

# CAPITOL RESEARCH

## ● ● ● TRANSPORTATION, ENERGY & ENVIRONMENT

### Green Transportation

#### Executive Summary

Green transportation—transportation that produces less greenhouse gas emissions than gasoline—is needed to mitigate climate change and reduce dependence on foreign oil.

State and local governments are updating vehicle fleets to greener forms of transportation. For example:

- Illinois requires state agencies to purchase flex-fuel vehicles that run on E85 (fuel that contains up to 85 percent ethanol) and diesel vehicles that run on B5 (fuel that contains 5 percent biodiesel fuel).
- 100 percent of the transit fleet in Culver City, Calif., runs on compressed natural gas, while 80 percent of the garbage trucks run on compressed natural gas, saving the city an estimated \$1.2 million annually.
- The American Recovery and Reinvestment Act provided \$100 million in funding through the Federal Transit Administration for 43 transit agencies in 27 states to purchase hybrid buses.

Advancing alternative fuels is another way states can make transportation greener:

- States such as Washington offer various tax exemptions, credits or rebates for alternative fuels and vehicles.
- As of June 2009, 38 states either mandated biofuel use or provided incentives for it. Twelve states have renewable fuel standards requiring a certain percentage of these fuels be used.
- Biofuels produce one-third less greenhouse gas emissions than gasoline. However, pipeline infrastructure will need to be built if biofuel usage is to increase.
- Clean (or ultra low sulfur) diesel offers another fuel alternative. Clean diesel is more efficient than gasoline and reduces CO<sub>2</sub> emissions by 10 to 20 percent.

Electric vehicles are considered by many to be the future of green transportation, and the automobile industry predicts electric vehicles will make up 10 percent of the market in 2020. However, for the market to truly expand, several things must occur:

- Tax incentives promoting the purchase of electric



- vehicles will need to be established;
- Locations for electric vehicle charging stations will need to be identified and multiplied many times over;
- Local electric grids will need to be reinforced to handle increased demand; and
- Building codes will need to be revised to ensure buildings are wired for car chargers.

Finally, other green transportation policy activities involve thinking beyond the automobile:

- The Obama administration announced a “complete streets” policy that seeks to put bicycle and pedestrian projects on equal footing with road and transit work. Complete streets are those designed and operated to enable safe access for all users.
- Oregon and Florida have the oldest state complete streets policies.
- New York is considering such legislation this year.
- Some state departments of transportation have also made complete streets part of their internal policies.
- The National Complete Streets Coalition identified 10 elements a complete streets policy should have.
- But critics say encouraging more bike riding simply doesn’t make sense for a modern industrial nation and such policies can take money away from repairing crumbling roads and bridges.
- Still, communities such as Portland, Ore., New York City and Detroit are working to change existing infrastructure to better serve those on two wheels.



## Need for Greener Transportation

The recent oil spill in the Gulf of Mexico, off the coast of Louisiana, provides a stark illustration of why the nation needs cleaner transportation. Not only do oil spills have enormous, often indelible, environmental consequences, they also raise the price of oil. If the explosion aboard the Deepwater Horizon oil platform halts the pursuit of offshore oil development long term, the nation's dependence on foreign oil is likely to increase.

Alternatives to oil, on the other hand, not only reduce environmental risk, they also mitigate price spikes due to shortages and scares. Thus green, clean transportation is essential to continued environmental and economic prosperity.

Petroleum burning from personal transportation—cars and light duty trucks—alone contributes approximately 17 percent of greenhouse gas emissions.<sup>1</sup> Improving vehicle efficiency—and increasing the use of biofuels, clean diesel and electric vehicles—can reduce emissions and reliance on foreign sources of oil. With gas expected to hover near \$3 a gallon this summer, that reliance is becoming increasingly costly.<sup>2</sup>

But combating climate change will require more than improving fuel efficiency and increasing the use of alternatives to oil. Policies leading to a decreased number of vehicles on the roads and policies encouraging walking and biking may also be important.

## Greener Fleets

One way that state government agencies are seeking to both set an example and have some impact on reducing the greenhouse gas emissions that contribute to climate change is by updating their fleets of cars, trucks and buses to greener vehicles.

Colorado state government, the State of Illinois' Central Management Services Division of Vehicles, the Ohio Department of Transportation, the Washington Department of Transportation and the Oklahoma Department of Central Services Fleet Management Alternative Fuels Program all have award-winning green fleets.<sup>3</sup> All are 2009 recipients of the Government Green Fleet Award, presented annually by Government Fleet magazine to federal, state and local government fleets based on criteria such as fleet composition and use of renewable and alternative sources of energy.

In the case of Illinois, the state is not only expanding the use of clean and renewable energy, but building on efforts to support Illinois farmers as well. In 2007, then-Gov. Rod Blagojevich signed House Bill 4137, which requires state agencies to purchase flexible-fuel vehicles that run on E85 (a form of fuel that contains up to 85 percent ethanol) and diesel-powered vehicles that run on B5 biodiesel (a 5 percent biodiesel fuel). The law also encourages state agencies to purchase fuel-efficient hybrid vehicles.<sup>4</sup>

But it was Culver City, Calif., that achieved the title of number one government green fleet for 2009. The city's fleet is powered to a great degree by compressed natural gas. In 2004, it became the second city in California with a 100 percent compressed natural gas transit fleet. About 80 percent of garbage trucks run on natural gas in Culver City as well; the other 20 percent are diesel-powered. City officials estimate using natural gas has saved fleet operations more than \$1.2 million annually.<sup>5</sup>

Public transit fleets are also getting greener. Last September, the Obama administration announced \$100 million in American Recovery and Reinvestment Act funding through the Federal Transit Administration for 43 transit agencies in 27 states that administration officials said are "pursuing cutting-edge environmental technologies to help reduce global warming, lessen America's dependence on oil and create green jobs," according to the press release announcing the funding. Alabama, Connecticut, Iowa and Oregon are among the states that will all see new hybrid buses on the roads as a result of the Recovery Act funds.<sup>6</sup>

## Developing Infrastructure & Incentives for Greener Fuels

Another way states are seeking to mitigate the impacts of climate change and reduce the nation's dependence on foreign oil is by enacting policies that mandate or promote the development of alternative fuels and vehicles—such as biofuels, clean diesel and hybrids—and related infrastructure.

States are promoting that development through various tax exemptions and deductions. Washington, for example, exempts alternative fuel vehicles from state motor vehicle sales and use taxes. The state also exempts public lands used for installing, maintaining and operating electric vehicle infrastructure from leasehold excise taxes. In addition, electric, compressed natural gas and liquefied petroleum gas vehicles are exempt from emissions control inspections. States such as Virginia allow alternative fuel vehicles displaying a special license plate to use high occupancy vehicle lanes, regardless of the number of occupants riding in them. Other states offer various other tax credits, rebates and exemptions.

While every alternative fuel has distinct advantages, they also have disadvantages. A broad-based approach that utilizes a combination of fuels will often work best to achieve the tandem goals of reducing greenhouse gases and moderating price.

## Biofuels

According to the Pew Center on Global Climate Change, as of June 2009, 38 states have mandated biofuel use and/or provided incentives for it, while 12 states have renewable fuel standards that stipulate a portion of all fuel consumed must come from renewable resources (typically in the form of E10, a form of fuel that contains 10 percent ethanol). Massachusetts, for example, provides a gasoline tax exemption for biofuels derived from cellulose that reduce lifecycle greenhouse gas emissions—those emissions resulting from the entire process of harvesting, producing and consuming the fuel—by 60 percent when compared with gasoline.

Biofuels produce about one-third less greenhouse gas emissions than gasoline and thus make an attractive alternative fuel.<sup>7</sup> However, they face several impediments to broader use. One of the main barriers to increased biofuel use is the lack of a suitable pipeline infrastructure. Ethanol requires a separate pipeline than gasoline. According to the U.S. Department of Energy, most ethanol currently is transported by tanker or rail.<sup>8</sup> But if ethanol is to scale up, pipelines will need to be built and service stations will need to be converted to handle biofuels. The pipeline infrastructure will be a costly process, expected to run in the billions of dollars, and incentives are a key measure to induce the desired outcome.

## Clean diesel

A recent National Research Council study found light-duty clean diesel engines could reduce fuel consumption by up to 46 percent over traditional gasoline engines.<sup>9</sup> This fuel efficiency reduces the amount of CO<sub>2</sub> generated by diesel vehicles by 10 to 20 percent over gasoline vehicles.<sup>10</sup> In addition, the infrastructure to dispense diesel is present at nearly every station where gasoline is available.

Diesel is the primary fuel for heavy duty vehicles and automakers are manufacturing more light duty vehicles that use diesel fuel. Diesel currently makes up approximately 4 percent of the market and is expected to grow upwards of 10 percent by 2015.<sup>11</sup> States can promote clean diesel by providing financial incentives for the purchase of automobiles that reduce

greenhouse gas emissions, regardless of the technology used. Beginning with 2010 models, new diesel trucks and buses are virtually emissions free, testing to the same emissions levels as those powered by natural gas. Older vehicles can be retrofitted to reduce emissions from 20 to 90 percent.

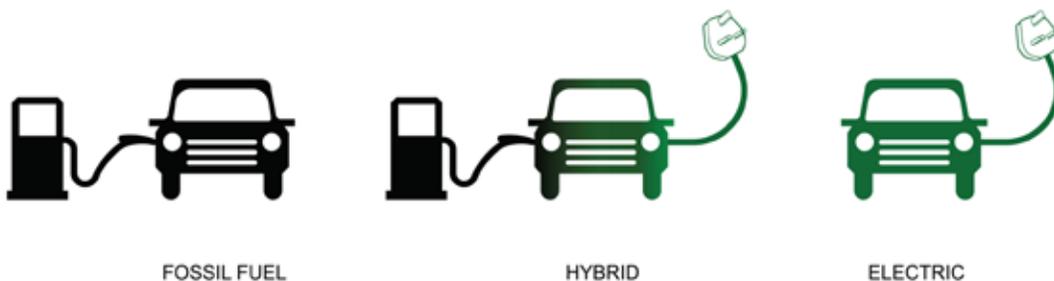
## Electric Cars

Many believe, however, that as Americans and their leaders get truly serious about reducing the emissions caused by transportation, electric cars must play a vital role.

The promise of electric cars, analysts say, is both in their efficiency and their potential to produce less of the emissions linked to climate change than traditional vehicles. Battery-powered motors cost drivers on average only 2.5 cents per mile for fuel, less than a third of the cost for a highly efficient car that runs on gasoline.<sup>12</sup> While battery-electric vehicles don't produce any tailpipe emissions, they do recharge using electricity that is sometimes generated at power plants that emit smog-forming pollutants. If they are recharged using electricity from renewable energy sources like wind, solar or hydropower, the vehicles don't cause any air pollution at all. Still, even if they are recharged with electricity from power plants that use fossil fuels such as coal, they are up to 99 percent cleaner than conventional vehicles and can cut global warming by as much as 70 percent, the Union of Concerned Scientists reports.<sup>13</sup>

The automotive industry appears to be taking note. At this year's Detroit Auto Show in January and the New York International Auto Show in April, electric vehicles were highlighted to the degree that SUVs were several years ago. In Detroit, Nissan and Mitsubishi showcased only their electric cars, the Leaf and MiEV.<sup>14</sup>

Analysts predict the introduction of the Nissan Leaf in the U.S. market this December will bring about the first wave of electric car buying. It's a five-passenger car that will go 100 miles on a fully charged battery and—with a federal tax credit—it will cost \$25,280. Arizona, California, Oregon,





## 7 Green Transportation Facts

- Petroleum burning from personal transportation—cars and light duty trucks—alone contributes approximately 17 percent of greenhouse gas emissions, according to the Environmental Protection Agency.
- Biofuels produce about one-third less greenhouse gas emissions than gasoline and thus make an attractive alternative fuel, according to the Pew Center on Global Climate Change.
- Colorado, Illinois, Ohio, Washington and Oklahoma all have award-winning green fleets—they are 2009 recipients of the Government Green Fleet Award from Government Fleet magazine.
- Alabama, Connecticut, Iowa, Oregon and other states are using federal stimulus funds for new hybrid buses, according to the Federal Transit Administration.
- The Earth Policy Institute reported earlier this year that in 2009, for the first time since World War II, the number of cars scrapped (14 million) exceeded the number of new cars sold (10 million).
- Battery-powered motors cost drivers on average only 2.5 cents per mile for fuel, less than a third of the cost for a highly efficient car that runs on gasoline, according to the Union of Concerned Scientists.
- It would take 20 hours to top off a 30 kilowatt-hour battery using a 1,500-watt power outlet but electric vehicle chargers with more power could do the job in less than 30 minutes, according to Environment & Energy Publishing's ClimateWire.

Tennessee and Washington are expected to get the first several thousand from Japan.<sup>15</sup> In 2009, Oregon became the first state to partner with Mitsubishi in testing electric vehicles for the U.S. market. Oregon already has the nation's highest per capita ownership of hybrids.<sup>16</sup>

But with auto industry officials predicting 10 percent of the cars sold will be electric vehicles by 2020, now is a key time for state and local governments, as well as the private sector, to get involved in making sure the infrastructure will be in place to support them. Fortunately that is already happening. As *The New York Times* reported in February, "Utilities are gearing up to cooperate with the automakers, a first for the two industries, and governments on the West Coast are focusing intently on the coming issues. Price and tax incentives need to be worked out. Locations must be found for charging stations. And local electrical grids may need reinforcement."

Making it easy for consumers to own an electric car will also clearly have to be a focus for governments if such vehicles are to become as ubiquitous as some predict. If consumers experience long delays

and must jump through significant red tape to have charging stations installed in their homes, as some early adopters reportedly have, others could decide the hassle is not worth it. The California Public Utilities Commission recently brought together utilities, automakers and charging station companies to discuss how best to "smooth the pavement" for the new electric cars.<sup>17</sup> In 2009, the California Energy Commission adopted the state's first transportation investment plan, which provides \$120 million over the next seven years to stimulate green transportation projects including \$46 million for electric vehicles, public charging stations and manufacturing plants.<sup>18</sup>

Controlling electrical demand may also be important if the cars do become popular. Some utility executives worry about neighborhood blackouts if too many car owners all decide to charge at the same time since a single car could consume three times as much electricity as a typical house. Pacific Gas and Electric, the California-based utility, is working to monitor where electric cars are sold to try to prevent such scenarios from occurring. Later this year, the utility will lead a "smart-charging" pilot project that will connect 200 cars to special charging stations that let utilities control the electrical demand at a given moment.

San Francisco has become a key testing ground for electric car infrastructure. The city's building code is being revised to require new structures be wired for car chargers and charging stations for converted hybrids are already in place near City Hall. San Francisco officials hope to have 60 charging stations installed in public garages by the end of this year and a thousand more across the Bay Area in 2011.<sup>19</sup>

Among states, Hawaii is another leader on the electric car front, perhaps owing to its relatively short travel distances on small islands, not to mention the state's high energy costs. The state's Clean Energy Initiative calls for at least 3,000 electric vehicles this year and by 2015, more than 50,000 vehicles and 100,000 charging stations powered by renewable energy sources. The first public electric car charging station in Hawaii went online earlier this year. In May, CT&T, a Korean electric vehicle manufacturer, announced plans to build an assembly plant in the islands to make 10,000 two-seater electric vehicles a year. The state also has \$1 million in federal stimulus funds to provide rebates for Hawaiians who want to purchase an electric vehicle or charger.<sup>20</sup>

In June, the Maryland Energy Administration awarded \$500,000 in federal stimulus funds to build at least 64 electric vehicle charging stations at parking garages in Baltimore and other sites in the state, primarily along Interstate 95. The stations will be powerful enough to fully recharge a battery in about four hours. Earlier this year, the Maryland General Assembly approved a \$2,000 excise tax credit on purchases of battery-powered cars and trucks, and gave electric vehicle drivers the authority to use express commuter lanes reserved for high-occupancy vehicles.<sup>21</sup>

Oregon is also making inroads of its own in planning for an electric car future. Gov. Ted Kulongoski signed an Executive Order in 2008 creating the Alternative Fuel Vehicle Infrastructure Working Group, made up

of leaders from business, utilities and government. In a final report issued in January, the group laid out a series of recommendations for state government, including the creation of an Electric Vehicle Executive Council to set a statewide agenda for electric vehicles. (See sidebar for more on how Oregon is seeking to foster the use of electric vehicles.) The state is in the process of adding 2,000 charging stations along the Eugene-to-Portland I-5 corridor.

Even with state governments trying to grease the skids for electric vehicles though, some energy and transportation analysts believe it may be difficult to get many consumers on board, at least initially. Doug Kim, an executive at Los Angeles-based electric utility company Southern California Edison, told *The New York Times* the popularity of the vehicles “will be a function of a lot of different things: the state of the economy, how many people can actually afford to buy the cars and the price of gasoline — how high does it have to be?”

Incentives like those recommended in Oregon and even subsidies may be needed to bring electric car prices down to an affordable level for many. Each electric car battery alone currently costs automakers \$12,000 even before the rest of the car is designed. Household charging units can cost consumers \$1,500 and up.

But those economic realities haven’t dissuaded federal officials from banking on the future of electric vehicles. Last year’s Recovery Act committed nearly \$200 million to support installation of more than 11,000 charging stations in Arizona, California, Oregon, Tennessee and Washington, the same states that are expected to get the first batch of Nissan Leafs.<sup>22</sup> The stimulus package also provided \$5.9 billion to the Ford Motor Company and \$465 million to Tesla Motors to manufacture electric vehicles. Nissan got a \$1.4 billion federal loan to retool the Smyrna, Tenn., auto manufacturing plant where the Leaf is being built.

An Arizona-based company called eTec, which focuses on infrastructure for alternative vehicles, received Recovery Act funds for a two-year study called the “EV Project” that will assess exactly how Americans want to use electric cars. Participants in the study are volunteers who expressed interest in the Nissan Leaf and who agreed to have information collected about where they drive, where they charge and how much it costs. The EV Project will observe how far people drive and whether they prefer to charge up at home, at work or elsewhere.

One main fear for some drivers is that they will become stranded when their battery dies if there isn’t a charging station available close by, so determining where they prefer to charge up may be key. Charging speed may be an issue as well. It would take 20 hours to top off a 30 kilowatt-hour battery using a 1,500-watt power outlet. Chargers with more power could do the job in less than 30 minutes. But current batteries can’t handle as many of these charges. There also is not yet a universal standard for the shape of the plug used to charge an electric vehicle. According to Environment and Energy Publishing’s Climate Wire, the electric vehicle industry is aiming for typical

## Oregon Fosters Electric Vehicles

Oregon Gov. Ted Kulongoski signed an Executive Order in 2008 creating the Alternative Fuel Vehicle Infrastructure Working Group. In its final report in January, the group recommended the state:

- Create an Electric Vehicle Executive Council to “set a statewide agenda for the introduction and general deployment of electric vehicles, infrastructure and related services in Oregon.”
- Work with consumer-owned utility governing boards and regulators of investor-owned public electric companies, electric utilities, the motor vehicle industry, and other interested stakeholders in identifying barriers to and solutions for electric vehicle commercialization.
- Set purchase standards for state-funded fleets to increase the percentage of alternative fueled vehicles in the fleets.
- Create a program for free home audits for consumers prior to installing charging equipment that “will accomplish the goal of educating consumers about cost, permitting, physical constraints and other (electric vehicle)-related issues as applied to their residence to increase (electric vehicle) adoption rates.”
- Incorporate electric vehicle manufacturing into its Business Energy Tax Credit program.
- Create a new Transportation Electrification Tax Credit for electric vehicles and infrastructure.
- Create a world-class, multi-disciplinary, transportation electrification and “smart mobility” center of excellence that would work “in conjunction with private industry, universities and relevant trade organizations.”

The Working Group also recommended adding additional incentives, inducements and facilitations to potential electric vehicle consumers that include:

- Expanding the state’s alternative fuel vehicle tax credit to a \$3,000 maximum;
- Simplifying access to electric vehicle incentive information by creating a one-stop Web site for consumers and business customers to gain information about existing tax credit programs;
- Setting a target of 48 hours for local jurisdictions for turnaround of electric vehicle infrastructure installation and inspection;
- Streamlining the permitting and inspection of home charging installation;
- Making sure home charging units can be installed within a reasonable time-frame of electric vehicle purchase; and
- Enacting legislation authorizing public agencies to facilitate public charging and allowing them to provide electricity for public charging at no cost during the electric vehicle adoption phase.<sup>39</sup>

charge times of three to four hours as the sweet spot for consumers. But electric vehicle owners will clearly have to factor something more time-consuming than a trip to the gas station into their travel routines.<sup>23</sup> City planners in Tucson, Ariz., along these lines, will decide this summer on locations of public charging stations, which some say should be installed not at convenience stores but at places like shopping malls and libraries, where motorists will want to spend a few hours while their cars are charging.<sup>24</sup>

Analysts believe the best case scenario would be to convince electric vehicle consumers that charging at night is best for the environment and the energy grid. Lots of charging during the day, when the demand for electricity is highest, could require power companies to build new power plants. With more charging at night, when demand is typically lowest, there may already be enough electricity available on today’s

grid to charge electric cars and cars might be able to charge using power generated by wind, which tends to pick up after dark.<sup>25</sup>

## The Future of the Car

In addition to making the country more accommodating for alternative vehicles and fuels, federal, state and local governments are already planning for a future that may involve fewer cars on the road and more travel options. Many believe such efforts could have an even bigger impact on the greening of American transportation.

The Earth Policy Institute reported earlier this year that in 2009, for the first time since World War II, the number of cars scrapped (14 million) exceeded the number of new cars sold (10 million). The U.S. vehicle fleet shrank from the all-time high of 250 million to 246 million vehicles. In addition to the recession and the Cash for Clunkers program, other factors that may have played a role in this change, according to the Institute, were “market saturation, ongoing urbanization, economic uncertainty, oil insecurity, rising gasoline prices, frustration with traffic congestion, mounting concerns about climate change, and a declining interest in cars among young people.”<sup>26</sup>

Environmentalists hope that means more people will turn to public transportation or ride a bike for their commuting needs. In recent years, governments

have enacted policies aimed at making it easier for them to choose those options.

Most recently, the Obama administration officially announced a “complete streets” policy that seeks to put bicycle and pedestrian projects on equal footing with road and transit work. Complete streets are designed and operated to enable safe access for all users.

“We are discouraging transportation investments that negatively affect cyclists and pedestrians,” U.S. Secretary of Transportation Ray LaHood said in announcing the policy in March. “And we are encouraging investments that go beyond the minimum requirements and provide facilities for bicyclists and pedestrians of all ages and abilities.”

The department’s new policy also encourages state and city transportation officials to adopt their own complete streets policies.<sup>27</sup> Many have already done exactly that. The states of Oregon and Florida have the oldest and perhaps most sweeping complete streets policies on the books. Oregon’s policy was codified in statute in 1971 and requires that “foot-paths and bicycle trails ... shall be provided wherever a highway, road or street is being constructed, reconstructed or relocated.” The Florida statute dates back to 1984 and states that “bicycle and pedestrian ways shall be given full consideration in the planning and development of transportation facilities, including the incorporation of such ways into state, regional, and local transportation plans and programs.”<sup>28</sup>

The New York Senate this year passed complete streets legislation, Senate Bill 5711, that would mandate new and reconstructed public roads “accommodate all users,” specifically pedestrians, cyclists and “individuals of all ages and mobility capabilities.” The bill is sponsored by Sen. Martin Malave Dilan from Brooklyn. Dilan is a member of CSG’s Transportation Policy Task Force. As of late June, the New York Assembly’s Ways and Means Committee was still considering the legislation.<sup>29</sup>

But legislation isn’t the only way to put complete streets policies in place. The California, New Jersey and North Carolina departments of transportation have simply made complete streets part of their internal policies, while the Massachusetts Department of Transportation incorporates complete streets into a project development and design guide.<sup>30</sup>

The National Complete Streets Coalition, a group of advocates and transportation professionals affiliated with the Washington, D.C.-based anti-sprawl advocacy group Smart Growth America, said complete streets policies are necessary to improve safety, foster strong communities and address climate change and oil dependence (see sidebar).<sup>31</sup> Others say such policies are a triumph for social equity in improving transportation access for those who can’t afford a car as well as a victory for public health in increasing opportunities for physical activity.<sup>32</sup>

But the new federal policy has not been without its critics, who contend that cycling is a form of recreation, not transportation. A blog on the National Association of Manufacturers Web site called the policy “dumb and irresponsible” and said “pedal parity is nonsensical for a modern industrial nation.”<sup>33</sup>



For many, the concern about the policy comes down to this question: does more money for biking and walking mean less money for roads and bridges? States are already struggling to find funds to repair crumbling infrastructure.

“(Secretary LaHood’s) efforts will be especially ill-advised if they divert Highway Trust Fund dollars from overdue road and bridge repairs and expansion,” wrote American Trucking Association president and CEO Bill Graves in a March 2010 blog post. Graves is a former Kansas governor.<sup>34</sup>

But LaHood said he believes the change in federal policy doesn’t have to be a zero sum game.

“People are always going to drive cars,” he wrote in his official blog in April. “We’ve made a huge investment in our interstate highway system, and that’s not going away. We are going to continue maintaining that investment. But we do have many modes of transportation in this country, many different ways of getting around. Why not make room at the table for bicycling and walking.”<sup>35</sup>

But clearly many in all parts of the country are hoping and preparing for a future on two wheels or two feet. In February, the city council in Portland, Ore., voted to accept a new bike plan with the ambitious goal of increasing the percentage of people riding bikes from 6 percent (already the highest of any big city in the country) to 25 percent. On the same day, New York City’s Department of Transportation announced it would make permanent the closing of Broadway to vehicle traffic.<sup>36</sup> This was just a month after the Manhattan Community Board voted to convert 240 parking meters on the Upper West Side to bike racks.<sup>37</sup> Even Detroit, longtime home to the big three automakers, is getting into the act. The city is embarking on an ambitious plan to create 30 miles of bike lanes this year, with a goal to create as many as 400 miles of them in the years ahead.<sup>38</sup>

## Conclusion

Policy options for greening the nation’s transportation abound. They include: overhauling state transportation fleets, building alternative fuel infrastructure, providing financial incentives for the purchase of alternative vehicles, and even shifting transportation expenditures towards vehicle-neutral solutions such as bicycle paths and pedestrian walkways. A combination of these measures may be needed to comprehensively impact transportation’s portion of greenhouse gas emissions. All vehicles will not move to the electric grid simultaneously, nor will all options be available in all geographical regions. Further, by incentivizing “clean” or “green” transportation as opposed to a specific technology, policymakers allow the market to work and the best solutions to prosper. It is toward that goal, that policymakers should provide incentives for technology that reduces greenhouse gas emissions below baseline gasoline emissions. Policymakers must also strive to work cooperatively with industry, the federal government, and nonprofit organizations as they seek to develop the nation’s future transportation infrastructure.

## Complete Streets

According to the National Complete Streets Coalition, a group of advocates and transportation professionals, comprehensive complete streets policies should:

- include a vision for how and why the community wants to complete its streets;
- specify that “all users” includes pedestrians, bicyclists and transit passengers of all ages and abilities, as well as trucks, buses and automobiles;
- encourage street connectivity and aim to create a comprehensive, integrated, connected network for all modes of transportation;
- be adoptable by all agencies to cover all roads;
- apply to both new and retrofit projects, including design, planning, maintenance and operations, for the entire right of way;
- make any exceptions specific and set a clear procedure that requires high-level approval of exceptions;
- direct the use of the latest and best design standards while recognizing the need for flexibility in balancing user needs;
- direct that complete streets complement the context of the community;
- establish performance standards with measurable outcomes; and
- include specific next steps for implementation of the policy.<sup>40</sup>



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