisticated but low-cost controls, that allow them to automatically dim when there is more daylight. These lamps can now be controlled even at the desktop by remote controls or through a PC. Greater control over the workplace environment in general, and lighting in particular, has been linked to productivity increases. Similarly, computer-controlled adjustable speed drives for motors can simultaneously reduce energy consumption and improve process control, achieving significant direct cost savings as well as productivity gains. Even boilers and hot water heaters can cut energy consumption 25% or more through the installation of microprocessor-based controllers. Also, a digital energy management control system (EMCS) can now continuously gather data about what is taking place in a building and how its equipment is operating, which can then be fed into a central computer that can be used to control the building and optimize its energy performance. Energy experts at Texas A&M have shown in two dozen Texas buildings that using such an approach can cut energy use 25% with an 18-month payback in buildings that have already received on upgrade with the latest energy-saving equipment.

Some companies have instituted corporate wide policies to adopt these technologies, such as IBM and Johnson & Johnson. They have been able to sustain steady improvements in their corporate energy intensity (energy per dollar of output) of 4% per year and 3% per year respectively throughout the 1990s. Though virtually every company could do what IBM and J&J have done, they are still the exceptions. *Fortune* magazine noted in 1998, "Only a third of U.S. manufacturers are seriously scrutinizing energy usage, where savings in five areas can move billions to the bottom line." As energy became a much lower fraction of the cost of doing business in the mid-1980s (because of lower prices and a decade of successful investments in

energy efficiency), businesses naturally reduced investments in energy-saving technologies. During the corporate downsizings of the early 1990s, many corporate energy staffs were sharply reduced or eliminated entirely. Thus for most of this period, most companies have lacked both the motivation and the management expertise to improve energy performance. Many companies, including some of our largest and most energy intensive, were making investments in energy-savings technologies only if they paid for themselves within about a year.

OUTSOURCING: A new trend, however, has emerged that is revolutionizing corporate energy efficiency investments. Companies are starting to outsource their power needs altogether. In March 1999, Ocean Spray announced a \$100 million deal with the energy services division of Enron, a major natural gas and utility company based in Houston. Enron will use its own capital to improve lighting, heating, cooling and motors and to invest in cogeneration (the simultaneous generation of electricity and steam onsite, which is highly efficient). Ocean Spray will save millions of dollars in energy costs, have more reliable power and cut pollution, without putting up any of its own capital. In September, Owens Corning, the fiberglass insulation manufacturer, announced a similar \$1 billion deal with Enron. Many other energy service companies are taking a similar approach. Pacific Gas and Electric (PG&E) Energy Services announced a deal last year with Ultramar Diamond Shamrock, to cut the oil refiner's energy costs by \$440 million over the next seven years. Most of the savings would come from capital investments by PG&E in energy efficiency and cogeneration. Some companies, like Sempra Energy Solutions, have even gone so far as to finance, build, own and manage the entire energy system of a customer.

The potential impact of this trend is enormous. Companies like Ocean Spray, Owens Corning, and Ultramar Diamond Shamrock would typically make investments in energy-efficient equipment only with a payback of a year or so. The energy companies they signed a long-term contract with, Enron, PG&E, and Sempra, however, will make much longer term investments, typically with a five- to seven-year payback, but sometimes as high ten years. This allows a great deal more energy efficiency to be achieved.

These energy outsourcing deals are quite new. Few engendered much investment in new capital before 1998. I believe that these deals will grow very rapidly in the next few years, and are likely to ultimately achieve savings well beyond that achieved by utility demand-side management (DSM) programs, which have been scaled back in recent years. This is especially true for two reasons. First, traditional DSM often focused on retrofitting individual electricity-using components, whereas outsourcing encourages a whole systems approach to efficiency covering all fuels, an approach that can achieve deeper savings at lower cost. Second, traditional DSM did not in general encourage cogeneration, as the outsourcing deals do. And cogeneration combined with energy efficiency can cut the energy consumption of a building or factory by 40% or more in a period of just a few years. Energy outsourcing is poised to have a major impact on improving the nation's energy intensity in this decade, particularly as the large energy service companies are increasingly using the Internet to deliver services and cut costs.

CORPORATE CLIMATE COMMITMENTS: Another important trend begun in the last few years is for major corporations to make corporate-wide commitments to reduce their greenhouse gas emissions. This trend has accelerated since the industrialized nations of the world agreed in December 1997 in Kyoto, Japan to reduce greenhouse gas emissions below 1990 levels by 2008 to 2012. As the *Wall Street Journal* noted in an October article on the trend:

In major corners of corporate America, it's suddenly becoming cool to fight global warming.

Facing significant shifts in the politics and science of global warming, some of the nation's biggest companies are starting to count greenhouse gases and change business practices to achieve real cuts in emissions. Many of them are finding the exercise is green in more ways than one: Reducing global warming can lead to energy-cost savings.

For instance, in September, DuPont, one of the biggest energy users in the United States, pledged that by 2010 they would reduce greenhouse gas emissions 65% compared to 1990 levels. While two thirds of those savings will come from reducing process-related greenhouse gases, the rest will come from energy. DuPont pledged to keep energy consumption flat from 1999 to 2010 even as the company grows, and to purchase 10% renewable energy in 2010. Kodak announced in 1999 that they would reduce their greenhouse gas emissions 20% by 2004.

The Center for Energy and Climate Solutions is working with World Wildlife Fund and a number of companies to generate similar commitments. We anticipate that over the next several months, and in the years to come, a number of major companies will pledge to cut greenhouse gas emissions by making major investments in energy-efficiency (as well as cogeneration and renewable energy).

It may well be that these two trends—energy outsourcing and corporate climate commitments—combine. The Center is working with a major energy service company to demonstrate that virtually any Fortune 500 company can make an outsourcing deal to reduce its energy bill, its energy intensity, and its greenhouse gas emissions, without putting up any of its own capital. Should concern over global warming continue to grow, this type of deal may become commonplace.

COSTS TO CUT GHGS TYPICALLY OVERESTIMATED

The notion that it will be costly for the nation to reduce GHGs is certainly wrong, and reports that say so are typically very flawed. For instance, EIA's 1998 study "Impacts of the Kyoto Protocol on U.S. Energy Markets and Economic Activity," wildly overstates the carbon price required to reach various levels of emissions reductions. As a result, EIA wildly overestimates the increase in energy prices and the short-term impact on GDP. Even though EIA's results are more

pessimistic than those from the two models commissioned by the anti-Kyoto industry groups, the EIA study finds that compliance with the Kyoto Protocol can be achieved with "no appreciable change in the long-term [GDP] growth rate." A variety of flaws render the study irrelevant to the current policy debate about Kyoto.

FLAW #1: EMISSIONS REDUCTIONS DON'T START UNTIL 2005. EIA assumes the country waits until just 3 three before the Kyoto mandates to start reducing emissions. That means, the country must reduce from a much higher levels of carbon emissions than if it started earlier, such as 2000. Even worse, this assumption gives the country far less time to act, only 3 years to meet the first target, forcing the economy to try to turn on a dime, rather than 8 years if we started in 2000. No consumer or industry who uses energy takes any anticipatory actions prior to 2005. While any person or company could dramatically reduce the impact if they started just a few years early, EIA forbids them from doing so. EIA undoes all voluntary commitments by industry (such as BP and the steel industry, which have said they will reduce to 10% below 1990 levels by 2010). EIA partly fixed this flaw in a later report, but the other flaws continue to render their conclusions indefensible.

FLAW #2: EIA ASSUMES THE U.S. GOVERNMENT NEVER INSTITUTES A SINGLE POLICY TO REDUCE THE IMPACT OF KYOTO. EIA assumes that, after waiting until the last possible moment to mandate that the country meet the Kyoto targets, the government passes not a single law or tax break or utility deregulation bill to make it *easier* to reduce emissions. So this is truly an irrelevant exercise, since it models the one thing that will never happen. EIA even ignores key ongoing policies and trends that would temper their results:

- *EIA freezes all utility deregulation and restructuring efforts for the next two decades.* Competitive pricing (based on marginal costs) of electricity is allowed only in California, New York, and New England, regions which do not account for much coal use. Everywhere else, regulated pricing (based on average price) is used through 2020 even though EIA acknowledges "this may not be appropriate in the near future" and that under competitive pricing "it is easier for suppliers to meet the carbon reduction goals, and the carbon price is lower, than it would be under average cost pricing." As discussed below, deregulation is fostering energy outsourcing, which will likely slow energy and GHG growth nationwide significantly.

FLAW #3: EIA TECHNOLOGY ASSUMPTIONS YIELD "GARBAGE IN, GARBAGE OUT" RESULTS. EIA ignores or artificially limits technologies that every other major study has indicated would play a major role in reducing the impact of Kyoto. Here are just a few key errors:

- **COGENERATION:** This is widely seen as a major greenhouse gas reducer since it cuts carbon emissions by about half with no increase in energy costs, and, with technology now coming on the market, a decrease in electricity costs. (Britain expects to double cogen from 1990 to 2010, accounting for about 20% of its Kyoto reductions.) Yet, for EIA, even if coal prices rise 700% and electricity prices double, cogeneration rises only 3% to 4% compared to the baseline in 2010—and it remains flat from 2010 to 2020! Even more amazing, with delivered coal prices averaging about 6 times higher from 2010 to 2020, industrial use of steam coal remains flat during that time.
- **FUEL CELLS:** EIA projects that even under the most extreme scenario, carbon at over \$300 a ton, which nearly doubles electricity prices, fuel cells will provide no electricity—not even 100 Megawatts—through 2020. EIA, in examining the potential for fuel cells to achieve 3- to 4-year paybacks in buildings concludes "the likelihood of such substantial improvements in the next two decades is small." This view is contrary to virtually every other technical projection.
- **RENEWABLES:** EIA artificially constrains key renewables, such as wind. As a result, even when carbon and electricity prices soar through the roof, renewables hardly budge. Utilities are the one sector that (supposedly) acts with foresight—indeed, with "perfect foresight of carbon prices for capacity planning." Yet, knowing that the price of delivered coal is about to jump 350% and electricity prices by 50%, renewable capacity is only 2% higher than the reference case in 2005 and 9% higher in 2010. In the 2010-3% case, where electricity prices nearly double, renewables in 2010 are only 18% higher.

FLAW #4: EIA uses the "highly inappropriate" DRI model for calculating economic impact. As Dale Jorgenson and William Nordhaus wrote in April 24, 1997 in their review of the Administration's climate modeling effort—an effort that EIA participated in:

"The DRI model is probably the best known short-term forecasting model for the U.S. economy. This model is especially appropriate for projecting the impacts of monetary and fiscal policy over a time horizon of approximately two or three years. For longer term projections, however, it is highly inappropriate and has some important limitations that are well-known to the community of economic forecasters. For example, the DRI long term projections are extremely sensitive to assumptions about energy prices. This feature is totally at odds with most empirical work and with the practice of government agencies that produce such projections."

In spite of its deeply flawed modeling, the EIA study finds that if carbon tax revenue is recycled through a reduction in either income or social security taxes, compliance with the Kyoto protocol can be achieved with "no appreciable change in the long-term (GDP) growth rate".

FLAW #5: EIA's long-term projections are invariably wrong and it is making the exact same mistakes it made when EIA overestimated the cost of sulfur permits by a factor of four just a few years ago. In particular, EIA notes that just a few years

ago, its first analysis of the cost of SO₂ allowances under the Clean Air Act was projected at \$423 a ton in 2000 (in 1996 dollars) rising to \$751 a ton in 2010. "Currently, the cost of an allowance is \$95 a ton, and AEO98 projects that the cost will be \$121 a ton in 2000 and \$189 a ton in 2010." Why was EIA wrong?

- "There has also been downward pressure on short-run allowance costs because generators have taken actions to comply with the SO₂ limitations earlier than anticipated."
- "There has been more fuel switching to low-sulfur, low cost-Western coal than previously anticipated."
- "Finally, technology improvements have lowered the costs of flue-gas desulfurization technologies, or scrubbers.... The cost of SO₂ compliance was overestimated to a large extent because compliance relied on scrubbing, a relatively new technology with which there was little experience."

These are exactly the reasons EIA is once again wrong by a factor of 4. They have forbidden all energy users—and the federal government—to take any anticipatory actions. They have overestimated the cost and underestimated the opportunity for fuel switching to low-carbon fuels (like gas and renewables). And they have ignored the role of key technologies, including cogeneration, fuel cells, and advanced end-use efficiency. Since this analysis has nothing to do with how the government, businesses, or consumers will act in the real world, the study is wholly irrelevant and has no bearing on "Impacts of the Kyoto Protocol on U.S. Energy Markets and Economic Activity."

INTERNET EFFICIENCY

Let me return to the issue of trying to explain the remarkable gains in energy intensity in the last two years. Weather played a role. In 1998, the country experienced both a very warm winter (which reduces the consumption of natural gas and other heating fuels) and one of the hottest summers on record (which increases the consumption of electricity for air conditioning). The reduction in heating has a bigger effect on total energy consumption than the increase in cooling, so the weather was responsible for perhaps 0.6% out of the 4.0% improvement in energy intensity in 1998. If, however, global warming is occurring, then over time we should expect both warmer winters and warmer summers, which may positively impact U.S. energy intensity. The EIA announced in September that it "is adopting weather premises that reflect a three-decade long warming trend identified by the National Oceanographic and Atmospheric Administration." EIA notes that "Adopting the warming trend in place of long-term averages for the period October 1999 to September 2000 lowers total annual projected energy consumption by about 0.3 percent."

Since at least one third of the gain in energy intensity in the past two years comes from structural changes in the economy, one obvious place to look to is any segment of the economy that has been rapidly growing and is not very energy intensive. That describes the IT-producing industries, which includes computers, semiconductors, telephone equipment, software, programming, and computer services. While semiconductor manufacturing is moderately energy intensive, it is far less so than that of the process industries—such as pulp and paper, steel, and chemicals—which account for most industrial energy consumption. The other IT-producing industries are light manufacturing and services, which are not very energy intensive at all.

The Commerce Department said 1999 that those IT-producing industries were responsible for 28% to 29% of the contribution to real growth during 1997 and 1998. One recent analysis by EPA suggests that continued rapid growth of the IT-producing industries may decrease the demand for energy compared to economic projections that do not properly reflect such changes in the economy, while increasing overall U.S. economic growth. Based upon a "first approximation" of the potential impact of structural changes driven by double-digit growth of the IT-producing industries, EPA economist Skip Laitner indicates that mainstream projections of U.S. energy and carbon dioxide emissions in the year 2010 may be overestimated by up to 5 quads and 300 million metric tons of carbon dioxide. This is about 5% of the nation's projected energy use and GHG emissions.

Further, the EPA analysis does not attempt to incorporate everything that is typically included in a definition of the Internet economy: all of the additional sales over the Internet during those two years by traditional industries that were taking advantage of the output of these IT-producing industries and creating Web sites, intranets, and extranets. Moreover, while the IT-producing industries are likely to keep producing a significant though probably relatively steady share of the nation's real growth, the additional sales spawned by the rest of the Internet Economy are growing at an almost exponential rate.

The two together are having a disproportionate impact on the economy as a whole, according to early analyses that attempt to count everything, such as that by the University of Texas discussed in the Introduction. Indeed, the impact of the entire Internet Economy on energy intensity almost certainly goes beyond the purely structural gain of having growth from industries that are not very energy intensive. The IT-producing industries and the Internet economy spawned by those industries may be creating a so-called "New Economy," which can sustain higher levels of productivity growth than in the past two decades. As Federal Reserve Board Chairman Alan Greenspan told Congress in June:

But the recent years' remarkable surge in the availability of real-time information has enabled business management to remove large swaths of inventory safety stocks and worker redundancies, and has armed firms with detailed data to fine-tune product specifications to most individual customer needs....

For example, since 1995 output per labor work-hour in the non-farm business sector—our standard measure of productivity—has grown at an annual rate of about 2 percent. Approximately one third of that expansion appears to be attributable to output growth in excess of the combined growth of inputs....

As lead times have declined, a consequence of newer technologies, firms' forecasts of future requirements have become somewhat less clouded, and the desired amount of lead-time insurance in the form of a reserve stock of capital has been reduced. In addition to shortening lead-times, technology has increased the flexibility of capital goods and production processes to meet changes in the demand for product characteristics and the composition of output. This flexibility allows firms to deal more effectively with evolving market conditions with *less physical capital* than had been necessary in the past.

Taken together, reductions in the amount of spare capital and increases in capital flexibility result in a saving of resources that, in the aggregate, is reflected in higher levels of productivity. The newer technologies and foreshortened lead-times have, thus, apparently made capital investment distinctly more profitable, *enabling firms to substitute capital for labor and other inputs far more productively than they could have a decade or two ago*. Capital, as economists like to say, has deepened significantly since 1995. The surge in investment not only has restrained costs, it has also increased industrial capacity faster than the rise in factory output.

So, capital deepening allows economic growth without as much increased resource use as typically occurs. As discussed in our analysis, the Internet economy is shortening lead times, improving forecasting, reducing inventories, and improving capacity—and discuss why these trends will probably accelerate throughout the next decade.

Yet, if the overall productivity of the U.S. economy is significantly increasing, why should not the energy productivity of the U.S. economy also significantly increase? Such gains could be undermined if the Internet were itself a huge user of energy, which it does not appear to be (see below). They could also be undermined if the Internet drove new behavior patterns that led to increased energy use by certain sectors. However, the Internet economy has certain special attributes, such as the ability to foster dematerialization, that may well increase energy productivity even faster than average productivity. And any significant gains in traditional energy efficiency through the widespread adoption of energy outsourcing deals and corporate greenhouse gas mitigation actions will only spur further gains in energy intensity.

THE INTERNET'S OWN USE OF ENERGY

In May 1999, *Forbes* magazine published an article arguing that the Internet has become a major energy *consumer* because it supposedly requires a great deal of electricity to run the computers and other pieces of hardware that make the Internet economy work. The authors of the article appear to have significantly overestimated the energy consumption of most critical pieces of equipment, according to a number of leading energy analysts.

Scientists at Lawrence Berkeley National Laboratory (LBNL) recently examined in detail the numbers underlying the *Forbes* analysis. LBNL found that the estimates of the electricity used by the Internet were high by a factor of eight. Large overestimates were found in every category, including the calculations of how much energy was used by the major dot-com companies; by the nation's web servers; by telephone central offices; by routers for the Internet and local networks; and by PCs used by businesses and residences.

The *Forbes* authors assumed, for instance, that a "typical computer and its peripherals require about 1,000 watts of power." In fact, the average PC and monitor use about 150 watts of power; this dips to 50 watts or less in energy-saving mode. Printers and peripherals tend to be spread over a great many users and don't increase this average very much. Laptop computers, a key growth segment, are particularly low energy users; some new laptops use under 30 watts. Moreover, computers are getting more energy-efficient every year because of steady improvements in technology driven in part by the growing market for portable equipment (and by the IT sector's desire to reduce its environmental impact). For instance, Intel's Instantly Available Personal Computer "is designed to improve the capacity of a PC to stay connected to information networks while providing much more effective management of PC energy use and reducing the lengthy boot-up times PCs currently need." It consumes "less than 5 watts of power while maintaining connections to the outside world." Similarly, new flat screens typically use about a quarter of the energy of traditional video display terminals with cathode ray tubes. As far back as mid-1997, one computer industry observer quoted in a Harvard Business School case study said, "the corporate PC business is becoming a replacement business." Since new PCs tend to be more efficient than the ones they replace, many if not most companies are unlikely to see corporate energy consumption from computers rise sharply. For some it may even decline: Companies like Pratt & Whitney have instituted programs to cut the energy consumption of their computer systems (see case study at www.cool-companies.org).

Indeed, I believe that the argument of the *Forbes*' authors is almost completely backwards. One of the reasons why energy intensity declined so slowly from 1987 through 1996 is likely that businesses in particular purchased a great many computers and other IT equipment that consume electricity, yet generated little accompanying productivity gains to offset that increased energy use. The Internet, however, is the killer application for PCs, in terms of reducing corporate energy intensity, especially for manufacturers, because it deepens capital, dematerializes, and the like. The incremental energy consumption from shifting PCs from traditional uses toward the Internet is apparently modest compared to its overall benefit. Put another way, as the 1999 OECD report explained, "One of the drivers of the Internet is the fact that it exploits all of the existing [information and communications technology] infrastructure, so that it can be used with a minimal amount of new investment."

The *Forbes* piece claimed, for instance, that from 1996 to 1997, the increase in electricity consumed by all computers used for the Internet represented more than 1.5% of all U.S. electricity consumed that year. Yet total electricity consumption for all purposes grew slightly less than 1.4% from 1996 and 1997. That would imply the entire rest of the economy had no growth in electricity consumption even though economic growth was 4.5%. That would be a startling improvement in

electricity intensity. And while we believe that the Internet reduces energy intensity, we don't believe it has quite that dramatic an effect, so it is far more likely that the *Forbes* analysis is flawed.

Computers and the Internet may well lead to more home electricity consumption. This is a long-standing trend, as homes have for some time been getting bigger and more stocked with electronic equipment. But the question is, if people spend *more* time on the Internet, *what are they spending less time doing?* Some will be watching television less; others reading newspapers less; some may be printing individual items of interest to them rather than receiving entire printed catalogs or directories in the mail; others will be working at home rather than at a commercial office building; and, potentially, some may be not be driving to work, to the grocery store, to their bank, and to malls as much as before. These are all activities that would normally consume a great deal of energy and their potential displacement by home Internet use is the subject of our recent analysis.

Also, although it is not a major factor today, we believe that in the very near future the Internet will itself be used to save energy directly. For instance, the computer-controlled energy management control systems referred to above, can be accessed and run over the Internet. We know of one major energy service company that is pursuing the installation of digital EMCS's in the buildings they manage, so they can operate them over the Internet very efficiently and at low cost; the Internet is already being used in Singapore for this purpose. Similarly, many utilities have begun exploring Internet-based home energy management systems, which would give individual homeowners more control and feedback over their home energy use, or the ability to have an outside energy company or expert software system optimize their energy consumption. This could lead to significant energy savings in homes. Early trials of remote controlled home energy management systems suggest the savings in energy bills could be as high as 10%. Finally, a number of groups are raising money to launch e-commerce Web sites that will allow homeowners to easily get information on energy savings home appliances and strategies, and to aggregate purchases in order to lower the price of those appliances. One of the barriers to greater penetration of energy-efficient technologies in homes is a high initial cost, even for technologies that pay for themselves in energy savings in a few years.

In conclusion, energy consumption and GHG emissions in the economy appears to be slowing even as GDP growth is accelerating. If, as we believe, part of this is due to the Digital Economy, then it is likely to continue for some time to come, and with other trends, such as energy outsourcing and corporate voluntary efforts to reduce GHG emissions (and warmer weather), is likely to slow the growth of energy and GHG emissions for the next ten years. These factors together mean that it will be easier for the nation to reduce GHG emissions.

STATEMENT OF
JAY E. HAKES
ADMINISTRATOR, ENERGY INFORMATION ADMINISTRATION
DEPARTMENT OF ENERGY
before the
SUBCOMMITTEE ON NATIONAL ECONOMIC GROWTH,
NATURAL RESOURCES, AND REGULATORY AFFAIRS
COMMITTEE ON GOVERNMENT REFORM
UNITED STATES HOUSE OF REPRESENTATIVES
February 2, 2000

Mr. Chairman and Members of the Committee:

I appreciate the opportunity to appear before you today to discuss the potential impacts of the growing use of computers and the Internet on electricity consumption.

The Energy Information Administration (EIA) is a statistical and analytical agency within the Department of Energy. We are charged with providing objective, timely, and relevant data, analysis, and projections for the use of the Energy Department, other agencies, the Congress, and the public. We do not take positions on policy issues, but we do produce data and analysis reports that are meant to help policy makers decide energy policy. Because we have an element of statutory independence with respect to the analyses we publish, our views are strictly those of EIA. We do not speak for the Department, nor for any particular point of view with respect to energy policy, and our views should not be construed as representing those of the Department or the Administration. EIA's baseline projections on energy trends, however, are widely used by government agencies, the private sector, and academia for their own energy analyses. Each year EIA publishes the *Annual Energy Outlook*, which provides projections and analysis of domestic energy consumption, supply, prices, and carbon emissions. These projections are not meant to be exact predictions of the future but represent a likely future, assuming known trends in demographics and technology improvements and also assuming no change in current law, regulation, and policy.

Background

We are all well aware of the explosive growth of personal computers (PCs) and the Internet in our homes and in all aspects of our daily lives—schools, businesses, and industries. A recent report from the Department of Commerce, *The Emerging Digital Economy II*, is one of many

recent studies undertaken to analyze the growing public access and availability to the Internet and the growth of electronic commerce (E-commerce). These studies have indicated that E-

commerce, in the form of business-to-consumer and business-to-business sales over the Internet, may transform the way business is currently carried out, while increasing productivity and reducing waste. Some argue that the increase in the use of electronic equipment will increase energy use while others contend that the Internet will temper future growth in energy use by reducing the need for energy-intensive manufacturing, retail space, and transportation requirements.

Electricity Use B Past and Future

From 1985 to 1995, retail electricity sales grew at a rate of 2.6 percent per year, faster than any other delivered energy source over the same ten year period. Since 1995, the use of the Internet has increased dramatically, yet retail electricity sales have grown by 2.1 percent per year, 0.5 percentage points less than the previous 10 years. Economic activity, weather, and other factors can, of course, affect these growth rates. However, some might conclude that the Internet, in and of itself, has not yet caused a significant impact on the amount of electricity used by households, commercial establishments, and large industrial users combined, due to the substitution away from other uses of electricity, such as color televisions and stereo systems. From 2000 to 2010, the *Annual Energy Outlook 2000 (AEO2000)* projects electricity sales to grow at about 1.5 percent per year, as trends in energy efficiency, appliance saturation, population, and economic growth act to slow the growth realized in the 1980s and 1990s. An in depth look at how electricity is used in each sector will help in understanding the projected growth rates for electricity in the *AEO2000*.

Residential Buildings

Households currently consume more electricity, 35 percent, than any other end-use sector in the United States (Figure 1). The uses for electricity in the house are numerous, with no single service responsible for more than 13 percent of the total electricity sold to the residential sector on an annual basis. Over the past decade, many new electronic devices have made their way into the home, including PCs and peripheral equipment. Although PCs have been on the market for more than 15 years, sales have recently skyrocketed as a result of the development of various software applications and the popularity of the Internet. Trade publications estimate that about half of the households in the United States have at least one PC, up from 35 percent in 1997.

Even with the increasing use of PCs in the residential sector, it is estimated that in 1999, PCs (including the central processing unit and monitor), accounted for only 2 percent of the electricity delivered to the home (Figure 1). The four largest uses for electricity—space heating, space cooling, refrigeration, and water heating—account for almost half of all electricity used on an annual basis. In fact, an average household using electricity as its main space heating fuel would use nearly 12 times more electricity for space heating than for PCs. PCs, however, are one of the fastest growing uses for electricity, as more householders purchase them and those that have them use them for more than simply balancing their checkbook. Even with the explosion in the use of a variety of home electronics, residential electricity sales in the 1990s grew at an average rate of only 2.4 percent per year (compared to 2.6 percent per year in the 1980s), about twice the rate of household formation (1.2 percent per year). Within this decade, residential electricity consumption declined from its previous year total twice (1992 and 1997), as cooler summer temperatures, particularly in 1992, significantly reduced the amount of electricity needed for air conditioning. The *AEO2000* projects residential electricity sales to grow at an annual rate of 1.5 percent per year through 2010, as household formation growth slows and energy efficiency increases, dampening the growth in miscellaneous electric devices. In *AEO2000*, electricity use by miscellaneous electric appliances, including PCs, color televisions, and the like, are projected to grow at 3.2 percent per year through 2010, more than twice the rate of the average electricity growth rate, and more than three times the rate of household formation. These growth rates are based on saturation rates and recent data detailing the use of these appliances in the home.



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central processing unit, monitor, and laser printer) and other office equipment, such as copiers and FAX machines, were estimated in 1999 to account for 2.4 and 7.5 percent of total commercial electricity use, respectively, for a total of about 10 percent. In contrast, lighting in commercial buildings is estimated to require more than three times the electricity needed to power PCs and other office equipment. Space conditioning (heating, cooling, and ventilation) also commands a significant share of commercial electricity use, about twice that used for PCs and office equipment. Refrigeration, water heating, cooking, and various other services account for the remaining commercial energy use.

EIA's recent report on PC use in commercial buildings estimated that the number of PCs and computer terminals used in commercial buildings increased by 45 percent from 1992 to 1995. For all commercial buildings, there were three PCs or computer terminals for every five employees in 1995, and in office buildings, which comprised nearly half of all computers used in the commercial sector in 1995, there were four PCs or computer terminals for every five employees. However, the dramatic growth in commercial PCs has not translated to similar growth in electricity use, which has averaged 3.0 percent per year in the 1990s (compared to 4.5 percent per year in the 1980s) because PC use still comprises a relatively small share of commercial electricity consumption. Electricity used for all office equipment, PCs, and miscellaneous applications, including Internet-related uses, is projected to grow at 3.0 percent per year through 2010, more than 2.5 times the rate of commercial floor space, and nearly twice the rate of total commercial sector electricity use (Figure 3). The growth rates assumed for these miscellaneous uses are based on recent data on appliance saturation and usage rates.



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manufacturing facilities in 1994 was consumed for facility support. Facility support, in this case, includes the functions normally associated with office or building operations other than facility lighting, heating, ventilation, and air conditioning. Operation of office equipment such as PCs and copying machines are part of facility support. However, cooking and refrigeration in cafeterias, elevator operation, and the energy used by vending machines are a few examples of other functions included in facility support, highlighting the fact that office equipment use comprises just a small fraction of the electricity used in manufacturing facilities.



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purchased by Standard Industrial Classification (SIC) 357 (computer manufacturing) and SIC 367 (semiconductor manufacturing). In 1994, computer manufacturers purchased 4.9 billion kilowatthours of electricity while semiconductor manufacturers purchased 15.7 billion kilowatthours of electricity, which together account for 2.6 percent of the 802 billion kilowatthours of total manufacturing sector purchased electricity. These two sub-sectors accounted for 5.2 percent of the total value of manufacturing shipments in 1994. In 1996, the ASM reported that these same SIC groups accounted for the same percentage of total manufacturing purchased electricity, while its value of manufacturing shipments increase to 6.2 percent. From 2000 to 2010, *AEO2000* projects the value of output for SIC 367 to grow at 7.3 percent per year, one of the fastest growing manufacturing sectors in the U.S. economy, which contributes to a projected overall Gross Domestic Product (GDP) growth rate of 2.3 percent per year through 2010. Total gross output of the U.S. economy is projected to grow at 2.3 percent per year through 2010, the same rate as GDP. As a percentage of total gross output, SIC 367 is projected to grow to 2.8 percent by 2010, up from 1.7 percent in 2000. The high rate of growth in SIC 367 contributes to an electricity sales growth rate of 3.2 percent per year for metal based durables manufacturing, more than twice the rate of overall industrial sector electricity sales through 2010.

The Digital Age and Energy Consumption

The Digital Age has brought about many new electronic devices over the recent years, many of which are associated with the use of PCs. For household PC use, which includes the central processing unit and

monitor, current electricity use estimates range from 130 to 262 kilowatthours per year, based on many factors, including hours of use, efficiency features (e.g., sleep mode), and monitor size. While it appears obvious that the Internet has increased the number of hours a home PC might operate, it is not clear that the energy use associated with the extra operating hours necessarily adds extra kilowatthours to the average monthly electricity bill. In some cases, the time spent on the Internet could supplant watching television or playing video games, both of which consume electricity. In fact, a home theater equipped with a cable box and VCR could, depending on the features of the equipment, use more electricity than surfing the Internet for a comparable amount of time. Newer PCs are equipped with efficiency features that allow the unit to Apower down@ when left inactive for a certain amount of time. This feature, however, can be disabled in a manner similar to flow restriction devices in showerheads, limiting the overall effectiveness of the option. Current estimates for Internet use at home are 7 hours per week, less than half the hours (15) estimated for television use. Recent trends have shown that hours spent on the Internet have been increasing, while time spent watching television has been flat or falling.

In the commercial sector, growth in the number of PCs is expected to slow in the next decade as the market becomes saturated. As noted earlier, office buildings were estimated to have four PCs for every five employees in 1995. Office workers may increase Internet use; however, this may offset use of other types of office and computer equipment, such as FAX machines and copiers or travel for reference materials. In short, it is extremely difficult to separate computer use associated with the Internet from computer use in general, given the fact that no matter the application, the desktop computer will use the same amount of electricity (i.e., ON is ON).

Uncertainties Relating to Electricity Consumption

The uncertainty related to future electricity demand due to the growth of the Internet is just a small component of all the uncertainty relating to future electricity demand. There are many factors that can either increase or decrease the use of electricity on a per household or per building basis. As a wealth of new electronic devices makes its way into homes and businesses, electricity use can be expected to increase. However, many programs exist to reduce the amount of electricity needed to power most major appliances. These include Federal equipment efficiency standards, State and local building codes, research and development (R&D) programs, voluntary programs, and executive orders for Federal agencies. More efficient versions of current technology can provide a means to offset the expected growth in electricity use due to the introduction of new electronic devices. However, the timing and widespread acceptance of these technologies provide a degree of uncertainty regarding their effectiveness. The implementation of unforeseen policies and advances in technologies can easily dwarf any impact that the Internet might have on electricity demand. This is especially true internationally, where regions such as China and South America are in the process of providing electricity to hundreds of millions of people. Europe is currently transitioning to a continent-wide wholesale market for electricity, which could have a major impact on future electricity demand, regardless of how fast the Internet grows.

Future energy prices and their effects on consumer behavior add further uncertainty to projections of total energy and electricity consumption. It is possible that the increasingly competitive structure of the electricity generation, transmission, and distribution industry may lead to declining electricity prices. In that case, consumers are likely to be less concerned about their use of electricity-consuming services and the purchase of energy-efficient products. As the marginal price of providing a particular service falls, as a result of either declining energy prices or increasing energy efficiency, one would expect the energy intensity for that service to increase. This Arebound@ effect is particularly important in space conditioning applications, where a direct response to higher or lower energy prices can be easily accomplished by modifying the thermostat setting. On the other hand, higher prices of fuels used to generate electricity, electricity industry developments, or policy initiatives to reduce U.S. energy consumption and emissions could lead to higher electricity prices.

Electricity Use and the Kyoto Protocol

In the EIA report *Impacts of the Kyoto Protocol on U.S. Energy Markets and Economic Activity*, reference case electricity sales are projected to grow at 1.5 percent per year from 2000 to 2010, identical

to the rate projected in *AEO2000* over the same period. Depending upon the magnitude and availability of flexibility measures to meet the Kyoto Protocol (U.S. carbon emissions 7 percent below their 1990 levels), the carbon price is projected to range from \$67 to \$348 (\$1996) per metric ton in 2010. Average electricity price increases in these scenarios in 2010 range from 20 to 86 percent over the reference case level of 6 cents per kilowatthour. Residential electricity prices in the Kyoto study range from 19 to 82 percent over reference case levels in 2010. Even at the most extreme price increase, it is not expected that household use of the Internet would substantially change. With the near doubling of projected electricity prices by 2010 compared to recent history in the most extreme case of the Kyoto study, operating a home PC for a month would cost about 5 times less than the cost of a standard monthly subscription for Internet access. In the most extreme case of the Kyoto study, residential sector electricity use by PCs was projected to decrease by 14 percent (1.7 billion kilowatthours) relative to the reference case in 2010.

Recent Studies on the Digital Age and Energy Use

Several recent articles have indicated that the increasing popularity of the Internet will dramatically increase electricity use, creating the need for new power plants, while others suggest that the Digital Age will bring about structural change leading to more efficient use of resources and energy.

The Internet Begins With Coal: A Preliminary Exploration of the Impact of the Internet on Electricity Consumption by the Greening Earth Society, and the derivative *Dig more coal B the PCs are coming* in the May 31, 1999, issue of *Forbes Magazine*, both contend that the Internet economy will require a substantial increase in electricity use to keep up with the pace of Internet development and that this increase will have Astaggering implications for the thermoelectrical power complex.@ In summary, these articles suggest that there are over 200 million computers in homes and businesses, and that these computers, coupled with their accessories and associated devices, use about 8 percent of the U.S. demand for electricity. In addition, these articles suggest that within 10 years, half of the electric grid will power the Internet and E-commerce activity. The *Forbes* article, as the title suggests, purports that coal will be the generating fuel of choice to meet the demand for electricity.

The *AEO2000* reference case projects electricity sales to grow at 1.5 percent per year through 2010, half the rate implied by the *Forbes* article. This projection includes recent trends in the growth of consumer electronics, recently enacted Federal appliance efficiency standards, the effects of structural changes in the economy, and electricity deregulation. These factors have different effects on the electricity growth rates and consumption of various building sector end uses (Figure 3). However, at the average rate of growth of 1.5 percent per year, electricity generated by coal increases by only 13 percent (242 billion kilowatthours), while electricity generated by natural gas increases by 96 percent (309 billion kilowatthours). By 2010, only 2 percent of cumulative electric generator additions are projected to be coal-fired, while 94 percent are projected to be natural gas-fired.

If the demand for electricity were to grow at 3 percent per year through 2010, as suggested in the *Forbes* article, generation from coal would account for 32 percent of the increase, while natural gas would account for 60 percent. In this Ahigh electricity growth case,@ coal would account for less than 50 percent of electricity generation, while generation from natural gas would nearly triple, increasing to 25 percent by 2010. Given the increased reliance on natural gas in the electric generation sector, the 16 percent increase in electricity sales in this Ahigh electricity growth case@ would increase carbon dioxide emissions by 6.6 percent in 2010 (117 million metric tons of carbon equivalent), relative to the *AEO2000* reference case forecast.

While it is indisputable that the Internet and E-commerce are growing rapidly, estimates regarding the electricity associated with its direct use cited in the *Forbes* article have been subject to some debate. In fact, the amount of electricity attributable to PCs in the commercial sector was overstated in the Mills analysis because all PCs and all other office equipment was used as the basis for the electricity use by PCs. Lawrence Berkeley National Laboratory asserts that electricity use associated with the Internet has been overestimated by a factor of 8 in the *Forbes* article. The *Forbes* article appears to have severely over estimated the number of PCs in use today. While it is true that sales of PCs have been brisk of late, not all of these purchases are additive to the stock. In fact, because of fast stock turn over (roughly 2 to 3

years), many computer purchases replace older units, especially since the technology has been evolving so rapidly over the past several years. Also, for many of the devices associated with Internet use and dot-com companies, such as routers and mainframe computers, the electricity use was estimated using the rated power, which is typically twice the actual power draw. Correcting for this error reduces the amount of electricity attributable to routers in the Forbes analysis by a factor of three. With all of these corrections taken into account, it is unlikely that the Internet will require half of the electric grid in the coming decade, as suggested in the Forbes article.

While the *AEO2000* forecast does include Internet use in the projections, it does not include it as a separate category due to the difficulties in quantifying its exact use. Figures 1 and 2 detail electricity use in the residential and commercial sectors for 1999. Electricity use attributed to PCs accounted for about 2 percent (19 and 27 billion kilowatthours in the residential and commercial sectors, respectively) of the electricity used in each sector, with peripheral equipment related to the Internet in businesses and home PCs accounting for 1.5 and 0.3 percent (16 and 3 billion kilowatthours) of commercial and residential sector electricity use, respectively. With the addition of the electricity used to manufacture computer-related equipment, electricity used by all computers and Internet-related uses accounted for less than 3 percent (98 billion kilowatthours) of all domestic electricity sales in 1999, well below the 8 percent (263 billion kilowatthours) reported in the Forbes article. Included in the *AEO2000* forecast are the recent historical growth trends in miscellaneous uses of electricity, of which the Internet is one, in order to quantify future electricity use. Even with the inclusion of these recent growth rates, the amount of electricity used by PCs and peripherals in the home and PCs and office equipment in commercial establishments is well below the amount claimed in the Forbes article.

A recent article by The Global Environment and Technology Foundation (GETF) entitled *The Internet Economy and Global Warming* takes the position that the growth in the Internet will help companies become more energy and resource efficient, contributing to higher economic growth and less negative impact on the environment. These claims are based largely on economic and energy data for two years, 1997 and 1998, which exhibited fairly substantial increases in economic growth while energy consumption hardly grew at all. The paper suggests that the precipitous drop in energy intensity over this time period can be attributed to structural changes in the economy and gains in energy efficiency. While it is true that total delivered energy (excluding fuel used to generate electricity) decreased from 1996 to 1998, it should be noted that the decline is almost entirely due to a decrease in the use of natural gas in the buildings and industrial sectors. Natural gas use in these sectors decreased by 6 percent over this period, however, three-fourths of the decrease was in the buildings sector, where gas-weighted heating degree-days were 16 percent lower in 1998 than were observed in 1996. In fact, through the first nine months of 1999, natural gas consumption in the buildings sector was 4.1 percent higher than the first nine months of 1998, as winter temperatures became more normal in early 1999. In fact, buildings sector natural gas consumption, when normalized for weather fluctuations, increased in 1998, relative to all other years since 1986 (Figure 4). Although customer growth is not reflected in Figure 4, the trend line shows that growth in natural gas use, in terms of customers and/or intensity, has more than offset increases in efficiency. If energy efficiency was responsible for the decline in natural gas consumption over this period, one would not expect such a marked increase in this index in 1998, relative to 1996. Overall, one would expect the change in energy consumption and intensity to have occurred over a wider range of fuels and sectors if energy efficiency and structural changes were responsible for the lower energy use over this two year period, which was not the case.



numerous. The Internet has been successful in bringing together buyers and sellers of goods, on a virtually international level, reducing transactions costs in the process. Ford and General Motors, for example, have plans to integrate their respective supply chains via the Internet, allowing for a more precise inventory scheme and allowing vendors to compete in an auction-type setting for the right to supply parts. These new concepts may radically change the way companies compete for business, but the effect on energy consumption is vague at best. To the extent that this new business model lessens the need for energy-using services such as business travel, retail outlets, or the production of excessive inventories, overall energy use may decline. On the other hand, as electricity markets are deregulated and electricity is auctioned via the Internet, electricity prices might decline, effectively making some investment decisions regarding energy efficiency less attractive. However, real-time pricing in wholesale electricity markets has been subject to large price spikes over the past several years. A more coordinated market structure via the Internet may help alleviate some of these spikes in the future, as buyers and sellers of electricity are brought together more efficiently in the marketplace. Other energy-saving applications of the Internet could include more efficient monitoring of heating and cooling equipment in buildings and increased telecommuting, which could reduce transportation energy use.

Summary and Conclusions

At this point in time, it is too soon to come to any conclusions as to the precise energy path of electricity use resulting from Internet and Internet-based commerce. Attempts have been made to show that the growth of the Internet will substantially increase electricity use, while others have stated that the growth in the Internet and the information technology sector will decrease energy use. There are many problems associated with trying to estimate the direct impact that the Internet will have on energy consumption. As mentioned earlier, Internet use is not purely additive as implied in the Forbes article. Other uses for electricity, such as television and stereo equipment, will most likely see less use in the home as Internet use rises. The Astaggering implications@ to the electric grid because of increased Internet use purported by the Forbes article are therefore overstated. The *AEO2000* reference case includes the major policies and market phenomena that have and are projected to continue to influence the amount and type of energy used throughout the U.S. economy. Recent trends in the growth of electronic equipment, stock turnover, appliance efficiency standards, structural changes in industry, electricity restructuring, and macroeconomic activity all factor into the development of the *AEO2000* reference case forecast. While there is uncertainty in all of these elements, it is clear that the size of Internet electricity use today is small compared to that of all of the other uses of electricity.

Statement of Chairman David M. McIntosh

Subcommittee on National Economic Growth, Natural Resources, and Regulatory Affairs

on

"Kyoto and the Internet: the Energy Implications of the Digital Economy"

February 2, 2000

Today's hearing will examine how the burgeoning digital economy, comprised of electronic commerce (E-commerce) and the information technology industries that make E-commerce possible, may change energy trends in the U.S. economy, and how such changes may affect the cost and feasibility of the Kyoto Protocol.

In March 1999, Vice President Gore stunned some of us and amused others by claiming to have created the Internet. "During my service in the United States Congress, I took the initiative in creating the Internet," Mr. Gore said during an interview with CNN's Wolf Blitzer. Now, whether or not Al Gore is the Father of the Internet, he is unquestionably the Father of the Kyoto Protocol. Mr. Gore led the U.S. negotiating team at the December 1997 climate conference in Kyoto, Japan. During his service in the Senate and the White House, Al Gore took the initiative in creating a legally binding international climate treaty.

So, one might say that today's hearing will examine the relationship between the Vice President's brainchildren. Will the digital economy facilitate Kyoto-style energy restriction policies by decreasing the energy intensity of the U.S. economy? Or will the digital economy sweep the Kyoto Protocol into the dust bin of history by increasing U.S. and global demand for electric power?

The digital economy is growing at a phenomenal pace. For example, during the past two years alone, the number of web users world-wide increased by 55 percent, the number of web servers increased by 128 percent, and the number of new web address registrations rose by 137 percent. The U.S. Commerce Department's recent publication, *The Emerging Digital Economy II*, forecasts that by 2006, almost half the U.S. workforce will be employed by industries that are either major producers or intensive users of information technology products and services. The Commerce Department study also reports that information technology industries contributed over one-third of the nation's real economic growth from 1998 to 1999.

In thinking about this key driver of U.S. economic performance, I can't help noticing that the digital economy runs solely on electricity. More than half of U.S. electricity is produced from coal. Coal is the fuel source targeted for extinction by the Kyoto Protocol. So, is there not a fundamental incompatibility between the energy requirements of digital economy and the Kyoto Protocol? Can we really "wire the world" and, at the same time, restrict U.S. and global access to abundant, affordable, and reliable electric power?

Our witnesses, I am aware, have different answers to those questions. Yet there appear to be some broad areas of agreement. The experts agree that the digital economy is enormously important, enormously large, and growing exponentially. They also agree that Internet forecasting is fraught with uncertainty. As the Commerce Department has observed, "This emerging digital economy regularly surprises those who study it most closely." What this suggests to me, is that we should proceed with caution in considering any policy that may damage or restrict the electricity supply that powers the digital economy. Indeed, since the digital economy is still very much in its infancy, we should probably move more slowly and cautiously in considering a treaty like the Kyoto Protocol than at any other time.

Before turning to Mr. Kucinich for his opening statement, I would like to introduce our witnesses. The Honorable Jay Hakes, Administrator of the Energy Information Administration (EIA) of the U.S. Department of Energy, will speak first. Mr. Hakes will present EIA's analysis of energy trends and the digital economy. EIA testified before this Subcommittee last year on a related issue. Welcome back, Mr.

 Hakes.

Dr. Joseph Romm, Executive Director of the Center for Climate and Energy Solutions, and former Clinton Administration Acting Assistant Secretary for Energy Efficiency and Renewable Energy, will speak next. Dr. Romm will present the case that the Internet economy is breaking the historic link between economic growth and energy demand growth. If I am not mistaken, Dr. Romm believes that Internet efficiencies will enable us to implement the Kyoto Protocol without economic pain. Thank you for testifying, Dr. Romm.

Our final witness is Mark Mills, Senior Fellow at the Competitive Enterprise Institute and Scientific Adviser to the Greening Earth Society. Mr. Mills will present the case that the digital economy is fueling a surge in demand for cheap, abundant, and reliable electric power. He views the Kyoto Protocol as a threat to the digital economy. To my knowledge, Mr. Mills was the first analyst to raise the topic of today's discussion. Thank you for participating in this hearing, Mr. Mills.

"Kyoto and the Internet: The Energy Implications of the Digital Economy"**Testimony of Mark P. Mills****Science Advisor, The Greening Earth Society****Senior Fellow, The Competitive Enterprise Institute****President, Mills-McCarthy & Associates, Inc.****before the****Subcommittee on National Economic Growth, Natural Resources, and Regulatory Affairs****U.S. House of Representatives****February 2, 2000**

Thank you, Mr. Chairman and distinguished Members of the Subcommittee for inviting me to speak about the energy implications of the Digital Economy. We live in a special time. It is perhaps not a totally unique time in historical terms, but it is a rare one. Times of major inflections in technology, infrastructure and the economy occur only episodically in history. I am not alone in the belief that we are only at the beginning of one of those powerful inflections, driven by what has been broadly termed the Information Revolution. The Internet is a central part of that revolution and it has only just begun to effect profound changes in our economy.

There have been many attempts to attach numbers to chronicle the growth of the Internet over this remarkable past decade. The number of people accessing the Web has grown from thousands to tens of millions. Web sites have grown from practically none to millions. Computers sold annually have risen from tens of thousands to tens of millions. Digital traffic is measured by prefixes formerly reserved for astronomers; not megabytes, or gigabytes, but petabytes. Still, traffic on the Web is doubling every several months. The entire telecommunications industry as been upended, rebuilt and expanded by the digital revolution. Commerce on the Web has exploded from nothing to tens of billions. New companies, new kinds of equipment, new services appear in a continual flow. Employment in Information Economy jobs has risen from thousands to millions. The real growth by any of these measures has been so astonishing that even the hyperbolic language of headline writers appears understated by comparison.

Against this backdrop, last year I put forth a simple proposition with a colleague that has created some controversy. The proposition is really quite simple. The Internet is using a lot of electricity, and it will use even more in the future.

The currency of the Information Economy, digital bits, are themselves simply bundles of electrons. Every single one of the hundreds of millions of devices, PCs, routers, servers, transmitters and so on, have exactly two kinds of connections: one for bits and one for kilowatt-hours. Just how much electricity does the Internet use? We think something like 8% of the nation's electric supply is absorbed by the sprawling and deeply penetrating hardware of the Internet. And when the broader array of all computers and related equipment are considered, in other words the heart of our new Information Economy, the total probably reaches 13% of all U.S. electricity consumption.

These ideas have been previously submitted to this Committee for the record. The basic concepts are set forth in my report for the Greening Earth Society, "The Internet Begins with Coal," (available at www.fossilfuels.org) and an article published in *Forbes* magazine (5/31/99) with my colleague Peter Huber, a Senior Fellow at the Manhattan Institute.

Subsequently, two respected research organizations and a number of environmental activists have exhibited alarm at the proposition that the Internet uses large and rising amounts of electricity. Before addressing the counter claims, and their deep flaws, I should like to consider the broad context for my analysis to lend perspective to the energy requirements of the Internet.

The Internet's Energy Transformation

If the U.S. Department of Commerce is correct, and I believe it is, in concluding that the Information Technology (IT) sector accounts for at least one-third of all GDP growth, then any policy issue that impacts IT must be considered with great caution. Energy policy is just such an issue. Because the explicit and implicit provisions of the Kyoto Protocol would directly impact every aspect of the nations' energy supply, it is appropriate, in fact critical, to consider the energy implications of our emerging Digital Economy.

Energy underpins any economy, in effect because of the laws of physics. Put simplistically, you can't get something for nothing. The Internet has not changed the laws of physics. Even cyberspace has an energy cost. Energy will continue to underpin our economy in the 21st century, just as it did in the 20th. But there will be one difference. In energy terms, the last century belonged to oil. This one belongs to electricity. Oil will not lose its prominent role, but it will take - and indeed, already has taken - second place to kilowatt-hours.

The dawn of the last century saw an explosion of economic activity in the creation of the automobile age. Investors and Wall Street rode chaotic markets investing in new companies. For technology historians, and Wall Street speculators, the dawn of the auto age has important analogs to the dawn of the Digital Age. One consequence of the rise of the automobile was the creation of an enormous and complex oil-related industrial infrastructure to fuel engines in all kinds of vehicles. The engine of the Digital Age is the microprocessor. Its fuel is electricity. Digital bits are bundles of electrons. The billions and even trillions of bits of data created and routed are, perforce, supported and energized by billions of watts. There's no getting around it. Cyberspace, far from virtual, is very real and anchored in electrons. Thus, the Internet, the central driving force of the Digital Age, is both driving and reshaping the electric infrastructure.

The transformation is already in evidence. Our economy today spends four times as much purchasing electricity as oil. This is a profound reversal of the economic positions of oil and electricity 25 years ago. The only basic energy policy that makes sense in this new Digital Economy is to ensure an expanding supply of ever lower cost and ever more reliable electricity, especially considering the trends of the past decade which have been characterized by a dominance of the tools of the Information Economy.

During this past Digital Decade, consumption of electricity has risen by 650 billion kilowatt-hours. For perspective, this growth alone required more new U.S. electric supply than exists in all of Central and South America.

The increase in kilowatt-hour use occurred despite billions spent by federal and state governments and utilities to reduce electricity growth, and despite dramatic improvements in the efficiency of electric appliances, lights and motors. It occurred, I submit, in large part because of the new tools of the Digital Age.

Considering that coal supplied about one-half of the additional electricity over the past decade (about 10% from natural gas), it is easy to see the collision course this trend has with Kyoto-inspired energy policies which are explicitly and implicitly directed at reducing coal use as well as electric consumption.

The Internet & Electricity Demand

Just how much of the nation's electricity demand is a direct result of equipment in the Digital Economy, and more specifically, the Internet? Truth be told, it is hard to draw a bright line between many devices used for the Internet and those that are part of the broader Digital Economy. Nonetheless, we made just such an attempt, precisely because the Internet is at the epicenter of the Digital Revolution.

It would be exceptionally challenging to catalog all the wide array of devices that comprise the Internet and Digital Economy. Instead, we chose a technique known as sequential approximation. This well-established technique permits one to gain a reasonable order-of-magnitude estimate of a complex factor without a detailed

inventory. One can, for example, use sequential approximation to estimate the number of people in a stadium by considering an inventory of hot dogs and soft drinks. Some approximations are required, but the outcome will be in the right ballpark.

The ballpark estimate: the Internet in all its facets, likely consumes 290 billion kilowatt-hours, or about 8% of the U.S. electric supply system. The broader category, the entire array of all types of computers and computing-related devices (such as storage systems), in homes, businesses and factories which fuel our Digital Economy likely uses 13% of all the nation's electricity.

These numbers encompass much more than PCs on desktops. One must include for example all the hardware behind-the-wall in the telecommunications and Internet networks which includes, but is far from limited to, such things as routers, the hardware of the dot-coms such as servers, and even the silicon and PC factories. Determining Internet and Digital Age electricity use requires collecting and assessing data across many sectors and boundaries.

It is clear that traditional data sources and methodologies are not adequate to the task of clearly tracking the electric needs of the Information Age. For example, most of the necessary data for the commercial sector is invisible in traditional Energy Information Administration energy accounting. EIA does report on PC electric use in commercial buildings, but all of the other types of information technology hardware (which comprise over three-fourths of Internet energy use) are thrown into a general grab bag category called "other." EIA notes cryptically that "other" includes telecommunications equipment. The data lost in "other" was irrelevant two decades ago at the dawn of the Digital Age. Today, the "other" category of commercial electric use is over 300 billion kilowatt-hours and is greater than all other categories except lighting - and will soon overtake lighting.

Before addressing a few points of contention regarding my estimate of 290 billion kilowatt-hours for the entire Internet, it is useful to ask first, is such a result in the ballpark? Much of the confusion and controversy surrounding the issue arises from a key question. In effect, how much of the electric use of a PC (or any IT equipment) is directly attributable to the Internet? Since the Internet is an integral subset of the Digital Economy, the easiest sanity check would be to evaluate the electric needs of all Information Technology equipment. For example, how do you count computers used to develop software for the Internet if those PCs were not directly plugged into the Web? Clearly they are part of the bigger picture, the entire Internet-driven Digital Economy.

A useful starting point for a ballpark check is in the simple fact that the U.S. Information Technology industry sold over \$400 billion worth of hardware last year. Over the past three years alone, more than \$1 trillion of IT hardware has been installed. This hardware represents the engine of the new Digital Economy. Much of it becomes part of the Internet, most is driven by the Internet. Every single piece of this \$1 trillion in hardware gets plugged into a wall somewhere.

There's another more specific ballpark check available from the year 1993, the Jurassic Era of the Internet. A 1995 Lawrence Berkeley Labs (LBL) study (the most recent on the subject) reported about 50 billion kWh in 1993 for commercial sector use by PCs, computers and directly related equipment such as monitors and printers.

This 50 billion kWh figure for the commercial sector from seven years ago is a good starting point for the Digital Decade. Let's consider what's happened since then.

- the number of PCs and related equipment in offices has exploded
- the number of PCs in homes, schools, everywhere, has also exploded
- the Internet has burst on to the scene, with all its back-office Web and telecommunications hardware
- an entirely new class of businesses has been created; the dot-coms
- the usage level for all computing and IT equipment is up everywhere

I am quite confident that these factors collectively have brought the 50 billion kWh starting point in 1993 up to my estimates for the broader Internet (i.e., beyond the commercial sector alone) and the Digital Economy today. And if we're not quite there yet, just wait a few more months.

There are some other useful ballpark indicators. The Information Technology Industry Council's tracking shows the total inventory of computers and computer-type

equipment has jumped by at least 100 million units since 1993. The inventory is growing at over 40 million a year now. And their data set specifically does not include such Internet equipment as routers, which are functionally computers. Cisco sells about a million routers a year. Nor does the official data track the number of wireless base stations, amplifiers, ports, hubs, information appliances, and so on. All of these have grown rapidly over the past Digital Decade. All of these devices use electricity. Many are already part of the Internet, and those that are not will soon be.

And this is only part of the story. One must also add the electric needs of the semiconductor, PC and IT manufacturing industries. Semiconductor manufacturing alone has grown in the past half-decade to become the nation's largest manufacturing industry. Silicon plants are the steel mills of the 21st Century. Their fuel of choice; kilowatt-hours.

When you think about it, it is inconceivable that the Digital Age and the Internet, do not already account for a significant and growing share of the nation's electric supply.

The Case for 1%

Two organizations have offered rebuttals to the 8% estimate for the Internet's share of national electric use. I believe it important to address these ostensible rebuttals given the importance of this issue to federal energy and economic policy. There is insufficient time here to address all of the details, but a few observations are instructive.

The researchers at Lawrence Berkeley National Laboratory (LBL) have published a superficially analysis of my study "The Internet Begins with Coal." Before addressing a couple of representative examples of the inherent failures in the LBL rebuttal, there are two over arching points that should be made. The first relates to the failure of LBL to step up and take an honest crack at estimating an answer to the core question. The second relates to the strange failure of the LBL team to seek information to clarify their misunderstandings.

First then is the fact that LBL team and others seem preoccupied with rebutting details of my analysis, but are quite unwilling to make their own independent estimate to answer the central and critical question: how much electricity does the Internet use? My recommendation to the LBL team then and now: please undertake a detailed and intellectually honest ground-up analysis of the Internet's electric needs.

The central conclusion of the LBL paper is that 8% is an overestimate of the Internet's use of U.S. electricity by "a factor of eight."

On learning this, I asked the LBL team the obvious question, if you say 8% is an overestimate by a factor of eight:

"May I quote LBL as claiming/believing/estimating that the Internet uses 1% of the nation's electricity supply?"

Their answer, in full:

"You may NOT quote LBNL 'as claiming/believing/estimating that the Internet uses 1% of the nation's electricity supply' because your estimate just focuses on direct electricity use, and not the overall effects on the U.S. economy that result from structural changes and substitution effects due to the Internet. You may quote me as believing that your estimate of the direct electricity use associated with the Internet is too high by a factor of eight, but that the NET effect of the Internet on electricity and energy use (which is really what matters) cannot be estimated accurately without assessing the associated indirect effects of the internet on resource use in the economy."

Given what I've outlined earlier, and what practically everyone who reads the news knows, the explosion in Internet equipment is quite unlikely to have led to a reduction in the use of electricity. Data contained in LBL's own research on PCs and

computers yields a figure of 2% way back in 1993 and just for the commercial sector.

Furthermore it is disingenuous for the LBL team to state that what really matters is the "NET" effect of the Internet. Certainly it's an interesting issue (more about this in a minute). Fax machines use electricity and displace jet fuel by replacing overnight mail. I believe I may have been the first to publish detailed analyses of this effect of electrification in 1991, and to describe this effect I coined the term "ecowatts" at that time, documenting and publishing widely to extol this important efficiency trend.

But here's a simple arithmetical fact; estimating the net savings from faxing requires, *a priori*, knowing the amount of electricity used by faxes. Accurately calculating the net savings is actually much more difficult than accounting for the electricity used. (Consider, for example, that faxing should have been expected to reduce use of overnight mail; in fact overnight mail has grown.) But LBL suggests that one should not study the use of electricity from PCs, or by inference, faxes or any office equipment "without assessing the associated indirect effects." LBL's own EPA-funded 1995 research on electricity used by all manner of office equipment in commercial buildings does not meet this test - nor should it have to.

The idea that we can or should only study and publish the "NET" effect is the equivalent of claiming that you can figure out the change from dinner without knowing how much money you gave the waiter.

The LBL team dodged the issue.

The second generic point I should like to make arise from the following statement from the LBL paper:

"Mills' report does not contain enough detailed documentation to assess the reasonableness of many assumptions." (emphasis added)

This is a fair complaint. I note for the record that the LBL team, in full possession of my e-mail, phone number and address, and despite a couple of very general e-mail exchanges with them, made absolutely no attempt to contact me to obtain clarification or expansion on specifics for any assumptions. Considering that clarification was and is necessary for "many assumptions," their failure to do so leaves one wondering if they did not want clarification, and that the rebuttal was motivated by something other than the requirements of technical scholarship.

That the LBL team has, so far, dodged the central question is clear. Thus far their only contribution to this debate has been an attempt to cast doubt on my analysis. The LBL rebuttal contains numerous serious errors. Let me briefly outline two that are representative.

The first technical point: In the LBL paper, the authors take issue with the claim that the desktop for an Internet-configured PC (i.e., including necessary peripherals) is about a 1,000 Watt device. Setting aside the question of whether it is 1,000 Watts (it is), the LBL researchers know full well that the relevant number used in the calculation is NOT the peak watts, but the quantity of kilowatt-hours used in a year. In analogous terms, what really matters is how much gasoline you use in a year, not the horsepower of your engine.

In this regard, my analysis for an Internet-configured PC is based on 750 kWh/yr and is consistent with many other analyses, including their own at LBL.

- In their 1995 study, LBL finds that a PC and printer uses 650 kWh/yr

("Efficiency Improvements in U.S. Office Equipment: Expected Policy Impacts and Uncertainties," LBL, December 1995, p. 15.).

- In an unrelated 1995 EPA study, annual PC electric use was estimated to range from 450 to 2,000 kWh/yr.

("The Green PC," S. Anzovin, Windcrest, 1994, p. 5).

- A more recent National Academy of Sciences report put annual PC/workstation electric use at 1,000 to 1,800 kWh/yr.

(IEEE Spectrum, January 2000).

Despite the readily verifiable above noted facts, the LBL paper nonetheless concludes that "With these corrections [to Mills' assumptions], PCs in offices use about 7.2 TWh, a reduction of 84% from Mills' estimate."

Surely the LBL team noticed the bizarre inconsistency in this conclusion. Their own 1995 seminal study showed collective commercial sector PC electric use at 50 TWh more than five years ago. How could their "correction" to my analysis yield 7 TWh today?

Let me turn now to a second example of poor analysis in the LBL paper, but of a slightly different 'flavor' of error.

One entirely new category of computer use since 1995 is in Web servers. Servers are really computers ranging in type from PCs, to workstations, and up to mainframes that host the Web sites. Servers run 24-7 and are frequently arranged by the hundreds in enormous banks of racks creating a "server farm" for mid-sized to large Internet Service Providers. LBL claims that we need to adjust downwards both the power used by servers and the total number of servers. The power use issue for servers is essentially the same as I've just outlined for PCs.

At the time of writing my report, I used an estimate of 4 million servers for 1999 based on an extrapolation from data for the number of Web sites. The LBL team 'adjusted' my estimate arbitrarily to conclude that the "correct" number of servers should have a downward correction of "80%" to 1 million. LBL could have undertaken some modest additional research, as I did subsequently, to learn that there is hard data on the number of servers in operation in 1999 that does not require any extrapolations. The actual number of servers last year was 4 million (Netcraft Internet Survey, www.netcraft.com/Survey/Reports/). Clearly my methodology was more accurate than theirs. As a point of interest; there were fewer than 20,000 servers in 1995. Servers are only one piece of a very big digital pie, but quite indicative of the electric trends.

In general LBL sought to ignore the basic methodology I used, sequential approximation, and instead clearly sought to undermine the integrity of my work, without attempting their own honest analysis. They also failed to note the explicit mention in my report that we did not count the electric use of a wide variety of other relevant Internet related devices, totaling in the millions.

The LBL researchers are right about one claim, that it is difficult to cleanly separate Internet equipment from all information technology equipment. Thus, I asked the LBL team to consider the conclusion offered in the study and the *Forbes* magazine article, that microprocessors of the Digital Age, in all categories including the Internet, consume about 13% of the nation's electricity. We have yet to receive a response.

The Case for Zero

While the LBL team dodged the specific question of how much electricity the Internet or even the Digital Economy uses, a Cool Companies study led by Joseph Romm was braver. The Cool study has two central contentions that merit brief discussion. One contention, incredibly enough, is that the Internet's electric use is zero. And the other central contention is that the efficiency gains from the Internet offset any putative energy needs. Let me briefly address these two contentions.

The Cool study conclusion about the Internet simply and astoundingly concludes:

"The authors found that the Internet itself is not a major energy user, largely because it draws heavily on existing communications and computing infrastructure."

This observation reflects such a deep misunderstanding of the telecommunications revolution that it is difficult to know how to respond. Just what exactly do the authors think the past half decade of over several trillion dollars in new investment in telecommunications and computing equipment has been for and driven by, if not the Internet?

The exponential growth in equipment (and related Wall Street valuation) constitutes the electric-intensive infrastructure of the Internet. None of it was "existing." Equally important, it is still rapidly expanding. The entire telecommunications industry has been visibly up-ended and expanded by the Internet. The purchase and installation of hundreds of thousands of miles of fiber optics, and the entire attendant infrastructure has been almost entirely driven by the Internet. Digital traffic now dwarfs voice traffic on the telecommunications networks. And every telecom expert forecasts traffic to grow, and for the growth to be utterly dominated by bits, not voice. The driving force for bits is the Internet.

The Cool study authors would have us believe the Digital Economy is some kind of virtual overlay on existing infrastructure. This is the equivalent of asserting, in 1950, that the several decade build-out of the nation's Interstate Highway system, to support all the new cars and trucks moving into the economy, would not entail any investment (in dollars, materials or energy) since drivers would be using an existing highway infrastructure. It is 1950 for the digital highways.

But the Internet Improves Efficiency

It is widely recognized that the Internet is improving economic efficiency, sometimes astonishingly so. Indeed, this central fact is the very reason that the market is so rapidly consuming digital bandwidth and all of the equipment to create and serve that bandwidth. But economic and energy efficiency are not the same thing. Indeed, economic efficiency can fuel increased energy demand.

There are two aspects to the efficiency argument. One is macro-economic; is the general, overall effect of the Internet to reduce energy and material use? The second, micro-engineering; does the Internet reduce material and energy use in specific applications?

The Internet serves as a kind of economic lubricant. According to the Department of Commerce (Digital Economy II), information technologies drive at least one-third of the GDP growth, and further two-thirds of ALL investment in capital equipment. These results suggest the answer to an oft-posed question from economists and digital skeptics, "when will we see the putative economic effects of the massive investments in computers?" We're seeing them now. Indeed, Chairman Greenspan appears to believe that the reaction is even a little overheated.

Regardless, so far the net effect of the Digital Age at the national level has been to increase energy use. In the last digital decade, total air miles flown have risen from 4.3 to 5.8 billion a year. People are flying more than ever. Planes use fuel. People are driving more than ever, and in bigger vehicles. SUV and light trucks account for one-half of all vehicle sales - doubling in the past Digital Decade. Transportation fuel use is up 12%. Similarly, the digitally-accelerated economy has driven up the size of homes and the spending on home improvements. Whether you think this is good or bad is not relevant to the fact; so far, it has all generated greater energy use.

A robust economy tends to use more energy. To be sure, we're more efficient. But there is no evidence yet in human history, much less the past few decades, of rising economies with sustained declines in energy use. Obviously, improvements in efficiency moderates a growth rate; but the operative word is "growth."

What about the application-specific efficiency argument? The idea, in a nutshell: the Internet is so powerful that it will improve efficiency faster than the energy consumed by the hardware on the Network.

The energy used per dollar of GDP is the favorite efficiency metric of both environmentalists and business leaders seeking environmental coverage. By this measure, the U.S. is incredibly more efficient than just a decade ago. Total U.S. energy use per dollar of GDP has dropped 16% since 1990. Today's economy, operating at the energy efficiency of 1990, would need 15 Quads more fuel - in oil terms, that would be a 40% increase in total U.S. oil use. Interesting, but largely meaningless. The nation still uses more energy today than a decade ago. And more importantly for a Digital Economy, we use a lot more electricity. Increased supply to meet electric growth in just the past five years is equal to the total generating capacity of Italy.

There is a real problem with the dollars per BTU metric for energy efficiency, and easily illustrated. Considering, with this metric, who is the most energy efficient person in America? Bill Gates. Despite enormous energy use in his legendary home, personal jet and so forth, Mr. Gate's wealth yields an efficiency measured as energy per \$ that would shame a Sudanese hunter gatherer - only because his wealth is so great. The economic path the U.S. is on, with the Digital Era accelerating economic gains out of proportion to relatively modest energy growth, means that the U.S. economy is following the Bill Gates method for energy efficiency: increase wealth faster than you increase energy use.

What then of the specific energy efficiency gains of the Internet, especially the efficiencies of buying "on line" via e-commerce - what might be termed Amazon-dot-com effect? The jury's still out on whether more or less energy/material infrastructure is used to warehouse and deliver e-commerce products. Books from Amazon via 747 and trucks may use less or more energy than driving an SUV to the book and grocery store. It is far from clear, however, what the final, overall effect will be in retail e-commerce, especially since it is still only a tiny fraction of total retail. The 24-7, send-it-overnight e-commerce economy could increase energy use if aircraft begin to substitute for trucks and trains for product delivery. Many analysts believe that competition in e-commerce will drive business increasingly to delivery overnight. Developers are already building new, dedicated airport hubs that can handle multiple 747s loading-unloading specifically as for e-commerce. ("Developers Rush to Meet the Demands of E-Commerce," 1/23/00, New York Times.)

Even if the net overall impact of the Amazon-effect is improved energy efficiency (it probably is in many cases, if not specifically the Amazon case) - reduced transportation oil use still comes with increased use of electricity. This in fact has been the general macro-energy trend of the past decade.

The Cool study continues also with one long-sought goal of environmental activists. The paperless society. The Cool study sees the Internet saving "2.7 million tons of paper every year by 2003, as it reduces the need to print newspapers, catalogs, direct mail, and the like." ("The Internet may give a boost to energy efficiency," J. Romm, Yahoo.com, 01.24.00) Perhaps. But this sounds eerily like the paperless office touted as the result of word processors a decade ago. So far, paper use is up.

Then too there is the long-promised energy savings from telecommuting. Certainly telecommuting uses less fuel than driving your car. But auto and air travel is up even with the rise of telecommuting. The reasons are complex, but even the co-inventor of the Internet himself has concluded:

"The Internet has the funny effect of increasing the amount of travel."

(Vinton Cerf, Senior VP of Internet Architecture, MCI WorldCom, actual co-inventor of the Internet, Engineering Tomorrow, IEEE Press, 2000, p.10.)

Where does Internet Electric Demand Go From Here?

Up.

Will there be continued growth in the hardware of the Digital Age? Is the Digital Age fully formed, IT appliance invention, production and utilization fully saturated? All indicators point to the fact that we're just at the beginning. The number of applications, and the range of microprocessor-based devices, the magnitude and extent of the communication networks needed to integrate all the devices is still at that so-called knee in the hockey-stick curve.

One hundred million computers today will become hundreds of millions in a few short years; globally, billions. As the Internet moves increasingly into a wireless mode, power use will grow disproportionately because it is inherently less efficient to broadcast than pipe information. The Palm VII and similar handheld devices and their wireless access to the Internet are only the beginning of an explosive trend. Add to this the ever expanding appetite for faster Internet access, and more broadband services. This is just the beginning.

Thus will the Information Economy keep driving demand for electricity? Or will the market's use of new electric devices reach saturation, and efficiency gains combine

to flatten out load growth? These two key questions have been posed repeatedly over the past two decades with regard to electric use in general, and are even more critical to understand today, at the dawn of Internet era.

The old conventional wisdom was that PCs and their kin would follow the efficiency trend of all other electric appliances. In one sense they have. Certainly PC monitors are more efficient today, as are many PCs. But unlike lights, chillers and refrigerators, the number of PCs and PC type devices has grown geometrically in a few short years.

In the past, some prominent forecasters have been confident that demand for electricity would stop growing because of efficiency gains and market saturation. We hear much the same language today, with much the same reasoning.

In 1980, a study from the Union of Concerned Scientists predicted:

"Because saturation levels for most major appliances are achieved, only minor increases in electricity consumption [will] occur."

(Energy Strategy, Union of Concerned Scientists, 1980)

In 1981, a study from the then Solar Energy Research Institute, since re-named the National Renewable Energy Lab concluded:

"It appears that the demand for electricity is unlikely to increase significantly during the next two decades."

(A New Prosperity: Building a Sustainable Energy Future, Solar Energy Research Institute, 1981)

What happened since 1980? Electric demand grew nearly 60%. What went 'wrong'? The analysts completely misunderstood the technology trends of ever greater applications for electricity, uses that more than offset improved efficiency. The same mindset is in place once again with regard to the information age and the Internet.

More recently, researchers at LBL concluded in 1995, just five Internet years ago:

"While total energy use for office equipment has grown rapidly in recent years, this growth is likely to slow in the next decade because the US commercial sector market is becoming saturated (especially for PC CPUs and monitors)."

("Efficiency Improvements in U.S. Office Equipment," LBL, December 1995.)

To be charitable, forecasters even five years ago could hardly have forecast the growth in electricity-consuming IT-type equipment. But this has not stopped the refrain from continuing. The indicators for future trends are nothing less than amazing.

There are literally trillion of objects manufactured each year. We are rapidly approaching a time when everything will be manufactured with a silicon device of some kind, and where virtually all of them will communicate. Even if the energy needs of this trillion chip industry, and trillion petabyte bandwidth are trivial in per-chip terms - the aggregate electric needs will no doubt be astonishing.

As bandwidth demand rises, power use rises, as does the market's use of the services. Yes efficiency will rise too. But for some time, as we build out the new infrastructure of the Digital Age, efficiency gains will be overwhelmed by sheer growth. Electricity is the fuel of the Digital Age, and the Internet at the heart of this revolution.

No energy policy, including and perhaps especially the anti-electricity aspects of the Kyoto Protocol, should be considered without passing it first through a Digital sanity test. The integrity, reliability and low cost of the national electric infrastructure will be more, not less important in the future. A juxtaposition of key facts illustrates a policy collision course. Kyoto Protocol advocates call explicitly for the reduction, even elimination of fossil fuels and especially coal from the nation's energy infrastructure. Yet the nation gets 70% of its electricity from fossil fuels (three-fourths of that from coal). EIA forecasts that more fossil fuels will be needed to support economic growth. And while EIA forecasts natural gas

will dominate the growth, they also forecast coal use will rise to support the economy. Clearly energy policy and the Digital Economy are tightly linked.

Randolph J. Steer
11/14/99 01:49:44 PM

Record Type: Record

To: Elwood Holstein/OMB/EOP@EOP, Kathleen Peroff/OMB/EOP@EOP, Peroff@gateway.com@inet
cc: Gary L. Bennethum/OMB/EOP@EOP, David A. Bernell/OMB/EOP@EOP, rsteer@concentric.net@inet
Subject: Quick look at new Conservation conference \$

The new conference level for Energy Conservation is \$745.242 million, \$56 million more than the PREVIOUS conference level of \$689.242 million. The \$56 million includes elimination of an \$11 million deduction in the previous conference mark for "use of balances".

The \$56 million increase breaks down as follows:

(If the table looks scrambled on your home e-mail, try setting your default display font to Courier. I'll also try to paste a simplified copy of the table below the "nice" one.)

Program (\$ in millions)	OMB/WHCCTF Compromise	Latest Conf. Mark (11/13)	Relative to FY 1999
Buildings R&D	\$20	\$14.2	+19.3
FEMP	\$5	-\$0.4	-.3
Transportation R&D	\$29	\$20.3	+31.1
Use of Balances (we want them restored)	\$11	\$11.0	0
State Grants	\$20	\$1.5	+2.5
Industrial Efficiency	\$10	\$9.4	+4.8*
Management	\$0	\$0	+4.7
Total	\$95	\$56.0	+62.5*

* Comparable program basis; totals don't add due to rounding.

+\$5m Back Liquef

Program (\$m)	OMB/WHCCTF Add	Latest Conf	Rel to FY99
Buildings R&D	\$20	\$14.2	+19.3
FEMP	\$5	-\$0.4	-0.3
Transportation R&D	\$29	\$20.3	+31.1
Use of Balances (we want restored)	\$11	\$11.0	0
State Grants	\$20	\$1.5	+2.5
Industrial Eff.	\$10	\$9.4	+4.8*
Management	\$0	\$0	+4.7
Total	\$95	\$56.0	+62.5*

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So, the major "losers" relative to our add-back list are FEMP and the State Grants programs. FEMP is

actually \$300K below the FY 1999 level, while State Grants are \$2.5 million above FY 1999. The other programs are all ahead of the FY 1999 levels. (That's on a comparable basis for the Industry programs, since \$9m of what was in Conservation last year is in Fossil R&D this year.)

Overall, I would say we fared reasonably well.

DOE has said that they would like to approach the Hill to move \$1 million within the Industry programs, reducing the conference mark for efficiency "science" programs in industry from \$3.9m to \$2.9m, and adding back \$1m of the \$3m cut from the House mark for cogeneration turbines. Kathy Peroff and I talked to Mike Telson and Ernie Moniz about this, and agreed.

DOE may also approach you about the \$5 million they wanted for simulation support. That was cut from the request in the Science budget in the Energy and Water bill, and they have been trying to get it added in Interior, using Conservation as the vehicle. Funding that activity in Conservation would require taking money away from the programs we requested as part of Conservation/CCTI. I, personally, would recommend against it.

Randy.

Energy at +\$56m,
getting it to \$61m

is important

another \$5m - Black liquor

David A. Bernell

10/25/99 11:10:45 PM

Record Type: Record

To: Roger S. Ballentine/WHO/EOP@EOP, Wesley P. Warren/CEQ/EOP@EOP

cc: Angela C. Mizeur/WHO/EOP@EOP, Kathleen Peroff/OMB/EOP@EOP

Subject: How to add back \$25 million to energy conservation in Interior Bill

Elgie has proposed an additional \$25 million to our proposed addbacks for Energy Conservation. This would take our addbacks from \$70 million to \$95 million. If you have major problems with this allocation, please let Elgie and me know. Thanks.

Program	\$25 million Increment	Total Increase Requested Over Conf.
Buildings R&D (Path)	\$ 6	\$16
FEMP		\$5
Transportation R&D (PNGV)		\$29
Use of Balances(we want them restored)		\$11
State Grants	\$ 9	\$24
Industrial Efficiency	\$10	\$10
Management		\$0
Total	\$25	\$95

- ① I need to check w/ Linda to make sure the PNGV Number is correct
- ② I think the state grants number is a little high, but I not opposed to it.
- ③ How does this compare to the Alliance to Save Energy proposal?

OMB Addback List

(11/5/99)

Recommended CEQ Add

INTERIOR

Lands Legacy/Federal (\$156 M)

\$61 M	USFS Baca ranch →
\$16 M	USFS Miscellaneous
\$20 M	DOI Catellus
\$10 M	DOI Everglades
\$12 M	DOI Civil War battlefields
\$20 M	DOI Grand Staircase coal rights
\$17 M	DOI/NPS Miscellaneous

Lands Legacy/State&Local (\$93 M)

\$30 M	DOI State Grants	} +\$50M \$20
\$ 2 M	DOI Urban parks	
\$12 M	DOI Cooperative Endangered Species	
\$40 M	USFS Forest Legacy	
\$ 9 M	USFS Urban Community Forestry	

Climate Change (\$100 M)

\$95 M	DOE Energy Conservation
\$ 5 M	USDA Sinks research —

-\$5

Clean Water (\$51 M)

\$25 M	USFS CWAP
\$10 M	NW Forest Plan
\$10 M	DOI CWAP abandoned mines
\$ 6 M	DOI/USDA C/FIP

-\$20

Miscellaneous (\$54 M)

\$ 5 M	Guam
\$74 M	Indian Programs
\$15 M	Education

Guam \$5
BIA Law Enforce. \$10
NEA \$5

TOTAL INTERIOR

OMB: \$494 M

CEQ: \$544

• CJS \$100 M for Salmon, Lands Legacy,
Clean Water, Satellites
(OMB provides another
\$2.5 million for GLOBE)

FY 2000 FUNDING ISSUES -- OFFER SHEET
Interior and Related Agencies

~~11/08/99 pm~~

11/9 9:30 am

<u>Agency/Program</u>	OMB Adds over <u>Conf</u> <u>BA</u>	Hill Adds over <u>Conf</u> <u>BA</u>	11/7 OMB Counter +/- 11/7 <u>Hill offer</u> <u>BA</u>	11/8 Hill Over 11/7 <u>Hill offer</u> <u>BA</u>
INTERIOR:				
Lands Legacy:				
Federal Land Acquisition	150	167.5	-10.0	
NPS Land Acquisition (included above)	37			
BLM Land Acquisition (included above)	39			
FWS Land Acquisition (included above)	0			
USDA For. Serv. Land Acq. (inc. above)	74			
(Baca Ranch included in USDAFS) (3) (4)	[61]	[61]	[0]	
Undistributed priority projects (included above)		[+45]	[-10]	
Other Lands Legacy (Interior Approps bill only)	99	35.0	45.0	
Forest Legacy (included above) (1)	40	10.0		[+5]
Urban Comm. Forestry (included above) (1)	9			
USDA Smartgrowth Partnership	0			
LWCF state grants	30	20.0	10.0	
Cooperative Endangered Species	12	5.0		[+2]
Urban Parks	8			
Undistributed (for Forest Legacy, Urban parks, Urban Comm. Forestry, and Coop. Endangered Species)			[+35]	
Lands Legacy total (Interior Approps bill only)	249	202.5	35.0	7.0
NPS Construction :				
Elwha (WA) Dam Removal (Check language) a)		10.0	0.0	
FDR Memorial Construction	0	1.0	0.0	
Indian Programs:				
BIA Construction (schools only)	26	23.0	0.0	
Operation of Indian Programs	13	18.0	0.0	
Tribal Comm. Colleges (included above)	3	[+3]		
BIA Law enforcement (included above)	10	[+5]		[+5]
NAPA implementation	0	[+5]		
School operations addback	0	[+5]		
Contract Support Costs	0			[+5]
Indian Programs (BIA Con. & Operations):	39	41.0	0.0	10.0
Clean Water Action Plan:	45	20.0	5.0	
DOI/OSM AML Reclamation Fund	10			
USDA National Forest System (2)	35	[+20]		5.0
Climate Change:				
Forest Service Research	5	0.0	0.0	
Assistance to Territories (Guam only)	5	0.0	3.0	3.0
Community Federal Information Partnership (USGS)	6	0.0	0.0	
NOTES:				
Interior/Forest Service Subtotal:	349	274.5	43.0	25.0

120

* Indicates change from previous table.

FY 2000 FUNDING ISSUES -- OFFER SHEET
Interior and Related Agencies

11/08/99 pm

<u>Agency/Program</u>	<u>OMB</u> <u>Adds over</u> <u>Conf</u> <u>BA</u>	<u>Hill Adds</u> <u>over</u> <u>Conf</u> <u>BA</u>	<u>11/7 OMB</u> <u>Counter +/-</u> <u>11/7</u> <u>Hill offer</u> <u>BA</u>	<u>11/8 Hill Over</u> <u>11/7</u> <u>Hill offer</u> <u>BA</u>
ENERGY:				
Energy Conservation	95	41.0	50.0	[+15]
Buildings R&D (PATH, included above)	16			
Federal Energy Mgmt (included above)	5			
Transportation R&D (PNGV, included above)	29			
Use of Balances (included above)	11			
State grants (included above)	24			
Industrial Efficiency R&D (included above)	10			
Management (included above)	0			
Fossil fuel	0	4.0	0.0	
Smithsonian				
Music Museum	3	0.0	3.0	
NOTE: The \$3 million for FY 2000 Proposed BA was submitted in budget amendment package from Sept. 21.				
Energy Subtotal:	98	45.0	53.0	15.0
EDUCATION:				
Nat'l Endow. for the Arts	10	0.0	10.0	
NOTES: Increase supports Challenge America initiative to increase access to the arts and to serve at-risk youth.				
Nat'l Endow. for the Humanities	0	0.0	0.0	
NOTES: Increase supports summer humanities seminars for teachers and preservation gifts.				
Office of Museum Services	5	0.0	3.0	
NOTES: Increase supports electronic connections between museums and schools.				
Education Subtotal:	15	0.0	13.0	0.0
HEALTH AND HUMAN SERVICES:				
Indian Health Services	35	15.0	15	10
NOTES: (1) Language (Sec. 326) requiring a second-year moratorium on new & expanded tribal contracting is objectionable.				
(2) Funding: need +\$35 million for Contract Support Costs, which are administrative costs paid to tribal contractors for running IHS hospitals and other IHS public health services.				
TOTAL FOR INTERIOR BILL:	497	334.5	124.0	50.0

+ 20
(14 min)

FY2000

STATUS OF ENVIRONMENTAL PRIORITIES
IN BUDGET FY 2000 ENDGAME
(October 18, 1999)

In order to produce a win on the environment in the budget, the Administration will need to secure major increases in funding for its key initiatives and keep remaining bills virtually free of riders. This memo summarizes the overall budget situation for environmental priorities and makes specific recommendations for Administration targets for the Interior Appropriations bill. Overall, the Administration needs to add about \$500 million to the Interior Appropriations bill for key priorities including Lands Legacy, climate change, clean water, and livability.

OVERALL BUDGET SITUATION

For FY 2000, the Administration proposed an increase of over \$1.6 billion in spending (from \$3.6 billion to over \$5.2 billion) on four hallmark issues – climate change, Lands Legacy, the Clean Water Action Plan, and Northwest salmon. To date Congress has provided funding that is far below the Administration's request and actually totals below the FY 1999 level for these issues. Congress also provided less than \$100 million of the over \$1 billion Livability Initiative.

Funding for these issues is located in several bills, some of which the Administration has already agreed to sign. Only three of these bills remain in play -- Commerce-Justice-State, Interior and Related Agencies, and Foreign Operations. Negotiations on these bills are complicated by the opposition of environmentalists to over two dozen riders in these bills (mainly in the Interior bill) and to acceptance of the CAFÉ rider in the DOT bill.

Table 1 compares the Administration request with Congressional funding in conference reports, or as an average of the House and Senate where unresolved, for the following bills -- Agriculture; Commerce-Justice-State; Energy and Water; Interior; Foreign Operations; and VA-HUD.

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CLIMATE CHANGE	1355	1900	1227	+545	-673
LANDS LEGACY	458	1030	361	+572	-628
CLEAN WATER AP	1648	1974	1709	+326	-265
NW SALMON	123	316	157	+193	-159
TOTAL	3584	5220	3454	+1636	-1766

STATUS OF INTERIOR APPROPRIATIONS

The Interior Appropriations bill offers one of the best remaining opportunities to negotiate a budget win on the environment. Significant funding opportunities exist for funding for Lands Legacy, climate change, clean water, and livability. Furthermore, most of the anti-environmental riders are in this bill. Finally, House Democrats for the most part seem willing to back us in an environmental fight on this bill.

RECOMMENDATIONS FOR INCREASED FUNDING

- **+\$300 million Lands Legacy** – Funding to be divided almost equally with \$148 million for major Federal land acquisitions, such as the Baca Ranch, the Everglades, Catellus/California Dessert, Civil War battlefields, and Grand Staircase coal rights, and with \$152 million for livability-related financial assistance to communities for greenspace management.
- **+100 million for ^{energy conservation} ~~climate change~~** – Funding to be divided between DOE energy efficiency programs (\$95 M) and USDA work on forests as carbon sinks (\$5 M).
- **+50 million for clean water** – Includes money for DOI's abandoned mine lands (\$15 M), USDA's part of the Clean Water Action Plan (\$25 M), and the Community/Federal Information Partnership at the U.S. Geological Survey, an important livability proposal.
- **+50 million for the Bureau of Indian Affairs** – For law enforcement and education efforts.

For additional detail, see table 2 and the Appendix.

MAJOR RIDERS IN THE INTERIOR BILL

The final conference report includes more than 20 riders affecting mining, timber, wildlife, water management, and the taxpayers' interest. The following is a partial list of the most serious ones.

- (1) **Millsite Waste Dumps** – In November of 1998, DOI proposed restrictions on the use of mill sites on Federal land as dumps for wastes from hardrock mining operations. The conference language would unacceptably limit its application by exempting sites under existing hardrock mining applications, mining operations with approved plans even if those plans are amended in the future, and plans of operation that are currently awaiting approval.
- (2) **Hardrock Mining Reform** – DOI is working on a proposal for improving the environmental compliance of hardrock mining operations. The conference report would delay agency work on this issue once again by prohibiting a final rule during FY 2000.

- (3) **Lead Mining in Mark Twain National Forest** – DOI has proposed withdrawing land temporarily from lead production in the Mark Twain National Forest until a final decision can be made about the pollution potential of these activities including effects on the Ozark National Scenic Riverway. Gephardt and the state's Attorney General have opposed earlier versions of this rider.
- (4) **Oil Valuation Subsidy** – DOI proposes to start charging companies that drill on Federal land market-rate royalties for the oil they extract. The conference language blocks the rule for six months pending completion of a GAO report, long enough to pass a moratorium extension in next year's appropriations supplemental just as they did this year.
- (5) **Forest Management** – The conference report contains over half a dozen forest-related riders. Although these riders vary greatly in their effect, the total when taken together would foster objectionable overcutting in the national forests. Some of the most serious riders would impede revisions to national forest plans, interfere with scientific wildlife and timber surveys, and stop efforts to reform management of the Columbia River Basin.
- (6) **American Heritage Rivers** – The Executive Office of the President oversees coordination and implementation of the American Heritage Rivers initiative. The conference provision would prevent any funds in this bill from being used to respond to EOP requests for support for this initiative or for participating in the interagency task force that administers it. Since over half of the agencies that belong to AHR are funded totally or in part through this bill, the provision would fatally cripple this effort.
- (7) **Grand Canyon Overflights** – In December 1999 the Administration is planning to control noise at the Grand Canyon by regulating overflights. This provision delays implementation of that rule until a report to Congress is complete, jeopardizing completion in FY 2000.
- (8) **Land between the Lakes** – This provision transfers Land Between the Lakes to the Forest Service to manage because necessary funds (\$7 M) were not appropriated to TVA as part of the Energy and Water Appropriations bill.

Other riders include:

Everglades Restoration
Columbia River Gorge land Acquisition
Grizzly Bear Reintroduction
Grazing Permits
Man and the Biosphere Program
Kankakee River refuge prohibition
Lake Powell study prohibition

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in millions of dollars
(10/19/99)

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LANDS LEGACY							
Federal Acquisitions							
DOI	211	295	176	-119		263	+ 87
USDA/FS	118	118	40	- 78		101	+ 61
<i>Subtotal</i>		329	413	216	-197		364
+148							
State and Local*							
DOI/ state grants	0	200	20	-180		120	+100
DOI/CESC Fund	14	80	16	- 64		40	+ 24
USDA/Forest Legacy	7	50	10	- 40		30	+ 20
USDA/Urban &Com. Forestry	31	40	32	- 8		40	+ 8
<i>Subtotal</i>	52	370	78	-292		230	+152
<i>Total Lands Legacy</i>	381	783	294	-489		594	+300
CLIMATE CHANGE							
DOE Energy Conservation		692	838	697	-141		792
+ 95							
USDA forest sinks	0	6	0	- 6		5	+ 5
<i>Total Climate Change</i>	692	844	697	-147		797	+100
CLEAN WATER							
DOI Com/Fed. Information Partnership*	2	14	2	- 10		12	+ 10
DOI Abandoned Mines/Clean Streams	278	306	287	- 19		302	+ 15
Clean Water Action Plan	629	731	646	- 85		671	+ 25
<i>Total Clean Water</i>	909	1051	935	-114		985	+ 50
SUBTOTAL ENVIRONMENT				-750			+450
NATIVE AMERICANS (DOI)							+ 50
TOTAL INTERIOR APPROPRIATIONS							+500

*Livability-related programs

(NOTE: numbers may not add due to rounding)

“FY00 need” = Internal-only CEQ proposed Administration bottom-line on priority programs.
“Add to Conf.” = Amount of money to be added to conference to reach proposed need number.

SEE APPENDIX FOR DETAILS ON LANDS LEGACY AND LIVABILITY LINE-ITEMS

APPENDIX LANDS LEGACY AND LIVABILITY

The over \$1 billion Lands Legacy proposal for the Land and Water Conservation Fund (LWCF) is divided almost equally between Federal acquisitions and state and local assistance. Although most of the attention has been on the Federal side, the Administration has proposed a major amount for communities to help improve their livability by protecting and expanding open space. However, Congress has provided only a small portion of the proposed increase for communities.

Details of the \$148 million in additions to conference for Federal Lands Legacy acquisitions:

DOI	Catellus	+20 million
	Everglades, state grants	+35 million
	Civil War battlefields	+12 million
	<u>Grand Staircase coal</u>	<u>+20 million</u>
	Total	+87 million*
USDA	Baca Ranch	+61 million

Details of \$152 million in additions for livability-related state and local Lands Legacy money :

Some of these programs would require an authorization to receive funding specifically from the LWCF, but all of them are authorized to get appropriations on their own.

- An increase of \$100 million in DOI state grants for open space management divided equally between formula and discretionary distribution; acquisitions and smart growth planning will both be eligible for the discretionary distribution, but discretionary acquisitions will focus on Northern Forests (\$120 million total).
- An increase of \$24 million to preserve greenspace habitat through DOI's Cooperative Endangered Species Conservation Fund (total \$40 million).
- An increase of \$20 million for USDA's Forest Legacy to protect forestland through easements, also focusing on Northern Forests (total of \$30 million).
- An increase of \$8 million for USDA's Urban and Community Forestry, targeted to open space development (total of \$40 million).

In addition to these programs that aid communities through financial assistance, an increase of \$10 million is proposed for the Community/ Federal Information Partnership (grouped with Clean Water in Table 2), which provides data, mapping, and other planning services to communities on water and other natural resources, helping them improve livability through smart growth planning (total of \$12 million).

STATUS OF ENVIRONMENTAL PRIORITIES
IN BUDGET FY 2000 ENDGAME
(October 18, 1999)

Sf.m.
Monday
rider
negotiator

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306
334
221

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USDA/Urban &Com. Forestry	31	40	32	- 8		40	+ 8
<i>Subtotal</i>	52	370	78	-292		230	+152
<i>Total Lands Legacy</i>	381	783	294	-489		594	+300
CLIMATE CHANGE							
DOE Energy Conservation		692	838	697	-141		792
+ 95							
USDA forest sinks	0	6	0	- 6		5	+ 5
<i>Total Climate Change</i>	692	844	697	-147		797	+100
CLEAN WATER							
DOI Com/Fed. Information Partnership*	2	14	2	- 10		12	+ 10
DOI Abandoned Mines/Clean Streams	278	306	287	- 19		302	+ 15
Clean Water Action Plan	629	731	646	- 85		671	+ 25
<i>Total Clean Water</i>	909	1051	935	-114		985	+ 50

SUBTOTAL ENVIRONMENT				-750			+450
NATIVE AMERICANS (DOI)							+ 50
TOTAL INTERIOR APPROPRIATIONS							+500

*Livability-related programs

(NOTE: numbers may not add due to rounding)

“FY00 need” = Internal-only CEQ proposed Administration bottom-line on priority programs.

“Add to Conf.” = Amount of money to be added to conference to reach proposed need number.

SEE APPENDIX FOR DETAILS ON LANDS LEGACY AND LIVABILITY LINE-ITEMS

APPENDIX LANDS LEGACY AND LIVABILITY

The over \$1 billion Lands Legacy proposal for the Land and Water Conservation Fund (LWCF) is divided almost equally between Federal acquisitions and state and local assistance. Although most of the attention has been on the Federal side, the Administration has proposed a major amount for communities to help improve their livability by protecting and expanding open space. However, Congress has provided only a small portion of the proposed increase for communities.

Details of the \$148 million in additions to conference for Federal Lands Legacy acquisitions:

DOI	Catellus	+20 million
	Everglades, state grants	+35 million
	Civil War battlefields	+12 million
	<u>Grand Staircase coal</u>	<u>+20 million</u>
	Total	+87 million*
USDA	Baca Ranch	+61 million

Details of \$152 million in additions for livability-related state and local Lands Legacy money :

Some of these programs would require an authorization to receive funding specifically from the LWCF, but all of them are authorized to get appropriations on their own.

- An increase of \$100 million in DOI state grants for open space management divided equally between formula and discretionary distribution; acquisitions and smart growth planning will both be eligible for the discretionary distribution, but discretionary acquisitions will focus on Northern Forests (\$120 million total).
- An increase of \$24 million to preserve greenspace habitat through DOI's Cooperative Endangered Species Conservation Fund (total \$40 million).
- An increase of \$20 million for USDA's Forest Legacy to protect forestland through easements, also focusing on Northern Forests (total of \$30 million).
- An increase of \$8 million for USDA's Urban and Community Forestry, targeted to open space development (total of \$40 million).

In addition to these programs that aid communities through financial assistance, an increase of \$10 million is proposed for the Community/ Federal Information Partnership (grouped with Clean Water in Table 2), which provides data, mapping, and other planning services to communities on water and other natural resources, helping them improve livability through smart growth planning (total of \$12 million).

			By Agency					
10/7/99		99ENACT	00propose	00H	00S	00A	00need	Add to 00A
NOAA								
Salmon	Fund/CJS	0	160	0	110	60	110	50
	ESA/CJS	28	56	28	40	31	56	25
LandsLeg	CJS	78	183	78	123	95	145	50
Subtotal								125
INTERIOR								
LandsLeg	Fed/Int	211	295	159	162	167	263	87
	S&L/Int	14	284	49	43	38	161	123
Livability	CFIP/Int	2	14	2	2	2	12	10
Cleanwater	stream/Int	278	306			287	302	15
Subtotal								235
USDA								
LandsLeg	Fed/Int	118	118	1	36	40	101	61
	S&L/Int	38	100	39	45	41	70	29
Climate	FS/Int	0	6	0	0	0	5	5
CWAP	FS/Int	281	359	305	276	289	314	25
NWforests	USFS/Int					0	50	50
Subtotal								170
DOE								
Climate	Eff/Int	553	686	570	557	562	567	95
Subtotal								95
TREASURY								
GEF	For.Ops.	168	143	50	25	36	71	35
TOTAL	Environment							665
Headings								
	99ENACT = FY 1999 actual							
	00propose = Administration budget proposal							
	00H = House level for FY 2000							
	00S = Senate level for FY 2000							
	00A = Average of House and Senate or final conference							
	00need = Administration bottomline							
	Add to 00A = amount to add to average to reach bottomline							

			By Administration Initiative						
10/7/99		99ENACT	00propose	00H	00S	00A	00need	Add to 00A	
SALMON									
C-J-S	Noaa/Fund	0	160	0	110	60	110	50	
	Noaa/ESA	28	56	28	40	31	56	25	
Subtotal								75	
LANDSLEG									
C-J-S	NOAA	78	183	78	123	95	145	50	
Interior	DOI/Fed	211	295	159	162	167	263	87	
	USDA/Fed	118	118	1	36	40	101	61	
	DOI/S&L	14	284	49	43	38	161	123	
	USDA/S&L	38	100	39	45	41	70	29	
Subtotal		459	980			381		350	
CLIMATE									
Interior	DOE/Int	553	686	570	557	562	657	95	
	USDA/FS	0	6	0	0	0	5	5	
For.Ops.	GEF	168	143	50	25	36	71	35	
Subtotal								135	
NORTHWEST FOREST PLAN									
Interior	USDA/FS					0	50	50	
CLEAN WATER									
Interior	USFS/cwap	281	359	305	276	289	314	25	
	DOI/steams	278	306			287	302	15	
CJS	Noaa/cwap	17	22	15	14	13	18	5	
Subtotal								45	
LIVABILITY									
Interior	DOI/CFIP	2	14	2	2	2	12	10	
TOTAL	Environment							665	
Headings									
	99ENACT = FY 1999 actual								
	00propose = Administration budget proposal								
	00H = House level for FY 2000								
	00S = Senate level for FY 2000								
	00A = Average of House and Senate or final conference								
	00need = Administration bottomline								
	Add to 00A = amount to add to average to reach bottomline								

		By Appropriations Bill						
10/7/99		99ENACT	00propose	00H	00S	00A/C	00need	Add to 00A
C-J-S								
Salmon	Noaa/Fund	0	160	0	110	60	110	50
	Noaa/ESA	28	56	28	40	31	56	25
LandsLeg	NOAA	78	183	78	123	95	145	50
Cleanwater	Noaa/cwap	17	22	15	14	13	18	5
Subtotal								130
INTERIOR								
LandsLeg	DOI/Fed	211	295	159	162	167	263	87
	USDA/Fed	118	118	1	36	40	101	61
	DOI/S&L	14	284	49	43	38	161	123
	USDA/S&L	38	100	39	45	41	70	29
Climate	DOE/Int	553	686	570	557	562	657	95
	USDA/FS	0	6	0	0	0	5	5
Cleanwater	USFS/cwap	281	359	308	276	289	314	25
	DOI/streams	278	306			287	302	15
Livability	DOI/CFIP	2	14	2	2	2	12	10
NWForest	USDA/FS					0	50	50
Subtotal								500
FOREIGN OPS								
	GEF	168	143	50	25	36	71	35
TOTAL	Environment							665
KEY:								
Headings								
	99ENACT = FY 1999 actual							
	00propose = Administration budget proposal							
	00H = House level for FY 2000							
	00S = Senate level for FY 2000							
	00A = Average of House and Senate or final conference							
	00need = Administration bottomline							
	Add to 00A = amount to add to average to reach bottomline							



Wesley P. Warren
10/21/99 08:36:08 PM

Record Type: Record

To: Roger S. Ballentine/WHO/EOP@EOP

cc:

Subject: Re: Climate 

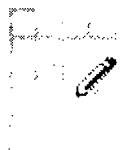


Per o budoverall.doc budconnum8c.x budconnum8b.x budconnum8.x ur conversation, my latest internal tables and background memo. The tables are organized by agency, appropriations bill, and initiative.

If we had to reduce Lands Legacy, I have identified the following cushions:

Baca	-\$ 5 M (other contributions)
Catellus	-\$15 M (break into two years)
Grand Staircase	-\$20 M (new deal, put into FY 2001 submission)
Civil War battlefields	-\$12 M (too bad)
Endangered Species Fund	-\$ 8 M (DOI said they could live with \$32 M)

more Baca



Julie M. Anderson
07/30/99 03:23:30 PM

Record Type: Record

To: Roger S. Ballentine/WHO/EOP@EOP, John D. Gibson/WHCCTF/EOP@EOP, Jefferson B. Seabright/WHCCTF/EOP@EOP, Rosina M. Bierbaum/OSTP/EOP@EOP

cc:

Subject: Status of CCTI numbers

Here is a list of how we are currently doing on ccti for doe and epa (I haven't done all the others yet). I am fairly confident on these, but I am double checking with doe.

1. Energy and Water – Total CCTI

<u>FY99</u>	<u>FY2000</u>	<u>House</u>	<u>Senate</u>
\$350M	\$437	\$347M	\$339M

Renewables Portfolio

<u>FY99</u>	<u>FY2000</u>	<u>House</u>	<u>Senate</u>
\$336M	\$399M	\$309M	\$301M

Science

<u>FY99</u>	<u>FY2000</u>	<u>House</u>	<u>Senate</u>
\$14M	\$33M	\$33M	\$33M

Nuclear

<u>FY99</u>	<u>FY2000</u>	<u>House</u>	<u>Senate</u>
\$0	\$5M	\$5M	\$5M

2. Interior – Total CCTI

<u>FY99</u>	<u>FY2000</u>	<u>House</u>	<u>Senate</u>
\$552M	\$687M	\$557M	\$570M

Energy Efficiency Portfolio

<u>FY99</u>	<u>FY2000</u>	<u>House</u>	<u>Senate</u>
-------------	---------------	--------------	---------------

\$526M	\$647M	\$517M	\$531M
--------	--------	--------	--------

Fossil

<u>FY99</u>	<u>FY2000</u>	<u>House</u>	<u>Senate</u>
\$24M	\$37M	\$37M	\$36M

EIA

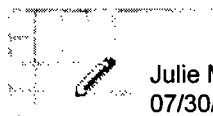
<u>FY99</u>	<u>FY2000</u>	<u>House</u>	<u>Senate</u>
\$3M	\$3M	\$3M	\$3M

3. VA-HUD - EPA Total CCTI

<u>FY99</u>	<u>FY2000</u>	<u>House</u>	<u>Senate</u>
\$109M	\$216M	\$105M	N/A

Clean Air Partnership Fund

<u>FY99</u>	<u>FY2000</u>	<u>House</u>	<u>Senate</u>
N/A	\$200M	\$41M	N/A



Julie M. Anderson
07/30/99 03:25:48 PM

Record Type: Record

To: Roger S. Ballentine/WHO/EOP@EOP, Angela C. Mizeur/WHO/EOP@EOP

cc:

Subject: numbers for ccti

The numbers I gave you for the weekly are a little confused. The renewables number is 309 in the house and 301 in the senate. (i had given you 309 and 306, but I think the 306 includes the 5M for nuclear). We apparently have gotten the \$5M for nuclear in both bills this year.

THE WHITE HOUSE AT WORK

Friday, June 25, 1999

PRESIDENT CLINTON CALLS FOR BIPARTISAN SEASON OF PROGRESS ON KEY DOMESTIC CHALLENGES FACING THE NATION

President Clinton addresses Presidential Scholars at Georgetown University today to call for a bipartisan "season of progress" on the key domestic challenges facing the nation. In his first public event since his trip to Europe following the end of the US/NATO air campaign, the President will express his determination to get the people's work done by joining with Congress and, when necessary, by Executive action.

Progress On Issues Where Bipartisan Consensus Already Exists:

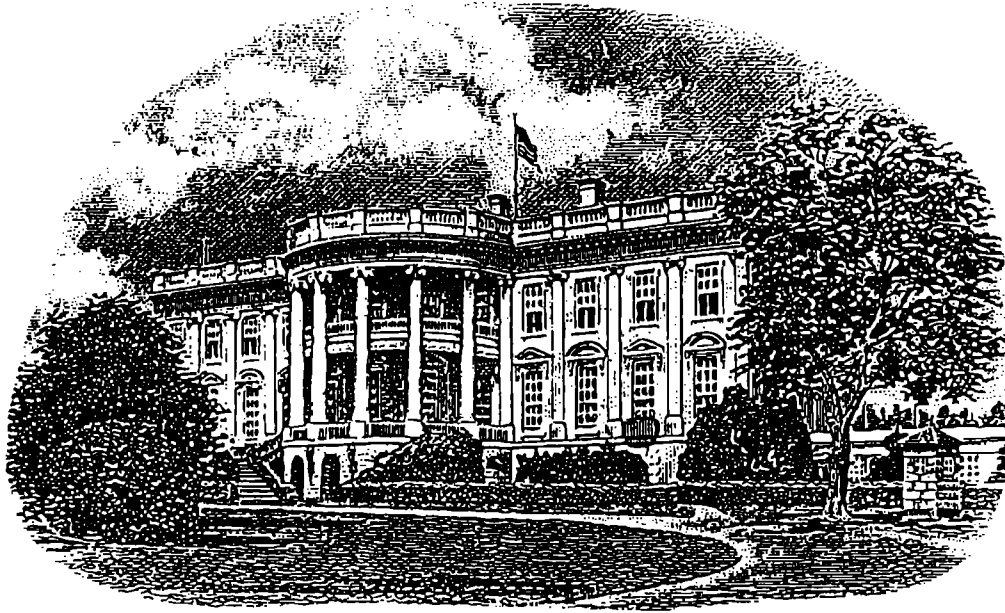
- Protect Health Insurance For Disabled Americans Who Want To Rejoin The Workforce
- Pass A Strong, Enforceable Patients' Bill of Rights For Millions Of Americans In HMOs.
- Raise The Minimum Wage To Make Work Pay And Strengthen Families.
- Provide Americans With Targeted Tax Cuts For Retirement, Child Care and Long-Term Care.
- Pass Strong Campaign Finance Reform To Renew Our Elections.

Progress On Fundamental Challenges Facing Our Nation:

- Pass A Budget That Maintains Fiscal Discipline And Makes Key Investments In The American People While Strengthening Social Security And Medicare
- Enact A Credible, Comprehensive Plan To Strengthen And Modernize Medicare, Including The Creation Of A New Prescription Drug Benefit.
- Maintain Commitment To Hiring 100,000 New Teachers To Reduce Class Size -- And Pass The President's Plan To Increase Accountability For States And School Districts.
- Enact The President's "New Markets" Tax Credits To Bring Economic Opportunity To Underserved Rural and Urban Communities.
- Protect Our Children From Gun Violence By Enacting The Moderate, Common Sense Gun Measures Passed By The Senate.

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*EXECUTIVE OFFICE OF THE PRESIDENT**Office of Management and Budget**Natural Resources, Energy and Science*

Number of pages (including cover sheet): _____

Date: 6/30

To: Roger Ballentine

Phone: _____ *Fax:* 66468

From: **Elgie Holstein / David Bernell**

Comments: _____

4:15 pm
6/30

The Honorable C. W. Bill Young
Chairman
Committee on Appropriations
U.S. House of Representatives
Washington, D.C. 20515

Dear Mr. Chairman:

The purpose of this letter is to provide the Administration's views on the Interior and Related Agencies Appropriation Bill, FY 2000, as reported by the House Subcommittee. As the Committee develops its version of the bill, your consideration of the Administration's views would be appreciated. These views are necessarily preliminary because they are based on incomplete information, since the Administration has not had the opportunity to review the draft bill and report language.

The allocation of ^{grossly} discretionary resources available to the House under the Congressional Budget Resolution is simply inadequate to make the necessary investments that our citizens need and expect. The President's FY 2000 Budget proposes levels of discretionary spending that meet such needs while conforming to the Bipartisan Budget Agreement by making savings proposals in mandatory and other programs available to help finance this spending. Congress has approved, and the President has signed into law, nearly \$29 billion of such offsets in appropriations legislation since 1995. The Administration urges the Congress to consider such proposals and reduce unrequested funding for programs and projects in this bill.

The Administration appreciates efforts by the Subcommittee to accommodate certain of the President's priorities within the 302(b) allocations. We also appreciate the Subcommittee's efforts to avoid extraneous, objectionable provisions, including those adversely affecting the environment and natural resources that would likely be rejected by the Congress, if considered on their own merits. We urge the Committee to keep the bill free of extraneous provisions, including any amendments that might restrict the actions of agencies under existing authorities to cut costs and reduce harmful emissions by implementing the President's recent executive order promoting energy efficiency.

X

It is our understanding, however, that the bill makes major reductions to critical requests like the President's Lands Legacy Initiative. We urge you to address the following issues:

From CEQ:
say
'Forest
Legacy'

Lands Legacy Initiative/Land and Water Conservation Fund (LWCF). The Administration strongly opposes the Subcommittee's decision not to fund major portions of the President's Lands Legacy Initiative. We understand that the bill would make significant cuts in key requests, such as the Cooperative Endangered Species Conservation Fund and the State and Private Forestry grant program. We also understand that the bill would provide no funds for State land acquisition, open space planning, and urban park grants, and would greatly reduce funding for land acquisitions in national parks, refuges, forests, and other public lands. In addition, we believe it is premature and inappropriate to eliminate the funding that the Congress previously approved to initiate acquisition of the majestic Baca Ranch in New Mexico. It would be short-sighted to gut the important Lands Legacy Initiative, given the growing bipartisan recognition of the need for the Federal government, the States and the private sector to protect open spaces and preserve America's great places. ✓

Land Management Operations. The Administration commends the Subcommittee actions to address the operational and maintenance needs of land management agencies in Interior and USDA. We appreciate the funding increases provided for Abandoned Mine Lands reclamation, as part of the Clean Water Action Plan. The Administration is concerned, however, with possible cuts in key conservation programs. We understand, for example, that the bill would reduce requests for the Fish and Wildlife Service endangered species program and the Forest Service wildlife management, ecosystem planning, research, and Forest Legacy programs. Moreover, the bill increases funds for timber sales management by \$23 million, or 12 percent, above the Administration's request. We urge the Committee to reduce these unrequested funds and adopt the Administration's timber sale user fee and offset proposals to fund the higher priority programs.

Environmental and Other Legislative Riders. The Administration commends the Subcommittee for its restraint in limiting the number of legislative riders in the bill. Such riders rarely receive the level of congressional and public review required of authorization language, and they often override existing environmental and natural resource protections or tribal sovereignty, and impose unjustified, micro-management restrictions on agency activities. We understand, however, that the bill includes a provision on certain aspects of Everglades restoration that we believe would be premature to address in an appropriations bill. Although we appreciate and share the Subcommittee's commitment to ensuring adequate fresh water supplies for the Everglades, [these issues should be considered as part of the authorization of the comprehensive plan for restoring the Everglades.] ✓

Millennium Initiative to Save America's Treasures. The Administration strongly objects to the lack of funding for this \$30 million Presidential initiative to commemorate the Millennium by preserving the Nation's historic sites and cultural artifacts that are America's treasures.

these issues are addressed in the comprehensive restudy for restoration. These issues will be considered as part of that plan in WRDA 2000.

From CEQ - Rick says this will not work. The

Guam Assistance. The Administration opposes the Subcommittee's decision not to provide additional covenant grant funding to Guam. The requested funding increase is needed to address the economic and social costs to Guam from high levels of immigration from Micronesia.

National Endowment for the Arts/National Endowment for the Humanities/Institute for Library and Museum Services. The Administration strongly objects to the proposed funding levels for the National Endowment for the Arts and National Endowment for the Humanities. The Subcommittee's proposed \$52 million, or 35 percent, reduction from the request would preclude NEA from moving forward with its Challenge America initiative which emphasizes arts education and access to under-served communities across America. The \$39 million, or 26 percent, reduction from the request would preclude NEH from expanding its summer seminar series to provide professional development opportunities to our nation's teachers as well as broadening the outreach of its humanities programs. The Administration urges the Committee to approve funding for the Endowments at the requested levels. The nearly \$10 million, or 29 percent, reduction from the request would preclude IMLS from moving forward on the digital library for education, expansion of after-school programs in museums, and Museums On-line to improve museum access to communities and schools. The Administration urges the Committee to approve funding for the Endowments and IMLS' Office of Museum Services at the requested levels.

Bureau of Indian Affairs (BIA) and Office of Special Trustee for American Indians (OST). The Administration commends the Subcommittee action to fully fund the request for Indian trust management improvements. The funding increase proposed by the President and endorsed by the Subcommittee provides the resources that are essential to enable the Department of the Interior to continue making progress in this multi-faceted reform effort. The Administration, however, opposes the Subcommittee decisions not to fund the \$30 million BIA School Construction Bonding Initiative for much-needed replacement or repairs of BIA-funded elementary and secondary schools, and to fund only partially two of the remaining schools on the priority list. As a Nation, we are making great strides in building a bipartisan consensus to ensure that all of our children receive the educational preparation needed to be productive citizens in the twenty-first century. The Federal government is responsible for delivering on that promise across America's Indian reservations. We must not fail in carrying out that responsibility.

Indian Health Service (IHS) -- Department of Health and Human Services. The Administration appreciates the Committee's support of the increase in funding for Indian health, which is only slightly below the \$170 million increase the Administration sought for IHS. As we learn more details of the House bill, we look forward to working with the Committee to make sure that the Administration's top priorities for IHS are properly addressed.

Department of Energy. Based on the information we have received, it appears that the Subcommittee mark for Department of Energy programs is \$144 million below the Administration's request. This reduction will seriously hamper the progress that is being made in the Partnership for a New Generation of Vehicles (PNGV) to push the commercialization of 80-mpg family sedans, and will prevent the Partnership for Advancing Technologies in Housing (PATH) from achieving dramatic savings in the energy operating costs in new homes.

Sincerely,

Jacob J. Lew
Director

Identical Letter Sent to The Honorable C. W. Bill Young,
The Honorable David R. Obey, The Honorable Ralph Regula,
and The Honorable Norm Dicks

The Honorable C. W. Bill Young
Chairman
Committee on Appropriations
U.S. House of Representatives
Washington, D.C. 20515

Dear Mr. Chairman:

Identical Letter Sent to The Honorable C. W. Bill Young,
The Honorable David R. Obey, The Honorable Ralph Regula,
and The Honorable Norm Dicks

The Honorable David R. Obey
Committee on Appropriations
U.S. House of Representatives
Washington, D.C. 20515

Dear Representative Obey:

The Honorable Ralph Regula
Chairman
Subcommittee on Interior and
Related Agencies Appropriations
Committee on Appropriations
U.S. House of Representatives
Washington, D.C. 20515

Dear Mr. Chairman:

The Honorable Norm Dicks
Subcommittee on Interior and
Related Agencies Appropriations
Committee on Appropriations
U.S. House of Representatives
Washington, D.C. 20515

Dear Representative Dicks:



The Secretary of Energy
Washington, DC 20585

June 28, 1999

The Honorable Ralph Regula
Chairman
Subcommittee on Interior and Related Agencies
Committee on Appropriations
U. S. House of Representatives
Washington, D.C. 20515

Dear Congressman Regula:

Last week, the Senate Committee on Appropriations adopted an amendment to the Interior Appropriations Bill that will severely restrict the Federal Government's ability to save taxpayer dollars by improving the energy efficiency of its buildings. I urge you to oppose any similar amendments to the House Interior Appropriations Bill.

The amendment--which prohibits any funds "to study, develop, or implement procedures or policies to establish energy efficiency, energy use, or energy acquisition rules or guidelines other than those based upon the provisions of the Energy Conservation Policy Act of 1975 could prohibit implementation of Executive Order 13123 and may jeopardize other policies related to energy efficiency. Executive Order 13123, like previous statutes and executive orders, simply extends common-sense energy efficiency policies established since 1975.

The Order calls for a 35 percent reduction in Federal building energy use per gross square foot by 2010 relative to 1985 levels. To assist agencies in meeting the new energy reduction goal, the Order directs agencies to maximize the use of:

- Energy Saving Performance Contracts and Utility Contracts, in which private companies make energy improvements on Federal facilities at their own expense and receive a portion of the resulting savings;
- Life-cycle cost analysis so agencies consider the long-term savings of energy investments; and,
- ENERGY STAR and other energy efficient products from light bulbs to boilers.

Energy efficiency policies established by statute and executive orders of Presidents Bush and Clinton have already led to a 17 percent reduction in energy use in Federal buildings. However, the Federal Government still spends \$8 billion each year on energy costs (\$4 billion on Federal building energy use) and the potential for additional cost-effective energy improvements and taxpayer savings is great.



Printed on recycled paper

By blocking implementation of Executive Order 13123, and preventing implementation of previous executive orders and other relevant statutes, the amendment could stand in the way of significant benefits to our Nation's taxpayers, our economy, and our environment. The new executive order alone will generate:

- \$750 million each year in taxpayer savings from energy improvements when fully implemented;
- Significant reductions in air pollution and a 30 percent reduction in greenhouse gas emissions—both of which result from energy improvements in Federal buildings; and
- Economic opportunities for the private sector, including energy service companies, utilities, and other energy providers, to finance and undertake billions of dollars worth of energy-saving and cost-saving improvements in Federal buildings.

Again, I urge you to exclude such an amendment from the House Interior Appropriations Bill, and I urge you to support full funding for the Department's energy efficiency programs, including Federal energy management efforts.

If you or your staff have any questions about Executive Order 13123 or other policies and legislation on Federal energy efficiency, please contact Mr. John C. Angell, Assistant Secretary for Congressional and Intergovernmental Affairs, at (202)586-5450. We certainly appreciate your efforts to ensure smart energy management in the Federal Government as well as in all sectors of our economy.

Yours sincerely,


Bill Richardson

cc. The Honorable Norm Dicks
Ranking
The Honorable Jim Kolbe
The Honorable Joe Skeen
The Honorable Charles D. Taylor
The Honorable George R. Nethercutt
The Honorable Zach Wamp
The Honorable Jack Kingston
The Honorable John Peterson

Question:

Does Executive Order 13123 violate any statutory constraints or exceed Presidential authority?

Answer:

We have found no statutory provisions that contravenes Executive Order 13123. Further, E.O. 13123 does not exceed any authority vested in the President.

Executive Orders may be issued pursuant to Article II of the United States Constitution. The goals proposed by the President in E.O. 13123 apply only to the Executive Branch, and the President is authorized by 3 U.S.C. Sec. 301 to delegate functions by designating and empowering the head of any department or agency in the Executive Branch. Further, there appear to be no statutory constraints which would bear upon the goals as contained in the Order.

Concur: Mark Schwartz
Deputy General Counsel
For Energy Policy (GC-70)
Department of Energy

MS
6/30/99

Recommended strategy. I'm not a lawyer, but I would base a defense of the E.O. on the following:

- The President has broad Constitutional authority to direct agencies to manage their operations in a responsible manner. He can set goals for financial management, environmental practices, purchasing, recycling, etc. (I'm sure there's a citation for that, but I don't know what it is.)
- The E.O. is **not** an implementation of the Kyoto Protocol. It has always been the policy of this Administration -- as it was of the Bush Administration -- to take prudent action to reduce greenhouse gas emissions in a cost-effective manner while continuing our scientific research to understand the true nature and extent of global climate change. This E.O. is about doing that by setting an example and focusing on win-win actions that simultaneously save taxpayer money and provide environmental benefits. The Kyoto treaty, on the other hand, is about establishing mandatory reduction goals on a national basis, which would probably require regulations and/or taxes. The E.O. does not implement any kind of national commitment.
- E.O. 13123 sets two primary goals for improving Federal energy management: saving taxpayer dollars and reducing emissions that contribute to air pollution and global climate change. It builds upon the Energy Policy Act of 1992 (EPAct) and previous Executive Orders, the most recent of which was E.O. 12902. Title I, Subtitle F of EPAct sets out a variety of energy efficiency goals for Federal agencies and a variety of methods of achieving those goals. E.O. 13123, like its predecessors, is grounded in those provisions.

The most significant goals set forth in EPAct are that the government should reduce its energy use per square foot in buildings by 20 percent by 2000, relative to a baseline of 1985, and that agencies should have installed all energy-efficiency measures that have a simple payback period of 10 years or less by 2005. E.O. 12902 extended the efficiency improvement-per-square-foot goal to 30 percent by 2005, and E.O. 13123 extends it further to 35 percent by 2010.

EPAct specifies actions in a number of areas to achieve its energy efficiency goals: management incentives, special energy-efficiency funds, energy-savings performance contracts (ESPCs), awards, renewable energy, facility audits, budget submissions, and reporting requirements. Virtually every specific action directed or recommended in E.O. 13123 fits in one of the categories established by EPAct. (Exceptions are concepts like competitive power purchases that were not available when EPAct was written.)

- The only really "new" goal -- new in kind, rather than an extension of a target -- is the goal to reduce greenhouse gas emissions by 30 percent relative to a 1990 baseline. Setting a goal for agency management is within the President's Constitutional prerogatives as mentioned in the first bullet. None the less, this goal also ties to various provisions of the Energy Policy Act of 1992 and is consistent with the apparent intent of

EPAct to address greenhouse gas emissions:

- There is a direct relation between energy savings in facilities and reductions in greenhouse gas emissions due to operation of those facilities. The greenhouse gas goal in E.O. 13123 was chosen to be a goal that we could reach if we reached our energy-efficiency goal.
- Section 152(h) of EPAct amends the National Energy Conservation Policy Act (NECPA) by inserting a section 549 that would create a Federal demonstration program for new technologies, and one of the selection criteria would be [549(b)(7)] "other environmental benefits, including the projected reduction of greenhouse gas emissions and indoor air pollution."
- Title XVI of EPAct is devoted to global climate change. That Title requires the Secretary of Energy to develop plans that would lead to "the stabilization and eventual reduction in the generation of greenhouse gases." [Sec. 1602(a)(2)] Sec. 1605 in the same Title directs the Energy Information Administration to collect voluntary reporting information on greenhouse gas emissions and reductions in such emissions. This title addresses national greenhouse gas emissions, not just Federal facilities, but it makes clear that greenhouse gas reductions are part of the overall intent and purpose of EPAct. In particular, establishing a goal for greenhouse gas emissions reduction is a logical implementation tool for voluntary reporting of Federal reductions in greenhouse gas emissions.



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Philip R. Sharp
Director, Institute of Politics
Harvard University

Facsimile Cover Sheet

To: *Todd Stern*

Organization: White House Special Projects

Phone: (202) 456-1648

Fax: (202) 456-2215

From: *David Nemtzw*

The Alliance To Save Energy

Phone: (202) 857-0666

Fax: (202) 331-9588

Date: June 3, 1999

**Pages including this
cover page: 2**

NOTES:

Alliance Press Release on President's
FEMP E.O. Please call Mark Hopkins or
me if you have any questions.



ALLIANCE TO
SAVE ENERGY
20 Years of Leadership

News Release

For Further Information

Rozanne Weissman (202) 530-2217 rweissman@ase.org
Shorge Sato (202) 530-2203 ssato@ase.org

For Immediate Release

Re: Cochran

Leading by Example on Climate Change...

Alliance to Save Energy Commends White House for Plugging Energy Leaks, Historic Climate Change Commitments

(Editor's note: This relates to an executive order that is being issued by the White House today)

Washington, DC, June 3, 1999 – “President Clinton has finally plugged some huge energy leaks while making a historic climate change commitment for the largest energy user in the world – the federal government,” said Alliance to Save Energy President David M. Nemtzow, strongly commending the White House for today’s executive order on Greening the Government through Energy-Efficient Management.

The White House is implementing most of the recommendations of the Alliance’s 50-member corporate task force of business executives and energy experts who examined federal energy use and waste for more than two years and issued a major November 1998 report, *Leading By Example: Improving Energy Productivity in Federal Government Facilities*. (<http://www.ase.org/media/newsrel/press.htm#leading>; executive summary at www.ase.org/femp.)

Government agencies will be required to increase efforts to achieve a 35 percent reduction in energy use by 2010, compared with 1985 levels. Agencies also will have to show that they’re on a path to cut greenhouse gas emissions to 30 percent below 1990 levels by 2010. This marks the first time that the government has set a specific greenhouse gas reduction target.

“The real test is in the coming year as Cabinet secretaries implement the President’s plan and are evaluated with score cards – will they come through with adequate plans and budgets and will Congress and the agencies follow the President’s lead?” added Nemtzow. “This is a major step forward in our efforts to address climate change and a substantial down payment on \$1 billion worth of potential taxpayer savings from lower utility bills.

“After all, if the federal government can make this work, anybody can.”

###

The Alliance to Save Energy is a coalition of prominent business, government, environmental, and consumer leaders who promote the efficient and clean use of energy worldwide to benefit consumers, the environment, economy, and national security.

To: Roger Ballentine/Julie Anderson 395-2342
456-6468

2 pages

COCHRAN AMENDMENT AIMS TO UNPLUG CLINTON'S EFFICIENCY DECLARATION

Sen. Thad Cochran last week succeeded in attaching an amendment to the FY-2000 Interior and related agencies appropriations bill aimed at blocking DOE from implementing a recent executive order by President Clinton requiring federal agencies to cut their energy use.

According to a spokeswoman, Cochran believes the order is a "back-door attempt" to implement the Kyoto climate change treaty. He is also concerned that the measure would benefit natural gas over electricity with its directive to measure energy use at the "source," which takes into account the loss of energy in generating and transmitting electricity, for example. The amendment, adopted by the Senate Appropriations Committee Thursday on a voice vote, states that "no funds shall be used to study, develop or implement procedures or policies to establish energy efficiency, energy use or energy acquisition rules or guidelines other than those based upon the provisions of the Energy Conservation Policy Act of 1975."

The premise of Cochran's amendment is that ECPA set a policy of measuring energy use from the "site," rather than the "source."

The June 3 executive order, which directs federal agencies to reduce energy use 30% by 2010 compared to 1990 levels, calls on the federal government to "strive to reduce total energy use and associated greenhouse gas and other emissions, as measured at the source. To that end, agencies shall undertake life-cycle cost-effective projects in which source energy decreases, even if site energy use increases" (IE/FL, 7 June, 1).

In a speech at Georgetown University Friday, President Clinton cited the amendment as an example of how "the atmosphere in Washington has become increasingly poisoned by bitter partisanship."

Clinton called the executive order "a no-brainer," that costs the government nothing and has no losers except "the people that won't be pumping electricity to us." "Unbelievably enough," he said, "just yesterday a Senate committee voted to largely block my executive action ... that would save you \$750 million a year."

"It's an example of what happens when adults with responsibility fall into small-time rankling and even want to stop things that are 100% good and not controversial," Clinton said.

The amendment was also decried by energy efficiency advocates. Describing the executive order as "a war on waste," David Nemtsov, president of the Alliance to Save Energy, said "the federal government is wasting \$1 billion a year in its buildings. Senator Cochran is disabling the Air Force by gutting the executive order. And that's crazy."

Michael Marvin, who heads the Federal Performance Contracting Coalition, a group of companies that have won contracts to improve efficiency in federal buildings, said "what we're looking at is saving energy and taxpayer dollars. That has got to be considered a priority over partisan issues."

Sen. Jeff Bingaman, D-N.M., is expected to attempt to strike the Cochran provision when the Interior bill comes to the Senate floor.

The Appropriations panel also adopted two amendments by Sens. Robert Byrd, D-W.Va., and Larry Craig, R-Idaho. According to Craig, one would add report language requiring DOE, the Commerce Dept. and the Environmental Protection Agency to report "on a timely basis" on their expenditures related to the Kyoto climate change treaty.

The second would require the department to work with the Idaho National Engineering and Environmental Laboratory on its Industries of the Future program with the mining industry, an aide to Craig said.

According to a committee aide, the bill includes \$367 million for fossil energy, slightly higher than the \$364 million the Clinton administration requested for those programs, but \$17 million less than they received in FY-99.

Energy conservation R&D, meanwhile, would be funded at \$658 million in the bill, the aide said, \$180 million less than the administration sought and \$34 million less than this year's level, not counting the use of prior year balances as offsets.

It was unclear at press time whether the Interior bill would come up on the Senate floor this week, but committee aides said it was unlikely. House appropriators, meanwhile, last week dispelled widespread rumors that the House Interior subcommittee will not move its bill anytime soon, by announcing that a markup has been scheduled for Tuesday (June 29). The full Appropriations Committee is scheduled to take up the Interior bill Friday (July 2).

The House energy and water subcommittee is expected to mark up its bill July 15. — Lira Behrens

RICHARDSON AIRS NEW PROGRAM FOR INCREASED RELIANCE ON WIND ENERGY

DOE last week launched a new initiative aimed at boosting the use of wind energy to the point where it supplies 5% of the nation's electricity needs by 2020. In the interim, the department wants to see 5,000 megawatts of wind energy installed by 2005 and more than 10,000 megawatts on-line by 2010.

"Wind energy has been the fastest growing source of energy in the world during the past decade and now represents a major economic opportunity for the United States," Richardson said Monday in announcing the initiative, Wind Powering America, at a conference in Burlington, Vt.

In a related matter, the secretary announced that DOE would provide nearly \$1.2 million in DOE grants to design, test and install small wind turbines in 10 states.

Among the other goals of the initiative are to double the number of states that have more than 20 megawatts of wind capacity to 16 by 2005 and triple the number to 24 by 2010. The department also proposes to increase the federal government's use of wind-generated electricity to 5% by 2010.

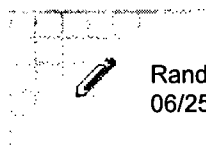
The agency said it would achieve those goals "by building on current and future public and private sector efforts to support the development of wind power." It does not commit the federal government, however, to a specific level of funding.

Specific actions the plan says the government will take include having the Federal Energy Management Program implement programs to help federal agencies identify their most cost-effective opportunities for wind. The plan also talks about launching an educational effort to build awareness of wind's benefits, and developing information on federal policies such as a production tax credit that could help "provide a supportive investment environment."

Separately, DOE's Bonneville Power Administration announced Tuesday it would purchase 1.8 megawatts of energy produced by three wind power turbines at the Foote Creek Wind Energy Project near Arlington, Wyo. According to BPA, the purchase is enough to power 700 homes.

"The Northwest is fortunate to have an abundant source of clean, renewable power coming from our rivers. In addition, we need to invest in new technologies such as wind power to keep our world clean and green," BPA Administrator Judi Johansen said in a statement.

DOE is accepting comments on the Wind Powering America draft action plan for "the next several months." Copies of the draft plan are available on the Internet at <http://www.eren.doe.gov/windpoweringamerica>.



Randolph J. Steer
06/25/99 04:21:53 PM

Record Type: Record

To: Roger S. Ballentine/WHO/EOP@EOP

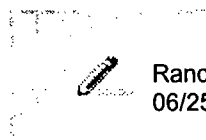
cc:

Subject: Fwd: Cochran Amendment

FYI, this is the take on the amendment I've given people in OMB, based on a conversation with DOE's GC office.

Randy.

----- Forwarded by Randolph J. Steer/OMB/EOP on 06/25/99 04:23 PM -----



Randolph J. Steer
06/25/99 11:13:53 AM

Record Type: Record

To: Charles E. Kieffer/OMB/EOP@EOP, Elwood Holstein/OMB/EOP@EOP, Joyce M. Wakefield/OMB/EOP@EOP

cc: Darlene B. Fleming/OMB/EOP@EOP, David A. Bernell/OMB/EOP@EOP, Ronald M. Cogswell/OMB/EOP@EOP

Subject: Cochran Amendment

What we know about the Cochran Amendment (based on my discussions with DOE's General Counsel's office):

1. The amendment cites the "Energy Conservation Policy Act (ECPA) of 1975." **There is no bill by that name or date.** Most probably he means the Energy Policy and Conservation Act (EPCA), which was enacted in 1975. But he **might** mean the law known as ECPA -- the Energy Conservation and Production Act, which was passed in 1976.
2. In either event, there were a number of energy laws passed by Congress in the two and a half decades since then that would all be substantially over-ruled by this amendment.

For instance, if Cochran's intention was to cite EPCA, then DOE would be prohibited from complying with **all** the Federal energy efficiency requirements of EPCA (Energy Policy Act of 1992) and the building standards that were set by ECPA in 1976 and amended by EPCA.

The net result is that the amendment throws out a large portion of the energy policies established by Congress over the past 24 years.

Randy.

10: Roger Ballentine 456-6468 2 pages

MEMORANDUM

DRAFT

TO:

FROM: Roger Ballantine

DATE: June 25, 1999

RE: Senator Cochran's Amendment on Federal Energy Use

Yesterday, the Senate Committee on Appropriations, agreed to include an amendment to the Interior Appropriations bill that will severely restrict the Federal government's ability to improve the energy efficiency of its buildings and thereby save taxpayer dollars. If the amendment is passed, the Federal government will be prevented from leveraging private sector investments to pay for energy improvements that will save taxpayers over \$750 million each year by 2010.

The amendment, as proposed by Senator Cochran, prohibits any funds "to study, develop, or implement procedures or policies to establish energy efficiency, energy use, or energy acquisition rules or guidelines other than those based upon the provisions of the Energy Conservation Policy Act of 1975." According to informal Committee reports, the language may have been amended to hold in effect all existing relevant statutes.

Depending on the amendment's final language, a number of important policies and goals that drive Federal agencies to greater energy efficiency and cost savings will be overturned. For example, the by the National Energy Conservation Policy established an energy reduction goal of 10 percent by 1995 relative to 1985 usage. Then, the Energy Policy Act of 1992 established a goal of 20 percent reduction in energy use by 2000. Subsequently, Executive Order 12902 established a goal of 30 percent reduction by 2005. Therefore, Federal agencies are already working toward these goals to reduce the energy use and save taxpayer dollars.

New Executive Order 13123

The new executive order calls for a 35 percent reduction by 2010. This order, like E.O. 12902 and the Energy Policy Act, is simply extending the good-sense policies established initially by the National Energy Conservation Policy Act to reduce Federal energy costs in buildings.

The Order requires Federal agencies to achieve by 2010:

- 35% greater energy efficiency in buildings relative to 1985 levels; and,
- 30% cut in greenhouse gas emissions from building-related energy use relative to 1990.

The Order directs agencies to maximize the use of:

- Energy Saving Performance Contracts and Utility Contracts, in which private companies make energy improvements on Federal facilities at their own expense and receive a portion of the resulting savings;
- Life-cycle cost analysis, so agencies see the long-term savings from energy investments;

- 2084416

- ENERGY STAR & other energy efficient products, everything from light bulbs to boilers; and,
- Renewable energy technologies and sources (solar, wind, geothermal, and biomass).

Since 1985, the Federal government has already reduced energy use in buildings by 17 percent; therefore, it is on course to meet the 2000 goal of 20 percent reduction. However, the Federal government still spends \$4 billion each year on energy costs in its buildings and the potential for greater energy improvements is great.

The new order calls for the Federal government to work with the private sector, including energy service companies and utilities, to leverage private investment to pay for energy improvements in Federal buildings. By investing this private financing in energy efficiency and implementing smart energy management strategies, the Federal government can save taxpayers over \$750 million each year by 2010. However, if these new goals are enforced and supported by Federal agencies and minimal Federal investment, many Federal agencies will continue to overlook opportunities for reducing energy waste, reducing associated pollution, and saving taxpayer dollars.

**Amendment Offered
by
Senator Thad Cochran**

No funds shall be used to study, develop, or implement procedures or policies to establish energy efficiency, energy use or energy acquisition rules or guidelines other than those based upon the provisions of the Energy Conservation Policy Act (ECPA) of 1975.

*Dan Heider
S86 9260*

Some apparently don't want us to move this country forward into the 21st Century. Just a few weeks ago, I signed an Executive Order that will reduce the federal government's emissions of greenhouse gases by 30% over the next ten years and that would increase the government's energy efficiency by 35%. These measures would save American taxpayers over \$750 million a year.

Yesterday, the Senate Appropriations Committee adopted an amendment that would ~~largely~~ ^{fully} prevent us from implementing that order. It seems that every time we try to move the country forward, special interests in Washington and their allies on Capitol Hill are fighting to hold us back. We have got to break this cycle and move forward.

62505
TO: Josh
Fr: Ballentine

BYRD / CRAIG

Insert on page 7 of the report, at the end of Climate Change:

"The Byrd-Hagel resolution passed in 1997 (S. Res. 98) remains the clearest statement of the will of the Senate with regard to the Kyoto protocol, and the Committee is committed to ensuring that the administration not implement the Kyoto protocol without congressional consent. The Committee recognizes, however, that there are also longstanding energy research programs which have goals and objectives that, if met, could have positive effects on energy use and the environment. The Committee does not intend to preclude these programs from proceeding, provided they have been funded and approved by Congress.

"To the extent future funding requests may be submitted which would increase funding for climate change activities prior to Senate consideration of the Kyoto protocol (whether under the auspices of the climate change technology initiative or any other initiative), the administration must do a better job of explaining the components of the programs, their anticipated goals and objectives, the justification for any funding increases, a discussion of how success will be measured, and a clear definition of how these programs are justified by goals and objectives independent of implementation of the Kyoto protocol. ~~[The Committee expects these items to be included as part of the fiscal year 2000 budget submission for all affected agencies.]~~

"Last year, the Committee directed all affected agencies to include these items in the Administration's fiscal year 2000 budget submission. The Committee is concerned that the Department of Energy and other affected agencies were tardy in doing so. The Committee takes cognizance of a joint hearing on agency accountability, conducted on May 20, 1999, by subcommittees of the Senate Committee on Energy and Natural Resources and the House Committee on Government Reform. In fact, three agencies did not submit reports until April 9 or later, and the Department of Energy submitted its report one day before this hearing. According to the General Accounting Office, both the timing and the content of these submissions made it more difficult for Congress to assess Administration proposals. The Committee reiterates its directive that all affected agencies submit these items to the Committee as part of all future budget submissions."

the May 20

#

Climate Change Initiative

On the heels of the announcement that 1998 surpassed 1997 as the warmest year on record, the President's FY00 budget will propose a package of investments and tax cuts to help address global climate change. It includes ~~start-up~~ start-up funding for a new Clean Air Partnership Fund (discussed [below]) and tax incentives to promote the purchase of ~~energy-efficient~~ energy-efficient cars, homes, and appliances, spurring the swift movement of innovative technologies into the market. Proposed increases in Federal spending would help foster a new generation of clean, ~~efficient energy sources (such as biomass) and~~ energy-efficient technologies for cars and homes; and renewable energy, as well as support research to identify and quantify carbon ~~sources and~~ sinks for in forests and farmlands and to develop soil carbon inventories. This package complements the other elements of the Administration's climate change plan, which include working ~~with industry to develop sector by sector initiatives to~~ cut greenhouse gas emissions, strengthening efforts to incorporate energy efficiency goals into Federal procurement and energy use, working with Congress to reward companies taking early, voluntary action to reduce their emissions, and restructuring the electricity industry. In addition, the Administration will continue its vigorous diplomatic efforts to encourage meaningful participation cooperatively with industry sectors on the part of developing country in efforts to address global warming initiatives to cut greenhouse gas emissions, strengthening efforts to incorporate energy efficiency goals into Federal procurement and energy use, working with Congress to reward companies taking early, voluntary action to reduce their emissions, and restructuring the electricity industry. In addition, the Administration will continue its vigorous diplomatic efforts to fill in key details of the Kyoto Protocol in areas such as international emissions trading, as well as to encourage the meaningful participation of developing countries in efforts to address global warming.

Climate Change Technology Initiative Funding

12/21/98 15:11

	FY98 App	FY 1999		Feb Plan	FY 2000		Appeal	Settle
		Request	Omnibus		Request	Passback		
Energy & Water Appropriation	272	409	350	426	415	421	421	421
Energy Supply Account *	272	382	336	393	388	388	388	388
Solar & Renewable Energy	272	372	336	383	383	383	383	383
Nuclear Energy	0	10	0	10	5	5	5	5
Outlays	272	316	295					
Science Account	0	27	14	33	27	33	33	33
Energy Research	0	27	14	33	27	33	33	33
Outlays	0	16	8					
Interior Appropriation	457	650	552	661	622	648	648	658
Energy Conservation R&D	457	617	526	625	602	612	612	618
Non-CCTI (tracking only):								191
(State Grants -- non-add)	155	191	166	138	161	166	166	176
(Energy Conservation Total)	612	809	692	763	763	778	778	794
(PODRA / transfers -- non-add)	-21	-35	-64	-25	-25	-25	-25	-25
(Energy Conservation Net)	591	774	628	738	738	753	753	769
Fossil Energy R&D Account	0	30	24	33	21	33	33	37
Energy Information Administr	0	3	3	3	0	3	3	3
Undistributed *								0
DOE CCTI TOTAL	729	1,059	902	1,087	1,037	1,069	1,069	1,079
EPA	90	205	109	216	205	216	216	216
HUD	0	10	10	0	10	0	10	10
USDA	0	10	0	16	10	10	10	10
DOC	0	7	0	7	7	5	5	5
CCTI TOTAL	819	1,291	1,021	1,326	1,269	1,300	1,310	1,320
Increase over FY99		472	202	305	248	279	289	299
Relative to Previous Approp		58%	25%	30%	24%	27%	28%	29%
Relative to CCTI 5-Yr Plan			-21%	0%	-4%	-2%	-1%	0%

Initiative # refers to DOE's order	Comments	FY2000 Plus-Up	Cumulative Total	EE.	RE
1. Biogasification Initiative	Demonstration partnership of advanced gasification technologies with industry (IOF program)	\$ 7.0	\$ 7.0	7.0	
2. Energy Smart Schools	Training, technical assistance, demonstrations	\$ 4.0	\$11.0	11.0	
3. Integrated Bioenergy Initiative	Accelerate bioenergy R&D and develop integrated processes for power, fuels, chemicals, etc.	\$ 7.0 (+3) ¹	\$18.0	15.0?	3.0?
4. Early retirement for inefficient appliances	Consumer education campaign to retire electricity guzzling appliances	\$ 1.0	\$19.0	16.0	
11. Accelerated advanced vehicles	Emphasis on emissions control from compression ignition engines to meet EPA Tier II emission stds	\$ 5.0 (+5) ²	\$24.0	21.0	
10. Harnessing 1/3 of the sun	Emphasis on advanced materials and designs to double the efficiency of today's photovoltaic cells	\$ 7.0 (+3) ³	\$31.0		10.0
9. Wind powering America	Assistance to states to develop wind power; field verification; development of village-scale systems	\$ 5.0 (+5) ⁴	\$36.0		15.0
16. Expand Energy Star Program	Expand	\$ 3.0	\$39.0	24.0	
7. Accelerated Appliance Efficiency Standards	Accelerate development of standards for comm. furnaces, boilers, A/C, water heaters, etc.	\$ 2.0	\$41.0	26.0	
*Solar Buildings	R&D in materials and systems for low-cost thermal collectors in support of million solar roofs program.	\$ 2.0	\$43.0		17.0
5. Low-carbon tech. in aluminum production	R&D on advanced aluminum production cell to eliminate use of carbon anode, improve efficiency	\$ 5.0	\$48.0	31.0	
6. Accelerated Industries of the Future	R&D on advanced sensors, controls, processes, etc.	\$ 4.0	\$52.0	35.0	
Initiatives Continued					
*Buildings Integration	R&D in whole buildings design, materials, and systems integration for Residential/commercial	\$ 8.0	\$60.0	43.0	
*Solar thermal electric	R&D in advanced high temperature receivers, storage, low-cost reflectors, and systems integration	\$ 2.0	\$62.0		19.0
*Building equipment	Extend work in advanced lighting, refrigeration, low power electronics, electrochromics, cogen	\$ 5.0	\$67.0	48.0	
8. Advanced transmission conductor development	R&D on high strength, low loss T&D lines; should be heavily leveraged w private sector	\$ 3.0	\$70.0		22.0?
12. Accel. deployment of geothermal heat pumps	Reduced in size; need to demonstrate effectiveness of and returns to deployment programs	\$ 2.0	\$72.0		24.0
13. New Federal Energy Management Initiative	Expand Federal Energy management Initiative	\$ 2.0	\$74.0	50	
14. Community Partnerships for Integrated Demos of Eff. Tech	Demonstrations of integrated strategies for reducing energy use in communities	\$ 4.0	\$78.0	54	
17. Expanded Support for State Energy Program		\$4.0	\$82.0	58	
18. Support for low income weatherization		\$21.0	\$103.0	79	
19. DOE Federal Facilities Energy Management Initiative	FEMP for DOE facilities	\$4.0	\$107.0	83	
15. Accelerated Industries of the Future	No detail provided	\$10.0	\$117.0	93	

*Programs identified as high priority by PCAST but not listed in DOE initiative package.

¹ Increase of \$3M for R&D on thermochemical production of liquid fuels/chemicals, integrated with power.

² Increase of \$5M for R&D on fuel cell vehicles and system integration.

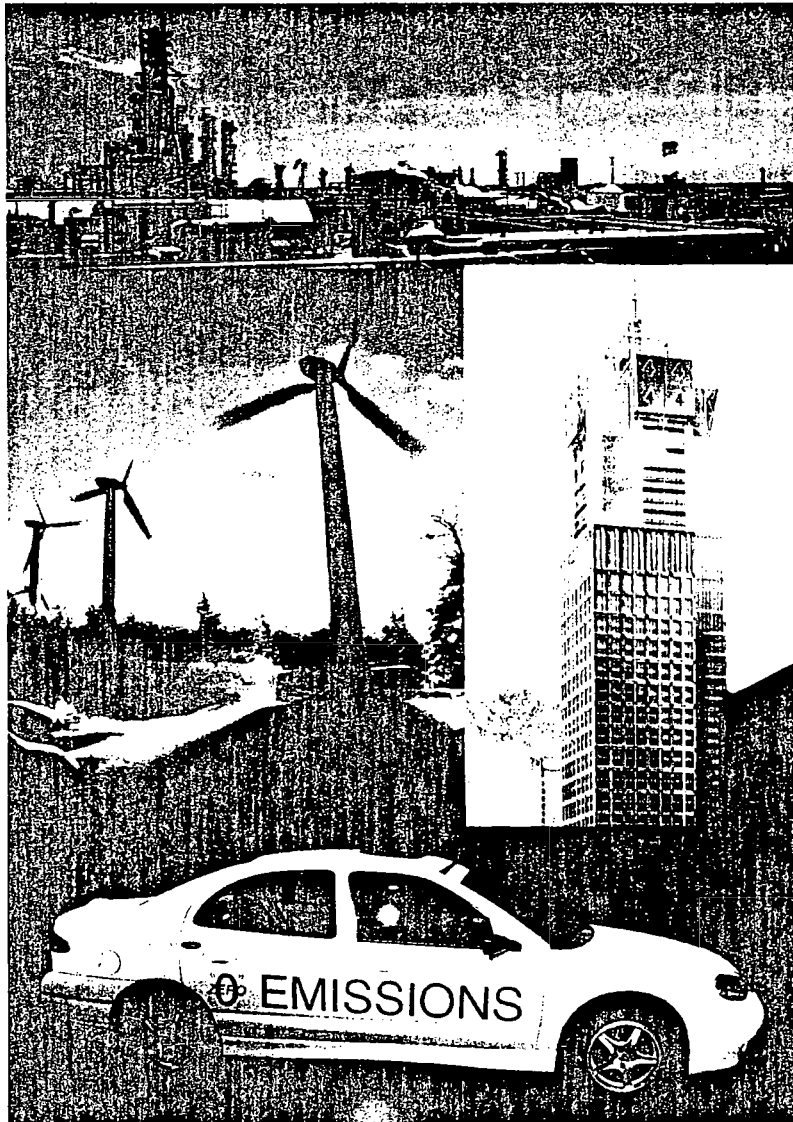
³ Increase of \$3M for R&D in production technology for thin film technologies to go from benchtop small area device to large area production module.

⁴ Increase of \$5M for R&D on advanced materials and for development of manufacturing technology.

not in DOE's

NOT in DOE's LIST

Science, Security and Energy: Powering the 21st Century



**The FY 2000 Budget
Request
Energy Efficiency and
Renewable Energy**

February 5, 1999

**Dan Reicher
Assistant Secretary**



Science, Security and Energy: Powering the 21st Century

FY 2000 Energy Efficiency and Renewable Energy Budget



Drivers

- Energy Security
- Air Emissions
- Climate Change
- Electricity Restructuring/Reliability
- Economic Competitiveness



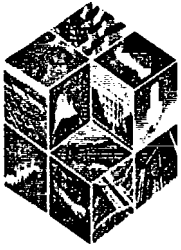
Science, Security and Energy: Powering the 21st Century

FY 2000 Energy Efficiency and Renewable Energy Budget



Accomplishments

- Buildings: Consumer savings totaling more than \$33 billion since 1978
- Industry: 114 energy saving technologies in market; saving \$2.1 billion since 1985
- Transportation: Fuel efficiency technologies and alternative fuel vehicles are currently saving 2 billion gallons of conventional fuel a year
- Power: Renewable energy costs down 80% since 1980. Over \$1 billion in annual U.S. renewable sales in 1998
- Federal: Reduced annual Federal energy costs more than \$800 million from 1985 levels. Established \$5 billion in energy savings performance contract authority



Science, Security and Energy: Powering the 21st Century

FY 2000 Energy Efficiency and Renewable Energy Budget



Goals

- Buildings: By 2010, enable a 50 % cut in new home energy use and 30% in new commercial buildings compared to 1996
- Industry: Cut energy use per unit of output 25% by 2010
- Transportation: 80 mpg prototype cars by 2004; 35% light truck fuel efficiency improvement by 2002
- Power: Triple non-hydro U. S renewable capacity to 25,000 MW by 2010
- Federal: By 2005, cut federal energy use by 30% from 1985 level and stimulate markets for efficiency & renewable technologies



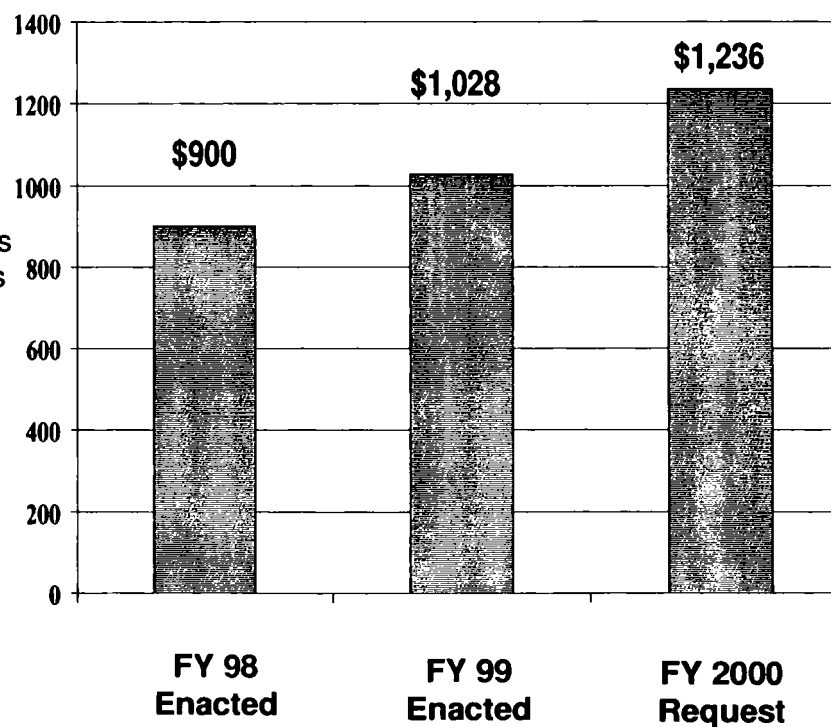
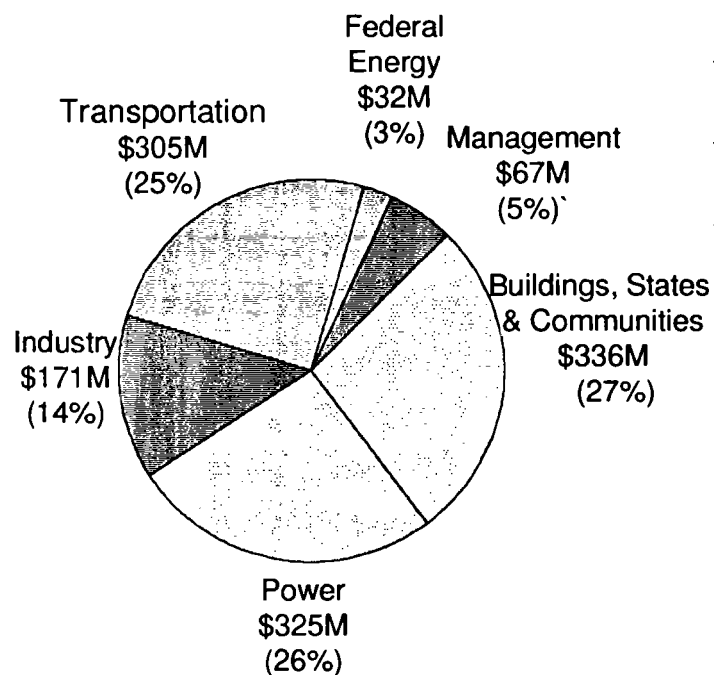
Science, Security and Energy: Powering the 21st Century

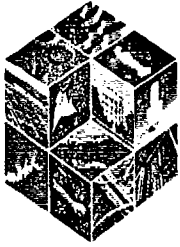
FY 2000 Energy Efficiency and Renewable Energy Budget



EERE Budget Request \$1.2 Billion

(millions of program dollars)



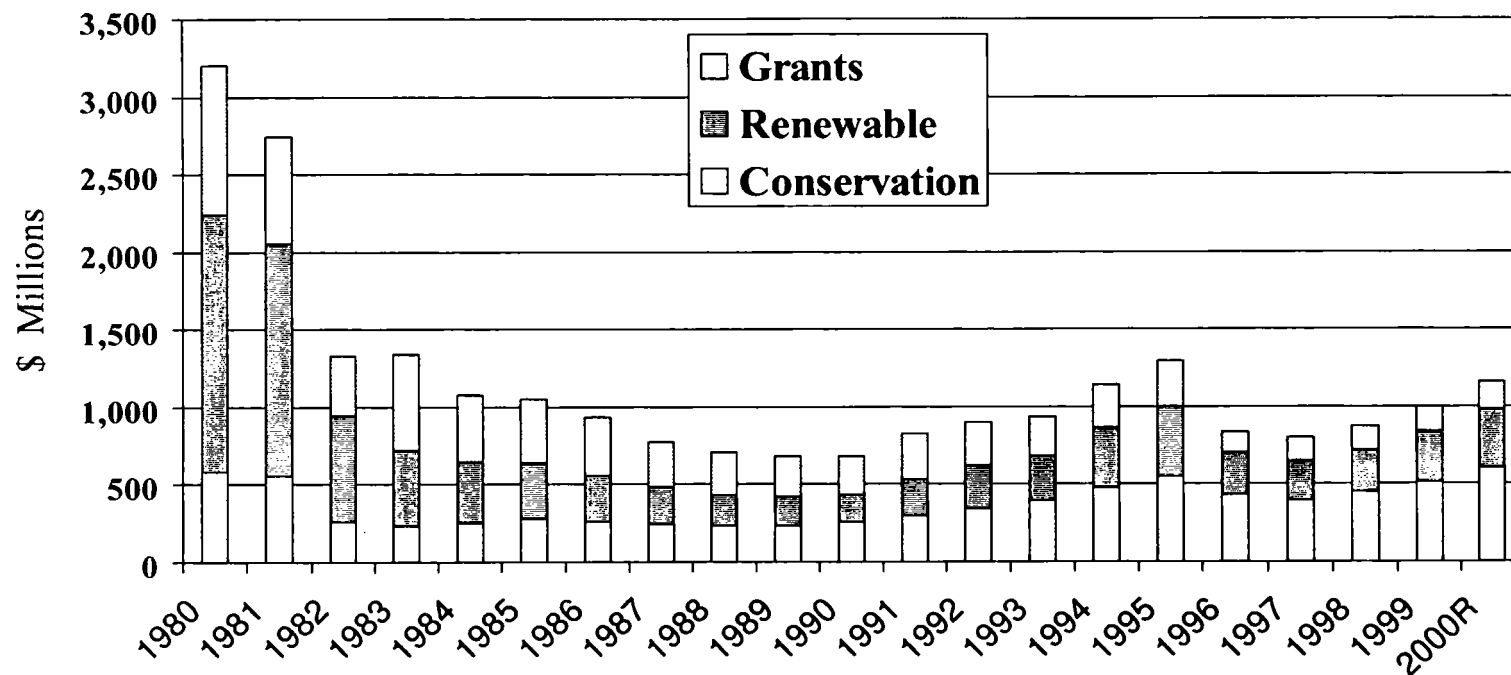


Science, Security and Energy: Powering the 21st Century

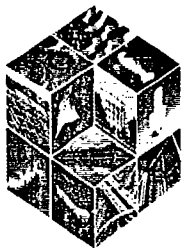
FY 2000 Energy Efficiency and Renewable Energy Budget



EERE Budget History 1980-2000



In constant 1998 dollars



Science, Security and Energy: Powering the 21st Century

FY 2000 Energy Efficiency and Renewable Energy Budget



Key Increases

SECTORS	FY 1999 Enacted	FY 2000 Request
Industrial Technologies	165.9	171.0
Transportation Technologies	243.8	305.5
Building Technology, States and Communities	262.2	335.9
<State and Community Grants>	<166>	<191>
Power Technologies	272.3	325.2
Federal Energy Management	23.8	31.9
<u>Policy and Management</u>	<u>59.7</u>	<u>66.9</u>
Totals	1,027.7	1,236.4

Expand Industries of the Future, complete advanced turbines

Accelerate R & D for high fuel efficiency vehicles

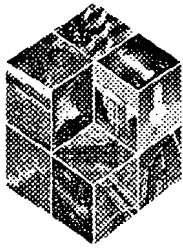
Accelerate four priority appliance standards, increase state energy and weatherization grants

Increase PV efficiency, biopower cofiring, wind, transmission reliability, and hydropower

Initiate hundreds of energy management projects via ESPCs and utility agreements

Improve strategic management and expand role of Regional Support Offices

Cross-Cutting Initiatives: Bioenergy, Distributed Power/CHP, EnergySmart Schools, Million Solar Roofs, International Markets



Science, Security and Energy: Powering the 21st Century



Presidents Climate Change Budget

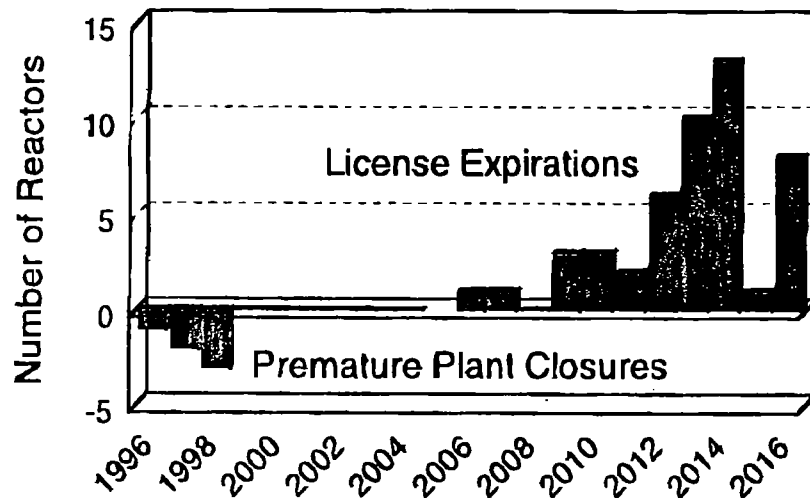
Office of Fossil Energy

	(\$ Millions) Thousands	FY 1999 Appropriation	FY 2000 Request
COAL			
Advanced Clean/Efficient Power Systems			
Indirect Fired Cycle		\$1,000	\$1,000
High Efficiency - Integrated Gasification Combined Cycle		\$14,000	\$16,250
High Efficiency - Pressurized Fluidized Bed			
Gas Stream Cleanup		0	\$1,000
Pressurized Fluidized Bed Combustion		0	\$400
Vision 21		0	\$200
Advanced Research and Environmental Technology			
CO ₂ Control/Sequestration		\$5,890	\$9,126
Advanced Research and Technology Development			
Coal Utilization Science		\$2,000	\$2,000
Materials & Components		\$1,000	\$1,000
GAS			
Natural Gas Research			
Turbines			
Vision 21		0	\$800
Fuel Cells		0	\$5,000
TOTAL		<u>\$23,890</u>	<u>\$36,776</u>

Science, Security and Energy: Powering the 21st Century

FY 2000 Nuclear Energy, Science and Technology Budget

Nuclear Energy Plant Optimization - A New \$5 Million Program in FY 2000



Six reactors have closed prematurely in the past three years and licenses for 40 percent of currently nuclear generating capacity will expire by 2015.

Addressing the Obstacles to Continued Nuclear Plant Operations

Address long-term effects of component aging -

Conduct scientific and engineering research which will provide capabilities to easily detect, mitigate, or repair the effects of long-term aging degradation.

Improving plant availability and optimize generation

- Develop advanced technologies that improve reliability and efficiency while maintaining high levels of safety

President Clinton's FY 2000 Climate Change Budget

~~114~~ \$ 143m for GEF
 \$ 150m/yr for AID grant auth.
 + \$20m devel. credit auth.
 Also fund UNFCCC and IPCC

Meeting the challenge of global warming. In his FY 2000 budget, the President is proposing a 34 percent increase for R&D in energy efficient technology and renewable energy; a new Clean Air Partnership Fund to boost state and local efforts to reduce greenhouse gases and air pollution; a five-year package of tax incentives to spur clean energy technologies; substantial new funding to focus on the ways farms and forests can reduce and offset greenhouse gas emissions; and \$1.8 billion for global change research -- a total package for FY 2000 of over \$4 billion.

Clean Air Partnership Fund. The President proposes \$200 million for a new fund to provide grants to state and local governments for multi-pollutant projects that reduce both greenhouse gases and pollutants like soot, smog, and air toxics.

Climate Change Technology Initiative (CCTI). The CCTI is a package of targeted tax incentives and investments aimed at increasing energy efficiency and spurring the broader use of renewable energy -- which will save consumers money and reduce greenhouse gas emissions at the same time. FY 1999 appropriations represented a 25 percent increase over the prior year. The President's new budget proposes a still more accelerated effort.

\$3.6 billion in tax incentives over five years. The proposed package contains \$3.6 billion over five years in tax cuts (\$383 million for FY 2000) for consumers who purchase energy efficient products and for producers of energy from renewable sources. Highlights include:

- Tax credits for energy efficient homes. Consumers can receive a \$1000-2000 credit toward the purchase of a new energy efficient home; a 10-20 percent tax credit for the purchase of selected energy efficient products for their homes and buildings; and a \$1000-2000 credit for installing a rooftop solar system.
- Tax credits for fuel-efficient cars. The package includes tax credits ranging from \$1000-4000 for the purchase of a qualifying electric, fuel cell or hybrid vehicle.
- Tax credits for renewable energy. The package extends the 1.5 cent per kilowatt hour tax credit for the production of electricity from wind and biomass; expands the biomass credit to cover additional sources of biomass; and adds a 1.0 cent per kilowatt hour tax credit for cofiring coal and biomass in power plants.

\$1.4 billion for Energy Efficiency & Renewables. The proposed package contains nearly \$1.4 billion in FY 2000 to research, develop, and deploy clean technologies for all the major energy-using sectors of the economy -- buildings, transportation, industry, and electricity -- a 34 percent increase over the amount appropriated in FY 1999. Highlights include:

*heads up calls
Budget Comm.*

President Clinton's FY 2000 Climate Change Budget

Meeting the challenge of global warming. In his FY 2000 budget, the President is proposing a 34 percent increase for R&D in energy efficient technology and renewable energy; a new Clean Air Partnership Fund to boost state and local efforts to reduce greenhouse gases and air pollution; a five-year, \$3.6 billion package of tax incentives to spur clean technologies; substantial new funding to focus on the way farms and forests can offset greenhouse gas emissions; and \$1.8 billion for basic global change research -- a total package for FY 2000 of over [\$3.8 billion].

Clean Air Partnership Fund. The President proposes \$200 million for a new fund to provide grants to state and local governments for multi-pollutant projects that reduce both greenhouse gases and pollutants like soot and smog.

Climate Change Technology Initiative (CCTI). The CCTI is a package of targeted tax incentives and investments aimed at increasing energy efficiency and spurring the broader use of renewable energy.

\$ 3.6 billion in tax incentives. The proposed updated package contains \$ 3.6 billion over five years in tax cuts for consumers who purchase energy efficient products and energy from renewable sources. Highlights:

- Tax credits for energy efficient homes. Consumers can receive a \$1000-2000 credit toward the purchase of a new energy-efficient home; a 10-20 percent tax credit for the purchase of selected energy efficient equipment for their homes and buildings; and a \$1000-2000 credit for installing a rooftop solar heating system.
- Tax credits for fuel-efficient cars. The package includes tax credits ranging from \$1000-4000 for the purchase of a qualifying electric, fuel cell or hybrid vehicle.
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*\$1000 m
in 2000**now includes agric waste*

\$1.4 billion in R&D spending. The proposed package contains nearly \$1.4 billion to develop and deploy clean technologies for the major carbon-emitting sectors of the economy -- buildings, transportation, industry, and electricity -- a 34 percent increase over the amount appropriated in FY 99. Highlights:

- Partnership for a New Generation of Vehicles. PNGV is a government-industry effort to develop attractive, affordable cars that meet all applicable safety and environmental standards and get up to three times the fuel efficiency of today's cars. The combined proposal for PNGV in the FY 2000 budget is [\$265 million], an increase from the [\$2__] appropriated in FY 99.

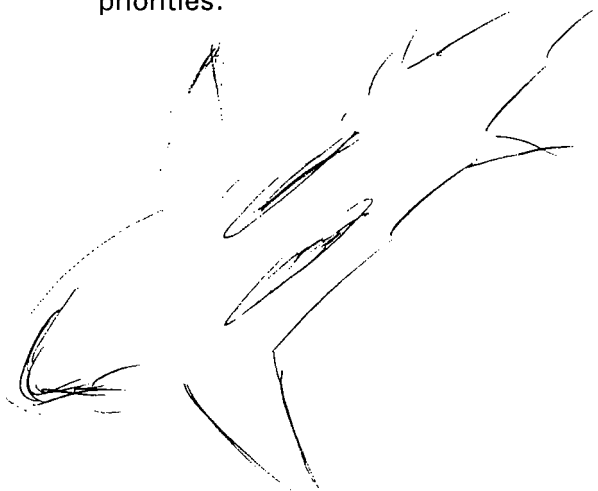
- Partnership for Advancing Technology in Housing. PATH is a government-industry partnership to build homes that are 50% more energy-efficient and to retrofit 15 million existing homes to make them 30% more energy efficient within a decade. **[NEED \$\$ or must delete.]**
- Renewable energy. The President proposes [\$399 million] for the Department of Energy's solar and renewable energy programs, an [X] percent increase over the amount appropriated in FY 99. The package includes expanded efforts in key renewable technologies, such as wind, bioenergy, photovoltaics, and geothermal.

Forests and Farms. The President proposes [\$50 million] for FY 2000, an increase from the \$10 million proposed for FY 99, for efforts at the Department of Agriculture -- including a new Carbon Cycle Initiative -- to better understand how carbon is absorbed by [agricultural soils and forests], a soil carbon inventory, and pilot projects to demonstrate how improved farming practices can help absorb carbon.

U.S. Global Change Research Program. The FY 2000 request includes \$ 1.8 billion for basic research to improve our understanding of human and naturally-induced changes in the Earth's environment and to assess the likely consequences of global warming.

Cleaner Coal and Power. The budget request includes \$122 million for R&D to develop next-generation technologies for coal and gas combustion with much higher energy efficiency and lower greenhouse gas emissions.

Weatherization & State Energy Grants. The request also includes \$191 million -- a \$25 million increase over FY 99 appropriations -- to deliver energy conservation services to low-income Americans and to assist State Energy Offices in addressing their energy priorities.



#105, 50M bump up

Clean Air Partnership Fund

To help protect public health and ease the threat of global warming, President Clinton is proposing the creation of a new Clean Air Partnership Fund. The President's FY 2000 budget includes \$200 million for the Fund, which will support state, local and private efforts that achieve reductions in both greenhouse gas emissions and ground-level air pollutants. The Fund will be administered by the Environmental Protection Agency (EPA) under existing authority.

- ***A Quicker Path to Cleaner Air.*** The Clean Air Partnership Fund will direct new resources to state and local governments to provide financing for public and private sector projects that accelerate pollution reductions. This new financing will support projects that go beyond current requirements and enable communities to achieve clean air goals sooner.
- ***Integrated Pollution Control.*** Targeting the financing towards projects and programs that achieve integrated reductions in soot, smog, air toxics and greenhouse gases will stimulate integrated, cost-effective pollution control strategies.
- ***Technological Innovation.*** The Fund will help spur both public and private sector innovations in next-generation technology to reduce greenhouse gas emissions and other air pollutants.
- ***Public-Private Partnerships.*** The Fund will encourage public-private partnerships to demonstrate ways to create a cleaner environment at the local level.
- ***Leveraging Non-Federal Investments.*** The Fund can be used to capitalize local revolving funds and other financial mechanisms, such as low-interest loan programs and matching funds, that leverage the original federal investment.

[Linda & Brad: we tried to beef this up a bit -- needs to be checked for accuracy]

Climate Change Technology Initiative: \$3.6 Billion in Tax Incentives

The President is proposing a \$3.6 billion package in tax incentives over 5 years to encourage energy efficiency and help develop renewable energy sources (see Table 1). This year's package of tax proposals has been updated and modified from last year's.

TABLE 1

Tax Incentives	Revenue effect (dollars in billions)
	Total FY2000-2004
Homes and Buildings	
Provide tax credit for energy-efficient building equipment	-1.5
Provide tax credit for new energy-efficient homes	-0.4
Provide tax credit for rooftop solar systems	-0.1
Cars	
Extend tax credit for electric or fuel cell vehicles and provide tax credits for highly fuel efficient hybrid vehicles	-0.9
	-0.3
Industry	
Provide tax credit for combined heat and power systems	-0.3
Renewables	
Extend tax credit for electricity produced from wind and biomass and expand eligible biomass sources [and uses?]	
Tax Initiative	
Total*	-3.6

*Details do not add to total because of rounding.

[Need corrected table from TDS]

HOMES AND BUILDINGS

- ***Tax credit to consumers who purchase new energy efficient homes.*** To encourage the purchase of new energy-efficient homes, consumers would receive a tax credit of \$1,000 for homes purchased from 2000-2001 that are at least 30 percent more energy efficient than the standard under the 1998 International Energy Conservation Code (IECC); a credit of \$1,500 for homes purchased from 2000-2002 that are at least 40 percent more

efficient than the IECC standard; and a credit of \$2,000 for homes purchased from 2000-2004 that are at least 50 percent more efficient than the IECC standard.

- ***Tax credit for installing energy efficient equipment in existing homes or buildings.*** This credit will encourage the purchase of electric heat pump and natural gas water heaters, electric and natural gas heat pumps, advanced central air conditioners and fuels cells. The credit would apply to both residential and commercial equipment. For fuel cells the credit would be 20 percent of the cost of the investment, subject to a cap. For all other equipment, the credit would be 10 percent of the cost of the investment, subject to a cap, for energy-efficient equipment purchased in 2000 and 2001 and 20 percent, subject to a cap, for higher-efficiency equipment purchased from 2000 through 2003.
- ***Tax credit for rooftop solar systems.*** A tax credit equal to 15 percent of the cost of the investment will encourage the purchase by consumers and businesses of rooftop solar systems and solar water heating systems. The maximum credit would be \$2,000 for rooftop photovoltaic systems installed through 2006 and \$1,000 for solar water heating systems placed in service from 2000 through 2004.

VEHICLES

- ***Tax credits for electric vehicles, fuel cell vehicles, and high-efficiency hybrid vehicles.*** Cars and light trucks (including minivans, sport utilities, and pickups) currently account for 20 percent of greenhouse gas emissions. Tax credits for electric vehicles, fuel cell vehicles and highly fuel efficient hybrid vehicles will encourage the early introduction and purchase of vehicles that incorporate new fuel efficient technologies and will help to move vehicles that are ultra efficient from the laboratory to the highway. These vehicles can significantly reduce emissions of carbon dioxide, the most prevalent greenhouse gas.
- ***Extend the present tax credit for electric vehicles and fuel cell vehicles*** . Under current law, a 10 percent credit is provided for the cost of qualified electric vehicles and fuel cell vehicles up to \$4,000. The full amount of the credit is available for purchases prior to 2002. The credit begins to phase down in 2002 and phases out in 2005. The President's proposal would extend the tax credit at its \$4,000 maximum level through 2006.
- ***Tax credits for highly fuel efficient hybrid vehicles.*** The credit -- available for all qualifying vehicles, including cars, minivans, sport

utility vehicles, and pickup trucks -- would be:

-- \$1,000 for each vehicle that is one-third more fuel efficient than a comparable vehicle in its class. Available from 2003-2004;

-- \$2,000 for each vehicle that is two-thirds more fuel efficient than a comparable vehicle in its class. Available from 2003-2006.

-- \$3,000 for each vehicle that is twice as fuel efficient as a comparable vehicle in its class. Available 2003-2006; and

-- \$4,000 for each vehicle that is three times as fuel efficient as a comparable vehicle in its class. Available 2004-2006.

RENEWABLE ENERGY

- ***Tax credit for electricity produced from wind.*** Current law encourages the production of electricity from wind, which emits no greenhouse gases, through a tax credit of 1.5 cents per kilowatt hour (adjusted for inflation after 1992). The current tax credit covers facilities placed in service before July 1, 1999. The President proposes a 5-year extension of this tax credit.
- ***Tax credits for electricity produced from biomass.*** This package of credits would:
 - **Extend current biomass credit.** This proposal extends for five years the current 1.5 cent per kilowatt hour tax credit (adjusted for inflation after 1992), which is scheduled to expire after June 30, 1999.
 - **Expand definition of eligible biomass.** This proposal expands the definition of biomass eligible for the 1.5 cent tax credit to include certain forest-related resources and agricultural and other sources.
 - **Include cofiring biomass and coal.** This proposal adds a 1.0 cent per kilowatt hour tax credit for electricity produced by cofiring biomass in coal plants.

INDUSTRY

- ***Tax credit for combined heat and power (CHP) systems.*** CHP systems make effective use of thermal energy that is otherwise wasted in producing electricity by more conventional methods. To encourage and accelerate investment in CHP equipment, this proposal provides an 8 percent tax credit

for investments in large CHP systems that have a total energy efficiency exceeding 70 percent and in smaller systems that have a total energy efficiency exceeding 60 percent. The credit would apply to property placed in service from 2000 through 2002.

Climate Change Technology Initiative: \$ ____ for Energy Efficiency and Clean Technologies

The President's FY 2000 budget proposes \$1.4 billion for the research, development and deployment of clean technologies and energy-efficient practices. This represents a \$347 increase (34 percent) over FY 1999 spending. The President's proposed investment package covers the four major carbon-emitting sectors of the economy -- Buildings, Transportation, Industry, and Electricity -- as well as Carbon Sequestration. **[HOLD FOR GRAPHIC OR SENTENCE FROM OSTP]**

Tables 1 and 2 below show how this spending is allocated, both by agency and by area of effort.

Table 1. R&D and Technology Deployment Funding

	1998	1999	2000
Energy	729	902	1,124
EPA	90	109	216
Housing & Urban Development	0	10	10
Agriculture	0	0	16
Commerce	0	0	2
Total R&D and Technology	819	1,021	1,368

[Table 2 -- breakdown by area of effort]

The following sections highlight selected programs in each of these areas of effort. The full agency programs extend well beyond what is described here.

BUILDINGS

- Partnership for Advancing Technology in Housing (PATH).** The Department Housing and Urban Development (HUD), Department of Energy (DOE), and the Environmental Protection Agency (EPA) are working with the building industry to develop, demonstrate and deploy housing technologies to make homes 50% more energy-efficient within a decade and to enable the retrofitting of at least 15 million existing homes within a decade to make them 30% more energy efficient.

-- In support of PATH's goals, DOE's **Building America** program will aid developers in building 2,000 highly energy-efficient, environmentally sound and cost-effective houses and then disseminate the results to the builders of 15,000 other houses. [RS]
- Energy-Efficient Appliances & Equipment.** A number of DOE and EPA programs aim to improve the energy-efficiency of appliances and equipment and encourage more widespread use of high-efficiency products:

-- DOE will accelerate the **lighting and appliance energy efficiency standards program** to realize even greater savings of energy, consumer energy costs and greenhouse gas emissions.

-- DOE and EPA's **Energy Star Products** program saves consumers money and reduces greenhouse gas emissions at the same time by promoting the use of energy-efficient appliances -- everything from computers to refrigerators to central air-conditioning units. New funding will

support the launch of new Energy Star product lines.

-- DOE will increase investment **R&D for key efficiency technologies** such as advanced lighting, space conditioning, building cogeneration and advanced appliances.

- ***Energy Efficient Commercial Buildings.*** DOE and EPA work in partnership with industry to research, develop, and deploy new technologies and practices to improve the energy performance of commercial buildings. Buildings in the top 25 percent in energy efficiency qualify for EPA's "**Energy Star Buildings**" label. Participants include the Empire State Building, the World Trade Center, and Chicago's Sears Tower. [HK] [RS]
- ***Energy Smart Schools.*** Announced in October, 1998, this initiative cuts across several DOE programs and brings together public and private sector resources to cut schools' energy bills so that the savings can be reinvested in students and their education.

TRANSPORTATION

- ***Partnership for a New Generation of Vehicles.*** A government-industry effort to develop attractive, affordable cars that meet all applicable safety and environmental standards and get up to three times the fuel efficiency of today's cars. Since 1993, great strides have been made in producing lower-cost, light-weight materials, inexpensive fuel cells, and advanced internal combustion engines for use in hybrid vehicles. The program aims to produce a prototype mid-sized family car capable of 80 miles per gallon (mpg) with a two-thirds reduction in carbon emissions by 2004. [HK] [RS][\$\$]
- ***Partnerships for Light and Heavy Trucks.*** Similar government-industry efforts are aimed at developing cleaner, more efficient diesel engines for both light and heavy trucks.
 - By 2002, DOE aims to develop **advanced diesel cycle engine technologies** for pickup trucks, vans, and sport utility vehicles which achieve at least a 35 percent fuel efficiency improvement relative to current gasoline-fueled trucks by 2002 while meeting strict emission standards.
 - By 2004, DOE, in coordination with EPA [and DOD], aims to develop **engine and vehicle technologies for heavy trucks** that will increase the fuel economy to 12 mpg from the current average of 5.3 mpg. [RS -- is DOD included?]

- **Biofuels.** DOE R&D efforts are seeking to produce alternative fuels for vehicles, such as ethanol, using agricultural crop waste. The program has completed the design of a 10 million gallons/year first-of-a-kind refinery for producing ethanol from biomass. In the upcoming year, it will seek to demonstrate the conversion of agricultural wastes to ethanol at a small commercial scale using a genetically engineered fermentative microorganism. [HK] [RS]

INDUSTRY

- **Industries of the Future.** This DOE program works cooperatively with the nation's most energy-intensive industries -- such as aluminum, glass, chemicals, forest products, mining, petroleum refining, and steel -- on developing technologies that increase energy and resource efficiency. Examples of promising collaborative efforts include improvements in the process of making steel and improvements in the aluminum production process that could dramatically increase efficiency and eliminate emissions of perfluorocarbons (PFCs), a highly potent greenhouse gas.
- **Industrial Cogeneration.** DOE is developing new industrial power/cogeneration systems to capture heat that would otherwise be wasted. These systems are expected to be 15 percent more energy efficient, 80 percent cleaner than conventional power systems and cut electricity costs by 10 percent. In addition, EPA and DOE are also working to eliminate barriers to the rapid dissemination of combined heat and power technology.
- **Agriculture.** The U.S. Department of Agriculture (USDA) will undertake R&D and support demonstration projects aimed at both lowering greenhouse gas emissions from agriculture and reducing agriculture's vulnerability to climate change.

--The **Natural Resources Conservation Service** will invest \$3 million in projects to demonstrate and test various greenhouse gas mitigation strategies and monitoring mechanisms, such as compost-based waste-handling facilities, rotational grazing systems and improved feed and forage systems.

--The **Agricultural Research Service** will devote \$7 million toward the development of new technology and expertise for reducing agriculture's vulnerability to a changing climate. Field experiments will seek to measure various potential effects of climate change, such as varying amounts and patterns of rainfall on forage production. Work will also be done on innovative bioenergy technologies.

ELECTRICITY

- **Photovoltaic Energy Systems.** Over the past 20 years, Federal R&D has resulted in a 90 percent cost reduction in solar photovoltaics. DOE will accelerate R&D of the next generation photovoltaic cells; increase manufacturing R&D; increase research in buildings-integrated applications; and fund new efforts to develop unconventional technological breakthroughs.
 - **Million Solar Roofs.** In June, 1997, the President announced an initiative to encourage the installation of one million solar systems by 2010, which would reduce carbon emissions equivalent to the annual emissions from 850,000 cars. DOE has received commitments for over half a million solar rooftop installations.
- **Biomass.** Biomass refers to trees, crops and agricultural wastes used to produce power, fuels or chemicals. It represents a tremendous, renewable resource whose use can help strengthen our energy security, protect the environment, and revitalize rural America.
 - **Biomass Power.** DOE is testing and demonstrating biomass co-firing with coal; developing advanced technologies for biomass gasification using paper industry by-products; and developing and testing high-yield, low-cost biomass feedstocks.
 - **Developing An Integrated Biomass Market.** This year DOE, USDA, and other federal agencies and private partners, will launch a national partnership to develop an integrated biomass industry.
- **Wind Power.** DOE will continue developing a next-generation wind turbine able to produce power at 2.5 cents per kilowatt-hour in good wind regions, accelerate R&D on critical components, and accelerate testing and field validation.
- **Hydrogen.** DOE will accelerate research on low-cost hydrogen production and storage, prerequisites to the widespread use of hydrogen as a fuel.
- **High Temperature Superconductivity.** DOE supports industry-led projects to capitalize on recent breakthroughs in superconducting wire technology, potentially leading to the development of devices such as advanced motors, power cables, and transformers. These technologies would allow more electricity to reach the consumer without an increase in fossil fuel input. [RS]

CARBON REMOVAL AND SEQUESTRATION

- ***R&D for Removal and Sequestration.*** Research initiatives are being funded to find ways to remove carbon dioxide from combustion gases and to sequester (store) carbon. Examples include:

-- [RS]

-- **Enhancing Forest and Farmland Sinks.** USDA will spend \$6 million for R&D and demonstration projects for optimizing forest and rangeland carbon sinks. The focus of such projects will include storage of carbon in forest soils and increased durability and use of wood products to sequester carbon.

-- **Enhancing natural geological and oceanic processes.** DOE will support research into the feasibility of capturing and storing carbon dioxide in underground geological structures or in the deep ocean.

Other Climate-Related Investments

There are a number of additional programs funded in the FY 2000 budget that -- while not part of the Climate Change Technology Initiative or the U.S. Global Climate Change Research Program per se -- contribute to improving energy efficiency and/or reduce greenhouse gas emissions. These programs include:

- ***Cleaner Coal and Power.*** The Department of Energy (DOE) supports an aggressive R&D effort to develop next-generation technologies for coal and gas combustion. Research and development on two new coal combustion technologies -- integrated gasification combined cycle and pressurized fluidized bed combustion -- could lead to ultra-high efficiency coal plants with dramatically lower greenhouse gas emissions.
- ***Low Income Weatherization and State Energy Grants.*** These DOE programs facilitate energy efficiency investments at the State and local level. The **Weatherization Assistance Program**, for example, delivers energy conservation services, [such as insulation] to low-income Americans, reducing energy costs for consumers, improving health and safety, and reducing carbon emissions. The total FY 2000 budget request for these two programs is \$191 million -- a \$25 million increase over FY 1999.
- ***Agricultural & Forestry Conservation Programs.*** Many U.S. Department of Agriculture (USDA) conservation programs have the co-benefit of reducing carbon emissions resulting from agriculture and forestry and enhancing the ability of "sinks," such as forests and farmlands, to sequester or store carbon. This includes programs such as the Farmland Protection Program, the Environmental Quality Incentives Program, and the Wildlife Habitat Incentives Program. In general, these programs assist farmers, ranchers, and other landowners in conserving and improving soil, water, and other natural resources associated with rural land. Overall funding in FY 2000 for agricultural and forestry conservation programs with significant climate co-benefits is \$ _____ billion -- a _____% increase from FY 1999. [MW]

U.S. Global Change Research Program

The United States Global Change Research Program (USGCRP) seeks to provide a sound scientific understanding of both the human and natural forces that influence the Earth's climate system. The information produced by USGCRP's scientists is used by national and international policy makers to make informed decisions on global change issues. It is a multi-agency scientific research program coordinated through the National Science and Technology Council's Committee on Environment and Natural Resources.

For FY 2000, the President is requesting \$1.786 billion for the U.S. Global Change Research Program, an increase of \$105 million, or 6 percent, above FY 1999 estimated budget levels. Of the FY 2000 budget request, \$828 million is for scientific research up \$84 million) and \$958 million is for NASA's development of climate monitoring satellites and ground based observation systems. Other important USGCRP budget highlights include:

- ***Carbon Cycle Initiative.*** The FY 2000 budget request establishes a new initiative to study of the role of farms and forests in capturing carbon that would otherwise be released to the atmosphere, contributing to the growing concentrations of carbon dioxide, a major greenhouse gas. Such agricultural carbon "sinks" may provide the U.S. and other nations with new tools for offsetting greenhouse gas emissions. The funding will also help scientists better understand carbon sources and sinks on large geographic and time scales. The initiative includes \$10 million in funding for the U.S. Department of Agriculture (USDA) and \$5 million for the Department of Energy (DOE).
- ***Soil Carbon Inventory.*** The FY 2000 budget request includes \$13.5 million (an increase of \$12 million from FY 1999) for a comprehensive scientific inventory of carbon stored in U.S. soils and to develop methods to predict how soil carbon levels would be affected by different practices and policies. The inventory will be conducted by USDA's Natural Resources Conservation Service. [MW -- check]
- ***3 Dimensional Mapping of Forests.*** The FY 2000 budget provides funding to launch NASA's Vegetation Canopy Lidar which for the first time will give scientists a three dimensional view of the earth's forests to help determine the contribution of forests in sequestering atmospheric carbon.
- ***Consequences of Climate Change.*** The FY 2000 budget provides funding to complete a report on the first national assessment of the potential consequences of climate change on the United States. Key areas of focus include potential impacts on key economic sectors and geographic regions, identifying mitigation and adaptation strategies, and technical information to

•
help policy makers consider appropriate measures.

- ***Regional variability.*** The FY 2000 budget request includes funding to help scientists examine climate change and variability on a regional scale. Supported in part by the Administration's new Information Technology Initiative, the funding will help improve U.S. computer capabilities to run the complex models required to understand the impacts of climate change and variability at the regional scale.

**White House Climate Change Task Force**

734 Jackson Place, N.W. • Washington, DC 20503

FACSIMILE TRANSMISSION SHEET

To	ISAAC Roger B.	From	Julie A
Office		Date	
Fax Number		Fax Number	395-2342
Office Number		Office Number	395-2310

Comments:

Still working on Ag 1-pager

Pages: _____, including this cover sheet.

IF TRANSMITTAL IS INCOMPLETE, PLEASE PHONE

proposal for PNGV in the FY 2000 budget is \$264 million, an increase from the \$240 million appropriated in FY 99.

- **Partnership for Advancing Technology in Housing.** PATH is a government-industry partnership to build homes that are 50% more energy-efficient and to retrofit 15 million existing homes to make them 30% more energy efficient within a decade. The FY 2000 budget request for PATH and other building efficiency efforts such as Energy Star and Build America totals \$267 million, a 58 percent increase over FY 99 appropriations.
- **Renewable energy.** The President proposes \$399 million for the Department of Energy's solar and renewable energy programs, a 19 percent increase over the amount appropriated in FY 99. The package includes expanded efforts in key renewable technologies, such as wind, bioenergy, photovoltaics, and geothermal.

Forests and Farms. The FY 2000 proposal includes \$105 million for the Department of Agriculture climate change budget, an increase of \$50 million over the amount appropriated in FY 99 and \$40 million over the Administration's FY 99 request. The new proposal funds efforts including a new Carbon Cycle Initiative to better understand how carbon is absorbed by agricultural soils and forests, a soil carbon inventory, pilot projects to demonstrate how improved farming practices can help absorb carbon, an expanded biomass initiative in conjunction with DOE, and programs to reduce emissions through means such as the conversion of waste to energy.

U.S. Global Change Research Program. The FY 2000 request includes \$ 1.8 billion for scientific research to improve our understanding of human and naturally-induced changes in the Earth's environment and to assess the likely consequences of global warming.

Cleaner Coal and Power. The budget request includes \$122 million for R&D to develop next-generation technologies for coal use with much higher energy efficiency and lower greenhouse gas emissions.

Weatherization & State Energy Grants. The request also includes \$191 million -- a \$25 million increase over FY 99 appropriations -- to deliver energy conservation services to low-income Americans and to assist State Energy Offices in addressing their energy priorities.

President Clinton's FY 2000 Climate Change Budget

The President's FY 2000 budget request for climate change comprises a number of key elements, including the Climate Change Technology Initiative, which mixes tax incentives and direct spending to spur the development and deployment of energy efficient technology and renewable energy; a new Clean Air Partnership Fund to boost state and local efforts to reduce greenhouse gases and air pollution; and the United States Global Research Program, to enhance our understanding of the human and natural forces that influence our climate system.

The President's overall climate change package for FY 2000 totals over \$4 billion.

Climate-Change-Related Programs (\$ in Millions)

	1999	2000	Change
Global Change Research Program (climate science)	1,681	1,786	+105
Climate Change Technology Initiative - spending	1,021	1,368	+347
Climate Change Technology Initiative - tax incentives	1	383	+382
Clean Air Partnership Fund	0	200	+200
Cleaner Coal and Power	123	122	-1
Weatherization & State Energy Grants	166	191	+25
<u>Total Climate-Related Domestic Programs</u>	<u>2,992</u>	<u>4,050</u>	<u>+1,058</u>

Clean Air Partnership Fund

To help protect public health and ease the threat of global warming, President Clinton is proposing the creation of a new Clean Air Partnership Fund. The President's FY 2000 budget includes \$200 million for the Fund, which will provide grants to states and localities to support state, local and private efforts that achieve reductions in both greenhouse gas emissions and ground-level air pollutants. The Fund will be administered by the Environmental Protection Agency (EPA) under existing authority.

- ***Integrated Pollution Control.*** The Clean Air Partnership Fund will stimulate integrated, cost-effective pollution control strategies. It directs new resources to state and local governments to finance projects and programs that achieve accelerated, integrated reductions in soot, smog, air toxics and greenhouse gases.
- ***A Quicker Path to Cleaner Air.*** By providing new resources for projects that accelerate pollution reductions, this financing will enable communities to achieve multi-pollutant clean air goals sooner and in advance of current requirements.
- ***Technological Innovation.*** The Fund will help spur both public and private sector innovations in next-generation technology to reduce greenhouse gas emissions and other air pollutants.
- ***Public-Private Partnerships.*** The Fund will encourage public-private partnerships to demonstrate ways to create a cleaner environment at the local level.
- ***Leveraging Non-Federal Investments.*** The Fund can be used to capitalize local revolving funds and fund other mechanisms to provide low-interest loans or matching grants that leverage the original federal investment.

Climate Change Technology Initiative: \$3.6 Billion in Tax Incentives

The President is proposing a \$3.6 billion package in tax incentives over 5 years to help reduce greenhouse gas emissions by encouraging energy efficiency and helping to develop renewable energy sources (see Table 1). This year's package of tax proposals has been updated and modified from last year's.

TABLE 1

Tax Incentives	Revenue effect (dollars in billions)
	Total FY 2000-2004
Homes and Buildings	
Provide tax credit for energy-efficient building equipment	-1.5
Provide tax credit for new energy-efficient homes	-0.4
Provide tax credit for rooftop solar systems	-0.1
Cars	
Extend tax credit for electric or fuel cell vehicles and provide tax credits for highly fuel efficient hybrid vehicles	-0.9
Renewables	-0.3
Extend tax credit for electricity produced from wind and biomass, expand eligible biomass sources and include coal-biomass cofiring	-0.3
Industry	
Provide tax credit for combined heat and power systems	
Tax Initiative Total*	-3.6

*Total does not add because of rounding.

HOMES AND BUILDINGS

- ***Tax credit to consumers who purchase new energy efficient homes.*** To encourage the purchase of new energy-efficient homes, consumers would receive a tax credit of \$1,000 for homes purchased from 2000-2001 that are at least 30 percent more energy efficient than the standard under the 1998 International Energy Conservation Code (IECC); a credit of \$1,500 for homes purchased from 2000-2002 that are at least 40 percent more efficient than the IECC standard; and a credit of \$2,000 for homes purchased from 2000-2004 that are at least 50 percent more efficient than the IECC standard.

- ***Tax credit for installing energy efficient equipment in existing homes or buildings.*** This credit will encourage the purchase of electric heat pump and natural gas water heaters, electric and natural gas heat pumps, advanced central air conditioners and fuel cells. The credit would apply to both residential and commercial equipment. For fuel cells the credit would be 20 percent of the cost of the investment, subject to a cap. For all other equipment, the credit would be 10 percent of the cost of the investment, subject to a cap, for energy-efficient equipment purchased in 2000 and 2001 and 20 percent, subject to a cap, for higher-efficiency equipment purchased from 2000 through 2003.
- ***Tax credit for rooftop solar systems.*** A tax credit equal to 15 percent of the cost of the investment will encourage the purchase by consumers and businesses of rooftop solar systems and solar water heating systems. The maximum credit would be \$2,000 for rooftop photovoltaic systems installed through 2006 and \$1,000 for solar water heating systems placed in service from 2000 through 2004.

VEHICLES

- ***Tax credits for electric vehicles, fuel cell vehicles, and high-efficiency hybrid vehicles.*** Cars and light trucks (including minivans, sport utilities, and pickups) currently account for 20 percent of greenhouse gas emissions. Tax credits for electric, fuel cell and hybrid vehicles will help to move these high efficiency technologies from the laboratory to the highway. These technologies can significantly reduce emissions of carbon dioxide, the most prevalent greenhouse gas.
- ***Extend the present tax credit for electric vehicles and fuel cell vehicles .*** Under current law, a 10 percent credit is provided for the cost of qualified electric vehicles and fuel cell vehicles up to \$4,000. The full amount of the credit is available for purchases prior to 2002. The credit begins to phase down in 2002 and phases out in 2005. The President's proposal would extend the tax credit at its \$4,000 maximum level through 2006.
- ***Tax credits for highly fuel efficient hybrid vehicles.*** The credit -- available for all qualifying vehicles, including cars, minivans, sport utility vehicles, and pickup trucks -- would be:
 - \$1,000 for each vehicle that is one-third more fuel efficient than a comparable vehicle in its class. Available from 2003-2004;
 - \$2,000 for each vehicle that is two-thirds more fuel efficient than a comparable vehicle in its class. Available from 2003-2006.
 - \$3,000 for each vehicle that is twice as fuel efficient as a comparable vehicle in its class. Available 2003-2006; and

-- \$4,000 for each vehicle that is three times as fuel efficient as a comparable vehicle in its class. Available 2004-2006.

RENEWABLE ENERGY

- ***Tax credit for electricity produced from wind.*** Current law encourages the production of electricity from wind, which emits no greenhouse gases, through a tax credit of 1.5 cents per kilowatt hour (adjusted for inflation after 1992). The current tax credit covers facilities placed in service before July 1, 1999. The President proposes a 5-year extension of this tax credit.
- ***Tax credits for electricity produced from biomass.*** This package of credits would:
 - **Extend current biomass credit.** This proposal extends for five years the current 1.5 cent per kilowatt hour tax credit (adjusted for inflation after 1992), which is scheduled to expire after June 30, 1999
 - **Expand definition of eligible biomass.** This proposal expands the definition of biomass eligible for the 1.5 cent tax credit to include certain forest-related resources and agricultural and other sources.
 - **Include cofiring biomass and coal.** This proposal adds a 1.0-cent per kilowatt hour tax credit for electricity produced by cofiring biomass in coal plants.

INDUSTRY

- ***Tax credit for combined heat and power (CHP) systems.*** CHP systems make effective use of thermal energy that is otherwise wasted in producing electricity by more conventional methods. To encourage and accelerate investment in CHP equipment, this proposal provides an 8 percent tax credit for investments in large CHP systems that have a total energy efficiency exceeding 70 percent and in smaller systems that have a total energy efficiency exceeding 60 percent. The credit would apply to property placed in service from 2000 through 2002.

Climate Change Technology Initiative: \$1.4 Billion for Energy Efficiency & Renewables

The President's FY 2000 budget proposes nearly \$1.4 billion for the research, development and deployment of renewable energy technologies and energy-efficient practices. This represents a \$347 million increase (34 percent) over FY 1999 spending (see Table 2). The President's proposed investment package covers the four major carbon-emitting sectors of the economy -- Buildings, Transportation, Industry, and Electricity -- well as Carbon Sequestration. The following sections highlight selected programs in each of these areas of effort. The full agency programs extend well beyond what is described here.

Table 1. R&D and Technology Deployment Funding (\$ in Millions)

	1998	1999	2000	Change from 1999
Energy	729	902	1,124	+222
<i>Programs within DOE -- non-add</i>				
<i>Solar and Renewable Energy</i>	272	336	399	+63
<i>Energy Conservation R&D</i>	457	526	647	+121
<i>Fossil Energy R&D</i>	--	24	37	+13
<i>Nuclear Energy</i>	--	0	5	+5
<i>Basic Science</i>	--	14	33	+19
<i>Energy Information Admin.</i>	--	3	3	0
EPA	90	109	216	+107
Housing & Urban Development	0	10	10	0
Agriculture	0	0	16	+16
Commerce	0	0	2	+2
Total R&D and Technology	819	1,021	1,368	+347
Tax Incentives	--	1	383	+382
Total CCTI	819	1,022	1,751	+729

Totals may not add due to rounding

BUILDINGS

- **Partnership for Advancing Technology in Housing (PATH).** The Department Housing and Urban Development (HUD), Department of Energy (DOE), the Environmental Protection Agency (EPA), the Federal Emergency Management Agency (FEMA), and other agencies are working with the building industry to develop, demonstrate and deploy housing technologies to make homes 50 percent more energy-efficient within a decade and to enable the retrofiting of at least 15 million existing homes within a decade to make them 30 percent more energy efficient.
 - In support of PATH's goals, DOE's **Building America** program will aid developers in building 2,000 highly energy-efficient, environmentally sound and cost-effective houses and then disseminate the results to the builders of 15,000 other houses.
- **Energy Efficient Appliances and Equipment.** A number of DOE and EPA programs aim to improve the energy-efficiency of appliances and equipment and encourage more widespread use of high-efficiency products:
 - DOE will accelerate the **lighting and appliance energy efficiency standards program** to realize even greater savings of energy, consumer energy costs and greenhouse gas emissions.
 - DOE and EPA's **Energy Star Products** program saves consumers money and reduces greenhouse gas emissions at the same time by promoting the use of energy-efficient appliances -- everything from computers to refrigerators to central air-conditioning units. New funding will support the launch of new Energy Star product lines.
 - DOE will increase investment **R&D for key energy efficient technologies** such as advanced lighting, space conditioning, building cogeneration and advanced appliances.
- **Energy Efficient Commercial Buildings.** DOE and EPA work in partnership with industry to research, develop, and deploy new technologies and practices to improve the energy performance of commercial buildings. Buildings in the top 25 percent in energy efficiency qualify for EPA's "**Energy Star Buildings**" label. Participants include the Empire State Building, the World Trade Center, and Chicago's Sears Tower.
- **Energy Smart Schools.** Announced in October, 1998, this initiative cuts across several DOE programs and brings together public and private sector resources to cut schools' energy bills so that the savings can be reinvested in students and their education.

TRANSPORTATION

- **Partnership for a New Generation of Vehicles.** A government-industry effort to develop attractive, affordable cars that meet all applicable safety and environmental standards and get up to three times the fuel efficiency of today's cars. Since 1993, great strides have been made in producing lower-cost, light-weight materials, inexpensive fuel cells, and advanced internal combustion engines for use in hybrid vehicles. The program aims to produce a prototype mid-sized family car capable of 80 miles per gallon (mpg) with a two-thirds reduction in carbon emissions by 2004. The FY 2000 budget includes \$264 million for PNGV-related work, an increase of \$24 million over the amount appropriated in FY 1999.
- **Light and Heavy Trucks.** Similar government-industry efforts are aimed at developing cleaner, more efficient diesel engines for both light and heavy trucks.
 - By 2002, DOE aims to develop **advanced diesel cycle engine technologies** for pickup trucks, vans, and sport utility vehicles which achieve at least a 35 percent fuel efficiency improvement relative to current gasoline-fueled trucks by 2002 while meeting strict emission standards.
 - By 2004, DOE, in coordination with EPA and DOD, aims to develop **engine and vehicle technologies for heavy trucks** that will increase the fuel economy to 12 mpg from the current average of 5.3 mpg.
- **Biofuels.** Working closely with USDA, DOE will continue its work in the biochemistry of converting wood chips, grasses, agricultural wastes, and other products into ethanol and other potentially useful fuels. The program has completed the design of a 10 million gallons/year first-of-a-kind refinery for producing ethanol from biomass. In the upcoming year, it will aim to demonstrate the conversion of agricultural wastes to ethanol at a small commercial scale using a genetically engineered fermentative microorganism.

INDUSTRY

- **Industries of the Future.** This DOE program works cooperatively with the nation's most energy-intensive industries -- such as aluminum, glass, chemicals, forest products, mining, petroleum refining, and steel -- on developing technologies that increase energy and resource efficiency. Examples of promising collaborative efforts include improvements in the process of making steel and improvements in the aluminum production process that could dramatically increase efficiency and eliminate emissions of perfluorocarbons (PFCs), a highly potent greenhouse gas.
- **Industrial Cogeneration.** DOE is developing new industrial power/cogeneration systems to capture heat that would otherwise be wasted. These systems are expected to be 15

percent more energy efficient, 80 percent cleaner than conventional power systems and cut electricity costs by 10 percent. In addition, EPA and DOE are also working to eliminate barriers to the rapid dissemination of combined heat and power technology.

- **Agriculture.** The U.S. Department of Agriculture (USDA) will undertake R&D and support demonstration projects aimed at both lowering greenhouse gas emissions from agriculture and reducing agriculture's vulnerability to climate change.

--The **Natural Resources Conservation Service** will invest \$3 million in projects to demonstrate and test various greenhouse gas mitigation strategies and monitoring mechanisms, such as compost-based waste-handling facilities, rotational grazing systems and improved feed and forage systems.

--The **Agricultural Research Service** will devote \$7 million toward the development of new technology and expertise for reducing agriculture's vulnerability to a changing climate. Field experiments will seek to measure various potential effects of climate change, such as varying amounts and patterns of rainfall on forage production. Work will also be done to improve our knowledge of biomass feedstocks and innovative biocnergy technologies.

ELECTRICITY

- **Photovoltaic Energy Systems.** Over the past 20 years, Federal R&D has resulted in a 90 percent cost reduction in solar photovoltaics. DOE will accelerate R&D of the next generation photovoltaic cells; increase manufacturing R&D; increase research in buildings-integrated applications; and fund new efforts to develop unconventional technological breakthroughs.

-- **Million Solar Roofs.** In June, 1997, the President announced an initiative to encourage the installation of one million solar systems by 2010, which would reduce carbon emissions equivalent to the annual emissions from 850,000 cars. DOE has received commitments for over half a million solar rooftop installations.

- **Biomass.** Biomass refers to trees, crops and agricultural wastes used to produce power, fuels or chemicals. It represents a tremendous renewable resource whose use can help strengthen our energy security, protect the environment, and enhance our rural economy.

-- **Biomass Power.** DOE is testing and demonstrating biomass co-firing with coal; developing advanced technologies for biomass gasification using paper industry by-products; and developing and testing high-yield, low-cost biomass feedstocks.

-- **Developing An Integrated Biomass Industry.** This year DOE, USDA, and

other federal agencies and private partners, will launch a national partnership to develop an integrated biomass industry.

- **Wind Power.** DOE will continue developing a next-generation wind turbine able to produce power at 2.5 cents per kilowatt-hour in good wind regions, accelerate R&D on critical components, and accelerate testing and field validation.
- **Hydrogen.** DOE will accelerate research on low-cost hydrogen production and storage, prerequisites to the widespread use of hydrogen as a fuel.
- **High Temperature Superconductivity.** DOE supports industry-led projects to capitalize on recent breakthroughs in superconducting wire technology, aimed at developing devices such as advanced motors, power cables, and transformers. These technologies would allow more electricity to reach the consumer without an increase in fossil fuel input.

CARBON SEQUESTRATION

- **R&D for Sequestration.** Research initiatives are being funded to find ways to sequester (store) carbon. Examples include:
 - **Enhancing Forest and Farmland Sinks.** USDA will spend \$6 million for R&D and demonstration projects for optimizing forest, farmland, and rangeland carbon sinks. The focus of such projects will include storage of carbon in forest soils and increased durability and use of wood products to sequester carbon.
 - **Enhancing natural geological and oceanic processes.** DOE will support research into the feasibility of capturing and storing carbon dioxide in underground geological structures or in the deep ocean.

Other Climate-Related Investments

There are a number of additional programs funded in the FY 2000 budget that -- while not part of the Climate Change Technology Initiative or the U.S. Global Climate Change Research Program per se -- contribute to improving energy efficiency and/or reduce greenhouse gas emissions.

These programs include:

- ***Cleaner Coal and Power.*** The FY 2000 budget includes \$122 million to support the Department of Energy's (DOE) aggressive R&D effort to develop next-generation technologies for coal combustion. Research and development on two new coal combustion technologies -- integrated gasification combined cycle and pressurized fluidized bed combustion -- could lead to ultra-high efficiency coal plants with dramatically lower greenhouse gas emissions.
- ***Low Income Weatherization and State Energy Grants.*** These DOE programs facilitate energy efficiency investments at the State and local level. The **Weatherization Assistance Program**, for example, delivers energy conservation services, such as insulation, to low-income Americans, reducing energy costs for consumers, improving health and safety, and reducing carbon emissions. The total FY 2000 budget request for these two programs is \$191 million -- a \$25 million increase over FY 1999 appropriations.
- ***Agricultural & Forestry Conservation Programs.*** Many U.S. Department of Agriculture (USDA) conservation programs have the co-benefit of reducing carbon emissions resulting from agriculture and forestry and enhancing the ability of "sinks," such as forests and farmlands, to sequester or store carbon. This includes programs such as the Conservation Reserve Program, the Environmental Quality Incentives Program, and the Farmland Protection Program. In general, these programs assist farmers, ranchers, and other landowners in conserving and improving soil, water, and other natural resources associated with rural land.

U.S. Global Change Research Program

The United States Global Change Research Program (USGCRP) seeks to provide a sound scientific understanding of both the human and natural forces that influence the Earth's climate system. The information produced by USGCRP's scientists is used by national and international policy makers to make informed decisions on global change issues. It is a multi-agency scientific research program coordinated through the National Science and Technology Council's Committee on Environment and Natural Resources.

For FY 2000, the President is requesting nearly \$1.8 billion for the U.S. Global Change Research Program, an increase of \$105 million, or 6 percent, above FY 1999 estimated budget levels. Of the FY 2000 budget request, \$828 million is for scientific research (up \$84 million) and \$958 million is for NASA's development of climate monitoring satellites and ground based observation systems. Other important USGCRP budget highlights include:

- ***Carbon Cycle Initiative.*** The FY 2000 budget request establishes a new multi-agency initiative to study of the role of farms and forests in capturing carbon. Such agricultural carbon "sinks" may provide the U.S. and other nations with new tools for offsetting greenhouse gas emissions. The funding will also help scientists better understand carbon sources and sinks on large geographic and time scales. The initiative includes \$10 million in new funding for the U.S. Department of Agriculture (USDA) and \$5 million for the Department of Energy (DOE).
- ***Soil Carbon Inventory.*** The FY 2000 budget request includes \$14 million (an increase of \$12 million from FY 1999) to significantly expand efforts to conduct a comprehensive scientific inventory of carbon stored in U.S. soils and to develop methods to predict how soil carbon levels would be affected by different practices and policies. The inventory will be conducted by USDA's Natural Resources Conservation Service.
- ***3 Dimensional Mapping of Forests.*** The FY 2000 budget provides funding to launch NASA's Vegetation Canopy Lidar, which, for the first time, will give scientists a three dimensional view of the Earth's forests to help determine the contribution of forests in sequestering atmospheric carbon.
- ***Consequences of Climate Change.*** The FY 2000 budget provides funding to complete a report on the first national assessment of the potential consequences of climate change on the United States. The report will identify potential impacts on key economic sectors and geographic regions, mitigation and adaptation strategies, and provide technical information for policy makers.
- ***Regional variability.*** The FY 2000 budget request includes funding to help scientists examine climate change and variability on a regional scale. Supported in part by the Administration's new Information Technology Initiative, the funding will help improve U.S. computer capabilities to run the complex models required to understand the impacts of climate change and variability at the regional scale.

**ENVIRONMENTAL PROTECTION AGENCY
CLIMATE CHANGE BUDGET
FY 2000**

	FY98 Enacted	FY99 Enacted	FY00 PresBud
EPM			
Buildings	\$38.8	\$38.8	\$80.1
Industry	\$20.9	\$18.6	\$55.6
Transportation	\$ 4.8	\$ 4.8	\$12.0
Carbon Removal/ Sequestration	0	0	\$ 3.4
Int'l Capacity Building	\$ 5.2	\$ 7.4	\$10.4
State/Local Outreach	\$ 2.8	\$ 2.9	\$ 5.0
<u>TOTAL</u>	<u>\$72.5</u>	<u>\$72.5</u>	<u>\$166.5</u>

S&T

Transportation Efficiency	\$17.0	\$36.9	\$49.9
<u>CCTI TOTAL</u>	<u>\$89.5</u>	<u>\$109.4</u>	<u>\$216.4</u>

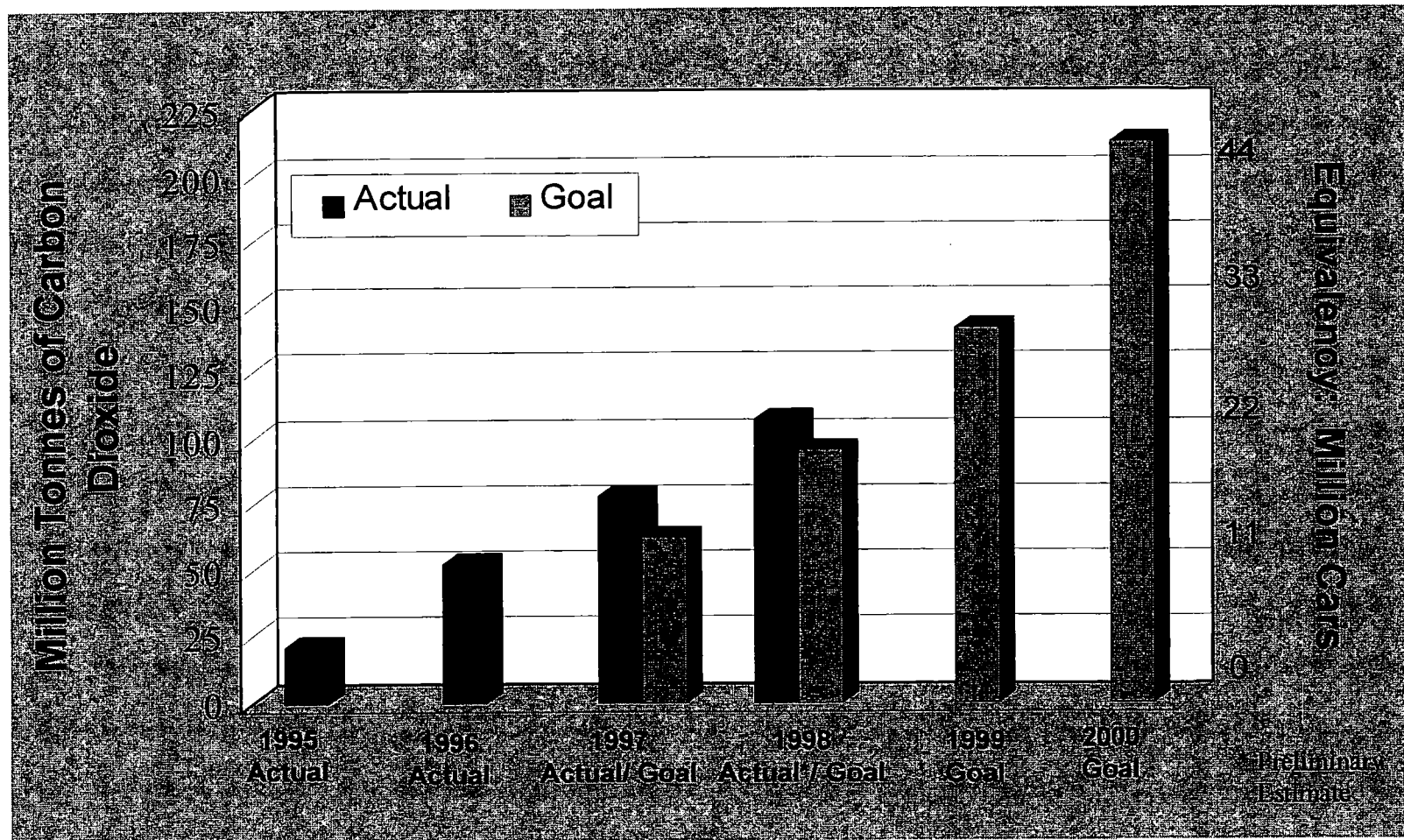
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<u>Clean Air Partnership Fund</u>	<u>0</u>	<u>0</u>	<u>\$200.0</u>
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Overview of Greenhouse Gas Reductions in 2000 from EPA CCTI Programs	
Sector	Emission Reductions (million metric tons of CO2 equiv.)
Buildings	46.5
Industry	139.2
Transportation	20.9
State and Local	6.2
Total	212.8 (58 MMTCE)

U.S. GREENHOUSE GAS EMISSIONS: ANNUAL REDUCTIONS

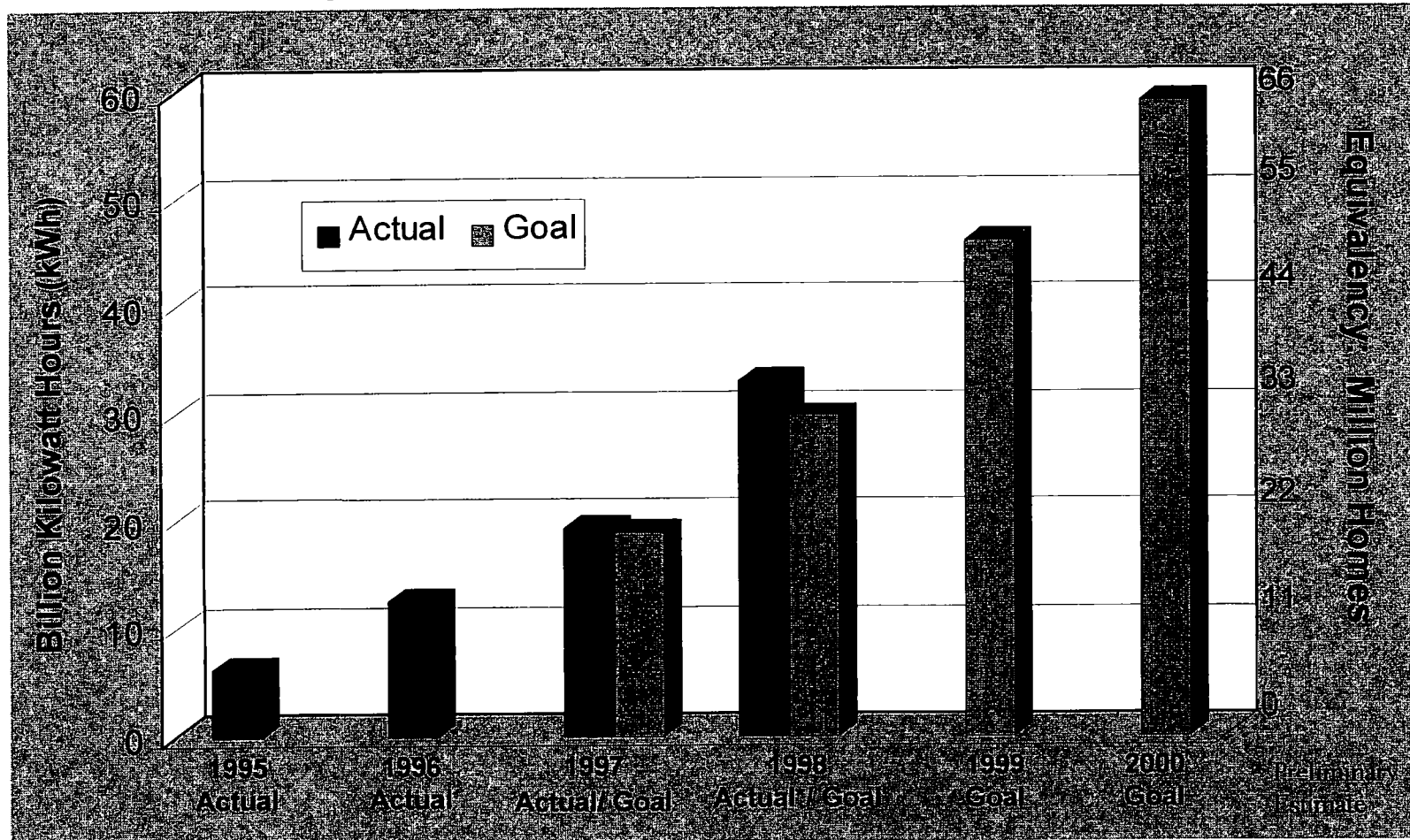
1998 reductions were equivalent to eliminating the greenhouse gas emissions from 22 million cars for the year.



EPA's Climate Programs have prevented 260 million tons of greenhouse gas emissions since 1995.

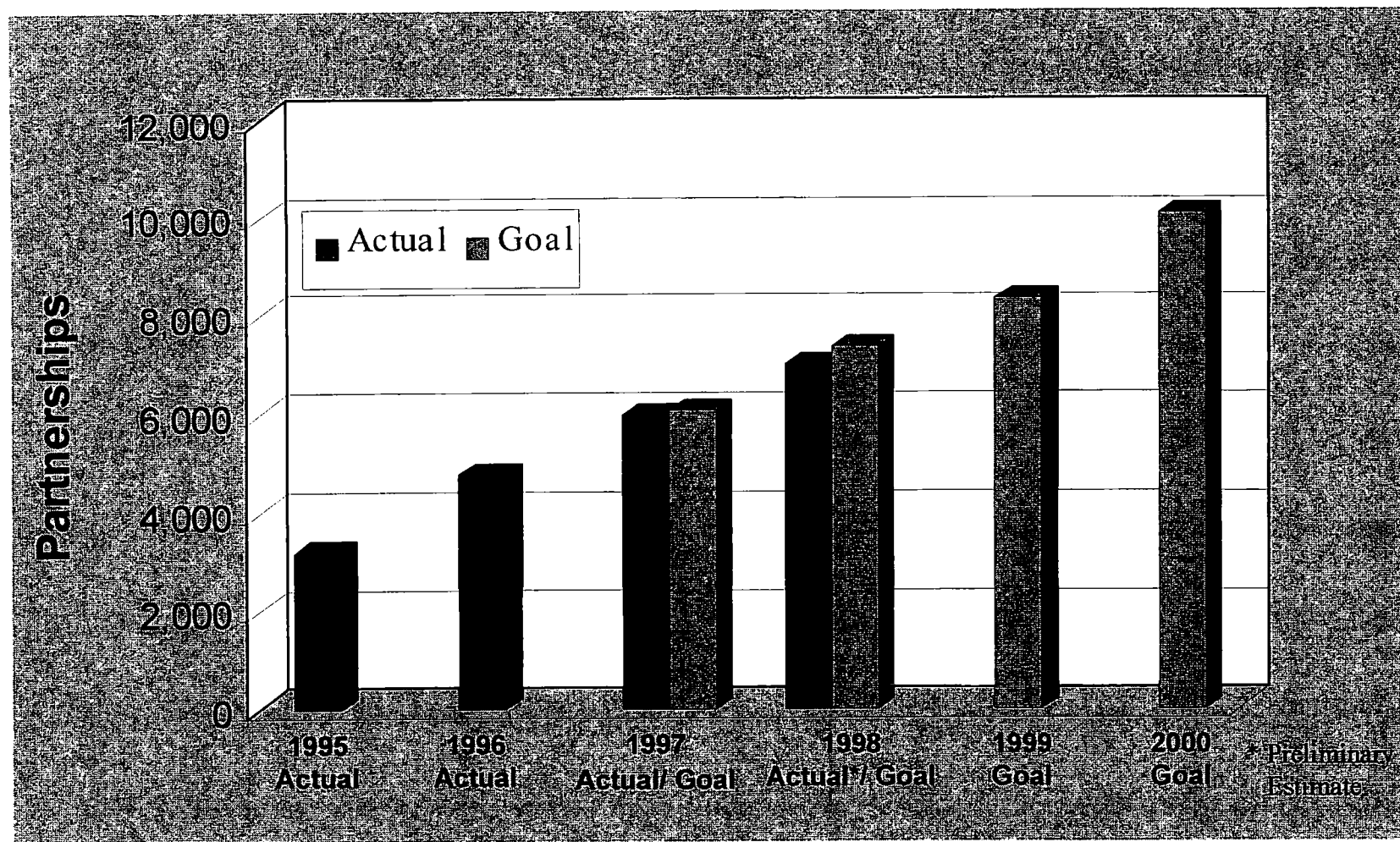
ANNUAL ENERGY SAVINGS

In 1998, EPA's climate technology programs saved enough energy to light 35 million homes for the entire year.



EPA's Climate Programs have saved 70 billion kilowatt hours of electricity since 1995.

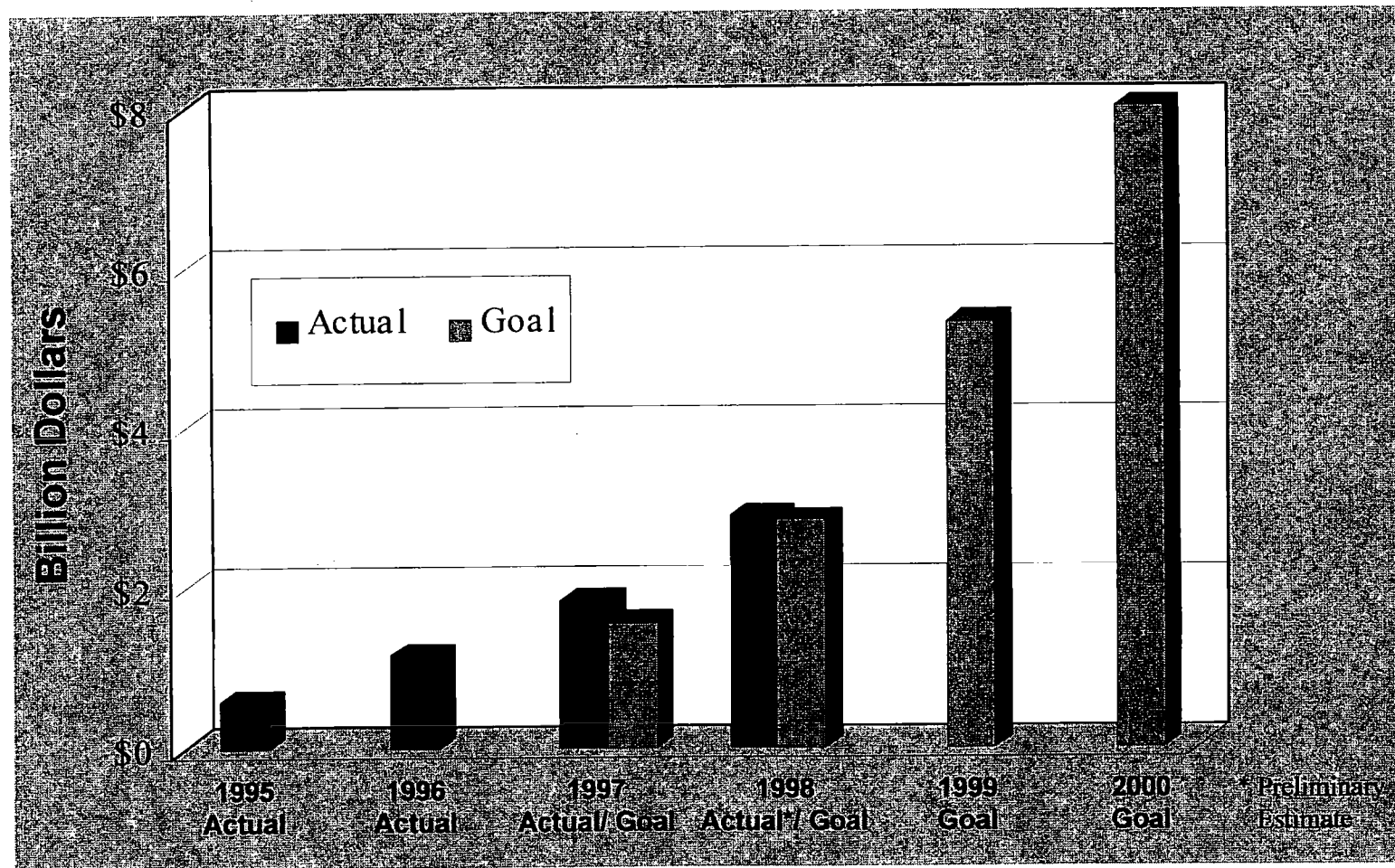
NUMBER OF EPA PARTNERSHIPS WITH SMALL AND LARGE BUSINESSES, SCHOOLS, HOSPITALS, AND STATE & LOCAL GOVERNMENTS



Since 1995, EPA has formed 7,000 partnerships with small and large businesses, schools, hospitals, and state and local government agencies.

ANNUAL ENERGY BILL SAVINGS TO FAMILIES, SCHOOLS AND BUSINESSES

Since 1995, EPA's programs have helped schools and universities save over \$200 million, enough money to buy 4 million text books or hire 4,000 teachers.



EPA's Climate Programs Have Saved U.S. Families and Businesses \$6.5 billion since 1995.

Clean Air Partnership Fund

To help protect public health and ease the threat of global warming, President Clinton is proposing \$200 million for the creation of a new Clean Air Partnership Fund. The Fund will provide grants to states, localities, and tribes to support state, local, tribal, and private efforts that achieve reductions in both greenhouse gas emissions and ground-level air pollutants. The Fund will be administered by the Environmental Protection Agency (EPA) under existing authority.

- ***Integrated Pollution Control.*** The Fund will stimulate integrated, cost-effective pollution control strategies. It directs new resources to state, local, and tribal governments to finance projects and programs that achieve accelerated reductions in both air pollutants, such as soot, smog, and air toxics, and in greenhouse gases.
- ***A Quicker Path to Cleaner Air.*** By providing new resources for projects that accelerate pollution reductions, the Fund will enable communities to achieve multi-pollutant clean air goals sooner and reduce greenhouse gas emissions at the same time.
- ***Technological Innovation.*** The Fund will help spur both public and private sector innovations in next-generation pollution control technology.
- ***A Magnet for Local Investment & Innovation.*** The Fund will encourage public-private partnerships to demonstrate ways to create a cleaner environment at the local level. The Fund can be used to support local revolving funds, low-interest loan programs, matching grants, and other mechanisms that will leverage the original Federal investment, greatly increasing its impact.
- ***"Win-Win" Clean Air Projects.*** The Fund will support a wide range of practical projects that will mean cleaner air, reduced greenhouse gas emissions, and real savings for taxpayers and consumers. These could include projects such as building combined heat and power facilities that put waste heat to work, reducing emissions of both sulfur dioxide and carbon dioxide; retrofitting municipal buildings to make them more energy efficient, reducing pollution resulting from electricity generation; and upgrading municipal vehicle fleets to make them more fuel efficient.

President Clinton's FY 2000 Climate Change Budget

The President's climate change package for FY 2000 totals over \$4.1 billion -- an increase of more than \$1 billion (34 percent) from the amount enacted for FY 1999. It is comprised of a new Clean Air Partnership Fund to boost state and local efforts to reduce both greenhouse gases and ground-level air pollutants; the Climate Change Technology Initiative, which mixes tax incentives and direct spending to spur the research, development, and deployment of energy efficient technology and renewable energy; other climate-related investments, such as R&D of highly efficient technologies for the combustion and use of coal and natural gas, weatherization, and state energy grants; and the United States Global Change Research Program, to enhance our understanding of the human and natural forces that influence the Earth's climate system.

Table 1. Climate-Change-Related Domestic Programs (\$ in Millions)

	FY 1999 Enacted	FY 2000 Request	Change
Clean Air Partnership Fund	0	200	+200
Climate Change Technology Initiative--tax incentives	--	383*	+383
Climate Change Technology Initiative--spending	1,021	1,368	+347
Other Climate-Related Investments (cleaner coal & natural gas; weatherization; state energy grants)	387	400	+13
Global Change Research Program	1,681	1,786	+105
TOTAL	3,090	4,137	+1,048

*First year of a proposed five year, \$3.6 billion package.

Clean Air Partnership Fund

To help protect public health and ease the threat of global warming, President Clinton is proposing \$200 million for the creation of a new Clean Air Partnership Fund. The Fund will provide grants to states, localities, and tribes to support state, local, tribal, and private efforts that achieve reductions in both greenhouse gas emissions and ground-level air pollutants. The Fund will be administered by the Environmental Protection Agency (EPA) under existing authority.

- ***Integrated Pollution Control.*** The Fund will stimulate integrated, cost-effective pollution control strategies. It directs new resources to state, local, and tribal governments to finance projects and programs that achieve accelerated reductions in both air pollutants, such as soot, smog, and air toxics, and in greenhouse gases.
- ***A Quicker Path to Cleaner Air.*** By providing new resources for projects that accelerate pollution reductions, the Fund will enable communities to achieve multi-pollutant clean air goals sooner and reduce greenhouse gas emissions at the same time.
- ***Technological Innovation.*** The Fund will help spur both public and private sector innovations in next-generation pollution control technology.
- ***A Magnet for Local Investment & Innovation.*** The Fund will encourage public-private partnerships to demonstrate ways to create a cleaner environment at the local level. The Fund can be used to support local revolving funds, low-interest loan programs, matching grants, and other mechanisms that will leverage the original Federal investment, greatly increasing its impact.
- ***“Win-Win” Clean Air Projects.*** The Fund will support a wide range of practical projects that will mean cleaner air, reduced greenhouse gas emissions, and real savings for taxpayers and consumers. These could include projects such as building combined heat and power facilities that put waste heat to work, reducing emissions of both sulfur dioxide and carbon dioxide; retrofitting municipal buildings to make them more energy efficient, reducing pollution resulting from electricity generation; and upgrading municipal vehicle fleets to make them more fuel efficient.

Climate Change Technology Initiative: \$3.6 Billion in Tax Incentives

The President is proposing a new \$3.6 billion package in tax incentives over five years to help reduce greenhouse gas emissions by spurring the purchase of energy efficient products and the use of renewable energy (see Table 2).

	Revenue Effect	
	FY 2000	Total FY00-04
Homes and Buildings		
Provide tax credit for energy efficient building equipment	-0.2	-1.5
Provide tax credit for new energy efficient homes	-0.1	-0.4
Provide tax credit for rooftop solar systems	--*	-0.1
Vehicles		
Extend tax credit for electric or fuel cell vehicles and provide tax credits for highly fuel efficient hybrid vehicles	0	-0.9
Renewable Energy		
Extend tax credit for electricity produced from wind and biomass; expand eligible biomass sources; and include coal-biomass cofiring	--*	-0.3
Industry		
Provide tax credit for combined heat and power systems	-0.1	-0.3
TOTAL**	-0.4	-3.6

*Less than \$50 million.

**Total may not add due to rounding.

HOMES AND BUILDINGS

- ***Tax credit to consumers who purchase new energy efficient homes.*** To encourage the purchase of new energy efficient homes, consumers would receive a tax credit of \$1,000 for homes purchased from 2000-2001 that are at least 30 percent more energy efficient than the standard under the 1998 International Energy Conservation Code (IECC); a credit of \$1,500 for homes purchased from 2000-2002 that are at least 40 percent more efficient than the IECC standard; and a credit of \$2,000 for homes purchased from 2000-2004 that are at least 50 percent more efficient than the IECC standard.
- ***Tax credit for energy efficient equipment in new and existing homes or buildings.*** This credit will encourage the purchase of electric heat pump and natural gas water heaters, electric and natural gas heat pumps, advanced central air conditioners, and fuel cells. The credit would apply to both residential and commercial equipment. For electric heat pump water heaters, natural gas heat pumps, and fuel cells, the credit would be 20 percent of the cost of the investment, subject to a cap, for equipment purchased from 2000-2003. For all other equipment, the credit would be 10 percent of the cost of the investment, subject to a cap, at one level of efficiency (2000-2001) and 20 percent, subject to a cap, at a higher level of efficiency (2000-2003).
- ***Tax credit for rooftop solar systems.*** A 15 percent tax credit will encourage the purchase by consumers and businesses of rooftop solar systems. The maximum credit would be \$2,000 for rooftop photovoltaic systems placed in service from 2000-2006 and \$1,000 for solar water heating systems placed in service from 2000-2004.

VEHICLES

- ***Tax credits for highly efficient cars and light trucks.*** Cars and light trucks (including minivans, sport utilities, and pickups) currently account for 20 percent of greenhouse gas emissions. Tax credits for electric, fuel cell, and hybrid vehicles will help to move these highly efficient technologies from the laboratory to the highway. These technologies can significantly reduce emissions of carbon dioxide, the most prevalent greenhouse gas.
- ***Extend the current tax credit for electric vehicles and fuel cell vehicles.*** Under current law, a 10 percent credit, up to \$4,000, is provided for the cost of qualified electric vehicles and fuel cell vehicles. The credit begins to phase down in 2002 and phases out in 2005. The President's proposal would extend the tax credit at its \$4,000 maximum level through 2006.

- **Tax credits for hybrid vehicles.** The credit -- available for all qualifying vehicles, including cars, minivans, sport utility vehicles, and pickup trucks -- would be:
 - \$1,000 for each vehicle that is one-third more fuel efficient than a comparable vehicle in its class -- available from 2003-2004;
 - \$2,000 for each vehicle that is two-thirds more fuel efficient than a comparable vehicle in its class -- available from 2003-2006;
 - \$3,000 for each vehicle that is twice as fuel efficient as a comparable vehicle in its class -- available from 2004-2006; and,
 - \$4,000 for each vehicle that is three times as fuel efficient as a comparable vehicle in its class -- available from 2004-2006.

RENEWABLE ENERGY

- ***Tax credit for electricity produced from wind.*** Current law encourages the production of electricity from wind, which emits no greenhouse gases, through a tax credit of 1.5 cents per kilowatt hour (adjusted for inflation after 1992). The current tax credit covers facilities placed in service before July 1, 1999. The President proposes a 5-year extension of this tax credit.
- ***Tax credits for electricity produced from biomass.*** Biomass refers to trees, crops and agricultural wastes used to produce power, fuels or chemicals. This package of credits would:
 - **Extend current biomass credit.** This proposal extends for five years the current 1.5 cent per kilowatt hour tax credit (adjusted for inflation after 1992), which covers facilities placed in service before July 1, 1999.
 - **Expand definition of eligible biomass.** This proposal expands the definition of biomass eligible for the 1.5 cent tax credit to include certain forest-related resources and agricultural and other sources.
 - **Include cofiring biomass and coal.** This proposal adds a 1.0 cent per kilowatt hour tax credit for electricity produced by cofiring biomass in coal plants.

INDUSTRY

- ***Tax credit for combined heat and power (CHP) systems.*** CHP systems make effective use of thermal energy that is otherwise wasted in producing electricity by more conventional methods. To encourage and accelerate investment in CHP equipment, this proposal provides an 8 percent tax credit for investments in large CHP systems that have a total energy efficiency exceeding 70 percent and in smaller systems that have a total energy efficiency exceeding 60 percent. The credit would apply to property placed in service from 2000-2002.

Climate Change Technology Initiative: \$1.4 Billion for Energy Efficiency & Renewables

The President's FY 2000 budget proposes nearly \$1.4 billion for the research, development, and deployment of renewable energy technologies and energy efficient products that will help reduce U.S. greenhouse gas emissions. This represents a \$347 million increase (34 percent) over FY 1999 spending (see Table 3). The President's proposed investment package covers the four major carbon-emitting sectors of the economy -- buildings, transportation, industry, and electricity -- as well as carbon sequestration (see Table 4). The following sections highlight selected programs in each of these areas of effort. The full agency programs extend well beyond what is described here.

Table 3. CCTI Funding by Agency (\$ in Millions)

	FY 1998 Enacted	FY 1999 Enacted	FY 2000 Request	Change from 1999
Energy	729	902	1,124	+222
EPA	90	109	216	+107
Housing & Urban Development	0	10	10	0
Agriculture	0	0	16	+16
Commerce	0	0	2	+2
TOTAL*	819	1,021	1,368	+347

*Totals may not add due to rounding

Table 4. CCTI Funding by Area of Activity (\$ in Millions)

	FY 1998 Enacted	FY 1999 Enacted	FY 2000 Request	Change from 1999
Buildings	140	172	273	+101
Transportation	245	291	377	+86
Industry	157	188	239	+51
Electricity	239	310	379	+69
Carbon Sequestration	0	14	39	+25
Management, Planning & Analysis	37	46	60	+14
TOTAL*	819	1,021	1,368	+347

* Totals may not add due to rounding.

BUILDINGS

- ***Partnership for Advancing Technology in Housing (PATH).*** PATH is a partnership between the Federal government and building industry to develop and deploy housing technologies to make new homes 50 percent more energy efficient and to make at least 15 million existing homes 30 percent more energy efficient within a decade.
- ***Energy Efficient Appliances and Products.*** Various DOE and EPA programs aim to promote the dissemination of energy efficient appliances and products:

- DOE will accelerate its program to establish **energy efficiency standards for lighting and appliances.**

- EPA and DOE's **Energy Star Products** program saves consumers money and reduces greenhouse gas emissions at the same time by promoting the use of energy efficient products -- everything from computers to refrigerators to central air-conditioning units. New funding will support the launch of new Energy Star product lines.

- ***Energy Efficient Commercial Buildings.*** DOE and EPA work in partnership with industry to research, develop, and deploy new technologies and practices to improve the energy performance of commercial buildings. Buildings in the top 25 percent in energy efficiency qualify for EPA's "**Energy Star Buildings**" label. Participants include the Empire State Building, the World Trade Center, and Chicago's Sears Tower.
- ***Energy Smart Schools.*** Announced in October 1998, this initiative cuts across several DOE programs and brings together public and private sector resources to cut schools' energy bills so that the savings can be reinvested in students and their education.

TRANSPORTATION

- ***Partnership for a New Generation of Vehicles (PNGV).*** PNGV is a government-industry effort that aims to develop attractive, affordable cars that meet all applicable safety and environmental standards and get up to three times the fuel efficiency of today's cars. Since 1993, great strides have been made in producing lower-cost, light-weight materials, inexpensive fuel cells, and advanced internal combustion engines for use in hybrid vehicles. The program aims to produce a prototype mid-sized family car capable of 80 miles per gallon (mpg) with a two-thirds reduction in carbon emissions by 2004. The FY 2000 budget includes \$264 million for PNGV-related work, an increase of \$24 million over the amount appropriated for FY 1999.

- ***Light and Heavy Trucks.*** Similar government-industry efforts are aimed at developing cleaner, more efficient diesel engines for both light and heavy trucks.
 - By 2002, DOE aims to develop **advanced diesel cycle engine technologies** for pickup trucks, vans, and sport utility vehicles which achieve at least a 35 percent fuel efficiency improvement relative to current gasoline-fueled trucks while meeting strict emission standards.
 - By 2004, DOE, in coordination with EPA and the Department of Defense, aims to develop **engine and vehicle technologies for heavy trucks** that will increase the fuel economy to 12 mpg from the current average of 5.3 mpg.
- ***Biofuels.*** Working with the Department of Agriculture (USDA), DOE will continue its work in the biochemistry of converting wood chips, grasses, agricultural wastes, and other products into ethanol and other potentially useful fuels.

INDUSTRY

- ***Industries of the Future.*** This DOE program works cooperatively with the nation's most energy-intensive industries -- such as aluminum, glass, chemicals, forest products, mining, petroleum refining, and steel -- on developing technologies that increase energy and resource efficiency. Promising collaborative efforts include improvements in the process of making steel, pulp and paper, and other energy-intensive products that could dramatically increase efficiency, lower greenhouse gas emissions, and improve competitiveness.
- ***Industrial Combined Heat and Power (CHP) Systems.*** DOE is developing new industrial CHP systems to capture thermal heat would otherwise be wasted. These systems are expected to be 15 percent more energy efficient and 80 percent cleaner than conventional power systems and cut electricity costs by 10 percent. In addition, EPA and DOE are also working to eliminate barriers to the rapid dissemination of combined heat and power technology.
- ***Voluntary Industrial Partnerships.*** EPA will expand its industry partnership programs, such as **Climate Wise** and the **Voluntary Aluminum Industrial Partnership**, to encourage businesses to take advantage of cost-effective emissions reductions opportunities -- including emissions of the most potent greenhouse gases, such as methane, perfluorocarbons (PFCs), hydrofluorocarbons (HFCs), and sulfur hexafluoride (SF6).

- ***Agriculture and Forestry.*** USDA will undertake R&D and support demonstration projects aimed at both lowering greenhouse gas emissions from agriculture and forestry and reducing their vulnerability to climate change.

--The **Natural Resources Conservation Service** will invest \$3 million in projects to demonstrate and test various means of reducing greenhouse gas emissions in agriculture, such as compost-based waste-handling facilities, rotational grazing systems, and improved feed and forage systems.

--The **Agricultural Research Service** will devote \$7 million towards climate change related activities, including the development of new technology and expertise for reducing agriculture's vulnerability to a changing climate. Field experiments will seek to measure various potential effects of climate change, such as varying amounts and patterns of rainfall on forage production.

The FY 2000 budget also includes important USDA funding for developing advanced biomass energy technologies; R&D and demonstration projects for carbon sequestration; research to study the role of farms, forests, and other natural or managed lands in capturing and storing carbon; and a comprehensive U.S. soil carbon inventory (see pp. 10-12 below).

ELECTRICITY

- ***Photovoltaic Energy Systems.*** Over the past 20 years, Federal R&D has resulted in a 90 percent cost reduction in solar photovoltaics. DOE will accelerate R&D of the next generation photovoltaic cells; increase manufacturing R&D; increase research in buildings-integrated applications; and fund efforts to develop new, unconventional technologies.

-- **Million Solar Roofs.** In June, 1997, the President announced an initiative to encourage the installation of one million solar systems by 2010, which would reduce carbon emissions equivalent to the annual emissions from 850,000 cars. DOE has received commitments for over half a million solar rooftop installations.

- ***Biomass.*** Biomass represents a tremendous renewable resource whose use can help strengthen our energy security, protect the environment, and enhance our rural economy.

-- **Biomass Power.** DOE is testing and demonstrating biomass co-firing with coal; developing advanced technologies for biomass gasification using paper industry by-products; and developing and testing high-yield, low-cost biomass feedstocks.

-- **Advanced Biomass Technologies.** This year DOE, USDA, and other Federal agencies and private partners will launch a national partnership to develop advanced integrated biomass technologies. These technologies will enable the production of power, transport fuels, and high-value chemicals from biomass feedstocks.

- **Wind Power.** DOE will continue developing a next-generation wind turbine able to produce power at 2.5 cents per kilowatt-hour in good wind regions, accelerate R&D on critical components, and accelerate testing and field validation.
- **Hydrogen.** DOE will accelerate research on low-cost hydrogen production and storage, prerequisites to the widespread use of hydrogen as a fuel.
- **High Temperature Superconductivity.** DOE supports industry-led projects to capitalize on recent breakthroughs in superconducting wire technology, aimed at developing devices such as advanced motors, power cables, and transformers. These technologies would allow more electricity to reach the consumer without an increase in fossil fuel input.

CARBON SEQUESTRATION

- **R&D for Sequestration.** Research initiatives are being funded to find ways to sequester (store) carbon. Examples include:
 - **Enhancing Forest and Farmland Sinks.** The Forest Service, in conjunction with other USDA agencies, will spend \$6 million for R&D and demonstration projects for optimizing forest, farmland, and rangeland carbon sinks. The focus of such projects will include storage of carbon in forest soils and increased durability and use of wood products to sequester carbon.
 - **Enhancing natural geological and oceanic processes.** DOE will support research into the feasibility of capturing and storing carbon dioxide in underground geological structures and in the deep ocean.

Other Climate-Related Investments

There are a number of additional programs for which funding is proposed in the FY 2000 budget that -- while not part of the Climate Change Technology Initiative per se -- contribute to improving energy efficiency and reducing greenhouse gas emissions. These programs include:

- ***Cleaner Coal and Natural Gas.*** The FY 2000 budget includes \$209 million to support the Department of Energy's (DOE) aggressive R&D effort to develop next-generation technologies for the combustion and use of coal and natural gas. For example, research and development of two new coal combustion technologies -- integrated gasification combined cycle and pressurized fluidized bed combustion -- could lead to ultra-high efficiency coal plants with dramatically lower greenhouse gas emissions.
- ***Low Income Weatherization and State Energy Grants.*** These DOE programs facilitate energy efficiency investments at the State and local level. The **Weatherization Assistance Program**, for example, delivers energy conservation services, such as insulation, to low-income Americans, reducing energy costs for consumers, improving health and safety, and reducing carbon emissions. The total FY 2000 budget request for these two programs is \$191 million -- a \$25 million increase over FY 1999 appropriations.
- ***Agricultural & Forestry Conservation Programs.*** Many Department of Agriculture conservation programs have the co-benefit of reducing carbon emissions resulting from agriculture and forestry and enhancing the ability of "sinks," such as forests and farmlands, to sequester or store carbon. This includes programs such as the **Conservation Reserve Program**, the **Environmental Quality Incentives Program**, and the **Farmland Protection Program**. In general, these programs assist farmers, ranchers, and other landowners in conserving and improving soil, water, and other natural resources associated with rural land.

U.S. Global Change Research Program

The United States Global Change Research Program (USGCRP) seeks to provide a sound scientific understanding of both the human and natural forces that influence the Earth's climate system. The information produced by USGCRP's scientists is used by national and international policy makers to make informed decisions on global change issues. This multi-agency scientific research program coordinated through the National Science and Technology Council.

For FY 2000, the President is requesting nearly \$1.8 billion for the USGCRP, an increase of \$105 million, or 6 percent, above the amount enacted for FY 1999. Of the FY 2000 budget request, \$828 million is for scientific research (up \$84 million) and \$958 million is for NASA's development of climate monitoring satellites and ground based observation systems. Other important USGCRP budget highlights include:

- ***Carbon Cycle Initiative.*** The FY 2000 budget request establishes a new multi-agency initiative to improve our understanding of how carbon cycles between the atmosphere, the oceans, and land. Included in this request are funds to study the role of farms, forests, and other natural or managed lands in capturing carbon. Such carbon "sinks" may provide the U.S. and other nations with new tools for offsetting greenhouse gas emissions. The initiative includes \$10 million in new funding for the Department of Agriculture (USDA) and \$5 million for the Department of Energy.
- ***Soil Carbon Inventory.*** The FY 2000 budget request includes \$14 million (an increase of \$12 million from FY 1999 appropriations) to significantly expand efforts to conduct a comprehensive scientific inventory of carbon stored in U.S. soils and to develop methods to predict how soil carbon levels would be affected by different practices and policies. The inventory will be conducted by USDA's Natural Resources Conservation Service.
- ***3-Dimensional Mapping of Forests.*** The FY 2000 budget provides funding to launch NASA's Vegetation Canopy Lidar, which, for the first time, will give scientists a three dimensional view of the Earth's forests to help determine the contribution of forests in sequestering atmospheric carbon.
- ***Consequences of Climate Change.*** The FY 2000 budget provides funding to complete a report on the first national assessment of the potential consequences of climate change on the United States. The report will identify potential impacts on key economic sectors and geographic regions, mitigation and adaptation strategies, and provide technical information for policy makers.
- ***Regional Variability.*** The FY 2000 budget request includes funding to help scientists examine climate change and variability on a regional scale. Supported in part by the Administration's new Information Technology Initiative, the funding will help improve U.S. computer capabilities to run the complex models required to understand the effects of climate change and variability at the regional level.

Agriculture and The President's FY 2000

Climate Change Budget

Farmland, rangeland, and forests can play a critical role in meeting the challenge of global warming through carbon sequestration and renewable bioenergy. In his FY 2000 budget, the President is proposing \$251 million in funding for sequestration and bioenergy research, development, and deployment. This includes \$105 million for the Department of Agriculture (USDA), a \$50 million increase over the amount appropriated for FY 1999, and \$146 million for the Department of Energy (DOE), a \$59 million increase over FY 1999 appropriated funds. Highlights include:

SEQUESTRATION

Carbon sequestration refers to the storage of carbon from the atmosphere by soils, trees, crops, and other plants.

- **Demonstration Projects and New R&D.** The Forest Service, the Agriculture Research Service and the Natural Resources Conservation Service will launch new R&D and demonstration projects to optimize farmland, rangeland, and forest carbon sinks.
- **Carbon Cycle Initiative.** The FY 2000 budget request establishes a new multi-agency initiative to improve our understanding of how carbon cycles between the atmosphere, the oceans, and land. Included in this request are funds to study the role of farms, forests, and other natural or managed lands in capturing carbon. Such carbon "sinks" may provide the U.S. and other nations with new tools for offsetting greenhouse gas emissions. The initiative includes \$10 million in new funding for USDA and \$5 million for DOE.
- **Soil Carbon Inventory.** The FY 2000 budget request includes \$14 million to significantly expand efforts to conduct a comprehensive scientific inventory of carbon stored in U.S. soils and to develop methods to predict how soil carbon levels would be affected by different practices and policies.

BIOENERGY

Biomass refers to trees, crops and agricultural wastes used to produce power, fuels or chemicals. It represents a tremendous renewable resource whose use can help strengthen our energy security, protect the environment, and enhance our rural economy.

- **Biomass Power and Fuels.** DOE and USDA will continue developing, testing, and demonstrating high-yield, low-cost biomass feedstocks; testing and demonstrating biomass cofiring with coal; and seeking to produce alternative fuels, such as ethanol, from biomass.
- **Advanced Biomass Technologies.** This year, DOE, USDA and other Federal agencies and private partners will launch a national partnership to develop advanced integrated biomass technologies.
- **Biomass Tax Credit.** The President's tax package proposes to extend for 5 years the current 1.5 cent per kilowatt hour tax credit for electricity produced from biomass. The proposal also expands the types of biomass eligible for the credit to include certain forest-related, agricultural and other resources. Finally, the package includes a 1.0 cent per kilowatt hour tax credit for electricity produced by cofiring biomass in coal plants.



American Council for an Energy-Efficient Economy

WASHINGTON, DC

March 17, 1999

The Honorable Christopher S. Bond
274 Senate Russell Office Building
United States Senate
Washington, DC 20510

Dear Senator Bond:

As the Senate prepares to take up S. 544, the FY 1999 Emergency Supplemental Appropriations and Rescissions Bill, we are writing to express our strong opposition to the proposed rescission of \$10 million in funding for energy efficiency technology programs at the Environmental Protection Agency.

The funds now proposed for rescission have been appropriated to provide information and technical support for companies, communities, and consumers to voluntarily reduce energy consumption through the use of efficient technologies. The EPA has developed a working partnership with manufacturers, retailers, and installers on labeling and rating systems for commercial buildings, building components, and energy-using equipment. This work has already achieved substantial results through the hugely successful Green Lights and Energy Star programs, and is being expanded to assist schools and health care facilities to realize the benefits of energy efficiency.

Saving energy through technical innovation creates American jobs, saves consumers and companies money, and improves air quality. We urge you not to withdraw your support for these important objectives.

Sincerely,

A handwritten signature in cursive script that reads 'Howard Geller'.

Howard Geller
Executive Director
American Council for an
Energy-Efficient Economy

Michael Marvin
Executive Director
Business Council for Sustainable Energy

David Nemtzw
President
Alliance to Save Energy

John Adams
President
Natural Resources Defense Council

Ed Reid
Executive Director
American Gas Cooling Center

Howard Ris
Executive Director
Union of Concerned Scientists



122 C St., NW, Fourth Floor
Washington, D.C. 20001
(202) 383-2500 Fax (202) 383-2505

FAX TRANSMITTAL

Roger
Bollentine

note:

Sen. Hagel (NE)
signed.

FAX:

FROM:

Jaime Stove 383-2506

DATE:

5/18

PAGE(S)

(including cover sheet)

Please respond by calling:

main line: 202-383-2500

fax #: 202-383-2505

202-383-2

MESSAGE:

Re: FY 2000 Renewable Energy Approps.

Jeffords/Roth/Bingaman/Allord Letter

to Ch. Domenici + Sen. Reid (NV)

→ 54 signers (13 R, 41 D)
(last year's letter had 42 signers)

AWEA, formed in 1974, is the national trade association of the U.S. wind energy industry. The association's membership of more than 700 includes turbine manufacturers, wind project developers, utilities, academicians, and interested individuals from 49 states. More information on wind energy is available at the AWEA web site: <http://www.econet.org/awea>, or email: windmail@awea.org

- Jaime

To:
From: Jaime Steve
Re: Jeffords/Allard/Bingaman/Roth FY 2000 Renewables Approps letter
Date: May 17, 1999 (Delivered to Sens. Domenici & Reid (NV) on May 17)

<u>Allard (R-CO)</u>	Lautenburg (D-NJ)
Akaka (D-HI)	Leahy (D-VT)
Bayh (D-IN)	Levin (D-MI)
Baucus (D-MT)	Lieberman (D-CT)
Biden (D-DE)	Lincoln (D-AR)
<u>Bingaman (D-NM)</u>	<u>Lugar (R-IN)</u>
Boxer (D-CA)	Mikulski (D-MD)
Breaux (D-LA)	Moynihan (D-NY)
Bryan (D-NV)	Murray (D-WA)
Chafee (R-RI)	Reed (D-RI)
Cleland (D-GA)	Robb (D-VA)
Collins (R-ME)	Rockefeller (D-WV)
Conrad (D-ND)	<u>Roth (R-DE)</u>
Daschle (D-SD)	Sarbanes (D-MD)
Dodd (D-CT)	Schumer (D-NY)
Dorgan (D-ND)	G. Smith (R-OR)
Durbin (D-IL)	Snowe (R-ME)
Edwards (D-NC)	Specter (R-PA)
Feingold (D-WI)	Torricelli (D-NJ)
Feinstein (D-CA)	Wellstone (D-MN)
Gorton (R-WA)	Wyden (D-OR)
Graham (D-FL)	
Grams (R-MN)	
Grassley (R-IA)	
Hagel (R-NE)	
Harkin (D-IA)	Repub. 13
<u>Jeffords (R-VT)</u>	
Johnson (D-SD)	<u>Dem. 41</u>
Kennedy (D-MA)	
B. Kerrey (D-NE)	Total 54
J. Kerry (D-MA)	
Kohl (D-WI)	
Landrieu (D-LA)	

**WIND/ SOLAR/ BIOMASS/ GEOTHERMAL/ HYDROGEN/ HYDROPOWER
RENEWABLES BUDGET LETTER**

54 SIGNATURES

James M. Jeffords
Wayne Allard
Slade Gorton
Arlen Specter
John H. Chafee
Richard G. Lugar
Susan M. Collins
Charles E. Grassley
Olympia J. Snowe
Rod Grams
Joseph R. Biden, Jr.
Max Cleland
John F. Kerry
Barbara Boxer
Joseph I. Lieberman
Jack Reed
Daniel Patrick Moynihan
John D. Rockefeller IV
Ron Wyden
Russell D. Feingold
Charles S. Robb
Herb Kohl
Daniel K. Akaka
Carl Levin
John B. Breaux
Max Baucus
Barbara A. Mikulski

William V. Roth, Jr.
Jeff Bingaman
Tom Daschle
Dianne Feinstein
Edward M. Kennedy
Tom Harkin
Charles E. Schumer
Mary L. Landrieu
Patrick J. Leahy
J. Robert Kerrey
Patty Murray
Tim Johnson
Blanche L. Lincoln
Frank R. Lautenberg
Richard J. Durbin
Paul Wellstone
Christopher J. Dodd
Paul S. Sarbanes
Robert G. Torricelli
Richard H. Bryan
Bob Graham
Evan Bayh
Gordon Smith
John Edwards
Kent Conrad
Byron L. Dorgan
Chuck Hagel

United States Senate

WASHINGTON, DC 20510

May 17, 1999

The Honorable Pete V. Domenici, Chairman
Subcommittee on Energy and Water Development
Committee on Appropriations
United States Senate

Dear Chairman Domenici:

As you develop the FY2000 Energy and Water Appropriations bill, we ask that you consider supporting increases in funding for renewable energy -- solar, wind, biomass, hydrogen, geothermal, hydropower -- research and development programs. The Administration has proposed increasing obligations for renewables by 16% from \$384 million to \$446 million.

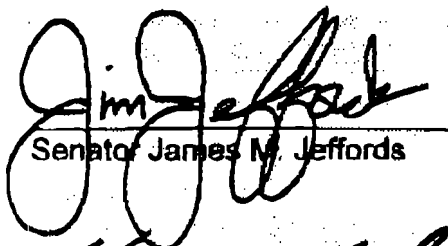
Investment in these renewable programs is important for several reasons. First, renewable energy research and development programs enhance fuel and technology diversity, thereby providing the United States with insulation from future oil price shocks and an oil supply dominated by the Middle East. Our national security is currently threatened by a heavy reliance on oil from abroad. U.S. dependence on imported oil has increased to record levels over the past 25 years. Net imports of oil currently account for 55% of total U.S. oil consumption and are expected to grow to over 70% by 2020, when potentially unstable Persian Gulf nations will account for over 64% of the world's oil exports. Petroleum imports accounted for \$62 billion of the U.S. foreign trade deficit in 1996--a number expected to reach \$180 billion per year by 2020.

Second, investments in renewable energy increase the U.S. market share of domestic and international markets for energy-supply products and permits the expansion of high technology jobs within the U.S. economy. It is estimated that the world market for energy supply equipment and construction over the next 30 years is in the range of several hundred billion dollars per year. America currently leads the world technologically in developing advanced renewable instruments and products. Research and development assistance has resulted in dramatic cost and performance improvements in wind turbines, helped to maintain America's dominance in solar technology development, and made it cheaper to produce ethanol from agriculture, forests and municipal waste. We should not surrender our lead to foreign competitors, who clearly recognize the potential market for clean and inexpensive renewable energy technologies.

page 2/ Senator Domenici

Renewable energy investments are critical to reduce our dependence on foreign sources of oil, expand U.S. markets, and create jobs. These are vital programs to maintain our nation's interests. Thank you for taking into account these high priority matters.

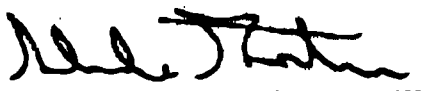
Sincerely,



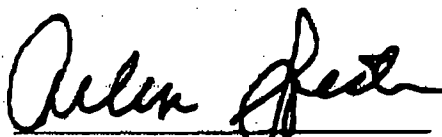
Senator James M. Jeffords



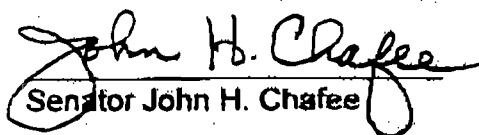
Senator Wayne Allard



Senator Slade Gorton



Senator Arlen Specter



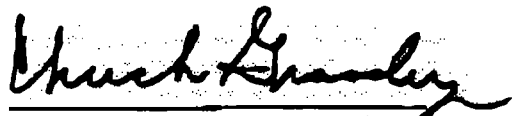
Senator John H. Chafee



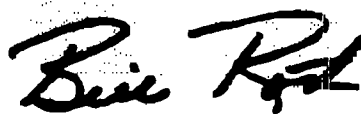
Senator Richard G. Lugar



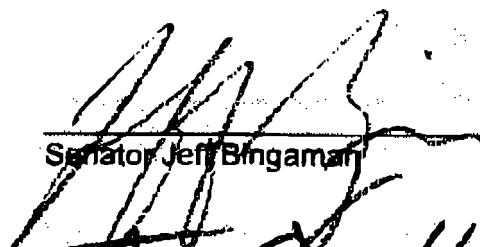
Senator Susan M. Collins



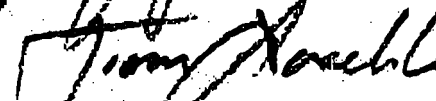
Senator Charles E. Grassley



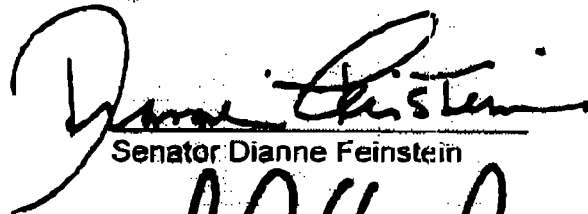
Senator William V. Roth, Jr.



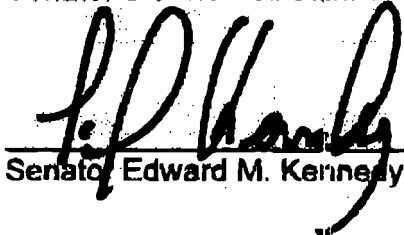
Senator Jeff Bingaman



Senator Tom Daschle



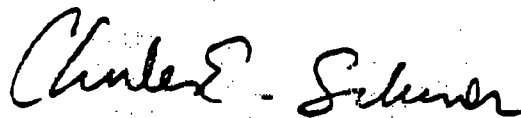
Senator Dianne Feinstein



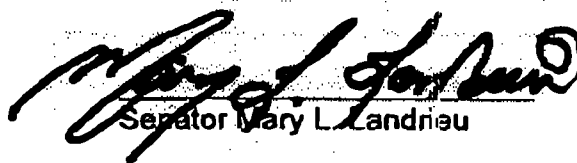
Senator Edward M. Kennedy



Senator Tom Harkin

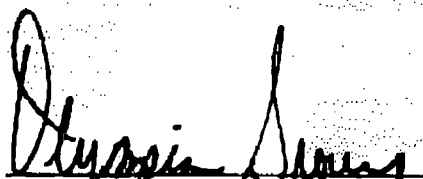


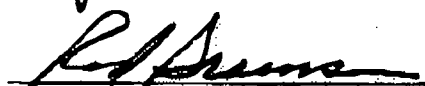
Senator Charles E. Schumer

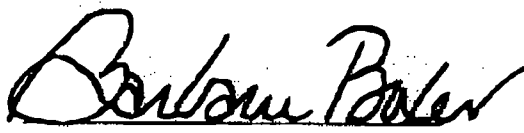


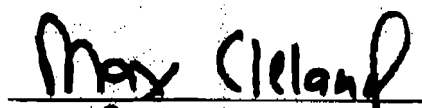
Senator Mary L. Landrieu

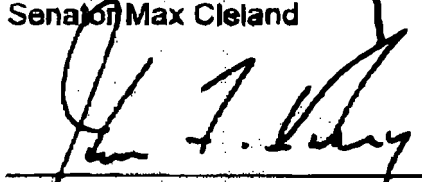
page 3/ Senator Domenici

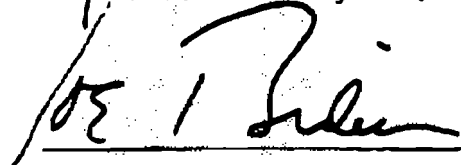

Senator Olympia J. Snowe

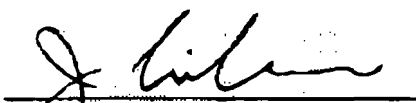

Senator Rod Grams

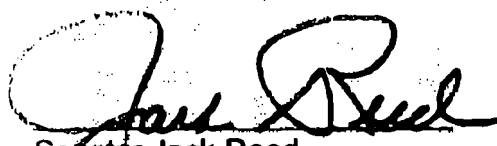

Senator Barbara Boxer

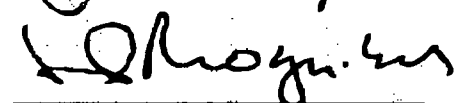

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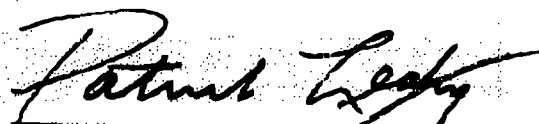

Senator John F. Kerry

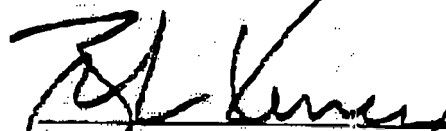

Senator Joseph R. Biden, Jr.

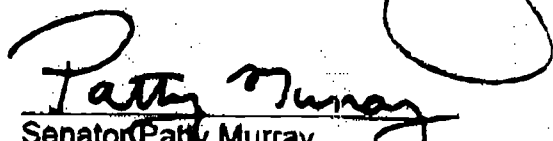

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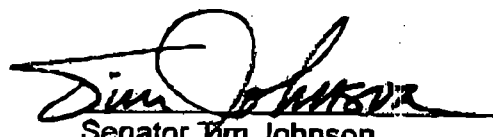

Senator Jack Reed

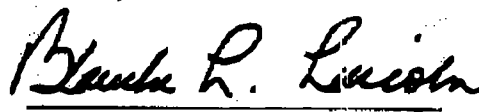

Senator Daniel Patrick Moynihan

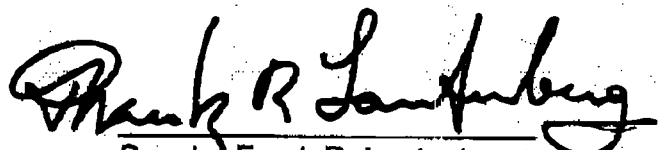

Senator Patrick J. Leahy


Senator J. Robert Kerrey

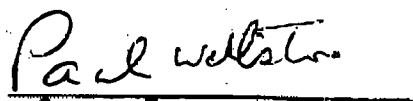

Senator Patty Murray

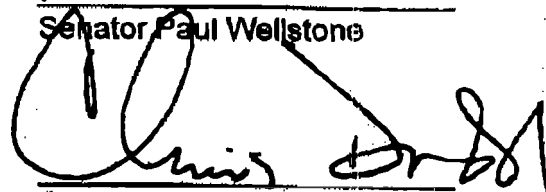

Senator Tim Johnson


Senator Blanche L. Lincoln

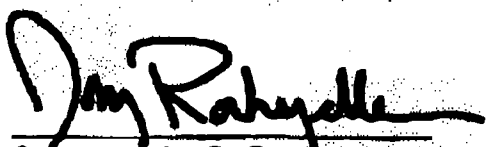

Senator Frank R. Lautenberg


Senator Richard J. Durbin

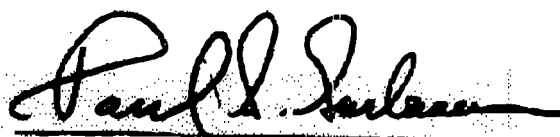

Senator Paul Wellstone


Senator Christopher J. Dodd

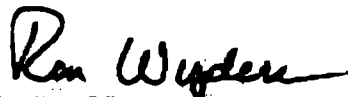
page 4/ Senator Domenici



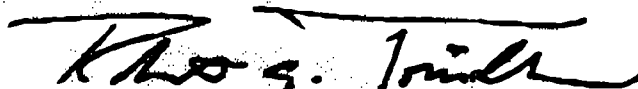
Senator John D. Rockefeller IV



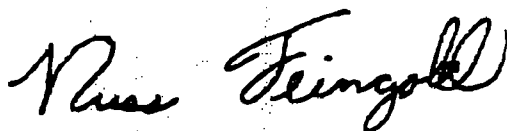
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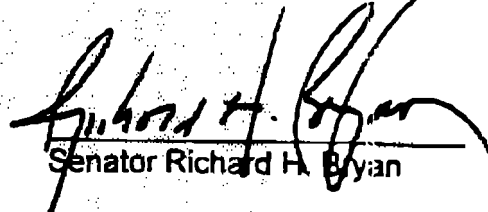
Senator Ron Wyden



Senator Robert G. Torricelli



Senator Russell D. Feingold



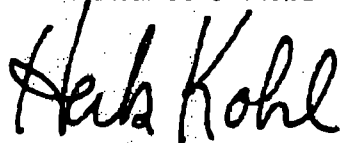
Senator Richard H. Bryan



Senator Charles S. Robb



Senator Bob Graham



Senator Herb Kohl



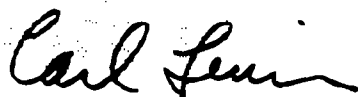
Senator Evan Bayh



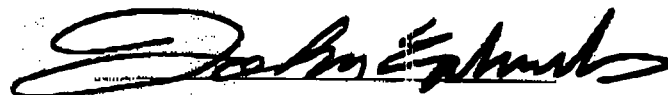
Senator Daniel K. Akaka



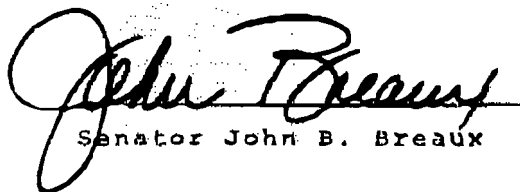
Senator Gordon Smith



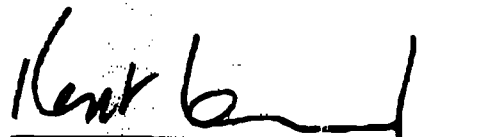
Senator Carl Levin



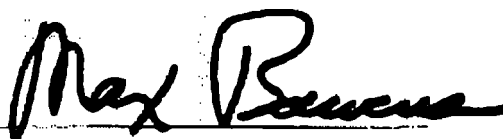
Senator John Edwards



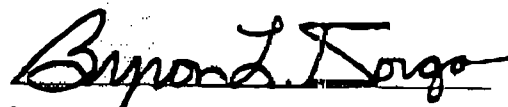
Senator John B. Breaux



Senator Kent Conrad



Senator Max Baucus



Senator Byron L. Dorgan

page 5/ Senator Domenici

Barbara A. Mikulski
Senator Barbara A. Mikulski

Chuck Hagel
Senator Chuck Hagel