



STATEMENT OF:  
**THE UNION OF CONCERNED SCIENTISTS**

BEFORE THE:  
**HOUSE COMMITTEE ON ENERGY AND COMMERCE  
SUBCOMMITTEE ON ENERGY AND THE ENVIRONMENT**

BY  
**DAVID FRIEDMAN, RESEARCH DIRECTOR AND SENIOR ENGINEER**

**April 24, 2009**

Mr. Chairman and Members of the Committee, I appreciate the opportunity to testify before you today. I am a research director and senior engineer with the Union of Concerned Scientists (UCS). UCS is a leading science-based nonprofit that has been working for a healthy environment and a safer world for 40 years.

I would first like to thank Chairman Markey for his leadership on the issue of fuel economy. As my testimony will show, there are many opportunities to take the transportation system much farther than the progress delivered under the 2007 Energy Independence and Security Act (EISA), but with your help we are now building on significant progress after two decades of stagnation.

As we look at where we must go from here, the draft bill that Mr. Waxman and Mr. Markey have presented for discussion today represents an essential next step. It opens the door to a much more comprehensive approach to the transportation sector, an approach that looks at transportation as a system, not just separate cars, fuels and infrastructure. Such an approach requires that we put policies in place that will address each of these areas in order to create a stable climate and transportation future.

The approach laid out in the draft bill will also require significant action by the administration. The Environmental Protection Agency will need to build on its solid foundation and take the lead on global warming standards for cars, light trucks, and freight trucks, as well as airplanes, rail, ships and off-road equipment. The EPA will also need to make a transition from a renewable fuel standard that covers only 10% of transportation fuels to a low carbon fuel standard that covers all transportation fuels and counts all direct and indirect emissions associated with those fuels. The Department of Transportation will have to build on their plans to help develop a smarter transportation system, working with state and local government to help get people where they need to go with fewer miles and less pollution. The Department of Energy will also play a key role in helping to get essential technologies out of the lab and onto our roads and rails. The administration will also have to protect and defend state authority to help bring about cleaner cars and fuels in recognition of both the unique circumstances in those states and the history of leadership on these issues from California and many others.

If Congress and the administration build on EISA and deliver on each of the three legs of the transportation system (vehicles, fuels, and efficient infrastructure), the results of the Union of Concerned Scientists Climate 2030 Blueprint analysis show that the United States can cut carbon emissions from cars and light trucks to 40% below 2005 levels while holding carbon emissions from freight trucks steady despite more than an 80 percent growth in the economy. By 2030, we can reduce our addiction to oil by more than 3 million barrels per day, and deliver annual savings of \$120 billion to consumers and businesses (\$580 per household per year and nearly \$40 billion for businesses in 2030)—and this is all on top of the benefits that will be generated by EISA.

When you look at today's economy and the prospect of rising gas prices and rising carbon emissions once we beat this recession, we simply cannot afford to ignore this opportunity to invest in a cleaner transportation future and the jobs that investment will create.

Today, I would like to share with you amore in-depth discussion of the transportation components of our Climate 2030 Blueprint analysis. The full committee saw the big picture results of that analysis when Kevin Knobloch, our president, testified before you on Tuesday. I will first lay out the policy recommendations that form the basis of the Blueprint. I will then go into some of the detailed findings for the transportation sector. Finally, because it has come up as a potential component of this bill, I will include a discussion of key principles for how to make a "cash for clunkers" program work to help the auto industry and the environment.

### **Six steps for policymakers to deliver transportation system that reduces carbon emissions, saves money and cuts America's oil addiction**

The transportation sector offers significant opportunities to cut emissions while reducing the cost of meeting our climate targets. These reductions come from switching to low-carbon fuels and by reducing our oil dependence, helping to lower annual transportation costs to consumers and businesses by about \$120 billion by 2030. In order to achieve these cost-savings, policymakers should put tools in place to reduce emissions from each of the three legs of the transportation sector: vehicles, fuels, and travel demand.

**1. Require investment in vehicle technology through tougher standards:** We can save money and oil while cutting heat-trapping gases from vehicles by requiring integration of both conventional and advanced technologies that boost fuel economy and reduce emissions from refrigerants across our national vehicle fleet. Additionally, requiring production of cleaner, more efficient vehicles will create jobs, help put the auto industry on the road to recovery and ensure that public dollars are invested wisely.

Because many of these technologies fall under both the Clean Air Act and fuel economy laws, there is an opportunity for a partnership between the Environmental Protection Agency (EPA) and the National Highway Traffic Safety Administration (NHTSA) to coordinated in setting standards for light-duty cars and trucks. As part of this process, EPA should set car and light truck tailpipe carbon standards of no more than 200 grams per mile (carbon dioxide equivalent emissions) by 2020. NHTSA should set fuel economy standards through 2020 that support EPA's efforts. Within this process, there should be a transition to EPA as the lead standard

setting agency in consultation with NHTSA, with a target of and no more than 140 grams per mile (with fuel economy delivering at least 55 mpg) by 2030.

For medium and heavy duty vehicles, EPA may be able to move more quickly than NHTSA, since there are fewer restrictions on the application of EPA's statutory authority. EPA's experience with the heavy-duty vehicle industry through the SmartWay program should also prove valuable in the standard-setting process. Medium duty standards should be set to achieve per-mile carbon emissions of no more than 780 grams per mile (carbon dioxide equivalent emissions) by 2020 and 500 grams per mile by 2030. Heavy duty standards should reach no more than 1075 grams per mile by 2020 and 840 grams per mile by 2030.

Additionally, standards should be set for all vehicles, not just highway vehicles. Airplanes, ships, off-road vehicles, and rail all contribute, and should be improved.

**2 Require investment in cleaner fuels through a low-carbon fuel standard:** EPA also has an important role when it comes to fuels. A low carbon fuel standard, which requires fuels to cut lifecycle carbon emissions per unit of energy delivered, is the next evolution from the current renewable fuel standard (RFS).

The RFS only applies to about 10 percent of the transportation fuel pool, while the LCFS would encourage improvements in fuel carbon content across the board, letting the industry determine the most cost-effective route and avoiding picking particular fuel types for special treatment. The EPA already has authority under the Clean Air Act to establish a low carbon fuel standard. The targets should be a 3.5 percent reduction in lifecycle carbon emissions for transportation fuels in 2020, a 7 percent reduction in 2023, and a 10 percent reduction in 2030. The initial benefit of the LCFS will be in preventing the increase of carbon emissions from the adoption and deployment of high-carbon fuels such as tar sands, liquid coal, oil shale, and biofuels that create emissions through significant land use change. For a LCFS to be effective in our global economy, the impacts of both indirect land use and other offshore emissions must be accounted for in the full lifecycle of the fuel.

**3. Maintain state authority to set vehicle and fuel standards:** The ability of states to act as a laboratory for innovative policies has produced success in California's efforts to clean up smog and toxic pollution and in encouraging the sales of a hybrid and electric vehicles. The next opportunity lies in California's efforts to reduce carbon emissions from cars, trucks, and fuels.

The authority for many states to act together with California to put in place innovative policies that address global warming must be protected. This authority allows states to address new challenges as they emerge. It also keeps progress moving when the federal government does not act quickly or aggressively enough, including today, as the federal government considers establishing the necessary national standards.

**4. Encourage smarter travel and include transportation in the cap:** Vehicles and fuels are just parts of the transportation puzzle. In order to help capture the remainder, transportation must be included in an overall cap-and-trade system. Policies must also be in place at the federal, state and local levels to encourage alternatives to cars and trucks without sacrificing daily mobility.

Including transportation in a cap will send a price signal across the transportation system to reduce carbon emissions by picking the right mode of transportation, and reducing the amount of transportation required. Both pieces are crucial to meeting transportation's portion of the climate challenge.

In addition to including transportation in the cap, all federal funding for transportation projects should be tied to reducing carbon emissions from transportation. This will encourage innovative planning, improved mass transit, and intelligent transportation systems that make travel easier at the same time as reducing the need for it by making our cities and towns more walkable and accessible.

Steps should also be taken at the federal level to encourage adoption of pay-as-you-drive insurance, to shift any future gas taxes over to per-mile fees in order to maintain or expand revenues for highway repairs and transit expansion, and to reward innovative local planning to encourage smarter growth and transportation options.

**5. Encourage and invest in advanced transportation technology:** Federal support will also be needed for development, demonstration and deployment of ultra-low carbon vehicles, fuels, and infrastructure. The federal effort should focus on technologies that will have trouble entering the market on their own, but have significant climate benefits, such as vehicles that run on renewably generated electricity or hydrogen.

In order to achieve the maximum cost savings and carbon reductions from transportation, advanced technology will need to be developed and deployed. The federal government's role is particularly critical when industry investment in R&D has been declining, and is especially in doubt in the troubled automotive sector. All aspects of advanced technology need further effort, from batteries to fuel cells to low carbon biofuels, and infrastructure for all. By investing in a wide range of advanced technologies consistently over the next 20 years, rather than shifting focus with every new election or current trend, we can ensure that we will have the technology tools we need to meet our transportation goals.

**6. Ensure transportation policies are consistent and durable:** Both companies and the climate need certainty that efforts to address heat trapping emissions from the transportation sector are going to continue for the long haul.

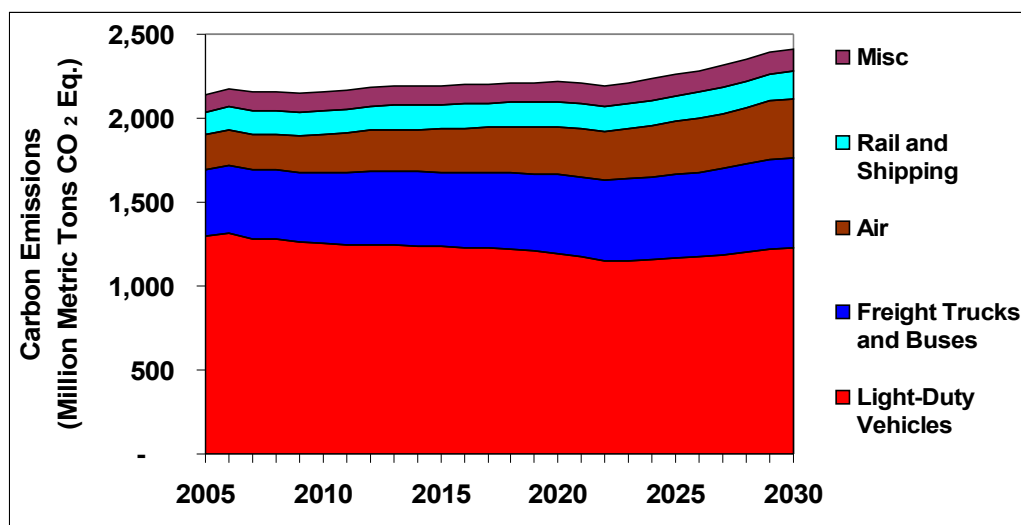
The automobile industry has to make significant investments and we need the resulting significant reductions in carbon emissions, so it is important that the policies that encourage these investments and deliver the reductions are strong enough and set in place for the long term and are not weakened with the political changing of the guard. This is especially essential for vehicle technologies, because they take about 15 years before they can have full impact as the fleet of cars and trucks turn over.

## Detailed Results from the Climate 2030 Blueprint: Transportation

### Reference Case: Carbon Emissions Climb Despite EISA

Our reference case shows that carbon emissions from the transportation sector will grow by 12 percent between 2005 and 2030. During the first two decades, carbon emissions are almost flat, growing only 2 percent between 2005 and 2022. This is due in large part to the passage of the 2007 Energy Independence and Security Act (EISA), which requires carbon reductions in biofuels through 2022 and increased fuel economy for light duty cars and trucks through 2020. Once these policies stall out, transportation carbon emissions begin to grow at near historic rates.

### Reference case changes in carbon emissions from transportation.



Fuel economy for light duty vehicles had remained essentially stagnant between 1985 and 2005, as the auto industry successfully fought back attempts to require improvements in fuel economy. EISA pushes car and truck fuel economy from about 25 miles per gallon (mpg) in 2005 to more than 35 mpg in 2030. This, however, falls short of the doubling in new vehicle fuel economy that could be delivered through existing technology. EISA also did not require specific efficiency targets for any other part of the transportation sector.<sup>1</sup>

EISA will help to increase the share of low-carbon biofuels from just 0.1 percent of transportation fuel in 2005 to 9 percent by 2030. This significant increase highlights the importance of carbon emissions standards placed on the majority of the biofuels required under the renewable fuel standard in EISA. These standards will bring cellulose-based biofuels to sales volumes where they could become cost competitive with conventional petroleum.

Without EISA, we estimate that 2030 carbon emissions from the transportation sector would have been projected to increase by about 30 percent instead of just 12 percent.<sup>2</sup> But a

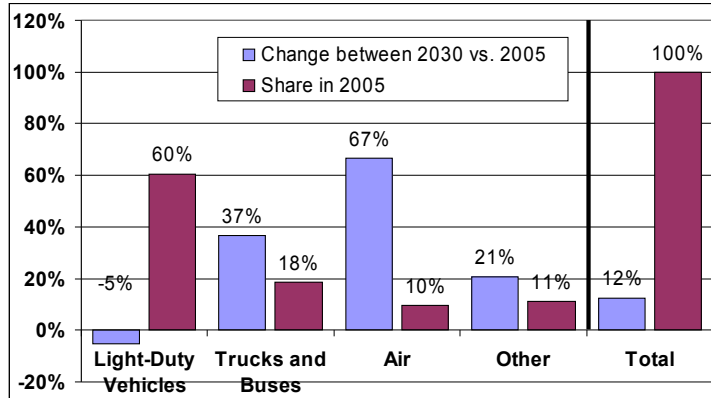
<sup>1</sup> EISA does require fuel economy standards for medium and heavy duty trucks, but no specific minimum is set. EISA does not address fuel economy standards for planes, trains, off-road vehicles, or ships.

<sup>2</sup> We estimate that EISA provides 350-450 MMTCO<sub>2</sub> in projected carbon emission reductions in 2030. Meeting the minimum EISA requirement of 35 mpg by 2020 cuts 250-300 MMTCO<sub>2</sub> in 2030. The low-carbon fuel progress

transportation sector that simply runs in place on carbon emissions for 25 years is not enough. To actually cut carbon emissions compared to 2005, we need to go beyond the first step of EISA.

But, even building on EISA, the Blueprint policies will have to overcome the fact that reference case emissions for light duty cars and trucks drops only slightly in 2030, while freight trucks and buses are projected to grow by nearly 40% and emissions from airplanes is expected to grow by more than two thirds.

**Projected growth of transportation carbon emissions by 2030 and share of carbon emissions in 2005.**

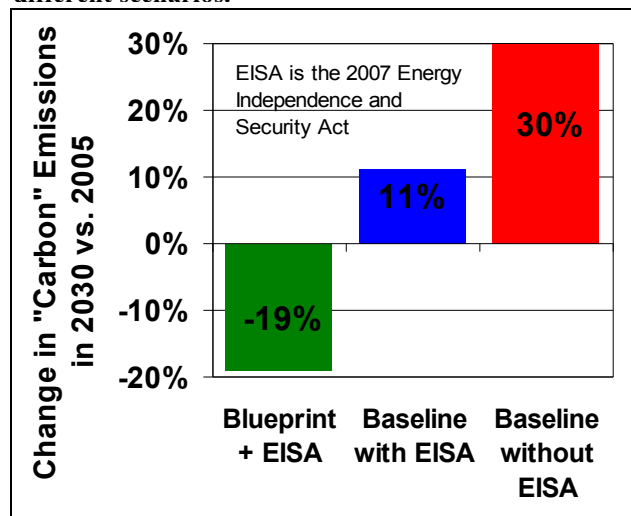


**Blueprint: Driving Significant Reductions in Carbon and Saving Money**

The transportation sector policies in the Blueprint represent the next necessary step after EISA. Together, they are a set of achievable but aggressive policies that address the three legs of the transportation stool: vehicles, fuels and miles traveled for cars, light, medium and heavy trucks. When all of our Blueprint policies are added on top of the progress made under EISA, the transportation sector can deliver a 19 percent reduction in tailpipe carbon emissions in 2030 compared to 2005.

This 19 percent reduction compared to 2005 is achieved by cutting transportation carbon emissions by more than 660 million metric tons in 2030. If the transportation reductions from EISA were also included, transportation’s contribution to total reductions in 2030 would increase to more than 1 billion metric tons.

**2030 Transportation Carbon emissions changes under different scenarios.**



**Blueprint: Energy Security Benefits**

The Blueprint delivers more than just reductions in carbon emissions; it also delivers improved energy security by reducing our demand for oil, thus making our economy less vulnerable to oil

---

under EISA is projected to save 100-150 MMTCO2 in 2030.

price shocks. While EISA kept transportation oil use from growing under the Reference Case, the Blueprint policies cut transportation’s demand for oil and other petroleum products in 2030 by 23 percent compared to 2005. Transportation provides more than half (53 percent) of the oil savings achieved through the Climate Blueprint. That represents oil savings of more than 3 million barrels per day in 2030 on top of the more than 3 million barrels of oil saved from EISA alone.

**Blueprint: Saving Consumers Money**

By cutting fuel use through efficiency and reduced travel and by shifting to cost-competitive, low-carbon fuels, the Blueprint transportation policies actually save consumers and businesses money while delivering reductions in carbon emissions. Through 2030, consumers and businesses will see their net expenditures on transportation (fuel and vehicle costs) drop by about \$120 billion compared to the reference case. In other words, the savings from the Blueprint transportation policies not only cover the \$53 billion cost of the more efficient vehicles, better fuels, and new transportation alternatives, but they reward consumers who help cut carbon emissions by saving them money.

**Transportation Consumer and Business Savings for Blueprint vs. Reference Case (billion 2006\$ in the years shown)**

		2020		2030
Fuel Cost Savings	\$	41	\$	172
Vehicle and Alternative Transportation Costs	\$	16	\$	53
Net Savings	\$	25	\$	119

Some of these costs and savings are borne by businesses, while others are directly related to personal transportation (improved fuel economy, lower pain at the pump, new per-mile congestion fees). Looking exclusively at personal transportation, the average American household would see savings of \$580 per year by 2030 on their annual transportation costs compared to a baseline case where the average new vehicle will already be getting 35 mpg—and these values exclude the potential for every vehicle owner to save as much as \$150 per year on insurance costs due to reduced driving (Bordoff and Noel 2008). In earlier years, consumers and businesses are asked to invest in new technologies (e.g. better engines and transmissions and GPS monitoring systems to enable pay-as-you-drive insurance), but they more than pay for themselves.<sup>3</sup> And, if the impact of allowance price revenue recycling is included, their total household savings would be even larger.

**Blueprint: Greater Savings for Society**

From a societal perspective, savings from transportation policies are even higher than consumer and business savings because carbon allowances can be recycled back into the economy. Consumers purchasing transportation fuels pay an average of \$0.27 per gallon to cover allowance fees for carbon emissions and those fees should be returned in ways that lower the cost of cleaner cars and fuels and better transportation options.

<sup>3</sup> These values assume consumers pay the full incremental price of technologies in the first year. Typical consumers will lease or get a loan on their vehicle, which would lower the costs in the early years.

### Blueprint: Keeping Down Gasoline Prices

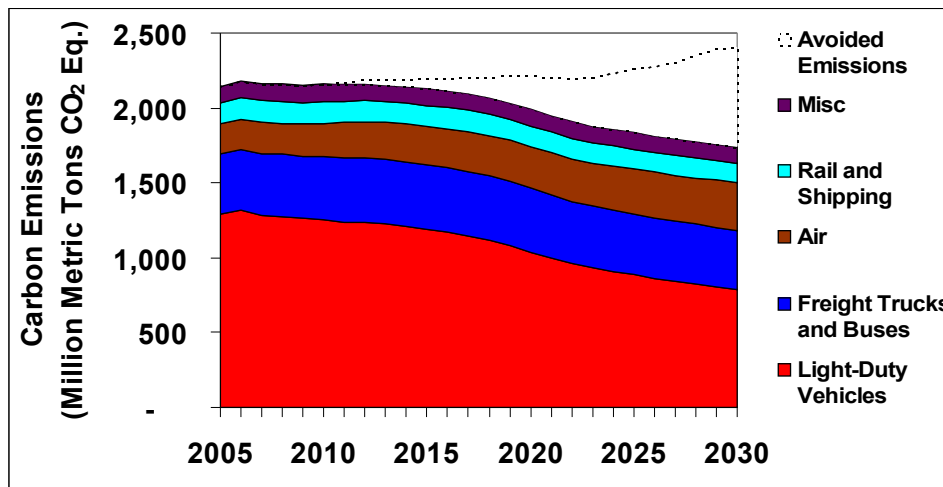
Despite carbon prices that reach as high as seventy dollars per ton, gasoline prices are, on average, only about \$0.10 above the reference case through 2020 and only about \$0.16 higher between 2020 and 2030. These results stand in sharp contrast to claims that cap-and-trade programs will significantly drive up fuel prices and instead point to gasoline prices that are similar or even smaller than increases that have happened within a matter of months, or even weeks in the last few years. These results indicate that including transportation in cap and trade will not significantly drive up prices for transportation fuels compared to the reference case because the Blueprint policies help drive down the price of oil compared to our reference case.<sup>4</sup>

The one ironic impact of keeping gasoline prices low is that it mutes the ability of a cap-and-trade policy to encourage consumers and businesses to purchase higher fuel economy vehicles or to shift to travel modes other than cars and instead could be seen as opening the door to more driving and increased urban sprawl. However, the Blueprint includes additional policies that directly address these issues, from vehicle greenhouse gas standards to per-mile driving fees, in a way that delivers even more cost effective carbon emission reductions.

### Blueprint: Highway Vehicles do the Heavy Lifting

The major policies in the Blueprint focus on highway vehicles light duty cars and trucks and freight trucks and buses). As a result highway vehicles deliver the majority of the pollution reductions in transportation compared to the reference case.

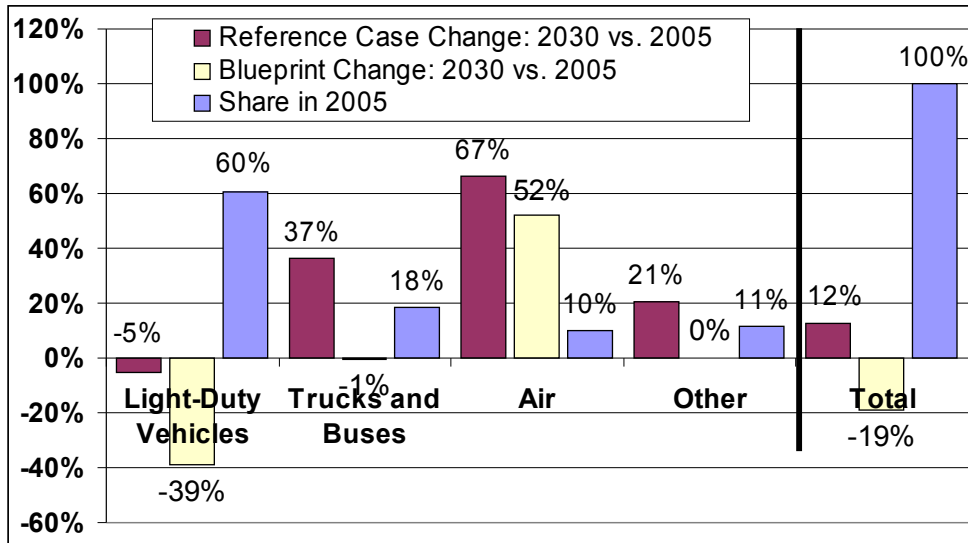
### Blueprint case changes in carbon emissions from transportation.



Significant improvements in efficiency, cleaner fuels, and alternatives to current travel patterns under the Blueprint case allow light-duty cars and trucks to cut their 2030 carbon emissions by nearly 40 percent compared to 2005. This represents a significant improvement over the reference case reduction of only 5 percent. Trucks and buses had an even bigger task at hand. Under the reference case their emissions went up nearly 40 percent, but they are held flat under the blueprint.

<sup>4</sup> As with all oil savings in this analysis, NEMS does not account for oil market instability that could cause price spikes. It also does not account for potential actions by OPEC members to reduce supply in attempts to drive up prices in response to countries that lower demand.

## 2030 Changes in Transportation Carbon Emissions vs. 2005.



### Blueprint: Carbon emissions from Air Travel Continues to Rise

Airlines were the worst performer under the blueprint, continuing to climb by more than 50 percent in 2030. The main policy that impacts the airline industry in our Blueprint is the cap-and-trade system that puts a price on carbon emissions. Ironically, the overall success of our blueprint policies keeps this impact small—jet fuel prices are only about 5-10 percent higher as a result of the cap and don't really impact the use of air travel compared to the near doubling in jet fuel prices between 2005 and 2030 that was already incorporated into our baseline.

This study only included the limited set of options available to reduce pollution from air travel through increased efficiency. There are also important logistics changes that could be made, such as improved routing to shorten distances, improved scheduling to reduce congestion, and an update to the hub-and-spoke network that rely on indirect stopovers and increase fuel use. High speed electric rail can replace air travel between major commuting hubs, particularly along the coastal regions, but large scale investments in high-speed rail would have to be significantly accelerated to have an impact by 2030. California will likely be the first state to build a high speed electric rail system.

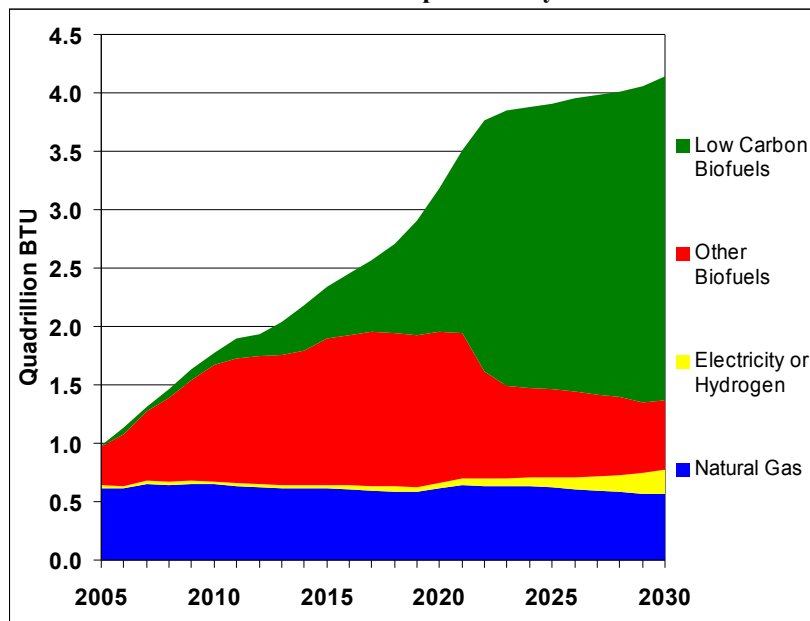
### Blueprint: Low-carbon Fuels are on the Rise

Low-carbon biofuels and renewable electricity/hydrogen will be an important part of a transportation future, increasing to about 3.5 quads, or about 14 percent of all transportation fuel (20 percent of all highway fuel) by 2030. Much of this progress happens because of the low-carbon biofuel portion of the Renewable Fuel Standard included in our baseline. The low-carbon fuel standard in our Blueprint takes that a step farther by accelerating the phase out of corn-based biofuels, which do not deliver reductions in carbon emissions and may even lead to significant increases over the timeframe of this study. The low-carbon fuel standard also drives a 1% increase in the efficiency of the refining sector and provides a backstop to ensure that high-carbon fuels like liquid coal, which could double carbon emissions per gallon, do not make

inroads that undermine climate progress.<sup>5</sup>

While electricity use in the transportation sector remains relatively small under the Blueprint, its growth is quite rapid between 2020 and 2030 as the combination of two policies, the low-carbon fuel standard and the requirement that 20 percent of new light-duty vehicles be plug-ins (or other electric drive vehicles) by 2030,<sup>6</sup> drive a ten-fold increase in the use of electricity for transportation due to the nearly 20 million plug-ins or other electric vehicles that would be on the road in 2030.

Alternative Fuel Mix Under the Blueprint Policy Case.



This progress, however, is only the beginning of the potential for electric drive vehicles. The electricity sector side of the Blueprint does not tap into the full potential of renewable electricity resources, so there is significant capacity available to generate clean electricity or hydrogen as electric drive vehicles grow to dominate the car and light truck markets beyond 2030.

### Progress in transportation critical for long term

While the transportation sector delivers significant reductions in carbon emissions compared to 2005 and saves the U.S. hundreds of billions of dollars in the process, the progress is still not as dramatic as the improvements seen in the electricity sector. That significant progress in the electricity sector will buy some time for progress in the transportation sector to be realized over a longer timeframe.

That progress must begin today. The majority of the benefits delivered under the Blueprint are from solutions that have been available for a decade or more. Had we begun to phase in solutions like more efficient vehicles, increased transit, reduced travel through per mile pricing policies and had we gotten serious about investing in low-carbon fuels and electric drive two decades ago, many of the benefits of the 2030 Blueprint would be available today. The year 2030 should be viewed as a critical mile-marker on the path to 80 to 90 percent reductions in 2050. If transportation policies do not attain the pollution reductions we outline here for 2030, there is no chance of reaching the 2050 target.

<sup>5</sup> Our reference case scenario did not include the use of liquid coal in the transportation sector, but significant efforts are underway to expand its use in the absence of climate controls.

<sup>6</sup> The portfolio of potential advanced vehicles includes plug-in hybrids, battery-electric vehicles, and fuel cell vehicles. For ease of modeling, rather than applying a performance-based technology requirement, plug-ins were used as the sole technology, but other technologies of equal performance could substitute.

## “Cash for Clunkers”

We support efforts to help the domestic manufacturers emerge from the current crisis as leaders of the industry, and we firmly believe we can best achieve this goal through policies that also reduce global warming pollution and our dependence on oil.

While a “cash for clunkers” program can stimulate sales and deliver some energy and environmental benefits, it will only do so if carefully structured. Otherwise, it risks being another expensive subsidy for automakers with no clear benefit to the taxpayers who would have to fund it. Focusing on the most fuel efficient segment of the market, can significantly reduce the cost of the bill and increase the fuel saving benefits. The following is a list of guidelines to help ensure a successful program:

1. The vehicles being purchased must deliver better than average energy and environmental performance.
  - a. Government funding for vehicles of average performance levels will not help to cut oil use or carbon emissions. **In order to be eligible, a vehicle should be in at least the top 25 percent of its class on carbon emissions or fuel economy.** This has the added benefit of reducing gasoline bills for the vehicle purchaser.
  - b. At the same time, the accelerated retirement program should be designed to reduce smog and toxic emissions by requiring that **any vehicle purchased must be as clean, or cleaner, than the Tier 2 Bin 5 tailpipe emission standard (or an equivalent California standard).**
2. Junked vehicles must have lower than average fuel economy and must be older than the typical vehicle.
  - a. In the United States fuel economy standards have not significantly increased over the past twenty years so a new vehicle is not necessarily more efficient. In order to be eligible, **a vehicle being junked should get at least 25% worse fuel economy than today’s average vehicle (about 18 mpg on CAFE tests).**
  - b. Making a new vehicle takes energy and creates pollution, so junking a relatively new vehicle and replacing it with a brand new one could cancel out much of the energy and environmental benefits of the program. **A vehicle being junked must be at least 8 years old,** roughly the median age of vehicles on the road today
3. **The “clunker” must be recycled, with all hazardous material properly removed.** Increased sales of new vehicles will only be realized if the vehicle, engine and other major parts cannot be resold. Resale, even of major parts, will extend vehicle life, blunting the desired increase in sales. The environmental benefits of the program would also be lost.
4. **People who junk their vehicles should be given the option of using the “cash for clunkers” incentive for purchase of transit fares and bicycling equipment.** Even greater oil savings and environmental benefits can be achieved by encouraging drivers to get off their cars, and take more trips under their own power, or on public transportation.

5. **If limited federal funds are available, place a priority on replacement of clunkers with new vehicles over used vehicles.** The sales and environmental impacts of allowing used vehicles to qualify as the purchased vehicle are complicated and uncertain, so priority should be given to the purchase of new vehicles (either directly or through transferable vouchers) unless analysis indicates otherwise.

Although “Cash for Clunkers” has had some apparent success in other countries and at the state level, differences in the markets may make realizing climate and oil savings benefits in the US more challenging. An important part of the apparent energy and environmental success of European programs is that a new vehicle sold in the EU today is significantly more efficient and has lower carbon emissions than one sold ten years ago due to voluntarily enforced vehicle greenhouse gas standards.

Setting strong greenhouse gas standards for vehicles will save far more oil and money and will reduce more greenhouse gas emissions than even the most expansive and aggressive scrappage program. Further, a simple consumer incentives program focused at highly fuel efficient vehicles might offer at least similar levels of benefits with fewer administrative burdens, and less potential for corruption. As Congress and the President move forward with legislation to encourage the purchase of fuel efficient automobiles, we encourage them to look at multiple avenues for improving the performance of the fleet while stimulating sales.