

Innovations in State-led Action to Reduce Greenhouse Gas Emissions from Transportation: The State Climate Action Plan

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ABSTRACT

This paper describes the recent development of action plans to reduce emissions of greenhouse gases (GHGs) from transportation sources at the state level. A growing number of states are drafting plans to reduce GHG emissions within their own borders. A key component of these plans is transportation policies. The paper discusses policy types that are popular across multiple states, and examines the effectiveness of these policies and the variations between them. The six state climate action plans examined in this paper include a total of 76 policies to reduce GHG emissions from transportation and land use. In many cases the state plans include very similar policies. Policies that have been developed, analyzed, or implemented by one state are often easier to replicate in additional states. Some of the most popular policies among the six states examined are:

- GHG emissions standards for light-duty vehicles
- Smart growth measures
- Clean car purchase incentives for consumers
- Provision/promotion of transit and alternative modes
- Pay as You Drive Insurance
- Alternative fuels/Low Carbon Fuel Standard

These policies are also among those with the highest estimated GHG reductions in each state.

At the time of writing, several more states are initiating their own climate action plans. We expect this policy phenomenon to continue to grow and to perhaps influence policies at other levels of governments.

INTRODUCTION

This paper describes the recent development of action plans to reduce emissions of greenhouse gases (GHGs) from transportation sources at the state level. A growing number of states are drafting plans to reduce their GHG emissions. Transportation policies play a key role in these plans. This paper describes the basic process for the drafting of state climate action plans, many of which have been facilitated by the Center for Climate Strategies (CCS). We review the importance of transportation policies to climate action in general. We introduce the types of policies that states are adopting and explain briefly how the policies differ in implementation and likely impact.

Human-induced climate change is the one of the most pressing environmental problems of the 21st century. An increase of average global temperatures of just a few degrees threatens to melt polar ice caps, raise sea levels, increase extreme weather events, and change patterns of rainfall and snowfall worldwide. These shifts in climate will have drastic implications for natural systems as they disrupt ecosystems, change habitat functions, and threaten some species with extinction. Climate change threatens humans, too, with flooding, droughts, and disruptions to food and water supplies. Scientist and policymakers alike find the threat significant, and anthropogenic sources of GHGs to be the primary cause.

The attention of scientist and policymakers is now increasingly turning to what can be done to reduce GHG emissions. The transportation sector, as one of the most prolific emitters of GHGs, is a focus of attention. Transportation, including on-road and non-road vehicles, accounted for about 28 percent of U.S. GHG emissions in 2005. (1) Figure 1 shows trends in the percentage share of GHG emissions by economic sector. Within the transportation sector, light-duty vehicles (LDVs) are the largest source of GHGs, followed by heavy-duty vehicles (HDVs). Figure 2 illustrates the breakdown of transportation emissions. (1)

In addition to being one of the most significant sources of GHG emissions, the transportation sector is also the fastest growing source of emissions. The sector accounted for nearly half of the growth in U.S. GHG emissions between 1990 and 2005. In the absence of policies to reduce GHG emissions from transportation, the sector is expected to continue to show the most rapid growth between now and 2030. The U.S. Energy Information Administration projects a 40 percent increase in CO₂ emissions from transportation over that period. (2)

FIGURE 1 U.S. GHG Emissions by End-Use Economic Sector, 1990-2005

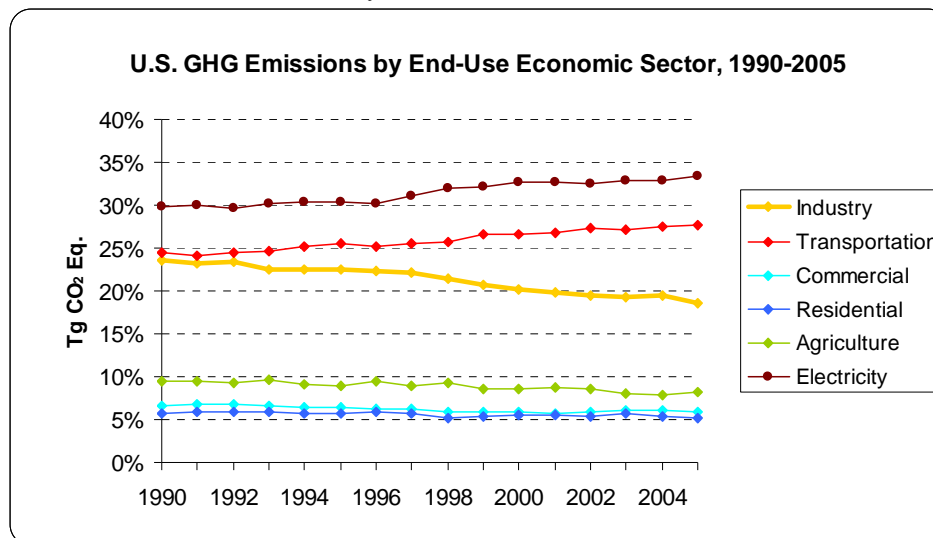
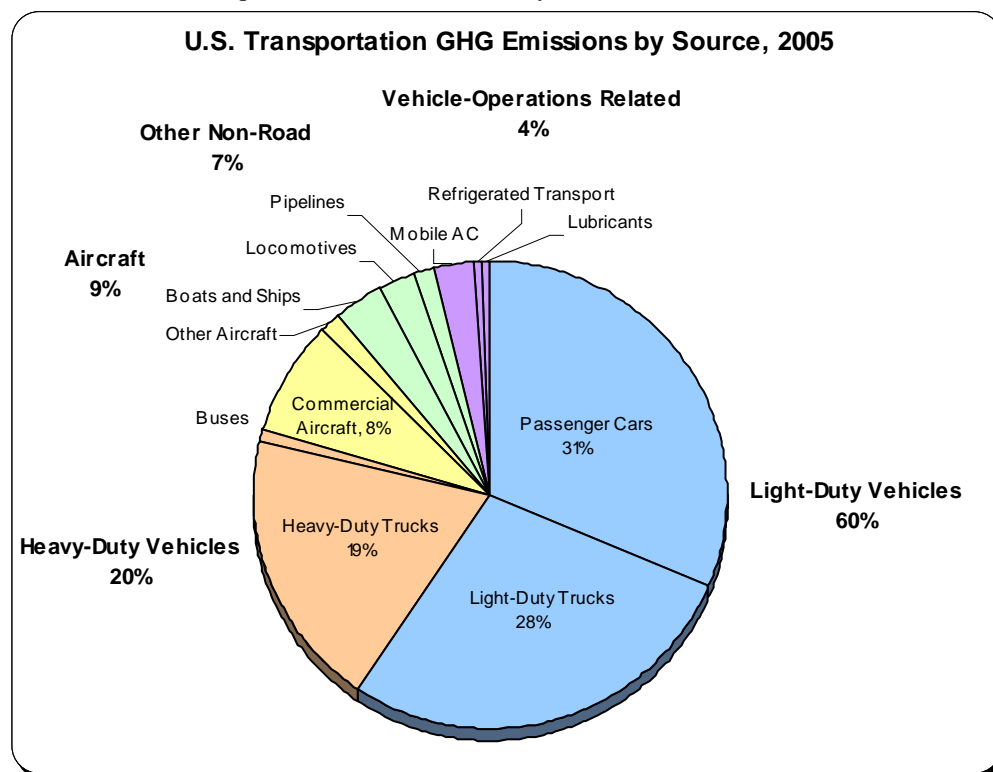


FIGURE 2 U.S. Transportation GHG Emissions by Source, 2005



Several recent papers and other resources have addressed state transportation actions to reduce GHG emissions.

“Greenhouse Gas Reduction Through State and Local Transportation Planning”, released by U.S. DOT in September 2003, provides seven case studies, conducted between 2001 and 2003, on efforts by states to use transportation planning to reduce GHG emissions. The document does not critically examine the assumptions or methods within various transportation plans. The report draws broad conclusions about political and institutional approaches to dealing with transportation and climate change. (3)

“Estimating Transportation-Related Greenhouse Gas Emissions and Energy Use in New York State” was released by NY State DOT in May 2005. The New York State Energy Plan (SEP), released in 2002, was one of the first plans in the nation to integrate transportation planning, energy conservation, GHG mitigation, and air quality planning. This report explored transportation-related GHG emissions and energy use in New York State, within the context of the NY SEP. It focused on three elements:

- Estimating the likelihood that the state would meet SEP’s GHG reduction goals
- Estimate emissions by metropolitan region and mode, and explore a recommendation for MPO’s to include GHG emissions estimates in their transportation plans
- Estimate the potential of various transportation polices to reduce GHG emissions (4)

“Assessing State Long Range Transportation Planning Initiatives in the Northeast for Climate and Energy Benefits” (BBG Group, December 2005) identified national best practices for climate protection and energy efficiency in long-range transportation plans (LRTPs). The report compared these best practices to the practices in four states: Massachusetts, Maine, New Jersey, and New York. The report found that LRTPs are useful but limited tools in combating climate change. It suggested areas for improvement in the integration of climate change policy with transportation planning. (5)

“Integrating Transportation, Energy Efficiency, and GHG Reduction Policies: A Guidebook for State and Local Policy Makers” (Center for Clean Air Policy) is an online resource including guidance documents, a spreadsheet emissions calculator, and a web-based user interface. The guidebook includes briefs on polices to reduce GHG

emissions from transportation as well as guidance on quantifying the benefits of these policies. The guidebook is intended to be updated continually. (6)

This paper adds to the existing literature by describing the state climate action plan, the most recent development in policy action on transportation and climate change. The paper also discusses policy types that are popular across multiple states, and reviews the effectiveness of these policies and the variations between them.

CLIMATE ACTION AT THE STATE LEVEL

Action at the state level has the potential to effect substantial change, by reducing emissions, and by promoting national and even global climate policy. States are important starting points for climate action for two reasons. First, individual states emit significant volumes of GHGs. Second, states have the ability to enact legislation outside the constraints of the federal government.

Many states have the power to make direct impacts on global GHG emissions within their own borders. U.S. states are some of the world's largest sources of emissions; thirty-four out of the seventy-five largest greenhouse gas emitters in the world are U.S. states. (7) If we consider U.S. states in the same cohort as other countries, Texas is the sixth largest emitter of GHGs in the world. California is the twelfth largest emitter. The ability to achieve substantial absolute emissions reductions makes states potential players in the global climate policy arena.

In addition to reducing their own emissions, states serve as both testing grounds for emerging climate policies and as the building blocks for political support at the federal level. States have traditionally been important actors in the development and implementation of environmental policy. Federal environmental laws, particularly those relating to air pollution, have often built on state and regional initiatives.

Climate policy in particular is well-suited to state government. Issues of climate policy are often hotly contested among stakeholder groups. State-led initiatives have the potential for greater stakeholder involvement, and therefore potentially better consensus building, than federal initiatives. In addition, transportation and land use are particularly important sectors for mitigation of GHG emissions. These policy areas are traditionally held within the purview of state regulation. Therefore state involvement is particularly important in the area of transportation and climate change.

Current State Action

A majority of action on GHG emissions in the U.S. to date has been state-led. California has been a first mover in passing binding legislation. In August 2006, the California legislature passed AB 32 (the Global Warming Solutions Act of 2006), which established a goal to reduce the state's greenhouse gas emissions to 1990 levels by 2020. AB 32 establishes California as the first state to impose mandatory emission limits. In the transportation sector specifically, California adopted AB 1493 in 2002, which requires tailpipe greenhouse gas emissions from new vehicles be reduced by 22% by the 2012 model year, and by 30% by the 2016 model year.

Other states have also moved rapidly into climate-related action and legislation. Forty-two states have compiled GHG inventories and forecasts. Seventeen states have set GHG reduction targets. (8) In 2007 alone, New Jersey has enacted legislation requiring the most dramatic state-level reduction in GHG emissions to date, the governor of Florida has signed an executive order to reduce GHG emissions, and Maine has mandated that state-owned buildings use 100% clean energy by 2010.

Multi-state collaboration is another important policy arena. Several multi-state regional initiatives are addressing climate change in the United States, including the Western Regional Climate Action Initiative, Western Governors' Association (WGA) Clean and Diversified Energy Initiative, Regional Greenhouse Gas Initiative (RGGI), New England Governors and Eastern Canadian Premiers (NEG-ECP) climate action plan, and Powering the Plains. These regional initiatives generally establish regional emissions targets. Some such as the RGGI have also established cap and trade systems for GHGs.

State Climate Action Plans

One of the most recent developments in state level climate action is the drafting of climate action plans. A climate action plan is a document that sets out specific policies and programs to reduce statewide GHG emissions. The document typically includes an overview of background conditions, a description of proposed policies and programs, and estimates of the impact of proposed measures on GHG emissions. Climate action plans develop policies for consideration by the state legislature. Although climate action plans vary in depth and detail from state to state, the processes that states use to draft plans are broadly similar. An independent organization typically conducts a review and analysis of potential policies with the help of stakeholder groups. Thirty-six states have developed or are developing some sort of climate action plan to date. (8)

CCS follows a standardized process when they assist states with climate plans. The process is directed by a broad-based plenary group of leaders selected by the commissioning state, who meet approximately every two months over a period of nine to twelve months. Sector-specific technical working groups develop policy recommendations for the plenary group. Typically, the processes have involved five such working groups:

1. Transportation and land use
2. Energy supply
3. Residential, commercial, and industrial
4. Agriculture, forestry, and waste
5. Cross-cutting issues

The basic steps are as follows:

1. Develop initial statewide GHG inventories and projections
2. Identify full range of possible GHG policy options (a catalog of options)
3. Identify initial draft priority policy options for evaluation (voting by the technical working groups to pick the top 10 priorities)
4. Develop straw proposals for draft policy option design (often including numeric goals)
5. Quantify GHG reduction, cost/cost savings potential of draft policy options
6. Define implementation mechanisms, related policies and programs, and feasibility issues
7. Iterate to final consensus on draft policy options through voting by plenary group
8. Finalize recommendations and report language

The process in individual states varies slightly based on the level of government support, the mix of stakeholders involved, and the state's prior experience with energy conservation and GHG mitigation measures. CCS is currently working on climate action plans in sixteen states. (9)

This paper focuses on recently completed climate action plans in six states: Arizona, New Mexico, North Carolina, Montana, Colorado, and Vermont. We chose these in part because of the authors' involvement in those processes, and as (to our knowledge) the most recent examples of state plans.

STATE GHG INVENTORIES

The first step in developing a climate action plan is developing a state GHG inventory and forecast. The inventory catalogs the amount and sources of current and projected GHG emissions. The inventory provides the GHG baseline that the proposed policies will reduce.

The transportation sector inventory is made up of emissions totals by transportation fuels. The four fuel categories are inventoried:

- Gasoline
- Diesel
- Jet fuel & aviation gasoline
- Natural gas, LPG, other

The inventories include the emissions of LDVs and HDVs, as well as non-road vehicles including air, rail, and sea modes. Inventories record emissions in million metric-tons of CO₂ equivalent (MMtCO₂e). CO₂e is a standard

metric that conveys the total global warming potential of all GHGs in terms of an equivalent amount of CO₂. The transportation sector is sometimes also referred to as the transportation and land use sector.

Table 1 below provides the inventory total and transportation-related emissions for the six states examined in this paper.

TABLE 1 GHG Inventory Forecasts by State, 2010

	VT	AZ	NC	CO	NM	MT
Total Emissions (MMtCO ₂ e)	9.42	116.6	196	132	77.5	39.7
Transportation (MMtCO ₂ e)	4.01	45.4	66.4	30.6	17.6	8.9
Transportation %	43%	39%	34%	23%	23%	22%

Total GHG emissions vary widely by state, depending on the size of the population and amount and type of industry in the state. Smaller states and less-populated states tend to emit less GHGs. In 2010, transportation will account for between 22 and 43 percent of total state GHG emissions in the six states examined.

Transportation's share of total emissions varies from state to state based on the amount and type of industry in the state. Vermont, for example, has a relatively small industrial base for its population. Thus transportation makes up a larger proportion of emissions. New Mexico and Montana have relatively large agriculture and resource extraction sectors, which play a larger role in GHG emissions in those states than elsewhere.

OVERVIEW OF REDUCTION STRATEGIES

Strategies to reduce GHG emissions from transportation are often categorized by travel mode and by policy type. Since LDVs represent the largest share of emissions, the majority of strategies in climate action plans focus on LDVs; however, HDVs and non-road vehicles are also important sources of GHG emissions. Many of the same policy types for LDVs can also apply to other modes, although the individual policies and implementation strategies are typically different. Three broad approaches to emissions reductions account for most reduction strategies: reducing the amount of travel, using cleaner vehicle technologies, and using cleaner fuels. This section describes several broad strategy types, with an emphasis on LDVs. The following section will outline the specific policies adopted by states.

Vehicle Technologies

These policies pursue the development, production, and adoption of new cleaner technologies in on-road vehicles. Technologies include innovations to increase the gas mileage from standard gasoline and diesel engines, technologies that replace petroleum, and technologies that reduce idling of vehicles.

The end result of these policies is that cleaner technologies are deployed. The policies pursue this result through a number of mechanisms including:

- Requiring that vehicle manufacturers meet stricter fleet-based standards
- Providing incentives for customers to purchase cleaner technologies
- Public education and information dissemination
- Accelerating fleet turnover (public and private)
- Requiring and/or funding deployment of other technologies (i.e. engine and exhaust retrofits, Truck Stop Electrification)

Alternative Fuels

Alternative fuels strategies encourage the production, distribution, and use of non-petroleum based fuels. Measures vary by how aggressively they promote the use of alternative fuels. Small increases in the use of alternative fuels, generally biodiesel and corn-based ethanol, can be achieved without major changes in vehicle stocks and distribution infrastructure. (Low-level blends of ethanol with gasoline and biodiesel with conventional diesel can be used much like conventional fuels.) Major increases in the use of alternative fuels will likely require new

distribution networks and may require deploying new engine technologies. Policies to promote the use of alternative fuels are often linked to agricultural policies to promote the in-state production of feedstocks for ethanol and biodiesel. Alternative fuel policies can also include measures to promote hybrid technologies and fuel cell vehicles.

The technological developments that will contribute to alternative fueled vehicles are still uncertain. A major pivot point in the use of ethanol is the gap between the benefits of corn feedstocks and cellulosic feedstocks. The latter, which has greater inherent energy content, achieves greater GHG reductions on a lifecycle basis. At present, technologies for the commercial production of ethanol from cellulosic feedstocks are in the early stages of development. The eventual maturation of these technologies would change the impact of alternative fuel policies significantly. Some policies explicitly incorporate this type of technological uncertainty. The Low Carbon Fuel Standard (LCFS), first established in California, sets a goal for the reduction of average lifecycle GHG of all fuels sold in-state. The policy places the burden on fuel producers and vehicle manufacturers to determine the best mix of technologies to meet the goal.

Transportation Demand Management (TDM)

TDM strategies reduce VMT, typically by increasing travel options for modes other than driving alone, by reducing the need to travel, and/or by changing price signals. TDM strategies vary broadly, from infrastructure investment to public education to market-based incentives. TDM policies pursued by the six states examined in this report include:

- Improving multi-modal options, including transit
- Pricing strategies for fuel and driving
- Pricing strategies for parking
- Public education

Land Use

Land use strategies seek to shift development patterns toward compact or smart growth patterns. They are often coordinated with investment in transit infrastructure. By bringing people's residences closer to the places they live, work, and play, land use strategies reduce distances traveled. By making origins and destinations more accessible by many modes, land use strategies help people to make trips by bike, foot, bus, or train.

Transportation System Management (TSM)

TSM strategies improve the operation of the existing road network. The general principle of TSM strategies is to optimize vehicle traffic flow and reduce idling, thereby eliminating unnecessary emissions. TSM strategies achieve this goal through options such as:

- Regulating vehicle speeds
- Providing real-time route information to drivers
- Reducing delays caused by accidents
- Improving the coordination of traffic flows at intersections and arterials

Strategies for Freight and Heavy-Duty Vehicles

The same three general approaches that can reduce emissions from LDVs can also reduce emissions from HDVs. Policies can change vehicle technologies, reduce the carbon-intensity of fuels, and reduce travel and activity rates. Because the policies and programs needed for these approaches are in most cases different for LDVs and HDVs, strategies for HDVs are considered separately.

Strategies for Non-Road Emissions

Non-road strategies affect air, rail, and maritime modes as well as off-road equipment. Again, available options include changes to technologies, fuels, and/or activity rates. Most strategies considered by states target technological improvements to non-road vehicles and to construction equipment.

ADOPTED STRATEGIES

This section reviews more specifically the transportation strategies that states have adopted as part of these planning processes. A detailed comparison of the modeling and evaluation mechanisms used to produce the estimates of impacts is beyond the scope of this paper. We encourage readers to consult the individual state action plans, available through the CCS website (www.climatestrategies.us), for methodologies. Deliberation documents are also available for individual state processes.

The six state climate action plans examined in this paper include a total of 76 policies to reduce GHG emissions from transportation. These strategies cover all of the categories above. In many cases, policies are very similar from state to state.

Table 2 presents information on the estimated effectiveness of 18 specific policy types that comprise the measures in the six states' plans. Percentages represent the total of transportation GHG emissions that the policy is estimated to reduce in 2020. For example, a 10% reduction means that the policy would eliminate 10% of the projected GHG emissions from transportation in 2020 in the respective state. Blank cells indicate that the state's plan did not include that policy. "NQ", not quantified, indicates that the plan included the policy but did not quantify the reduction in GHGs it might achieve. Policies are roughly ranked by estimated impact from highest to lowest. Not surprisingly, many of the most effective strategies are also the most common.

GHG emissions standards for LDVs is the most effective strategy, estimated to reduce transportation GHGs by about 9% in most of the states. California has adopted fleet-based standards for per-mile GHG emissions for manufacturers of passenger vehicles, and under the Clean Air Act, other states have the option of adopting the California standards. This type of standard is also known as a "Clean Car Program" or the "Pavley" standards, in reference to Assemblymember Fran Pavley who sponsored the California standards. Approximately 12 states have committed to these standards.

The policy is straightforward to adopt and to analyze, since the required GHG emissions rates are explicit. As a result, the percent emission reductions are similar across all five states that have included this policy in their plans. The primary unknown is the market penetration rate of new vehicles produced to the standard. The California standards currently face legal challenges. If the standards survive these challenges, other states will have the option to adopt the standards as well. The policy is popular with legislators because it places the burden of compliance on vehicle manufacturers.

Smart growth strategies are included in the climate plans of all six states reviewed. Their effectiveness in reducing GHG emissions varies widely among the six plans, for several reasons. In some states (such as VT and NC), the policies have set ambitious goals for reducing VMT through these policies. That is, the adopted policy is goal-driven rather than driven by a specific set of implementation mechanisms (although those are included as well). In other states, the plans have included more modest proposals to promote efficient land use patterns largely within the confines of existing state and local policies. The reductions estimated for Colorado, for example, reflect modeling by the Denver MPO of a compact future land use scenario considered feasible given the current policies and political environment.

Another factor that influences the effectiveness of smart growth strategies is the portion of a state's VMT that occurs in urban areas, particularly for those state plans that have focused on smart growth policies affecting only urbanized areas. Montana, for example, ranks last among all 50 states in terms of the percent of VMT in urbanized areas (23%). Because the smart growth policy in Montana's plan targets only urban VMT, its statewide impact is small. North Carolina and Arizona, on the other hand, have a relatively high proportion of VMT in urban areas (62% and 71%, respectively), so smart growth policies in those states are estimated to have larger impacts.

Incentives for consumers to purchase cleaner vehicles are present in all six state plans. These policies most often include market-based measures to change the types of vehicles that consumers purchase. For example, the state can charge consumers that purchase vehicles with higher emissions a surcharge and offer a rebate to consumers who purchase vehicles with lower emissions. This type of program is called a "feebate." Feebates affect GHG emission through two mechanisms:

1. Shifting consumer choice among available choices

2. Shifting vehicle fleet offerings from manufacturers.

The shift of fleet mix is thought to account for around 90% of the benefit of the policy. This is also the mechanism that will take longer to produce results.

Some of the states examined are considering feebate policies to be implemented regionally. For example, Arizona's policy includes a pilot program with the neighboring states of California and New Mexico. Multi-state collaboration is seen as essential in order to bring about a market shift on the part of manufacturers. The vehicle purchasing power of an individual state is not great enough to bring about a shift in fleet mix on its own. Because of the uncertainty associated with multi-state action and market dynamics, and the lack of rigorous analysis on the effects of feebate programs, stakeholder groups in many states have been reluctant to quantify the benefits of this policy. In the face of these uncertainties, the North Carolina plan adopted conservative assumptions about the policy's effectiveness. In contrast, the Vermont plan sets an ambitious goal of using feebates to increase the average fuel efficiency of new cars by 25%.

Other types of incentives target purchasers of hybrid and alternative fuel vehicles specifically. They include financial incentives as well as preferential access to lanes and parking spaces.

Promotion of multiple modes, including transit, is found in four of the six state plans. The approach is usually multi-pronged. It can include enhanced provision of infrastructure for multiple modes, such as new or increased transit service and stations, walking and biking paths, bike racks, and other types of facilities. In addition, the policies often include packages for promotion of these modes such as public education, advertising and incentives. These types of policies are often inter-related with smart growth policies.

The estimated effectiveness of these policies varies from 2.7% in Colorado to 8.5% in Vermont. The Colorado plan includes a simple plan to improve and expand transit service, primarily in urban areas. The North Carolina plan is much more aggressive. It includes improved and expanded transit service as well as Transit Oriented Development, marketing and promotion of transit, system management measures, and improvements to bike and pedestrian connections. The policy in the Vermont plan is also broader in scope. In addition, the stakeholder group in Vermont set ambitious goals to increase the proportion of trips made by modes other than single occupancy vehicle (SOV).

Pay as You Drive Insurance (PAYD) is included as a TDM measure in five out of the six state plans. In PAYD, drivers pay for insurance based on the amount of miles that they drive. Thus drivers are financially rewarded for driving less. In some states, the program would require a change to state insurance laws. Pilot programs have been conducted in a few states.

PAYD policies in state climate action plans usually specify pilot programs with eventual rollout to the entire market. Variation in effectiveness across states is generally due to assumptions about market penetration. Some plans propose making PAYD mandatory, in which cases penetration would reach 100%. The Colorado plan would not make PAYD mandatory. Both ultimate penetration and effectiveness are lowest in that state.

Alternative fuel measures are present in all six climate plans. The effectiveness of these measures varies greatly among the states because of the different ways the measures have been formulated. The Colorado plan includes a Low Carbon Fuel Standard, modeled after a similar standard in California, that would mandate a 10% reduction in vehicle fuel carbon intensity without specifying a particular mix of fuels. Because the carbon reduction goal is written directly into the policy, the GHG benefits are straightforward to calculate and relatively large. Other states (such as New Mexico) have adopted broad alternative fuels policies that promote not only biofuels (ethanol and biodiesel) but also electric and hybrid-electric vehicles, and these far-reaching policies tend to be relatively effective as well. These types of strategies tend to achieve smaller GHG reductions when they focus only on promoting ethanol (which, if produced from corn feedstocks, has a minimal lifecycle GHG benefit) and biodiesel blends.

Other policy options that are popular among the six states include measures to reduce idling from HDVs, measures to reduce emissions from diesel vehicles in general, and fleet procurement policies. All three policies are included in at least 4 out of the 6 six plans. Although popular, these measures are less effective than some of the policies described above. Strategies to reduce HDV idling are included in many plans because they are relatively easy to implement and have low cost to the state (particularly if the state adopts an idling regulation). But because HDV

idling makes up a relatively small portion of a state's GHG inventory, the benefits of these strategies are relatively small. Procurement policies within public agencies are relatively easy to implement, and have additional value as demonstration projects.

These policies that are particularly effective and/or popular are likely to continue to surface in other states' climate action plans. As the field of transportation and climate change progresses and states report their experience with certain policies, other types of measures may rise to the top of the list.

One additional consideration in the adoption of such policies is their cost effectiveness. Cost effectiveness indicates how much the government or society as a whole (depending on the quantification method) will pay for each ton of GHGs avoided. In some cases policies may actually have negative cost. A policy of surcharges on vehicles with low fuel efficiency would generate revenue. Smart growth policies often save money on infrastructure costs. Cost effectiveness data is not presented here, because it is not sufficiently reliable to compare across policies in different states. In general, cost effectiveness is an important component in the feasibility of adoption and implementation of policies.

TABLE 2 Effectiveness of Transportation Policy Types by State, 2020

Policy type	GHG Reduction as % of Transportation GHG Inventory						No. of State Plans
	AZ	CO	MT	NC	NM	VT	
GHG emissions standards for LDVs	9.6%	9.4%	8.6%	9.9%	8.5%		5
Smart growth measures	6.8%	1.3%	1.3%	9.8%	5.8%	17.8%	6
Clean car purchase incentives for consumers	NQ	NQ	NQ	2.7%	NQ	10.5%	6
Provision/promotion of transit and alternative modes	NQ	2.7%		7.1%		8.5%	4
Pay as You Drive Insurance	4.8%	2.6%		6.5%	4.5%	7.4%	5
Alt. Fuels/Low Carbon Fuel Standard	1.9%	6.1%	0.4%	5.5%	7.6%	7.7%	6
Commuter Benefits		1.2%				3.6%	2
Non-road measures			0.8%		2.2%	3.6%	3
Fuel efficient tire programs	1.4%		0.2%		2.7%		3
HDV anti-idling measures	2.2%	0.3%	0.1%	0.2%	3.1%		5
Lower speed limits	0.9%				1.3%		2
Emission reduction measures for diesel vehicles	0.1%		0.2%	2.7%	NQ		4
Parking management		0.1%					1
Public fleet procurement policies	0.1%		NQ	NQ	NQ		4
Operational improvements to road networks			NQ				1
Fuel tax						NQ	1
Public education		NQ	NQ				2
R&D				NQ			1

SUMMARY

The transportation sector is one of the largest sources of GHG emissions in the United States. It is also the most rapidly growing source of GHG emissions. Policymakers at all levels are recognizing that action on climate change is necessary, and that transportation-related policies are particularly potent tools.

In the evolving field of policy on climate change, state governments are some of the most important players. The latest development in state policy on climate change is the development of state climate action plans. These plans

convene multi-stakeholder groups to develop policies to combat climate change in several broad policy areas. The Center for Climate Strategies (CCS) is facilitating the development of many of these plans.

In the transportation policy area, stakeholder groups in different states tend to adopt similar policies. Some policies are more popular than others because of ease of implementation, high estimated reductions in GHGs, and availability of examples elsewhere. Some of the most popular policies among the six states examined are:

- GHG emissions standards for light-duty vehicles
- Smart growth measures
- Clean car purchase incentives for consumers
- Provision/promotion of transit and alternative modes
- Pay as You Drive Insurance
- Alternative fuels/Low Carbon Fuel Standard

These policies are also among those with the highest estimated GHG reductions in each state.

At the time of writing, several more states are initiating their own climate action plans. We expect this policy phenomenon to continue to grow and to perhaps influence policies at other levels of governments. As states gain experience with developing and implementing policies to reduce GHG emissions from transportation, policies and quantification methods will continue to be refined.

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