

# **BRIDGING THE GAP:**

**Initiatives to Achieve President Clinton's Climate Commitment**

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## *Introduction*

Last April, in his first major speech on the environment as President, Bill Clinton announced a new U.S. global warming policy. In a major departure from the Bush Administration, President Clinton committed the United States "to reducing our emissions of greenhouse gases to their 1990 levels by the year 2000" and instructed the Administration "to produce a cost-effective plan by August that can continue the trend of reduced emission." Environmental and energy efficiency organizations hailed this announcement as a major step forward.

As the first step in implementing his commitment, the President issued the Climate Change Action Plan (Climate Plan) on October 19, 1993. In introducing the plan President Clinton said "In concert with all other nations, we simply must halt global warming. It is a threat to our health, to our ecology and to our economy." The President went on to say "This plan isn't designed for an archive; it's designed for action. For rapid implementation, constant monitoring, and for adjustments as necessary to meet our goals."

Based on analyses of recent emission trends and projections for the year 2000, it is now clear that there is a gap of some 70 million metric tons of carbon as CO<sub>2</sub> (MMT) between 1990 emission levels and projected emissions for the year 2000 (Table 1).<sup>1</sup> Therefore the Climate Plan must be significantly strengthened to close the gap and fulfill the President's commitment. This paper describes six initiatives that taken together can accomplish this task (Tables 2 and 3). These initiatives build on the existing Climate Plan, and should be implemented in conjunction with that plan in order to achieve the President's commitment for the year 2000. Although our analysis for 2010 is preliminary, we also project that together with the existing plan, these initiatives would reduce emissions significantly below 1990 levels after the year 2000.

Table 1. Additional Emission Reductions Needed in 2000

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<b>Additions to the Baseline</b>	
Lower world oil prices	16 MMT
Realistic vehicle fuel economy assumptions	14 MMT
All carbon is not created equal	7 MMT
Base program shortfall	3 MMT
<b>Reductions in Climate Plan Credits</b>	
Delayed/incomplete plan implementation	20 MMT
All carbon is not created equal	10 MMT
<b>TOTAL</b>	<b>70 MMT</b>

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<sup>1</sup> See H. Geller and S. Laitner, *US Carbon Emissions Hit All Time High*. ACEEE, Washington, DC. April 1994; D. Lashof, *The Gap: Climate Plan Faces Major Shortfall*. NRDC, Washington, DC. April 1994.

The overall emission reduction from our six recommended measures is summarized briefly in the next section. The following sections provide a more detailed description of the initiatives as well as our analytical assumptions for projecting emission reductions.

**Table 2. Summary of Proposed Initiatives**

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**1. Increase Auto Fuel Economy**

Substantially increase existing CAFE standards and provide market incentives to achieve new car fuel economy of at least 45 miles per gallon by 2005. Also adopt standards and incentives to reduce tire rolling resistance.

**2. Adopt Pay-at-the-Pump Auto Insurance**

Eliminate uninsured motorists and make insurance payments more accurately reflect accident risks by collecting a portion of insurance premiums through gasoline sales.

**3. Upgrade Home Energy Efficiency**

Cut energy waste in America's 90 million existing homes by investing in improvements to low-income housing and by informing consumers and giving lenders incentives to promote mortgage financing of efficiency improvements. Also, establish model retrofit standards to apply when existing buildings are sold, and encourage their adoption by state and local governments.

**4. Strengthen Efficiency Standards**

Require states to upgrade their building codes for new construction. Adopt additional commercial and industrial equipment efficiency standards.

**5. Reward Efficiency Investments**

Require states to adopt regulatory reforms that make utility investments in energy efficiency at least as profitable as those in energy supply and that provide performance incentives for utilities to achieve maximum efficiency gains. Define Integrated Resource Planning, Demand-Side Management, and other energy efficiency measures as "reasonably available control measures" under the Clean Air Act.

**6. Increase Recycling**

Adopt minimum recycled content requirements for aluminum and plastic. Create incentives for community investments in source separation and industry investments to expand use of recycled materials.

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*Overview*

The projected reduction in carbon emissions from our six proposals are presented in Table 3. If implemented properly we estimate that these actions will result in about 75 MMT fewer emissions in 2000, equivalent to 5% of 1990 emission levels. The emission reductions increase rapidly after 2000 as a greater fraction of the building, equipment and vehicle stock is affected, leading to an estimated reduction of 290 MMT (almost 20% of 1990 emission levels) by 2010.

The current Climate Plan virtually ignores the transportation sector. To achieve essential emission reductions from this sector, we recommend stronger fuel economy standards plus other incentives for improving car and light truck efficiency, standards and incentives for low rolling resistance tires, and Federal incentives for states to enact pay-at-the-pump automobile insurance. Together these measures result in almost half of the emission reductions we project for 2000 and more than half of the reductions in 2010. Our other initiatives represent more aggressive efforts to increase the efficiency of energy use in other sectors, including mandatory standards and required changes in regulation where appropriate. We have a high degree of confidence that these emission reductions will be achieved if the recommended policies are adopted, as efficiency standards and regulatory reform play a significant (but not exclusive) role in our policy mix.

Table 3. Emission Reductions from Proposed Initiatives

Initiative	Emission Reductions (MMT)	
	2000	2010
1. Increase Auto Fuel Economy	30.6	162
2. Adopt Pay-at-the-Pump Insurance	4.8	19
3. Upgrade Home Energy Efficiency	9.2	20
4. Strengthen Efficiency Standards	8.7	43
5. Reward Efficiency Investments	13.4	27
6. Increase Recycling	8.0	20
<b>TOTAL</b>	<b>74.7</b>	<b>290</b>

## 1. Increase Auto Fuel Economy

### Background

Among the weakest aspects of the current Climate Plan is its neglect of car and light truck fuel economy. The only transportation sector actions in the plan are a set of proposed transportation demand management measures and efficiency labeling for tires.

The most notable transportation demand management action in the Climate Plan is the proposed reform of the federal tax subsidy for work-place parking; the proposal is that employer-provided work-place parking would remain tax exempt only if employees are also offered a taxable cash payment ("cash-out") or tax-free transit pass equivalent in value to the subsidized parking. The effectiveness of this option depends on how well it is implemented; exemptions from the cash-out requirement must be minimized to realize the benefits estimated in the Climate Plan.

The current Climate Plan contains no specific measures to increase personal vehicle fuel economy, although it does establish a working group to look into the issue.<sup>2</sup> The average fuel economy of new cars and light trucks in the United States has been within 0.9 miles per gallon (mpg) of 25 mpg (EPA-rated) since 1981.<sup>3</sup> Corporate Average Fuel Economy (CAFE) standards reached their highest mandated levels in 1985; world oil prices dropped precipitously in 1986; and declines have recently continued. CAFE standards have continued to constrain the new vehicle market while there has been a shift toward light trucks, for which the standards have been much lower than those for cars. Nevertheless, every year since 1985, the Department of Energy has projected that new car and light truck fuel economy would rise above the levels mandated by the standards. The "market-driven" fuel economy projections used for the Climate Plan are among the recent examples of such projections. Every year that has since gone by has proven such projections to be wrong. There is no evidence that the Climate Plan fuel economy projections would be any more accurate.

Personal vehicle transportation is one of the most rapidly growing sources of U.S. greenhouse gas emissions. We have adjusted the baseline projections issued in the Climate Plan based on a more realistic assumption of constant new vehicle fuel economy in the

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<sup>2</sup> A Federal Register notice announcing the intent to form a Policy Dialog Advisory Committee on automobile fuel efficiency was not published until April 14, 1994, delaying the schedule announced in the Climate Plan by at least six months.

<sup>3</sup> J.D. Murrell, K.H. Hellman, and R.M. Heavenrich. *Light-Duty Automotive Technology and Fuel Economy Trends Through 1993*. Report EPA/AA/TDG/93-01, U.S. Environmental Protection Agency, Office of Mobile Sources, Ann Arbor, MI. May 1993.

absence of new policies. This contributes 14 MMT to the gap that must be filled to ensure U.S. emissions do not exceed 1990 levels in 2000. Using the Administration's vehicle miles of travel (VMT) forecasts implies increases of 69 MMT by 2000 and 150 MMT by 2010 in greenhouse gas emissions from U.S. cars and light trucks.

### Policy

Policy makers cannot wish away the need to improve fuel economy; neither can they rely on research alone (such as the Clean Car Initiative) to move efficient technologies into the showrooms and onto the road. Leadership is needed to strengthen CAFE standards and establish effective, complementary market incentives to induce ongoing improvements in vehicle efficiency.

Substantial reductions in greenhouse gas emissions can be cost-effectively obtained by using fuel economy standards to guide the industry to apply available technologies to improve new car and light truck efficiency. An understanding of the light vehicle market clearly indicates that policies which directly influence automaker product planning will be the most effective and least costly approaches for reducing gasoline consumption and CO<sub>2</sub> in the personal transportation sector. The broader economic benefits of improving automotive fuel economy include reduced oil imports, cleaner air, and job creation.

Fuel economy standards are a proven and effective policy measure which provide emission reductions with a much greater degree of certainty than market incentives for either vehicle efficiency or transportation system efficiency. In spite of auto industry opposition and public relations campaigns damning regulatory standards, the energy savings and cost-effectiveness of CAFE standards are well documented. Presently saving nearly 3 million barrels per day of oil (corresponding to \$50 billion of consumer savings and 150 MMT of greenhouse gas emissions now avoided annually), fuel economy standards are truly one of the major energy policy success stories of the past twenty years.<sup>4</sup> We do agree that in the showroom, consumer interest in fuel economy is currently low. This is partly due to the industry's marketing strategies, partly due to low gasoline prices, but largely due to a variety of market imperfections, failures, and barriers. Market incentives specifically directed at fuel economy improvement, such as an expanded gas guzzler tax coupled with incentives for production and sales of vehicles more efficient than average, would therefore be a valuable complement to stronger fuel economy standards.

The Administration acknowledged the opportunity for reducing vehicle emissions by improving the efficiency (lowering the rolling resistance) of aftermarket tires for both light and heavy vehicles. (The "aftermarket" refers to sales of replacement tires directly to consumers, as opposed to the "original equipment (OEM) market" for tires supplied on new vehicles.) Aftermarket tires are about 20% less efficient than tires on new vehicles.

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<sup>4</sup> J.M. DeCicco, *Savings from CAFE: Projections of the Future Oil Savings from Light Vehicle Fuel Economy Standards*. ACEEE, Washington, DC. May 1992.

Information on tire rolling resistance is largely unavailable to tire buyers and so labeling tires with a rolling resistance rating is an important first step. Public education would be needed to help consumers interpret and take advantage of such information. Because technology advances are likely to yield ongoing improvements in rolling resistance, tire labeling and rating should be given on an absolute numerical scale, rather than a letter grading system.

Information programs, such as tire labeling, can be helpful, but are of themselves rarely sufficient for obtaining significant changes in market outcome. The Climate Plan assumes modest penetration increases of more efficient replacement tires; achieving even these levels is doubtful relying on an information-provision program alone. Establishing rolling resistance standards or sales tax incentives for low rolling resistance tires would achieve greater improvements in fleet-wide tire efficiency. There is an existing federal excise tax on tires, which are also subject to sales taxes in many states. (Some states also have environmental or disposal levies per tire sold.) An incentive could be created by converting existing taxes to a sliding scale, so that tires with the lowest rolling resistance are minimally taxed while tires with higher than average rolling resistance are more heavily taxed. Such a system would amount to a tire efficiency "feebate." Alternatively, tire rolling resistance performance standards could be developed (presently, there are standards only for tire strength and high-speed performance; there are uniform ratings, but no standards, for traction, temperature range, and tread wear of passenger car tires, but not for truck tires).

#### Analysis

A mid-range estimate of what is technically achievable and cost-effective over the next ten years given available technologies indicates that fuel economy standards can be raised at an average rate of 6%/yr starting in 1996.<sup>5</sup> The resulting ten-year 60% improvement would have new cars reaching 45 mpg and new light trucks reaching 33 mpg by 2005. If this improvement trajectory is started in 1996, greenhouse gas emissions would be reduced 27 MMT in 2000 and 152 MMT in 2010.

In addition, we recommend enactment of tire rolling resistance standards or incentives as needed to bring aftermarket tire efficiency up to par with that of new vehicle tires. We assume a maximum possible penetration of 60% (since new vehicle tires last for about 40% of a vehicle's lifetime mileage) and phase up to this level by 2005 (lead time is involved both for tire makers to convert production as well as for consumer tire replacement cycles). The 20% decrease in rolling resistance is estimated to yield a 3% increase in fuel economy.<sup>6</sup> These rolling resistance improvements are applied to a light vehicle stock that reflects the stronger CAFE standards discussed above, and to heavy trucks based on the fuel consumption projected by the 1994 Annual Energy Outlook. The result is greenhouse gas

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<sup>5</sup> J.M. DeCicco and M. Ross, *An Updated Assessment of the Near-Term Potential for Improving Automotive Fuel Economy*. ACEEE, Washington, DC. November 1993.

<sup>6</sup> DeCicco and Ross, 1993, op. cit.



emission reductions of 5.1 MMT in 2000 (i.e., 3.6 MMT more than projected by the Climate Plan due to tire labeling alone) and roughly 10 MMT by 2005 and later.

## *2. Adopt Pay-at-the-Pump Insurance*

### Background

Pay-at-the-pump insurance is a concept that would save energy and reduce carbon emissions while providing much-needed reform in the insurance industry.<sup>7</sup> Conceptually it is quite simple—the bulk of auto insurance premiums would be collected through a surcharge on gasoline. This would, at a stroke, accomplish several things: First, by tying insurance costs to fuel consumption it would provide incentives for reduced driving and for more efficient cars. Second, it would largely solve the problem of uninsured and underinsured drivers. Third, it would substantially reduce overall insurance costs by eliminating sales and underwriting costs. In addition, this reform would add an important element of fairness to the insurance system by making total insurance premiums proportionate to drivers' exposure to accidents (in terms of how much they drive).<sup>8</sup>

Ideally, Pay-at-the-Pump would be instituted nationwide. This would eliminate "border problems": the possibility that people would cross state lines to avoid paying the auto insurance premium if only a limited number of states adopted this policy. However, auto insurance regulation has traditionally fallen to state rather than federal authority. To address this problem, some states have considered tying the insurance premium to odometer readings and collecting payments through surcharges on vehicle registrations, rather than on gasoline sales. While this approach would preserve the incentive to reduce vehicle-miles travelled, there would no longer be an incentive for buying more efficient automobiles. Administrative costs could also be higher for this approach. Nevertheless, it remains an alternative for states which might experience significant border problems (at least until surrounding states adopt similar pay-at-the-pump programs).

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<sup>7</sup> This description of the Pay-at-the-Pump concept draws heavily from the proposal put forward by Andrew Tobias in *Auto Insurance Alert!*, Simon & Shuster, 1993.

<sup>8</sup> Clearly, some portion of the insurance premium should remain independent of fuel-consumption and reflect vehicle or driver-specific risk. That portion could continue to be collected through individual policies, although this would preserve much of the sales and underwriting cost embedded in the current system. Far more appealing is Tobias's proposal to collect such risk adjustments through surcharges on tickets, vehicle registrations, and drivers' license fees.

Policy

Because automobile insurance has historically been regulated by states, it is unlikely that the Federal government could mandate a pay-at-the-pump program nationwide. However, the Federal government could provide substantial incentives for states to individually adopt this approach. Potential points of leverage include:

- (1) Clean Air Act Implementation: Under the Clean Air Act Amendments of 1990, states are required to submit implementation plans (SIPs) demonstrating compliance with federally mandated air quality standards. The U.S. Environmental Protection Agency should encourage states to include insurance reform as a VMT-reduction measure in these implementation plans. To facilitate this, EPA should publish guidance to states on a methodology for computing the pollution reductions obtainable by linking fuel consumption or VMT to insurance premiums. If states fail to submit adequate SIPs, EPA should include pay-at-the-pump among the measures prescribed in federal implementation plans to bring those states into compliance.
- (2) Federal Highway Funds: The federal government could provide a powerful incentive for auto insurance reform by linking such reform to the disbursement of federal highway funds. States could be privileged in terms of receiving a higher allotment of funds to the extent that they implement VMT-reduction measures such as pay-at-the-pump. (Presumably the additional funds would be used to help provide better driving alternatives through investment in mass transit infrastructure, etc.) The existing Intermodal Surface Transportation Efficiency Act (ISTEA) already provides a framework for this linkage by giving states more flexibility in the use of highway funds and by conditioning highway funding on a demonstration of conformity with meeting clean air objectives.
- (3) Federal Fuel Taxes/Rebates: The federal government could secure all the emissions reduction benefits of pay-at-the-pump and eliminate border problems by collecting insurance premiums through a nationwide fuel tax. Collected taxes would be fully rebated to states that agree to return those revenues to their citizens in the form of insurance reform. However, states would retain final authority over how the auto insurance industry would be regulated. The politics of such a proposal could be significantly different from past tax initiatives because the tax would be returned to states (thereby obviating objections on grounds of regional fairness). Furthermore, for responsible citizens that currently carry insurance, the overall cost of driving would not increase, and could decrease significantly as their total insurance premiums could be reduced by more than the cost of the tax due to the elimination of uninsured motorists and reductions in administrative costs.

Analysis

Rough estimates of the cost of pay-at-the-pump suggest that it would add approximately 40 to 50 cents per gallon to the price of gasoline in California.<sup>9</sup> The carbon reduction estimates presented here for adoption of pay-at-the-pump assume that the elasticity of vehicle travel in response to a fuel price increase is -0.1 (i.e., a 1% reduction in driving for a 10% increase in fuel costs). This response is expected to account for all of the carbon reductions when coupled with the substantial fuel economy increases proposed here. In the absence of other measures to force fuel economy increases, however, the carbon reductions achieved through pay-at-the-pump are significantly larger, reflecting a greater response from added consumer demand for more efficient cars. The analysis assumes that pay-at-the-pump is instituted in California, Florida, and the Northeast's Ozone Transport Region by the year 2000;<sup>10</sup> the 2010 reduction estimate assumes nationwide adoption. The analysis also accounts for increased per gallon insurance fees by the year 2010 as fleet fuel economy improves and reduces overall gasoline consumption per vehicle-mile travelled. Enacted with stronger CAFE standards, Pay-at-the-Pump insurance reform as outlined here would cut emissions by 4.8 MMT in 2000 and by 19 MMT in 2010.

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<sup>9</sup> Currently insurance costs in California – a state characterized by relatively high insurance premiums – amount to roughly 85 cents per gallon. The 40 cent figure cited by Tobias reflects substantial overall savings as a result of no-fault and other insurance reforms. The actual increase in gas prices under pay-at-the-pump would be higher without these reforms; it would also vary depending on the amount of basic coverage included and in states with higher or lower overall insurance costs.

<sup>10</sup> The Ozone Transport Region consists of the 12 Northeastern states (CT, DE, MA, ME, MD, NH, NJ, NY, PA, RI, VA, VT) and the District of Columbia. Together with California and Florida, these states account for roughly 40 percent of the nation's total gasoline consumption.

### 3. Upgrade Home Energy Efficiency

#### Background

America's more than 90 million existing homes represent an enormous opportunity for cost-effective carbon dioxide emission reductions that is virtually ignored by the current Climate Plan. This sector was responsible for emissions of approximately 250 MMT in 1990, and the technical potential exists to cut these emissions by 50% or more through energy efficiency measures that pay for themselves through reduced energy bills. Individual homeowners generally don't make these investments because of a variety of market barriers, including uncertainty regarding the savings that will result from specific measures, uncertainty regarding how long they will own the home, uncertainty regarding the resale market value of the efficiency improvements, and lack of capital. In addition, renters are often responsible for utility bills but are not in a position to make capital improvements.

The current Climate Plan calls for promoting the use of Home Energy Rating Systems (HERS) and Energy Efficient Mortgages (EEMs) and expanding the Cool Communities program as the only initiatives aimed at making efficiency improvements to existing homes. Although these initiatives will achieve some emission reductions, they fall far short of what is possible and needed. First, they totally fail to address the low-income segment of the market. Second, the HERS/EEMs initiative does not provide for universal notification or incentives for lenders to promote energy efficient mortgages. Finally, these initiatives do not address the energy savings potential from residential retrofit standards/ordinances.

#### Policy

We propose a three-pronged initiative to improve the energy efficiency of America's existing homes. The first prong is to upgrade public and low-income housing, improving comfort, saving money, and reducing emissions. The Federal investment for this purpose should be increased by \$1.1 billion per year split between public housing and low-income weatherization. Although this initiative appears to be expensive in terms of direct federal outlays, it will generate direct returns to taxpayers by reducing HUD's \$2-3 billion per year energy bill as well as reducing the expenditures needed to prevent the poor from having to choose between food and heat.

The second prong of the initiative is to provide an effective mechanism for financing efficiency upgrades through home mortgages. This program must go beyond what is in the current Climate Plan by ensuring that all secondary lenders adopt uniform barrier-free procedures for issuing Energy Efficient Mortgages, by mandating that all homebuyers are informed about the availability of EEMs through a universal disclosure form, and by allowing homebuyers to automatically qualify for a larger mortgage to pay for cost-effective efficiency improvements (up to a maximum of \$6000). Because of the multiple concerns of homebuyers at the time of closing, purchasers should be allowed to add the cost of efficiency improvements to their mortgage for up to one year, without having to requalify or pay

additional initiation fees. To assure significant market penetration lenders must be given an incentive to promote EEMs. Providing a tax exemption for the interest income on energy efficiency loans conforming to appropriate guidelines would effectively compensate for any added default risks and give lenders a strong incentive to adopt uniform procedures and promote this product. In addition, primary lenders should be evaluated under the Community Redevelopment Act based, in part, on how many EEMs they write.

The final prong of the retrofit initiative is to promote the adoption of standards that require efficiency improvements at the time a home is sold or significantly remodeled. This approach, which has been adopted through city ordinances in San Francisco and Berkeley, California, requires sellers to ensure that a specific set of energy efficiency measures have been undertaken. For example, in these cities if ceiling insulation levels are less than R-11, then additional insulation must be installed to bring the thermal resistance value up to R-30, and low-flow showerheads and faucets must be installed. To maximize energy savings, compliance with retrofit standards should be coordinated with utility Demand-Side Management programs and Energy Efficient Mortgages, so that comprehensive retrofit packages can be designed and co-financed by sellers, buyer, and utilities. The Department of Energy should evaluate early experience with existing retrofit standards, and develop model standards and implementation tools that can be adopted by states or other jurisdictions.

#### Analysis

For public housing and low-income retrofits we assume that each dollar of federal funds leverages \$0.25 in additional investments (e.g. utility and state funds). Total investments through 2000 are \$6.88 billion, allowing 4.6 million households to be retrofitted at an average cost of \$1500 per household. We assume average primary energy savings of 40 billion Btu/yr per million dollars invested, resulting in year 2000 energy savings of 0.275 Quads and emission reductions of 4.6 MMT.<sup>11</sup> For expanded use of EEMs, we assume that energy efficiency improvements of 30% are made in 6% of existing homes by 2000 (i.e., EEMs are adopted in approximately 10% of the mortgages written during 1995-2000), resulting in emission reductions of 4.5 MMT. Of these savings, we assume that 3.5 MMT are in addition to what would be achieved under the current Climate Plan. The tax expenditure for providing the incentive described above would only amount to about \$80 million per year, assuming an average of \$4000 per EEM and mortgage interest rates of 7%. Finally, retrofit standards are assumed to result in 15% energy savings in an additional 3% of existing homes by 2000, yielding emission reductions of 1.1 MMT. Total incremental emission reductions are thus 9.2 MMT in 2000, expanding to approximately 20 MMT in 2010.

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<sup>11</sup> See H. Geller, J. DeCicco, and S. Nadel, *Cost-Effective Carbon Dioxide Reduction Initiatives*. ACEEE, Washington, DC. June 1993.

#### 4. Strengthen Building and Equipment Efficiency Standards

##### Background

Building and equipment efficiency standards are one of the most effective strategies for achieving widespread energy savings and emission reductions. The Climate Plan includes setting of some equipment efficiency standards as permitted by existing law, as well as promotion of stronger building standards and training of code officials and builders at the state and local level. The Climate Plan assumes that states and localities only adopt the current "vintage" of model building standards (i.e., the ASHRAE 90.1 model standard for commercial buildings and the CABO model standard for residential buildings),<sup>12</sup> and in the case of new housing, the plan assumes implementation in only part of the country.

There are opportunities to: 1) promote more widespread adoption of building standards, 2) increase the stringency of building standards and thus further improve the efficiency of new buildings, and 3) adopt additional appliance and equipment efficiency standards. This initiative proposes a combination of these actions.

##### Policy

First, we propose that DOE adopt equipment efficiency standards on products such as small motors and high intensity discharge lamps, as well as efficiency labeling for lamps, light fixtures, and office equipment. Standards and labeling for these products are authorized under the Energy Policy Act of 1992 (EPACT), but DOE did not include them in the original Climate Plan. Rulemakings are required to implement these efficiency labeling and standards provisions.

Second, we propose that minimum efficiency standards be adopted on a number of additional commercial and industrial products, specifically larger-size packaged heating and cooling equipment, packaged refrigeration equipment, chillers, fluorescent light fixtures, belts for motor systems, fans, pumps and compressors, and unit and duct heaters. These products are all good candidates for minimum efficiency standards -- high efficiency models are technically feasible and cost-effective for consumers, but are infrequently purchased due to limited availability, limited awareness, lack of life-cycle cost analysis, and other factors. New legislation is required to adopt standards on these products.

Third, we propose that states be required to adopt *residential* building standards that meet or exceed the CABO or ASHRAE model standards, just as states are required to adopt *commercial* building standards that meet or exceed the ASHRAE model standard for commercial buildings. EPACT only requires states to consider adopting such standards for

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<sup>12</sup> ASHRAE is the American Society of Heating, Refrigeration, and Air-conditioning Engineers. CABO is the Council of American Building Officials.

residential buildings. The Climate Plan includes an initiative designed to promote wider adoption of CABO or better residential standards, but assumes that the number of new housing units that meet or exceed the standards rises from 40% in 1996 to 80% by 2000. We propose that through new legislation, all states be required to adopt standards that meet or exceed current CABO or ASHRAE model standards by 1997. In addition, we assume that the model standards themselves are strengthened during the late 1990s, with states required to meet or exceed the new standards by 2001.

Fourth, we assume that the energy efficiency of new commercial buildings will improve after the publication of a revised ASHRAE model standard. Final publication of this revised standard is expected within two years. We assume the new model standard starts to affect construction in 1997, with 40% of new buildings complying by 2000 and all new commercial buildings complying by 2003.

#### Analysis

The details of our analysis of the EPACT equipment standards and labeling provisions are contained in a separate study.<sup>13</sup> ACEEE has also analyzed the potential energy savings from equipment efficiency standards on the additional products listed above.<sup>14</sup> Our analysis of residential building standards assumes a 25% reduction in space heating and cooling energy use from current model standards and a further 20% reduction from next generation standards. Regarding commercial building standards, we assume a 20% reduction in total energy use in buildings that comply with the forthcoming revised ASHRAE model standard. We present the estimated carbon emissions reductions in 2000 and 2010 from this initiative in the following table.

Table 4. Carbon Emissions Reductions from Stronger Efficiency Standards

Type of Standards	Emissions Reduction (MMT)	
	2000	2010
EPACT options	2.6	14.0
New equipment standards	4.5	13.9
Residential codes	0.6	3.8
Commercial codes	1.0	11.2
<b>TOTAL</b>	<b>8.7</b>	<b>42.9</b>

<sup>13</sup> H.S. Geller and S.N. Nadel, *Consensus National Efficiency Standards for Lamps, Motors, Showerheads and Faucets, and Commercial HVAC Equipment*, ACEEE, Washington, DC. June 1992.

<sup>14</sup> S. Nadel, *Minimum Efficiency Standards: Options for State and Federal Action*. ACEEE, Washington, DC, 1994.

## 5. Reward Efficiency Investments

### Background

Electric utilities are responsible for one-third of all energy-related carbon dioxide emissions projected for the year 2000 under the Climate Plan. These emissions come from burning fossil fuels (primarily coal and natural gas) in power plants in order to generate electricity that performs a variety of energy services for utility customers. Over the last decade, utilities in several states have been given incentives to provide these energy services to their customers at the least overall cost, which in many cases has meant helping customers reduce their demand by using energy more efficiently instead of generating additional electricity. The Energy Policy Act encourages this approach, often called Integrated Resource Planning (IRP), by requiring all states to *consider* adopting IRP and regulatory reforms that would make Demand-Side Management (DSM) at least as profitable as energy supply options for delivering a given energy service. The Climate Plan includes a measure to further encourage state adoption of IRP by expanding DOE's program to provide technical and financial assistance to states, but incremental emission reductions from this program are only projected to be 1.4 MMT in 2000.

Although most states now claim to have adopted IRP procedures to some degree, only ten have a regulatory framework that genuinely ensures that DSM can compete on an equal footing with supply options.<sup>15</sup> As of 1991, DSM expenditures exceeded 2% of utility revenue only in California, Connecticut, Massachusetts, Rhode Island, Washington, and Wisconsin. Expenditures were 1-2% of revenue in an additional ten jurisdictions: District of Columbia, Florida, Maine, Maryland, Nevada, New York, North and South Carolina, Oregon, and Vermont.<sup>16</sup> Although DSM programs have expanded substantially in some states since 1991, the basic picture has not change significantly.

Indications are that many states will respond to the Energy Policy Act provision with only a *pro forma* consideration of regulatory reforms. Meanwhile, DSM programs in all states are under pressure as a result of the specter that IRP will be undermined by retail wheeling--a practice being promoted in the name of competition, but that would in effect allow large industrial customers to obtain special deals with utilities outside their local

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<sup>15</sup> This includes four states that decouple profits from sales volume (CA, MT, NY, and WA), and six states that have other unconditional lost revenue recovery mechanisms (CT, MA, NH, OR, PA, VT). Based on *Incentives for Demand-Side Management*. NARUC, Washington, DC. October 1993.

<sup>16</sup> E. Hirst, *Electric-Utility DSM-Program Costs and Effects: 1991 to 2001*. Oak Ridge National Laboratory. May, 1993.



service territory. Whether or not retail wheeling will in fact be accepted by state regulators, many utilities are using this threat as an excuse to attempt to scale back DSM programs.<sup>17</sup>

### Policy

The piecemeal approach to IRP and DSM currently being pursued at the state level will not lead to the overall emission reductions and economic benefits that could be achieved through a uniform national policy. All states should be required to institute, within two years, full-fledged IRP and regulatory reforms that make DSM at least as profitable as energy supply options for providing a given energy service. In addition, states should be encouraged to provide positive incentives for effective DSM and to adopt IRP procedures that account for environmental externality costs in determining least-cost resource options. The detailed regulatory framework for implementing these objectives should be left up to each state to determine, but the objectives themselves are a matter of national policy and should not be optional. Adopting a uniform national approach to utility regulation also insures that the specter of retail wheeling can not be used to play one jurisdiction off against another, potentially undermining IRP everywhere.

In addition to requiring regulatory reforms through legislation, EPA should use its existing authority under the Clean Air Act to ensure that specific energy efficiency measures are implemented in a timely fashion. Efficiency programs not only reduce greenhouse gas emissions, but also the pollutants that cause acid rain and smog. These programs should therefore be defined as "Reasonably Available Control Measures" that must be applied in all areas that are not in attainment of ambient air quality standards. Finally, EPA should use its New Source Review authority, in addition to the State Implementation Plan process, to promote adoption of energy efficiency measures, both at the point of end-use and in energy supply. The Act requires new sources proposed for nonattainment areas to consider alternative sizes, processes and sites for such sources. Moreover, new sources locating in clean air areas are subject to a review for alternatives and to a requirement for application of "best available control technology." These authorities can be used to strengthen current State efforts to ensure full consideration of alternative technologies, including reliance on demand-side management as an alternative to the proposed new source.

### Analysis

As a result of these initiatives we project that utility DSM programs will reduce national electricity demand by 5% in the year 2000, compared to a total (baseline plus policy case) reduction of 2.7% assumed in the current Climate Plan. This level of impact is consistent with what some of the largest DSM programs are achieving currently and assumes

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<sup>17</sup> Cost-effective DSM programs reduce average utility bills, but can increase short-term kilowatt-hour rates because fixed utility costs must be spread over a smaller sales base. Retail wheeling would force utilities to compete on the basis of short-term rates rather than on the basis of minimizing total costs.

that national DSM expenditures increase to 2-3% of total utility revenues by 2000.<sup>18</sup> This leads to an incremental reduction in electricity generation of 71 billion kilowatt-hours and an emission reduction of 13.4 MMT, assuming the displaced generation mix is equivalent to 50% coal and 50% natural gas. The benefits of DSM will accumulate over time, leading to projected emission reductions of 27 MMT in 2010.

## 6. Increase Recycling

### Background

The Climate Plan includes an initiative to "Accelerate Source Reduction, Pollution Prevention, and Recycling." This modest initiative calls for expanding EPA's Federal Partnership for Source Reduction and Recycling, which provides information and technical assistance to states and localities, fosters "buy recycled materials" programs, and encourages investment in recycling infrastructure. The Climate Plan assumes that these actions will reduce waste and increase glass, steel and aluminum recycling by 5 percent in 2000, with an additional 5 percent increase in paper recycling due to further R&D activities. The total carbon emission reduction in 2000 due to energy savings from this initiative is 4.2 MMT.

Increasing the amount of recycling and reuse of materials such as glass, steel, aluminum, paper and plastics will reduce use of virgin materials and thereby reduce energy consumption in the energy-intensive basic materials manufacturing industries. But the impact on carbon emissions depends on the change in fuel mix that occurs as production shifts towards greater reliance on recycled feedstocks. For some materials (i.e., glass, steel and paper), there is little reduction in overall carbon emissions, or possibly even an increase, as the use of recycled feedstocks increases. This is due to a shift to more purchased energy and/or more carbon-intensive fuels as reliance on recycled feedstocks increases.

Unlike glass, steel and paper, increasing the amount of recycled materials used to produce aluminum and plastics will clearly result in lower carbon emissions. Producing aluminum from recycled feedstocks requires only 5% as much energy as aluminum production from virgin ore, while plastics made from recycled materials requires about one-third less energy than plastics production from virgin materials. Consequently, this initiative is aimed specifically at expanding the recycling of aluminum and plastics.

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<sup>18</sup> E. Hirst, *op. cit.*, 1993. Using data collected from utilities nationwide, Hirst projects utility DSM program impacts rising to 2.7% of generation in 2001 (consistent with the Climate Plan projection for 2000) corresponding to expenditures of 1.2% of total utility revenue in 2001.

Policy

There is potential for higher materials recycling levels by 2000 and thereafter if more extensive and active policies are pursued. These policies include:

- recycling and recycled material content requirements;
- beverage container deposit (i.e., "bottle bill") requirements;
- tax incentives for investments in recycling infrastructure;
- elimination of subsidies for virgin materials production and/or taxes on virgin materials;
- promotion of source separation and other practices to improve the quality of recycled materials;
- expanded R&D on new techniques for materials recovery and reuse.

The goal of these policies is not just to increase the volume of materials collected, but to collect materials with a high level of purity. High quality recycled feedstocks are needed to expand the use of these materials and produce higher value products. For example, bottle bills not only reduce littering, but produce a large source of high quality recycled feedstocks that industry can readily utilize.

Analysis

We assume that the recycling targets in the Table 5 are established and achieved. These targets were presented and analyzed in a previous ACEEE study.<sup>19</sup> If the targets are achieved, we estimate that an additional 8 MMT of carbon emissions would be avoided by 2000 and 20 MMT of emissions would be avoided by 2010, relative to emissions projected in the Climate Plan. These emissions reductions occur both directly in the manufacturing process and indirectly in electricity generation.

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<sup>19</sup> R.N. Elliott, *Carbon Reduction Potential from Recycling in Primary Materials Manufacturing*. ACEEE, Washington, DC. February 1994.

Table 5. Recycling Targets

Product	Average Recycled Content			Target 2010
	1991 Base	Climate Plan	Target 2000	
Aluminum	31%	33%	41%	50%
Plastics	2%	2%	20%	35%

Our estimates of avoided carbon emissions do not account for energy use in the collection and transport of recycled materials. Nor do they account for energy use in the production and transport of virgin feedstocks. These two secondary effects are offsetting to some degree. We believe a more complete analysis would result in even greater total greenhouse gas emissions reductions than the values estimated here. Thus, we believe our analysis is conservative.