

9-1-1993

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Recommended Citation

Salil P. Patel, *Reducing Carbon Dioxide Emissions to 1990 Levels by the Year 2000: What are the Options and Can the United States Achieve this Reduction Without Disrupting the Economy*, 3 Penn St. Envtl. L. Rev. (1993).

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**REDUCING CARBON DIOXIDE EMISSIONS TO 1990
LEVELS BY THE YEAR 2000:
WHAT ARE THE OPTIONS AND CAN THE UNITED STATES ACHIEVE THIS
REDUCTION WITHOUT DISRUPTING THE ECONOMY?**

I. Introduction

As society has technologically advanced in the twentieth century, so has the ability to predict. From election polls to economic outlooks to weather forecasts, technology has increased the value and accuracy of such prognostications. Nevertheless, the accuracy of many predictions is often questioned. As scientists continue to warn of the environmental threat of global warming, otherwise known as the greenhouse effect, their predictions are intensely debated. In short, the greenhouse effect is the climatic effect of the emissions of carbon dioxide (CO₂) and other gases generated by modern industrial activity.¹ Scientists believe that these emissions will raise the global average temperature and have serious consequences on society.² There are those who maintain that the threat of global warming is exaggerated and sensationalized while many others believe that the threat is real. The fact that the 1980s was the warmest decade on record³ has only furthered the maelstrom of heated discussion.

Recently, global warming has emerged as both a major scientific and political issue.⁴ In the United States, approximately 60% of the public display concern regarding this issue.⁵ Although many governments recognize the validity of the global warming phenomenon, controversy centers around what and how much to do about it. Because carbon dioxide is the major culprit in the greenhouse effect, contributing to 55% of global warming,⁶ its reduction has recently become a controversial issue. This comment will focus on whether it is feasible for the United States to reduce carbon dioxide emissions to 1990 levels by the year 2000 (the benefits versus the costs). Section II will discuss global warming and carbon dioxide. Section III will examine attempts to reduce carbon dioxide emissions. Section IV, the focus of this comment, will analyze the costs and benefits of various emissions reduction

1. Lewis D. Solomon & Bradley S. Freedberg, *The Greenhouse Effect: A Legal Policy Analysis*, 20 ENVTL. L. 83, 84 (1990). This comment focuses primarily on carbon dioxide emissions, the most prevalent greenhouse gas contributing to global warming.

2. Jeremy Leggett, *Introduction*, in *GLOBAL WARMING: THE GREENPEACE REPORT 2-4* (Jeremy Leggett ed., 1990) [hereinafter *GLOBAL*]. This book was written by leading scientists and energy analysts from the United States, the United Kingdom, Sweden, Brazil, and India.

3. Brad Knickerbocker, *Environment: Global Warming*, THE CHRISTIAN SCIENCE MONITOR, Oct. 19, 1992, at 8.

4. *GLOBAL*, *supra* note 2, at 1.

5. *Id.* at 6. In the United Kingdom, 76% of the public is worried by the greenhouse effect and 28% is "very worried." 80% of the public also believe that the government is doing too little about it. *Id.*

6. Jeremy Leggett, *The Nature of the Greenhouse Threat*, in *GLOBAL* 17 (Jeremy Leggett ed., 1990).

proposals. Section V will briefly discuss the role of other countries. Finally, Section VI will conclude by addressing the United States role in the future.

II. Global Warming and CO₂

The greenhouse effect starts when solar radiation reaches the Earth.⁷ While some of the radiation is reflected, most of it penetrates the atmosphere and warms the Earth.⁸ Next, the Earth emits infra-red radiation and cools the surface, but the greenhouse gases (carbon dioxide, chlorofluorocarbons, hydrochlorofluorocarbons, hydrofluorocarbons, methane, and nitrous oxide) trap the radiation and the heat.⁹ This is the phenomenon of global warming.

Carbon dioxide accounts for 55% of global warming,¹⁰ and therefore has become a primary target for reduction proposals. Although CO₂ is a naturally occurring gas, the principal greenhouse culprit is also unnaturally produced by burning fossil fuels.¹¹ Three hundred of the world's leading climate scientists estimate that at the current rate of greenhouse gas emissions, the average global temperature will rise one degree Celsius by the year 2025 and between three to five degrees Celsius by 2100.¹² To put these statistics in perspective, it took several thousand years for the most recent rise of five degrees Celsius, culminating during the end of the last ice age nearly 10,000 years ago.¹³

Such temperature changes could have grim consequences for society. Fossil records indicate the improbability of the plant world, and the creatures dependent on it, adapting to rates of change more than ten times faster than they have faced in hundreds of thousands of years.¹⁴ Specific consequences include the possibility of the seas rising by as much as a

7. *Id.* at 15.

8. *Id.*

9. *Id.*

10. Jeremy Leggett, *The Nature of the Greenhouse Threat*, in GLOBAL 17 (Jeremy Leggett ed., 1990). Chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs), and hydrofluorocarbons (HFCs) account for 24% of global warming. Methane (CH₄) accounts for 15% while nitrous oxide (N₂O) accounts for 6%. *Id.*

11. *Id.* at 14-15.

12. *Id.* at 16-21. These scientists were part of the Intergovernmental Panel on Climate Change (IPCC), and their estimates were published in May of 1990. Jeremy Leggett, *The Nature of the Greenhouse Threat*, in GLOBAL 16 (Jeremy Leggett ed., 1990). *Id.*

13. Jeremy Leggett, *Impacts*, in GLOBAL 115 (Jeremy Leggett ed., 1990). In the 1960s, Professor Roger Revelle of Harvard University was one of the first scientists to monitor rising amounts of carbon dioxide in the atmosphere and warned of global warming. Connie Koenenn, *The Politics of Pollution*, L. A. TIMES, Feb. 6, 1992, at E1.

14. Jeremy Leggett, *Impacts*, in GLOBAL 115 (Jeremy Leggett ed., 1990). Global temperatures were estimated to be 10 to 15 degrees Celsius higher during the age of the dinosaurs one hundred million years ago, which is the warmest the Earth has been in its six hundred million years of animal life. If global warming continues unchecked, the temperatures generated could be hotter than ever experienced by animal life on this planet. Jeremy Leggett, *The Nature of the Greenhouse Threat*, in GLOBAL 22-23 (Jeremy Leggett ed., 1990).

meter by the end of the century (because of polar ice caps melting and seawater thermally expanding), resulting in the displacement of populations, destruction of low-lying infrastructure, and contamination of fresh-water supplies.¹⁵ In addition, coastal and estuarine ecosystems, which support marine life, may be destroyed, thus causing humans to lose an important food source.¹⁶ Crop yields in the United States and Europe may significantly decrease as well, while creating a more severe agricultural impact in tropical regions and developing countries.¹⁷ Such predictions only provide a glimpse of the damage global warming could cause.

III. Attempts to Reduce CO₂ Emissions

Although there is substantial doubt among some scientists regarding whether the global warming predictions amount to a strategic threat,¹⁸ many industrialized nations have promised to reduce carbon dioxide emissions to 1990 levels by the year 2000.¹⁹ During the June 1992 Earth Summit, the largest international conference on the environment ever, many countries (including U.S. allies in Europe) wanted to sign an international treaty to cut CO₂ emissions to 1990 levels by the year 2000, but the Bush administration resisted.²⁰ As an alternative, the U.S. agreed to a treaty that required countries to make and publish plans for reducing emissions while taking into account each nation's particular circumstances.²¹ The Clinton administration had scheduled to release a "climate action plan" in August 1993, which would detail the United States' plan to reduce carbon dioxide

15. George M. Woodwell, *The Effects of Global Warming*, in GLOBAL 128 (Jeremy Leggett ed., 1990). A one meter rise would inundate 15% of Egypt's arable land and 14% of Bangladesh's net cropland. *Id.* In September of 1989, Arctic ice was reported to be thinning dramatically. Jeremy Leggett, *The Nature of the Greenhouse Threat*, in GLOBAL 23 (Jeremy Leggett ed., 1990). Water expands as it warms because its atoms vibrate through a larger space and keep each other further apart. Boyce Rensberger, *Sea May Become Deeper, Faster*, WASH. POST, Nov. 30, 1987, at A3.

16. Lakshman Guruswamy, *Integrated Environmental Control: The Expanding Matrix*, 22 ENVTL. L. 77, 103 (1991). Two-thirds of the world's fish supply depend on coastal wetlands for their survival. *Id.* at 104.

17. *Id.* at 107-108.

18. Knickerbocker, *supra* note 3, at 8. Some scientists maintain that efforts to halt global warming by reducing greenhouse gases will not stop temperature increases, but instead will only delay warming by one or two decades. According to John Firor of the National Center for Atmospheric Research in Colorado, if carbon dioxide emissions decreased by 20%, the Earth would still warm by one-third of a degree Fahrenheit per decade as opposed to one-half of a degree Fahrenheit per decade if nothing were done. William Booth, *Carbon Dioxide Curbs May Not Halt Warming*, WASH. POST, Mar. 10, 1990, at A1. See generally GLOBAL WARMING: THE GREENPEACE REPORT (Jeremy Leggett ed., 1990) (for views of other energy experts and scientists who have arrived at different numbers and find global warming much more imminent and threatening).

19. *Earth Summit Accords*, WASH. POST, June 14, 1992, at A26. While President Bill Clinton proposes to limit CO₂ emissions to 1990 levels by the year 2000, the Bush administration opposed specific timetables for reductions. Bush favored holding such emissions in the year 2000 from one to six percent above 1990 levels. *Bush vs. Clinton: What is an Environmental President?* L. A. TIMES, Sept. 27, 1992, at M4; *Where They Stand*, NEWSDAY, Nov. 1, 1992, at 5.

20. Knickerbocker, *supra* note 3, at 8.

21. *Id.* The United States has acted by planning to phase out chlorofluorocarbons (produced by aerosols, refrigerants, foam blowing solvents, etc.) by 1996. *Newsmaker Sunday: Environmental Issues and the Bush Administration*, (CNN television broadcast, Feb. 16, 1992) [hereinafter *Newsmaker*].

emissions to 1990 levels by the year 2000.²² As of October 1993, no plan had been officially published. Although the plan has not yet been released, Vice President Al Gore recently stated that the United States has made a "firm commitment" to reduce greenhouse gases to 1990 levels by the year 2000.²³

Pressure on the United States to sign a CO₂ emissions reduction agreement has been mounting for quite some time. In July of 1991, British Prime Minister John Major called on the United States to join Great Britain in setting limits on such emissions, saying, "The world looks to them for decisive leadership on this issue, as on others."²⁴ By far the largest CO₂ polluter, the United States generates approximately 25% of the world's carbon dioxide emissions.²⁵ Moreover, many U.S. states produce more carbon dioxide than entire nations. For example, Texas, with its population of eighteen million people, produces more CO₂ emissions than Canada (twenty-seven million) or Great Britain (fifty-seven million).²⁶ Even less populated states like Kansas (2.5 million) produce more carbon dioxide than Hungary (10.5 million) or Pakistan (113 million).²⁷

In light of these heavy carbon dioxide emissions in the United States, some states have taken legislative action on their own to reduce emissions. For example, California enacted a statute in September of 1992 that requires the State Air Resources Board to reduce emissions from mobile sources to the maximum degree possible pursuant to the California Clean Air Act of 1988.²⁸ In addition, the statute requires California to develop a plan by January 1994 to support the development, production, and operation of alternative fuel vehicles because conventional highway vehicles are a major contributor to the emissions of carbon dioxide.²⁹

More specifically, officials in St. Paul-Minneapolis recently developed a plan to cut

22. George Graham & Frances Williams, *Greenhouse Gas Deadline Missed*, FINANCIAL TIMES, Aug. 17, 1993, at 3.

23. Interview: VP Tells of New Sustainable Development Council, Greenwire, Jun. 14, 1993, available in LEXIS, Nexis Library, Omni File.

24. Glenn Frankel, *Prime Minister's Speech Indicates Break With Previous Policy*, WASH. POST, July 14, 1991, at A8. Major also said that "research cannot excuse inaction — the threat is too serious." *Id.*

25. Margaret E. Kriz, *Warm-Button Issue*, THE NATIONAL JOURNAL, Feb. 8, 1992, at 319. Industrialized nations are responsible for 75% of the world's annual carbon dioxide emissions. *Id.* The United States produces 25% of the world's carbon dioxide while only accounting for 5% of the world's population. See *Bush vs. Clinton: What Is An Environmental President?* L. A. TIMES, Sept. 27, 1992, at M4.

26. Paul Overberg, *Report: States are Major Culprits in Global Warming*, Gannett News Service, June 15, 1992, available in LEXIS, Nexis Library, Omni File.

27. *Id.* Industrial states have the highest emissions. Texas had the highest levels, followed by California, Pennsylvania, Ohio, and Indiana. The United States' myriad automobiles (compared to poorer countries) and extraordinary electricity use contribute to these emissions figures. *Id.*

28. CAL. PUB. RES. CODE § 25326 (Deering 1992).

29. *Id.* California is very progressive in such areas. Perhaps this is because California is very populous, and the more people a state has, the more likely it is to have higher carbon dioxide emissions resulting from automobiles and electricity usage.

carbon dioxide emissions by 20% from 1988 levels by the year 2005.³⁰ Among other goals, the plan would encourage car pooling, greater use of mass transit, less reliance on fossil fuels by utilities, energy-efficient building renovations, tree-planting, and stricter building codes that would generate fewer CO₂ emissions.³¹ Whereas the St. Paul-Minneapolis plan seeks to reduce emissions, a 1990 Connecticut statute provides for an emission offset plan. Basically, the statute requires a permit for a business to emit carbon dioxide, and permit applicants must provide for the planting of trees or turf grass to offset the carbon dioxide their activities emit.³² As a New Mexico statute succinctly states, "Trees naturally synthesize carbon dioxide into oxygen as a byproduct of photosynthesis and thereby reduce the harmful environmental effects caused by carbon dioxide."³³ While such laws are modest, they are a step in the right direction towards developing a serious awareness of carbon dioxide's contribution to global warming.³⁴

On the national level, the Environmental Protection Agency (EPA) created the Green Lights Program in 1991 to encourage U.S. corporations, utilities, and state and local governments to implement energy-efficient lighting as a profitable means of pollution prevention.³⁵ In exchange for program participants installing state-of-the-art energy-efficient lighting, the EPA provides technical assistance to facilitate the job. The EPA estimates that the program will help foster a reduction of carbon dioxide equal to the emissions of one-third of all the cars in the nation.³⁶ Contrary to being an economic burden, the resulting energy savings could total about \$16 billion annually, thus creating the opportunity for productive reinvestment.³⁷

30. *Carbon Dioxide: Twin Cities to Unveil Reduction Plan*, Greenwire, Oct. 6, 1992, available in LEXIS, Nexis Library, Omni File.

31. Bob von Sternberg, *Twin Cities to Join International Attack on Global Warming*, STAR TRIBUNE, Oct. 7, 1992, at 1B. Vehicle and gas tax funds may be used for developing mass transit and other alternatives. Committee member Sheldon Strom states, "[T]his is a no-regrets policy. It will cost no more than not changing anything." *Carbon Dioxide: Twin Cities to Unveil Reduction Plan*, Greenwire, Oct. 6, 1992, available in LEXIS, Nexis Library, Omni File.

32. CONN. GEN. STAT. § 22(a)-174(d) (1990).

33. N.M. STAT. ANN. § 68-2-30 (Michie 1992). The act promotes the planting of trees throughout New Mexico and espouses the view that the health and safety of the environment is threatened by increasing carbon dioxide. *Id.*

34. Gregg Marland of the Oak Ridge National Laboratory along with physicist Freeman Dyson calculated that to soak up all the excess carbon dioxide the world produces each year, it would be necessary to plant a tree farm the size of Australia. William Booth, *Carbon Dioxide Curbs May Not Halt Warming*, WASH. POST, Mar. 10, 1990, at A1. Furthermore, once the trees matured and could not soak up any more CO₂, another tree farm would have to be planted. *Id.*

35. *EPA Urges Energy Saving Lighting to Help Protect the Environment*, Business Wire, Oct. 16, 1992, available in LEXIS, Nexis Library, Omni File [hereinafter *EPA*].

36. *Id.*

37. *Id.*

IV. Conflicts Regarding the Feasibility of CO₂ Reductions: The Costs vs. the Benefits

Through various regulatory mechanisms, there are direct and indirect methods to help augment greenhouse gas emissions reductions.³⁸ Methods that seek to directly reduce CO₂ emissions include implementation of pollution taxes, emission standards, and tradable emission permits.³⁹ Indirect methods include funding research into alternative energy sources, encouraging and subsidizing conservation, and imposing higher standards for fuel efficiencies.⁴⁰ This section will examine the feasibility of some of these methods.

A. Carbon Tax

Perhaps the most controversial and provocative of these methods is the carbon tax. Taxes in general are politically unpopular, and the carbon tax has its share of opponents. Under a carbon tax, fossil fuels would be taxed in proportion to the carbon dioxide they produce when burned.⁴¹ The rationale behind such a tax is that higher fuel prices would translate into lower fuel consumption, and thus, fewer emissions would result.⁴² Several groups have made estimates of the consequences of such taxes, and the conflicting views can often be confusing amid the barrage of eye-opening statistics.

In December of 1991, the Department of Energy (DOE) examined the potential effects of a carbon tax and concluded that the only way to reduce carbon dioxide emissions by 20% of 1990 levels by the year 2000 would be to impose a carbon tax.⁴³ The DOE's report, "Limiting Net Greenhouse Gas Emissions in the United States," estimates that the emission reductions would cost \$95 billion annually in the year 2000 and would require a tax rate of \$500 per metric ton of carbon, resulting in a doubling of the price of gasoline.⁴⁴ The price of gasoline would increase by \$1.30 per gallon, and the price of heating oil would increase by \$1.45.⁴⁵ Furthermore, crude oil and wellhead natural gas prices would increase 350%

38. Gary E. Marchant, *Freezing Carbon Dioxide Emissions: An Offset Policy For Slowing Global Warming*, 22 ENVTL. L. 623, 626 (1992).

39. *Id.*

40. *Id.*

41. Thomas W. Lippman, *Would a Carbon Tax on Fuels Mean Kissing 'the Midwest Goodbye'?* WASH. POST, Sept. 25, 1990, at A21.

42. *Id.*

43. *DOE Study Shows That Pursuit of Dramatic Reductions in Carbon Dioxide Emissions Would Be Detrimental to Economy*, U.S. Newswire, Dec. 5, 1991, available in LEXIS, Nexis Library, Omni File [hereinafter *Study*].

44. *Id.*

45. *Id.* In a 1989 EPA report, suggested taxes were a \$25 per ton tax on coal, \$6 per barrel on oil and 50 cents per million cubic feet on gas. The Global Climate Coalition, an influential pressure group representing various energy producers in the coal, gas, and oil industries, estimated such taxes would increase gas prices 17 to 20 cents and would increase annual residential heating costs by \$85 to \$100. Jose Goldemberg, *Policy Responses to Global Warming*, in GLOBAL 177 (Jeremy Leggett ed. 1990).

and 400%, respectively.⁴⁶ Overall, such a tax would reduce the U.S. economy by 1.4% in the year 2000.⁴⁷

Perhaps the harshest opponents of such a tax are members of the coal industry. Coal is the fuel that emits the most carbon dioxide, and therefore, it would be taxed the most heavily.⁴⁸ When Representative Fortney H. "Pete" Stark (D-Calif.) proposed a carbon tax in the spring of 1990, the general counsel of the National Coal Association responded that the tax would undermine the competitiveness of U.S. manufacturers by driving up the cost of their products.⁴⁹ Midwestern states such as Indiana, Ohio, and Michigan derive most of their electric power from coal, prompting Fred Palmer, chairman of the coal-producing Western Fuels Association to say, "If they pass the carbon tax, you can kiss the Midwest goodbye."⁵⁰ Secretary of Energy James Watkins espoused a similar view in September of 1992 as he claimed that the carbon tax would jeopardize the state's 30,000 mining jobs and "put Eastern Kentucky coal out of business."⁵¹

Further ramifications of the tax were studied by the Natural Resources and Commerce Division of the Congressional Budget Office (CBO) in 1990.⁵² Focusing solely on the economic results, the CBO's analysis assumed that the tax would be phased in over 10 years, beginning at \$10 per ton in 1991 and rising to \$100 per ton (1988 dollars) by the year 2000.⁵³ The results include the coal tax to be double coal's selling price in the year 2000 and the real gross national product to be 1% lower than it would have been without the tax.⁵⁴ Echoing the sentiment of many in the coal industry, the analysis further noted that energy-intensive

46. *Study, supra* note 43.

47. *Id.*

48. Thomas W. Lippman, *Would a Carbon Tax on Fuels Mean Kissing 'the Midwest Goodbye'?* WASH. POST, Sept. 25, 1990, at A21.

49. *Id.* In addition, General Counsel Robert Stauffer said that the tax would cost consumers \$41 billion a year while having only a "negligible impact" on pollution. *Id.*

50. *Id.*

51. *Watkins Says Gore "Tax" Would Cost Jobs*, Greenwire, Sept. 25, 1992, available in LEXIS, Nexis Library, Omni File. Watkins further added, "Coal should be at the centerpiece . . . of all our actions in the future. Coal's such a major part of our energy strength. . . . [W]e're not going to let it go under." *Id.*

52. Lippman, *supra* note 48, at A21.

53. *Id.* The study did not address the environmental benefits. *Id.*

54. *Id.* Federal revenue in the year 2000 would be \$110 billion to \$120 billion (1988 dollars), and such rates "might" stabilize carbon dioxide emissions anywhere from 6% below to 5% above 1988 levels. *Thomas W. Lippman, Would a Carbon Tax on Fuel Mean Kissing 'the Midwest Goodbye'?* WASH. POST, Sept 25, 1990, at A21. Such a range in these figures exemplifies the uncertainty of many of these studies.

industries such as steel, glass, rubber, aluminum and chemicals would face greater costs that would undermine their competitiveness in international markets.⁵⁵

Nevertheless, some analysts believe that a carbon tax would have manageable economic consequences. Many of these arguments focus on fuel alternatives, energy conservation, and new technologies. For example, a group of Harvard economists estimates that a carbon tax as low as \$45 per ton will not only reduce carbon dioxide emissions to 1990 levels, but will also quickly dampen consumption of fossil fuels so as to increase the use of alternatives.⁵⁶ Compared to the DOE's estimate that a \$500 per ton tax would be required,⁵⁷ the Harvard economists' projections foresee a far less expensive bill. Because the DOE claims that a \$500 per ton tax translates into a \$95 billion expense in the year 2000,⁵⁸ simple extrapolation shows a \$45 per ton tax resulting in a \$8.5 billion expense. However, the \$8.5 billion figure may be an excessive calculation because the DOE did not consider the money from energy savings. For example, Robert H. Williams, an analyst at Princeton University's Center for Energy and Environmental Studies, believes that carbon taxes will hasten the development of low-cost energy sources (such as wind and solar power) that would provide savings resulting in a net economic gain.⁵⁹

Vice President Al Gore shares the view that the economy will not suffer because of carbon dioxide emission reductions. In fact, Gore claims that the DOE analysis of the effect of reducing carbon dioxide emissions is faulty.⁶⁰ For example, in its analysis, the DOE assumed that the U.S. Gross National Product will grow at an average annual rate of 3.2% between 1990 and 2000, whereas more realistic figures show growth between 2% and 2.5%.⁶¹ As a result, the DOE figures project an economy that is 9% larger by the year 2000, and such numbers double projections of carbon dioxide emissions.⁶² Consequently, this makes the goal of reducing emissions much more cumbersome than it actually is by setting the goal unrealistically high.⁶³ Moreover, the DOE projections of future carbon dioxide emissions by electric utilities is based on an outdated industry forecast.⁶⁴ The forecast was updated in 1990, and currently projects that electricity demand would be significantly lower

55. Lippman, *supra* note 48, at A21.

56. Michael Weisskopf, *From Beer to Utility Bills, Global Warming Measures Carry a Price*, WASH. POST, Feb. 4, 1991, at A4.

57. *Study*, *supra* note 43.

58. *Id.*

59. Weisskopf, *supra* note 56, at A21.

60. Al Gore, *Not Flying Down to Rio*, WASH. POST, May 3, 1992, at C1.

61. *Id.* The Department of Energy's annual outlook used a 2.3% growth rate. *Id.*

62. *Id.*

63. *Id.*

64. Gore, *supra* note 60, at C1.

than under the old analysis.⁶⁵ Perhaps the most glaring defect of the DOE report is that it assumes the economy operates with perfect efficiency, and therefore, any change is a net cost.⁶⁶ Realistically, the economy does not operate with perfect efficiency, and the DOE's assumption otherwise severely undermines its predicted figures.

More importantly, possible carbon taxes should not augment, but should replace other taxes. For example, when Senator Mitch McConnell of Kentucky recently accused then-Senator Gore of advocating a carbon tax in his book, *Earth in the Balance*, Gore responded that the U.S. ought to shift tax burdens away from work (incomes) and towards pollution.⁶⁷ He further stated that his book contains a proposal advocating a reduction of taxes on work and payroll to be replaced by taxes on pollution, including carbon dioxide.⁶⁸ The rationale behind this idea is that there should be more incentives for work and more disincentives for pollution. Such disincentives should spur exploration into energy-efficient technologies. Gore's idea is not meant to cripple the coal industry, but is meant to stimulate examination into how coal can be used more efficiently and how the United States can create many jobs in developing new technologies towards that goal.⁶⁹ As an example, Gore cites the Japanese as taking the lead on carbon sequestration technology, and urges the U.S. to take the lead in the development of clean coal technologies.⁷⁰ Contrary to hampering the economy, pollution taxes may encourage energy efficiency and create jobs in a new environmental market.

B. Emissions Trading

Considering the widespread apprehension at various levels of government and industry concerning carbon taxes, other alternatives must be examined.⁷¹ Whereas a carbon tax may fail to achieve a specific level of emissions reductions, an emissions trading program can directly control total emissions by determining the quantity of emission rights that regulators allocate.⁷² In a standard emissions trading program, regulators would allocate

65. Al Gore, *Not Flying Down to Rio*, WASH. POST, May 3, 1992, at C1.

66. *UN Framework Convention on Climate Change: Hearing of the Senate Foreign Relations Committee*, 102d Cong., 2d Sess. (Sep. 18, 1992) (testimony of Senator Al Gore) [hereinafter *Hearing*]. Gore stated, "[I]f you assume that everything is perfect, then yes, you're going to incur a cost when you change." *Id.*

67. *Id.*

68. *Id.*

69. *Hearing*, 102d Cong., 2d Sess. (Sep. 18, 1992) (testimony of Senator Al Gore).

70. *Id.*

71. This apprehension seems to stem from viewing pollution taxes as far too costly in relation to the environmental benefits. Most of the facts and figures showing the effects of such taxes do not take into account that the taxes may be used to replace other taxes. In addition, other factors such as the development of new energy-saving technologies are not considered. Money savings from energy efficiency are also left out of the equation. Nevertheless, the amount of tax required for specific levels of reductions is very speculative because it is uncertain what levels of taxes will discourage consumption.

72. Marchant, *supra* note 38, at 632.

or auction to firms a designated number of emissions permits under the requirement that each firm either reduce emissions to match the permits received or trade for more permits.⁷³

There are different types of trading programs, including those that merely offset emissions and those that actually reduce emissions. Under an offset policy, the total number of emissions rights allocated to a company equals their current total emissions.⁷⁴ In other words, a company's emissions could not increase from the status quo. In an analogous program under the Clean Air Act, environmentalists were skeptical of a plan that did not seem to provide for any environmental improvement.⁷⁵ This lack of improvement was controversial because mere stabilization at current levels was the goal as opposed to reduction. Basically, emissions trading programs seem more acceptable if accompanied by significant emission reductions.⁷⁶ For example, a firm that does not only offset its carbon dioxide emissions but furthermore reduces emissions would be able to sell its surplus rights (emission reduction credits known as ERCs).⁷⁷ Logically, such a program will have the effect of reducing emissions only if a fixed number of permits exists. The tradable rights "will have value when the demand for the rights to develop or pollute significantly exceeds the supply of rights that society chooses to permit."⁷⁸ In addition, because the rights could be sold in a trading program, incentives would exist for firms to reduce their carbon dioxide output. Those who could achieve reductions the most inexpensively would then presumably sell their excess rights.⁷⁹

In comparison to a carbon tax, the primary advantage of an emissions trading program is that it can guarantee a carbon dioxide reduction by fixing emission amounts.⁸⁰ A carbon tax, by contrast, will achieve reductions based on the very speculative deterrent effect the tax has on emissions. For example, Gary E. Marchant, author of "*Freezing Carbon Dioxide Emissions: An Offset Policy for Slowing Global Warming*," states:

73. *Id.* at 639. This part of the comment will not be a comprehensive review of emissions trading, but it will highlight the main points of the program and will compare emissions trading with carbon taxes.

74. *Id.* Examples of tradable items include cash, food, and energy-efficient products. Stephen H. Schneider, *The Costs of Cutting - or not Cutting - Greenhouse-gas Emissions*, in GLOBAL 187 (Jeremy Leggett ed., 1990).

75. Marchant, *supra* note 38, at 638.

76. *Id.*

77. *Id.* at 640.

78. *Id.* at 637.

79. See Gary E. Marchant, *Freezing Carbon Dioxide Emissions: An Offset Policy For Slowing Global Warming*, 22 ENVTL. L. 623, 639 (1992). An "advantage of market mechanisms is that they provide a dynamic incentive for firms to develop new technologies and methods for achieving larger and more cost-effective reductions in emissions." *Id.*

80. *Id.* at 632.

Because regulators have imperfect knowledge of the cost structures and price elasticities of firms, they would have difficulty setting a carbon tax rate that ensures that the United States achieves CO₂ emission reductions specified by future international agreements. Regulators would be forced either to intentionally over-tax emissions to ensure that the national quota is achieved; or to risk having to continually adjust the tax rate if it does not result in sufficient emission reductions.⁸¹

Moreover, economic growth may affect carbon taxes and emissions trading quite differently. According to Marchant, economic growth increases the number of firms willing to pay taxes to emit carbon dioxide, thus increasing the carbon dioxide content in the air.⁸² Conversely, economic growth does not affect trading programs in such a manner because the amount of permits is fixed.⁸³

Whether the EPA actually has the authority to establish a CO₂ trading program is questionable.⁸⁴ According to EPA Deputy Administrator Robert Sussman, the EPA lacks the statutory authority to establish a tradable emissions allowance program for carbon dioxide.⁸⁵ Pursuant to the Clean Air Act, the EPA has the authority to establish allowance trading for emissions of nitrogen oxides and sulfur dioxide only.⁸⁶ In addition, Sussman stated that a CO₂ emissions trading program raises many implementation issues.⁸⁷ Nevertheless, the EPA's power to institute such a plan is still an unresolved issue.

Assuming that the EPA can overcome the statutory obstacle, emissions trading would be administered differently than carbon taxes. Marchant claims that carbon taxes would result in large transfer payments from the private sector to the government that would substantially increase the cost of doing business.⁸⁸ However, large payments between the private sector and the government would not be necessary under an emissions trading program as regulators would allocate the emission rights.⁸⁹ Furthermore, the EPA has had some experience in implementing emissions trading programs, but almost none in pollution

81. *Id.* Taxes would have to be increased gradually "because the tax rate would have to become progressively steeper to achieve the increased emission reductions required in each successive year. Implementing such an escalating tax is likely to be difficult because of problems such as imperfect information and administration inertia." *Id.*

82. Gary E. Marchant, *Freezing Carbon Dioxide Emissions: An Offset Policy For Showing Global Warming*, 22 ENVTL. L. 623, 633 (1992).

83. *Id.*

84. *EPA Lacks Statutory Authority for CO₂ Emissions Trading, Sussman Says*, DAILY REPORT FOR EXECUTIVES, June 30, 1993, at A124.

85. *Id.*

86. *Id.*

87. *Id.*

88. Marchant, *supra* note 38, at 633.

89. *Id.* at 634.

taxes.⁹⁰ Whereas the EPA has developed some of the expertise needed to activate an emissions trading program, it lacks such expertise in assessing, collecting, and enforcing emissions taxes.⁹¹ In addition, a carbon tax would be under the supervision of the federal government, whereas an emissions trading program may require greater state involvement.⁹² Trades under an EPA-administered program must be approved by the state, the regional EPA office, and the EPA Administrator.⁹³ States could monitor compliance within their jurisdictions, but the EPA could establish a database that would register all trades in order to facilitate the availability of information on interstate trades.⁹⁴ In this respect, the division of responsibility between state agencies and the EPA would help minimize bureaucracy.⁹⁵

C. *Energy Efficiency and Other Alternatives*

Compared to carbon taxes and tradable permits, the concept of energy efficiency generates less controversy. Although the DOE views a carbon tax as the only way to significantly reduce carbon dioxide emissions,⁹⁶ a report from the Bush administration prior to the Earth Summit in June 1992 reveals quite a different view. A memo produced by a working group within the administration showed that the United States could achieve significant reductions in greenhouse gas emissions with little economic dislocation or cost.⁹⁷ Furthermore, the memo showed that carbon dioxide and other gases could be reduced 7% to 11% with little difficulty — close to the 1990 level proposed by the European nations and Japan.⁹⁸ The U.S. would achieve these reductions through the use of natural gas, energy

90. Gary E. Marchant, *Freezing Carbon Dioxide Emissions: An Offset Policy For Slowing Global Warming*, 22 ENVTL. L. 623, 634 (1992).

91. *See id.* at 635.

92. *See id.* at 644.

93. *See id.*

94. *See* Gary E. Marchant, *Freezing Carbon Dioxide Emissions: An Offset Policy For Slowing Global Warming*, 22 ENVTL. L. 623, 644 (1992).

95. *See id.* at 645.

96. *Study, supra* note 43.

97. *Earth Summit: White House Sees Feasible CO₂ Cuts*, Greenwire, Apr. 27, 1992, available in LEXIS, Nexis Library, Omni File.

98. *Id.* Surprisingly enough, the United States did not agree to any timetables at the Earth Summit in June in spite of this memo. An administration official said that despite the memo, there was no official change of policy. *Id.*

efficiency, and other steps in the national energy strategy.⁹⁹ Such studies indicate that reducing emissions does not strain the economy because the problem of carbon dioxide emissions is one of inefficiency.

Many paradigms exist to support the theory that the high levels of carbon dioxide emissions are the result of energy inefficiency. As a small-scale example, Dr. Amory Lovins, an energy expert who has served on the U.S. Department of Energy Senior Advisory Board, notes:

A single 18-watt compact fluorescent lamp, producing the same light as a 75-watt incandescent lamp for approximately thirteen times as long, will over its 10,000-hour nominal lifetime avoid the emission from a typical U.S. coal-fired power plant of 1 tonne [sic] of CO₂ and around 8 kg of SO₂, plus NO_x, heavy metals, and other pollutants. Yet far from costing extra, the lamp will save about \$20-worth of ordinary lamps and their installation labour, plus about \$20-30-worth of utility fuel - far more than its approximate \$5-8 production cost or approximate \$12-18 retail price. Thus the lamp cleans up the air while creating tens of dollars' net wealth and deferring hundreds of dollars' investment in electrical-supply systems.¹⁰⁰

Such small scale scenarios exemplify how efficiency creates monetary savings as well as environmental benefits. Even on a larger scale, Lovins can demonstrate the value of efficiency as he heats his 4000-square-foot energy research institute without a furnace on sub-zero days and runs office machines and lights that produce an average electrical bill of less than \$50 a month.¹⁰¹ Lovins acquires heat through sunlight drawn into an enclosed glass room and distributes it through a system.¹⁰² The energy-saving devices such as compact fluorescent lamps, triple-pane windows, and rooftop solar panels cost \$6000 to install in 1983, but save \$7100 a year in electricity and heating costs.¹⁰³ As Lovins says, "The carbon

99. *Id.* Prior to the Earth Summit, William Reilly explained why the United States did not want to sign a treaty that gave a specific timetable for reducing emissions:

You know, the conclusion you draw about how much in the way of greenhouse gases we're going to have over the next 10 years derives largely from your assumptions about economic growth and economic growth drives the electricity demand. Based upon growth projections that are low by historical standards, we nevertheless conclude there would be some modest increase in greenhouse gases, between 1 1/2 and 6 percent in the year 2000. The European Community even with its stabilization commitment, even with the carbon tax, is expecting to have a 3 percent increase in greenhouse gases. They chose to call that stabilization and they said they could commit to it. We choose to be faithful to the meaning of the language and said that unless we can be certain that we're going to be able to honor this commitment, we won't make it. But, in fact, I think the United States is going to do as well or better than virtually all the other developed countries at reducing its greenhouse gases.

The MacNeil/Lehrer NewsHour: Road to Rio; Parting of the Waters, (PBS television broadcast, June 1, 1992) [hereinafter *MacNeil*].

100. Amory Lovins, *The Role of Energy Efficiency*, in *GLOBAL 194* (Jeremy Leggett ed., 1990). Moreover, full practical use of the best oil and gas savings technologies would save about three-fourths of all the oil used now, at an average cost below three dollars a barrel — less than the typical cost of simply finding new domestic oil. *Id.*

101. Weisskopf, *supra* note 56, at A4.

102. *Id.*

103. *Id.*

dioxide and other pollution avoided by substituting efficiency for fuel is thus avoided not at a cost but at a profit."¹⁰⁴

Lovins' examples are not isolated instances of the concept that energy efficiency can help curb carbon dioxide emissions without detrimental economic cost. Two important facts to note are: (1) Since 1979, the U.S. has acquired more than seven times the capital from new energy savings as from all net increases in energy supply, and (2) Because of reductions in energy intensity achieved since 1973, the annual U.S. energy bill has been \$430 billion instead of approximately \$580 billion.¹⁰⁵ Energy efficient technologies will increase this reduction in energy intensity, and thereby, create more savings. Such a reduction will carry economic benefits on a larger scale. For example, Japan's GNP in 1986 was 36% less electrically intensive than the U.S. GNP, but created a cost advantage of 5% for a typical Japanese export.¹⁰⁶ In other words, the United States' using more electricity than Japan creates no competitive advantage.

In an effort to promote efficient electrical use, the EPA created the Green Lights Program (Program) in 1991.¹⁰⁷ Encouraging corporations, utilities, and state and local governments to convert to energy efficient lighting, the EPA projects the program to reduce carbon dioxide emissions equal to emissions from one-third of all of the United States' cars.¹⁰⁸ The Program is voluntary, and in exchange for a firm installing energy-efficient lighting, the EPA provides technical assistance.¹⁰⁹ As of July 1993, fourteen states had joined this program, with Ohio being the latest participant.¹¹⁰ By installing energy-efficient lighting in most of the state government's 7610 buildings, Ohio estimates a \$3 million to \$5 million savings in its annual \$36 million electricity bill.¹¹¹ State officials hope that the government's example will encourage private businesses to join the Program.¹¹² Because Ohio generates electricity by primarily burning coal, carbon dioxide emissions will greatly decline.¹¹³

104. *Id.*

105. Amory Lovins, *The Role of Energy Efficiency*, in GLOBAL 195 (Jeremy Leggett ed., 1990).

106. *Id.* at 207. "[E]lectric intensity per ton is falling in Japan - proof that such falling intensity can accompany, even increase, competitiveness - yet it is rising in the U.S., following the official U.S. dogma that rising electrical intensity is essential to economic health and must therefore be further subsidized." *Id.* at 208.

107. *EPA*, supra note 35. The EPA estimates the program to create a \$16 billion savings annually. *Id.*

108. *Id.*

109. *Id.* The EPA also has a Golden Carrot Program which will award 30 million dollars for the development of super-efficient, pollution-free refrigerators. *EPA Urges Energy Saving Lighting to Help Protect the Environment*, Business Wire, Oct. 16, 1992, available in LEXIS, Nexis Library, Omni File.

110. *Ohio: State Sees the (Green) Light*, Greenwire, July 13, 1993, available in LEXIS, Nexis Library, Omni File.

111. *Ohio to Try to Conserve Energy Through Lighting*, THE PLAIN DEALER, July 15, 1993, at 3B.

112. *Ohio: State Sees the (Green) Light*, supra note 110.

113. *Ohio to Try to Conserve Energy Through Lighting*, THE PLAIN DEALER, July 15, 1993, at 3B.

At the private level, Program participant Mobil saved \$250,000 and 3.2 million kilowatt hours of electricity. As a result, Mobil reduced carbon dioxide emissions by 1619 metric tons.¹¹⁴ Moreover, companies such as Magnatek, Inc. and Parke Industries, Inc. have aggressively manufactured highly energy-efficient lighting systems.¹¹⁵ Magnatek reduced its electric bill by \$500,000 annually by installing \$750,000 worth of energy-saving lighting components.¹¹⁶ Consequently, Magnatek will recover its initial \$750,000 outlay in the energy savings over the next one and a half years.¹¹⁷ These savings could be used in a variety of ways from rewarding investors to investing in new energy saving technology, technology that can create many jobs.

Some utilities are already taking aggressive steps to improve efficiency. For example, Pacific Gas & Electric has invested in lighting, heating, ventilating, and air conditioning improvements that will save enough energy to power 90,000 households.¹¹⁸ These efforts reduced carbon dioxide emissions by 3.9 million tons last year alone.¹¹⁹ Over the next ten years, these conservation and efficiency measures will reduce carbon dioxide emissions by 20 million tons while saving Pacific Gas & Electric's customers \$2.4 billion.¹²⁰ Furthermore, a recent study by Economic Research Associates concludes that conservation investments in Louisiana would create twice as many jobs (12,600) as an expansion of conventional power generators.¹²¹ Such examples demonstrate that utilities' investments in future efficiency will produce less pollution and more jobs.

Although still in the minority, some utilities are changing their position from being a seller of the single commodity of kilowatt hours (KWH) to providing a mix of efficient

114. *Mobil Saves Millions Through Office Environmental Conservation Programs*, Business Wire, July 8, 1993, available in LEXIS, Nexis Library, Omni File.

115. *Magnatek Receives EPA Certificate of Distinction*, Business Wire, June 29, 1993, available in LEXIS, Nexis Library, Omni File [hereinafter *Magnatek*]; *Parke Industries Selected to Retrofit Energy-Efficient Lighting at More Than 70 Southern California Gas Company Locations by the End of the Year*, Business Wire, Sept. 21, 1993, available in LEXIS, Nexis Library, Omni File.

116. *Magnatek*, *supra* note 115.

117. *Id.* Magnatek, Inc., a leading provider of electrical equipment and services, is listed on the New York Stock Exchange, and the company reported sales of \$1.23 billion for its fiscal year ended June 30, 1992.

118. *PG&E Touts Environmental Benefits of 1991 Customer Efficiency Program*, UTILITY ENVIRONMENT REPORT, Mar. 20, 1992, at 5.

119. *PG&E: Energy-Efficiency Efforts Saved \$89 Million, 607 Million KWH [sic] in 1991*, ELECTRIC UTILITY WEEK, Mar. 23, 1992, at 14.

120. Gore, *supra* note 60, at C1.

121. *Id.* According to the Union of Concerned Scientists, the United States could achieve a 12% reduction in carbon dioxide emissions by using alternative fuel; this method could save 19% in energy expenditures and could create 175,000 jobs in the area of renewable energy and energy conservation. *US Gas Industry Proposes Major Shift*, Reuters, Apr. 30, 1992, available in LEXIS, Nexis Library, Omni File. Contrary to the DOE report forecasting emissions reductions as an economic nightmare, it is clear that many other groups view emissions reductions as a problem of energy conservation. By focusing solely on costs, the DOE report loses sight of the energy savings. Conserving energy by using it more efficiently has been espoused by many as money-saving, job-creating, and environment-protecting.

commodities.¹²² These utilities adopt the view that selling less electricity and receiving less revenue is acceptable as long as costs continue to decrease.¹²³ Of course, this means that many utilities' goals must be redefined, but the benefits are apparent. Energy-efficient measures by these utilities will decrease carbon dioxide emissions from their plants. The savings created by lower operating costs can be used to create jobs and further explore new energy technologies. If more firms adopt such strategies, the United States could further reduce carbon dioxide emissions.

Another energy efficiency strategy is implementing nuclear power. Perhaps the most attractive feature of nuclear power stations is that they provide no direct emissions of carbon dioxide.¹²⁴ In addition, using nuclear power would reduce the United States' dependence on imported oil.¹²⁵ The European Community nations obtain one-third of their electricity from nuclear energy, followed by Japan (30%), and the United States (22%).¹²⁶ Currently, Japan is building the first of the American-designed advanced nuclear energy plants. However, growing antinuclear sentiment may impede Japan's nuclear energy goals.¹²⁷

Nuclear energy does not appear to be the best energy alternative for reducing carbon dioxide emissions. First, nuclear energy is very expensive. Approximately 5000 large nuclear power plants would have to be built worldwide by the year 2025 to achieve desired carbon dioxide reductions.¹²⁸ More importantly, electrical energy efficiency is much more economically sound. For example, a dollar invested in electrical energy efficiency reduces seven times more carbon than a dollar invested in nuclear power.¹²⁹ Second, the spread of nuclear power increases the risk of the proliferation of nuclear weapons.¹³⁰ Considering the numerous volatile regions of the world, this is a risk that should be avoided — especially when better alternatives are present. Finally, there is a safety concern regarding nuclear

122. Amory Lovins, *The Role of Energy Efficiency*, in *GLOBAL 202* (Jeremy Leggett ed., 1990).

123. *Id.* Profitable energy efficiency initiatives are not only being taken by utilities. Some major vendors of fuels are also becoming serious in this area. *Id.*

124. Bill Keepin, *Nuclear Power and Global Warming*, in *GLOBAL 296* (Jeremy Leggett ed., 1990). Negligible amounts of carbon dioxide are produced in the nuclear fuel-cycle releases. *Id.*

125. *Cf. NE Electric Succeeds with Pollution Reducing, Energy Efficient Plan*, Clean Air Network Online Today, Oct. 4, 1993, available in LEXIS, Nexis Library, Omni File (stating that by using cleaner-burning natural gas, electric utilities can reduce their reliance on imported oil). Likewise, nuclear power use would also reduce dependence on imported oil.

126. Phillip Bayne, *USA Needs Nuclear Now*, USA TODAY, Mar. 3, 1992, at 8A. Some scientists agree that nuclear waste can be safely isolated from the environment for thousands of years. *Id.* But see Keepin, *supra* note 124, at 313 (noting that of the 400 nuclear power plants worldwide, there is not a single long-term waste disposal program in place).

127. Margaret E. Kriz, *Warm-Button Issue*, THE NATIONAL JOURNAL, Feb. 8, 1992, at 319.

128. Keepin, *supra* note 124, at 299. A new nuclear plant would have to be built every two and a half days until the year 2025. The total cost would be \$5.3 trillion or an annual average of \$144 billion. The cost is extremely high for richer countries and unaffordable by developing nations. *Id.*

129. *Id.* at 315. In addition, long term, renewable energy such as solar and wind power are cleaner and less expensive. *Id.*

130. *Id.*

power. Though it may be true that no member of the public has ever been harmed by a nuclear plant in the U.S.,¹³¹ the potential for accidents with grave consequences do exist. The most glaring example is the Chernobyl tragedy in the former Soviet Union in April of 1986. In that accident, the radiation was the largest amount ever released in one disaster, and the fall-out was equivalent to a large, nuclear explosion.¹³² Thirty-one people died in the calamity itself, but it is estimated that the accident will cause 28,000 fatal cancers and 40,000 thyroid tumor cases worldwide.¹³³ Because seven hundred million people live within one hundred miles of a nuclear plant,¹³⁴ the mere possibility of these accidents should be taken seriously. Perhaps future technology will increase the feasibility of nuclear power as a means of reducing emissions. Until that time, nuclear power will not be a practical alternative for CO₂ reductions where electrical efficiency and other efficiency plans offer cheaper fiscal alternatives.

Other energy efficiency suggestions to reduce carbon emissions include switching industrial facilities from oil and coal to natural gas. Some benefits of natural gas are that it burns cleaner and more efficiently, and gas-powered plants cost less to build.¹³⁵ Such plants emit only one-half the carbon dioxide of oil or coal plants, cost one-twentieth as much to build, and can be built in one-quarter of the time.¹³⁶ Owing to the abundance of natural gas, this may seem to be a feasible option. While natural gas emits far less carbon dioxide than oil and coal, energy-efficient technologies still appear to be the optimal solutions.

Although the subject will not be explored in any great detail here, it is important to note that increasing corporate average fuel economy (CAFE) standards has been proposed as a method of reducing carbon dioxide emission reductions.¹³⁷ The more fuel-efficient the car, the less carbon emissions would result. Each gallon of gasoline a vehicle burns produces 19 pounds of carbon dioxide, and the average car emits 50 tons of CO₂ over its lifetime.¹³⁸ Currently, the CAFE standard is 27.5 miles per gallon.¹³⁹ The Bush administration resisted increases in these standards, arguing that many U.S. auto industry jobs would be lost because

131. Bayne, *supra* note 126, at 8A.

132. Bill Keepin, *Nuclear Power and Global Warming*, in GLOBAL 313 (Jeremy Leggett ed., 1990).

133. *Id.*

134. *Id.* According to a 1986 study, there was a 70% chance of another nuclear accident in the next 5.4 years. *Id.* Since the study, no such nuclear accident has yet occurred.

135. Lewis D. Solomon & Bradley S. Freedberg, *The Greenhouse Effect: A Legal and Policy Analysis*, 20 ENVTL L. 83, 103 (1990).

136. *Id.*

137. Earle Eldridge, *Senators Ask Clinton to Hike Cars' Fuel Economy Standards*, Gannett News Service, Aug. 17, 1993, available in LEXIS, Nexis Library, Omni File.

138. *Id.*

139. Laurie Goering, *Candidates' Environmental Cleanup Plans Present a World of Difference*, CHICAGO TRIBUNE, Oct. 15, 1992, at C18.

larger cars (which are usually less efficient) tend to be made in the United States, while smaller cars are made in Europe and Japan.¹⁴⁰ As a presidential candidate, Bill Clinton planned to gradually raise the standard to forty or forty-five miles per gallon but said that he would be flexible if such increases would cause large job losses.¹⁴¹ Recently, President Clinton's aides said that the President had made no decision about seeking higher fuel efficiency standards but that the issue will likely be addressed in the immediate future when the administration releases its 'climate action plan.'¹⁴²

Raising CAFE standards is a controversial issue. Although President Clinton has not yet introduced any firm plan for increasing these standards, he recently introduced a joint government-industry research program aimed at developing cars that are significantly more efficient than current models.¹⁴³ Some critics view such plans as political in nature. Christopher Flavin, Vice President of the Worldwatch Institute, a non-profit group that studies energy issues, states, "This [plan] allows them to do something on fuel economy without having to do the CAFE standards, at least in the short term. Clearly there is an element of being caught between the environmental community and the auto industry, and wanting to find a middle ground."¹⁴⁴

Through the EPA, Clinton can raise CAFE standards as part of new federal regulations. Some experts credit the CAFE standards enacted into law in the 1970s as catalyzing the fuel efficiency of new cars in the U.S.¹⁴⁵ However, many others (particularly those in the auto industry) assert that higher gasoline prices and increasing foreign competition spurred higher fuel-efficient vehicles.¹⁴⁶ A 1990 study, by the Committee on Alternative Energy Research and Development Strategies, holds the view that radical fuel-efficiency innovation in mass-produced automobiles is not possible in a short time.¹⁴⁷ According to their estimates, modest improvements in fuel efficiencies will increase the standard efficiency to

140. *Id.* But see Earle Eldridge, *Senators Ask Clinton to Hike Cars' Fuel Economy Standards*, Gannett News Service, Aug. 17, 1993, available in LEXIS, Nexis Library, Omni File (noting that a recent study by the American Council for an Energy-Efficient Economy found that increasing CAFE standards would create a net gain of 244,000 jobs, including 47,000 in the auto industry). Seventy-two percent of Americans favor increasing CAFE standards to 45 miles per gallon rather than increasing the gas tax by 50 cents per gallon. *Surprise: Americans Opposed to Gas Tax Rise*, WASH. POST, Feb. 12, 1993, at G3.

141. Goering, *supra* note 139, at C18. These standards are for current year automobile production. Of course, the average fuel efficiency of all cars in operation today is much lower because many of the older, less fuel-efficient cars are still on the road.

142. Dan Fagin, *Teamwork for Fuel Efficiency*, NEWSDAY, Sept. 30, 1993, News Section at 17.

143. *Id.*

144. *Id.*

145. COMMITTEE ON ALTERNATIVE ENERGY RESEARCH AND DEVELOPMENT STRATEGIES, NATIONAL RESEARCH COUNCIL, *CONFRONTING CLIMATE CHANGE* 70 (1990). Fifty-seven percent of the carbon dioxide emissions of the transportation sector are from automobiles and light trucks, and as a result, these vehicles are targets for emissions reductions. *Id.*

146. *Id.*

147. *Id.* at 69.

thirty-two miles per gallon.¹⁴⁸ The goal should be to strive towards more fuel-efficient vehicles, but not at such a pace that would cost a monumental amount of auto industry jobs. Overall, energy efficiency measures will reduce carbon dioxide emissions and create jobs, but over-zealously increasing CAFE standards may cost jobs in the short run. Improving fuel efficiency is only a part of the ultimate goal of comprehensive energy efficiency.

V. The Role of Other Countries

When the June 1992 Earth Summit convened in Rio, at least 139 countries arrived at the meetings with the goal of signing a treaty requiring countries to reduce carbon dioxide emissions to 1990 levels by the year 2000.¹⁴⁹ While many countries voluntarily promised to cut emissions to those levels, the United States did not agree to any timetables for reduction at that time.¹⁵⁰ The United States simply agreed to a treaty without timetables that pledged to reduce emissions.¹⁵¹ However, Vice President Gore recently affirmed that the U.S. is currently firmly committed to reducing CO₂ emissions to 1990 levels by the year 2000.¹⁵² The United States' plan for meeting that goal should be detailed in the soon forthcoming "climate action plan."

At the Earth Summit, the United States and other countries also had to address the concerns of developing nations. Developing nations' major concern is that they will be forced to control global air pollution by foregoing economic growth without adequate compensation.¹⁵³ Because of these fears, the United States, prior to the Earth Summit, offered \$75 million in grants to developing nations as an incentive to use less polluting fuels.¹⁵⁴ Many Third World diplomats rejected the offer, and one referred to it as "[a] good PR exercise."¹⁵⁵

Moreover, timetables are also difficult to impose on developing nations because emerging industrial powers like China, India, and Brazil are relying on vast reserves of fossil fuels in an effort to emulate the West's path to industrialization.¹⁵⁶ Many scientists argue that the impact of the West reducing emissions will be limited if the developing countries fail

148. COMMITTEE ON ALTERNATIVE ENERGY RESEARCH AND DEVELOPMENT STRATEGIES, *CONFRONTING CLIMATE CHANGE* at 69 (1990).

149. *Newsmaker*, *supra* note 21.

150. Knickerbocker, *supra* note 3, at 8.

151. *Id.*

152. *Interview: VP Tells of New Sustainable Development Council*, *Greenwire*, Jun. 14, 1993, available in LEXIS, Nexis Library, Omni File.

153. Michael Weisskopf, *Global Warming Rift Threatens Treaty*, *WASH. POST*, Feb. 28, 1992, at A3.

154. *Id.*

155. *Id.*

156. *Id.*

to control their emissions.¹⁵⁷ Possible proposals include a ten-year grace period for Third World countries.¹⁵⁸ A variety of aid packages should help developing countries reduce their carbon dioxide emissions through reductions in fossil fuel use. Germany, for example, has pledged to increase aid in this area to developing countries by 0.7% of its GNP, nearly double its current level.¹⁵⁹ Some countries such as Great Britain advocate increasing funds in the World Bank to help finance environmental policy changes in developing countries.¹⁶⁰ Whereas developing nations want an independent fund free from the domination of donors, the U.S. will probably provide aid both through the World Bank and directly to individual countries.¹⁶¹

In all of the international environmental conferences since 1972, the participants have considered the special circumstances of the Third World.¹⁶² Recognizing the importance of these poorer countries, the World Bank in 1990 released a document, *Funding for the Global Environment*, which promulgated the view that additional financial and technical assistance will be vital in helping developing countries address global problems.¹⁶³ Because developing nations are part of the mix that is needed to reduce carbon dioxide emissions, industrialized nations must commit themselves to introducing energy efficiency measures in those countries. Through various financial support and technology transfer, the industrialized countries can promote the developing countries' efforts to protect the environment without impeding these countries' economic development.

157. *Id.* It would be unfair to place the same emissions reductions goals on underdeveloped countries without some sort of financial compensation. The industrialized countries have emitted the most carbon dioxide, and now that these developing countries finally have the opportunity to follow the West's lead to industrialization (by using fossil fuels), they must be financially aided so that they can afford alternatives to high fossil fuel consumption.

158. Michael Weisskopf, *Global Warming Rift Threatens Treaty*, WASH. POST, Feb. 28, 1992, at A3.

159. James Brooke, *President, in Rio, Defends His Stand on the Environment*, N.Y. TIMES, June 13, 1992, at A1.

160. *Id.*

161. See Weisskopf, *supra* note 153, at A3. The channeling of funds through the World Bank is apparently to ensure that the money will be used for the purposes designated.

162. Kilaparti Ramakrishna, *Third World Countries in the Policy Response to Global Climate Change*, in GLOBAL 435 (Jeremy Leggett ed., 1990).

163. *Id.* at 436.

VI. Conclusion: The United States' Role in the Future

*"We reject the idea that economic growth and ecological stability are necessary enemies."*¹⁶⁴

— Vice President Al Gore.

The threat of global warming is real, and the consequences are grave if the United States and other countries do not reduce the level of greenhouse gases such as carbon dioxide. Many plans to reduce carbon dioxide levels have been suggested, and this comment has primarily explored carbon taxes, emissions trading, and energy efficiency. The effect carbon taxes may have on reducing emissions is speculative because it is uncertain what amount of tax would discourage consumption. Besides being politically unpopular, carbon taxes also have an uncertain effect on jobs as many workers in the coal industry vehemently claim that such a tax would sacrifice a substantial amount of jobs. However, a carbon tax, if implemented, should be used to replace existing taxes. The tax burden should be shifted away from work (incomes) and towards pollution, thus creating work incentives and pollution disincentives.

As an alternative, emissions trading programs provide an advantage over carbon taxes because the amount of carbon dioxide emissions is fixed. Only a fixed amount of tradable permits should be issued, and those companies that reduced emissions below their allowable level could sell the excess permits to others. Consequently, incentives would exist to reduce emissions and accrue excess permits that could be sold for a profit. The money received from the sale could be used to develop means of further efficiency which, in turn, would produce less emissions.

Nonetheless, the best method for reducing carbon dioxide emissions to 1990 levels by the year 2000 is to encourage energy efficiency strategies. These strategies not only significantly reduce emissions, but also provide net savings. Discovering and implementing increasingly efficient electrical technologies reduces demand on utilities and thereby significantly lessens carbon dioxide emissions from oil and coal-powered plants. A DOE study ("US Competitiveness in the Environmental Technology Industry") recently claimed that the Japanese appear to have realized first that the environmental market will offer a profit.¹⁶⁵ Because the market for environmentally sound products is now at \$200 billion annually,¹⁶⁶ the United States must adopt a proactive stance and lead an environmental revolution.

164. *Autos Fuel Debate in Veep Race*, USA TODAY, Oct. 7, 1992, at 6A.

165. *Hearing*, *supra* note 66.

166. *Id.*

167. Gore, *supra* note 60, at C1.

By taking the initiative to develop new technologies that achieve energy efficiency, the United States can create many new jobs and increase the GNP. The United States can improve its performance in the global economy and can create more jobs by expanding conservation than by expanding energy production.¹⁶⁷ Far from being an economic nightmare, evidence shows that the reduction of carbon dioxide emissions can provide an environmental and economic benefit within the framework of an environmental revolution.

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