Taking the Wheel:
Achieving a Competitive Transportation Sector Through Mobility Choice

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Mobility Choice

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About the Mobility Choice Coalition

The Mobility Choice Coalition is a broad-spectrum alliance offering a fiscally responsible, free-market-oriented approach to expanding competition among transportation modes for the purpose of reducing oil's strategic importance. Learn more at www.MobilityChoice.org and www.facebook.com/MobilityChoice.

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Executive Summary

Oil's virtual monopoly over transportation fuel coupled with limited economical and convenient alternatives for moving people and goods have made oil a strategic commodity and the lifeblood of the domestic and global economies. Passenger vehicles and light trucks account for more than 45 percent of U.S. oil demand.[1] To reduce the strategic importance of oil, the United States must embark on a comprehensive effort to both break oil's monopolistic grip on fuel for the light-duty vehicle fleet and open the market to vibrant competition among transportation options.

This report is about this second item, the often-overlooked role of transportation options, or mobility choice. These choices are absent in many neighborhoods even though there are fiscally responsible measures that would facilitate their delivery to more consumers. The paper projects the impact on oil demand of the policies outlined in the Mobility Choice Blueprint, a consensus document supported by a diverse coalition of security experts, energy experts, fiscal conservatives, and environmentalists.[2]

Mobility choice can help provide flexibility both to individual drivers and to the nation as a whole. Choice involves both having a range of fuels to power the passenger fleet and having alternative options to driving to accomplish our daily rounds. Having options means not only that individuals will have greater choice, but also that the nation will have greater flexibility if confronted with oil price spikes or supply restrictions.

FIGURE 1

Annual Passenger-Miles of Travel per Capita in Passenger Cars[3]

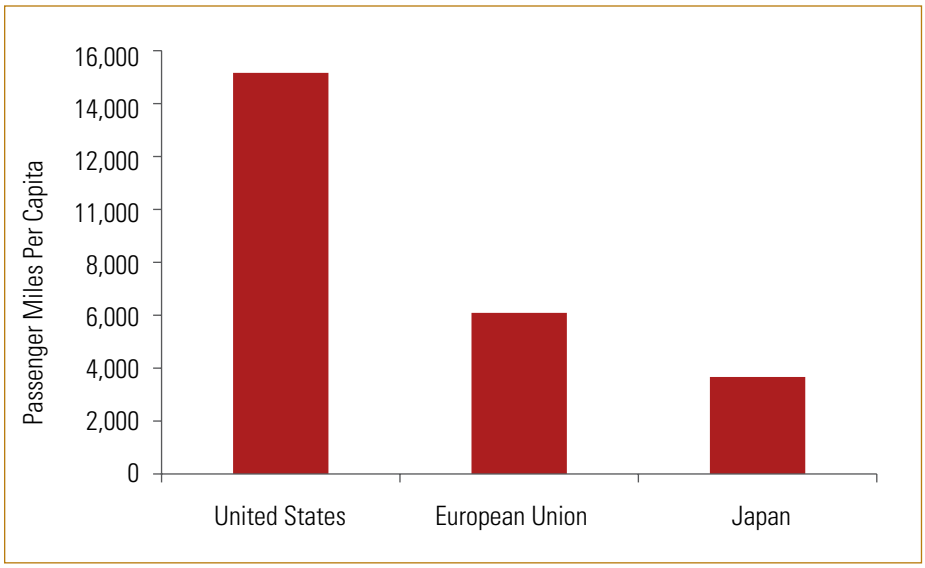
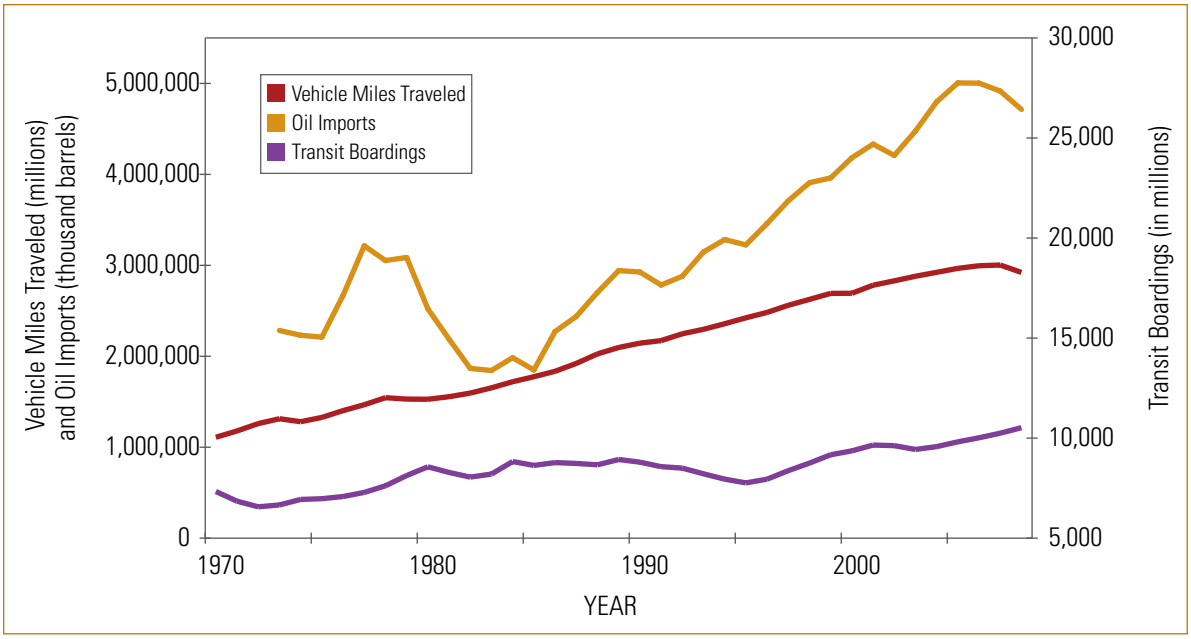


FIGURE 2
Trends in U.S. Annual Vehicle Miles of Travel, Transit Boardings and Oil Imports[4]



Reducing oil demand through fuel economy absent competitive markets—in transportation fuels, transportation modes, or both—serves to reduce the trade deficit as well as emissions, but is insufficient to change the strategic status of oil or the influence of the Organization of Petroleum Exporting Countries (OPEC), the oil cartel which controls 78 percent of world oil reserves. OPEC, striving to maximize the revenue of its members, has constrained production to the point where, despite accounting for the bulk of world oil reserves, it provides only 40 percent of global supply. When oil-consuming countries reduce net demand (or increase non-OPEC production), OPEC can respond by throttling down supply to drive prices back up. To fully de-fang this cartel, consumers must have viable choices that enable them to respond quickly to changes in oil prices, rendering the cartel's machinations ineffective. Drivers can't rapidly change the fuel economy of their vehicles, but with the right policies they could quickly change what fuel their vehicles use—and even how frequently they use those vehicles.

Now is the time to shift forward toward a future where Americans have real, viable transportation options.

Exploring Policies to Increase Competition Among Transportation Options

The first chapter of this paper reviews how public policies in the United States have promoted our oil-intensive transportation infrastructure. Whatever benefits these policies have generated, they have also tied our transportation system to oil. From the interstate highway system, to tax and zoning policies, federal, state and local governments have helped to lay the groundwork for our current transportation system and the importance of oil to our economy and way of life. The second chapter presents general principles that underlie a shift to a more economic and competitive transportation system. The third chapter offers 10 specific policy approaches that could open up America's transportation market to more competition among modes and reduce oil demand by hundreds of millions of barrels per year.

Chapter 1

Paving the Road to Oil Dependence: The Role of Government Policy

Auto commute times in metropolitan areas have risen steadily over recent decades. Between 1997 and 2007, the average annual mileage driven per capita increased by 7 percent.[1] Americans now spend more time commuting than vacationing.[2] While driving has become the default mode of transportation in the United States, the American transportation system was not always so dependent upon private vehicles and highways.

More than a century ago, rail dominated motorized transportation within and between cities. It was in 1908, when Ford introduced the low-priced Model-T, that vehicle ownership increased dramatically and the famed streetcar systems began to lose ridership. By 1916, the then recently formed American Association of State Highway Officials (AASHO) submitted to Congress the draft legislation of the Federal Aid Road Act. During these early years of federal policy, the foundations were laid for an enduring, mutually reinforcing relationship between government and highway interests.[3]

In the decades following, as the construction of roads and highways garnered considerable support through new federal economic subsidies and policies, vehicle-based travel grew at exceedingly rapid rates. In 1933, the National Industrial Recovery Act authorized $400 million in grants to the states for road construction projects.[4] And in 1939 and 1944, the Bureau of Public Roads (BPR)—the predecessor of the United States Department of Transportation (USDOT)—published bold plans for highway construction within and between metropolitan regions, which were later eagerly supported President Eisenhower and funded through Congress.[5] Finally, in the mid-1950s, leaders including Senator Al Gore, Sr. successfully championed the Federal Aid Highway Act, launching the construction of the Interstate Highway System (IHS).

With 46,876 miles of road constructed, the IHS cost American taxpayers roughly $130 billion (in nominal dollars, which equals roughly $425 billion in 2006 dollars), with the Federal government covering nearly 90 percent of this cost by the time it was completed in 1991.[6] The largest public works project in the history of the United States, the massive IHS investment has driven American prosperity, while also helping spur the country's ever-increasing dependence on driving. Although today they consist of only 1 percent of total road length in the nation, interstate highways carry nearly 25 percent of the traffic—60 times as many people as passenger rail carries, including 8.4 percent of rural traffic and 16.3 percent of urban traffic.[7,8]

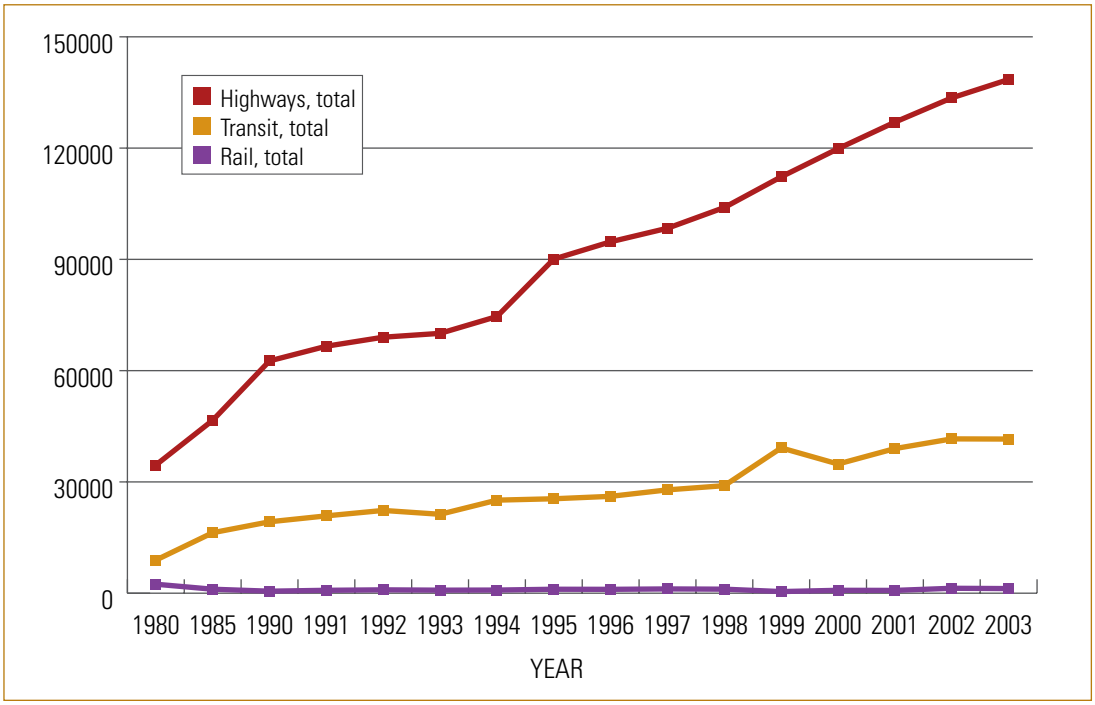
> ***Taxpayers […] shouldn't have to pick up the tab for other people's preferences for suburban living, yet that has been the effect of the federal interstate highway program since the mid-1950s. The construction of free beltways and expressways has subsidized suburban development. The "correct" or efficient amount of suburban development is the amount that consumers are willing to pay for so long as they bear the incremental costs of land acquisition and expressway construction.***
>
> —Howard Wood, CATO, How Government Highway Policy Encourages Sprawl

Prompted in large part "by a vast and seemingly intractable network of government regulations," the spread of suburbia coincided with the jump in highway and interstate construction.[9] At the federal level, housing subsidies gave priority and support to development in sparsely populated areas, while local regulations dictating minimum lot sizes and set-back requirements, density limits, single-use zoning, and minimum parking requirements have helped make transit uneconomical and walking and biking in many cases difficult or even infeasible. Driving in large swaths of the country has become less a matter of choice than necessity.

Since the 1956 passage of the Federal Aid Highway Act, federal policy has strived to build a highway system, not an integrated *transportation* system. The country witnessed a steady decline in mass transit between 1954 and 1963 as nearly 200 transit companies went out of business, leaving many mid-sized cities without any transit service.[10] Even in 1964, when the Urban Mass Transportation Act authorized federal grants for public-transit systems, and states began to subsidize their major transit systems, transit's share of travel remained in the single digits except in a handful of older, denser cities, such as New York, Boston, and Chicago.[11]

FIGURE 3

Total Federal, State and Local Transportation Expenditures, in Millions of 2008 Dollars[12]



Today, most commuters simply have no other option but driving when taking care of their daily affairs, from bringing kids to school to commuting to work to shopping.[13] One government programs analyst who ranked the highway system among the nation's 25 greatest endeavors of the last half of the 20th century summed up the situation:

> By building highways instead of mass transit systems...the federal government encouraged Americans to travel to and from work by car, thereby stimulating much of the urban sprawl that vexes commuters today, while diluting public support for urban mass transit. Thus does one endeavor's success sometimes precipitate another's failure.[14]

Chapter 2

How Transportation Alternatives Can Reduce the Importance of Oil

Federal Policy: Starting to Move in the Right Direction

Recent transportation laws have started to pivot away from interstate construction and towards multimodal (i.e., more than one mode of transportation) and more comprehensive transportation planning. Congress charted a new policy direction with the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA). This Federal transportation bill focused on priorities other than the completion of the Interstate Highway System. For example, it contained new planning requirements and funding for mobility options. The initial statement of ISTEA represented a new direction, at least in theory:

> It is a goal of the United States to develop a national *intermodal* transportation system that moves people and goods in an *energy-efficient* manner. The nation's future economic direction is dependent on its ability to confront directly the enormous challenges of the global economy, declining productivity growth, *energy vulnerability*, air pollution, and the need to rebuild the Nation's infrastructure.[1] [emphasis added]

The two transportation bills enacted since ISTEA varied little from this approach. For instance, the Transportation Equity Act for the 21st Century (TEA-21, enacted in 1998) maintained the same basic framework yet removed its declaration of policy and lacked clear federal policies and objectives. TEA-21 also eliminated Major Investment Studies (MIS), a requirement intended to result in better decisions. An MIS required a comprehensive analysis of all reasonable alternatives for addressing a particular transportation problem, including consideration of the benefits and costs of investments related to such factors as mobility improvements; social, economic, and environmental effects; land use and economic development; financing; and energy consumption.[2]

Key Goals and Objectives to Consider in Development of Future Transportation Policy

Given the Federal government's historic bias towards travel by automobile, several policy goals and objectives must become top priorities in transportation legislation to spur fair competition among modes and strengthen the economy's resilience to oil supply disruptions. The following four principles could help guide the development of those policies, paving the way to a more market-driven transportation system that is inherently more efficient and demand-responsive:

A. Fair and Transparent Pricing

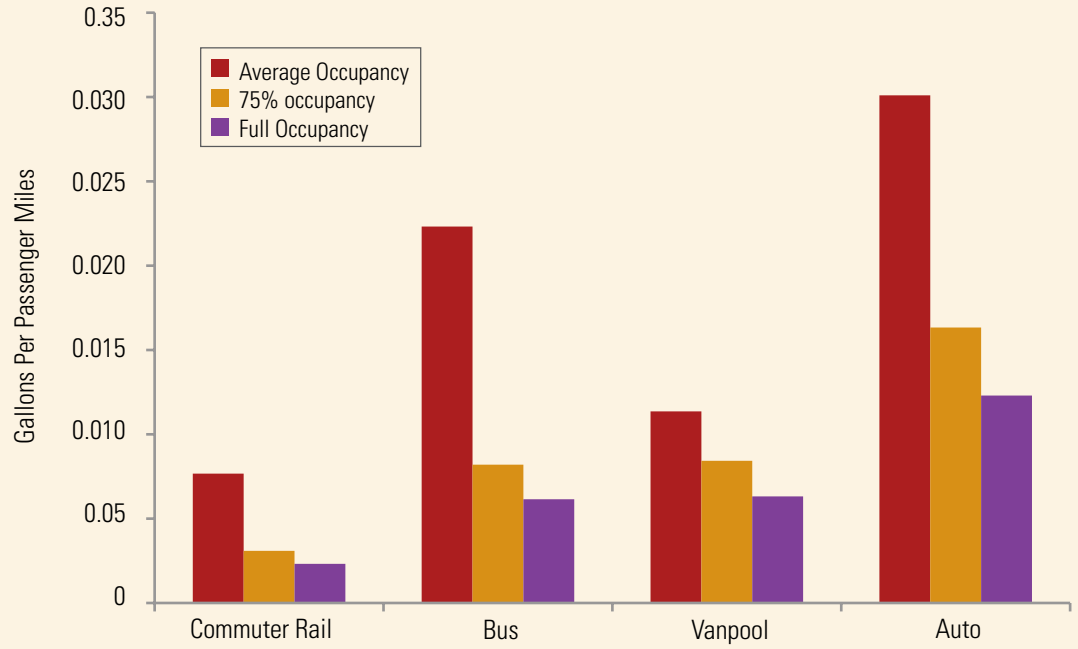
An important way to ensure people pay more directly for the road services they use—and to reduce the extent to which drivers are forced to subsidize the services used by others—is to implement tolls and congestion charging initiatives. This level of road tolling would not require new technology, but rather an acceleration of the already impressive rate of tolling system installations in states and metropolitan regions across the country. There are efforts exploring congestion pricing in both the New York City "PlaNYC" initiative and in San Francisco.[3] In addition, the Federal Highway Administration (FHWA) has made considerable efforts exploring and promoting these policies through its Tolling and Pricing Program.

More road pricing and other policy tools for internalizing costs raise concerns about potentially disproportionate impacts for low-income Americans. Efforts to move forward with these policies could address these concerns

Considering the Load Factor in Public Transportation Systems

The shrinking role of public transportation in commuting and travel poses a challenge with respect to fuel savings as compared to private vehicles. Fuel use, and its resultant cost per passenger, is the product of three factors: The efficiency of the vehicle, the energy source (e.g., electricity or diesel), and the "load factor." At peak commuting hours the last of these is likely to be high, yielding per-passenger fuel savings. However, during off-peak times ridership on buses or trains is often low enough to make them inefficient compared to private vehicles. It is essential to consider load factor and its relationship to vehicle efficiency when analyzing the oil security benefits of any form of transportation, since, as the table below illustrates, the relative efficiency of transit modes differs significantly based on how many seats in a vehicle are actually filled.[4]

FIGURE 4.
Gallons of Fuel Consumed Per Passenger Mile



Sources: National Transit Database 2008, National Household Travel Survey 2001

through planning in the earliest stages. The location of priced facilities and the uses of pricing revenues can minimize negative impacts to struggling households while moving the system as a whole in a more economically sustainable direction (see, for example, the discussion of transit vouchers and an oil security fee in Chapter 3).[5]

B. Allocate Taxpayer Dollars Based on Performance Criteria and Costs Based on Use

Expenditure of taxpayer money across the transportation system should be tied to performance criteria and costs should be allocated based on use. For example, heavy trucks should be charged based on the disproportionate amount of damage they inflict on roads and bridges. Public spending in transit and other high-occupant transportation options—running the gamut from rail transit, to bus rapid transit, to shuttle buses, vanpools, and carpools—should be tied to the goal of achieving modal choice in an energy efficient and thus cost effective manner for the greatest number of people. Policy should be reformed with the aim of achieving increased load factors (a measure of how fully a public transportation mode is utilized) for transit vehicles, providing a better return on taxpayer dollars, and saving more oil per passenger-mile. This is especially important in an era of declining revenues.

C. Pushing Responsibility Down to the Metro Level

As of 2007, metropolitan areas accounted for 90 percent of gross domestic product (GDP), and the five largest accounted for nearly one-quarter of GDP.[6] The 100 largest regions, which account for the vast majority of travel activity in the United States, also host a disproportionately large share of activity linked with national economic prosperity, including three-quarters of both GDP and residential real estate value.[7]

Given the primacy of metropolitan areas in the nation's economy, several reports and proposals for reforming the federal transportation program focus on these areas, with one calling for adoption of "Metropolitan Mobility plans" in regions with 1 million or more people.[8] The same report found that moving authority down to metropolitan areas should be part and parcel of a national plan to improve mobility:

> The USDOT would set mobility goals for large metropolitan areas by first establishing standardized measures of mobility (e.g., hours of delay per 1000 vehicle miles traveled [VMT]). It would then specify national performance standards for metropolitan areas. The full range of public and private stakeholders (including system owners, operators, and users) involved in the planning, construction, and operation of regional transportation in such metropolitan areas would be convened to assure consideration of the urban interests in defining national standards. This would help integrate transportation planning into other urban planning activities.[9]

Such an iterative process for determining performance standards for metropolitan areas is likely to yield a more competitive transportation system. To ensure this outcome, not to mention a more respectful use of taxpayer dollars, such standards should include load factor and other oil savings drivers such as congestion reduction among the metrics for success.

Such a process should also ensure federal taxpayer dollars are not expended on transportation projects not justified by a given area's population density and land-use patterns. Eligibility of municipalities for certain federal transportation funds should thus be conditioned on removal of regulatory barriers that make a variety of modal choices uneconomic.

D. Aggressively Deploy Innovation and the Next Wave of Technology

Improving operations in each transportation mode, as well as intermodal connections, could enhance efficient use of taxpayer money. Information technology has changed the worlds of commerce and leisure, allowing us to contact colleagues and loved ones around the globe nearly instantly. Yet much of America's transportation infrastructure is still basically stuck in the 1950s. Consider the traffic signal. Nearly 300,000 of these silent sentinels shine red, yellow, or green across the country. The agencies that run them, however, received the equivalent to a "D" letter-grade by a group of experts who concluded that currently used technology is outdated, yielding inefficiencies in traffic flow.[10] It would cost on the order of $1 billion to change that grade to an A, with a 40:1 benefit-cost ratio due to the fact that improper timing of signals accounts for as much as 10 percent of all traffic delay. This measure alone could save about one million barrels of oil per day.[11]

Such technological upgrades of the transportation system are a cost-effective way to reduce fuel wasted in all modes of travel. As transportation experts and authors Sam Staley and Adrian Moore state, "While capacity is important, managing traffic flows on the transportation network is even more critical because it ensures existing and new capacity is used at maximum efficiency."[12] To achieve this goal, the authors recommend, in addition to widespread deployment of active traffic management systems such as those in Beijing and London, applying variable rate tolling to highways, establishing better incident management systems, optimizing traffic signal operations at intersections, deploying ramp metering, and improving parking policies.[13] The potential impact on oil demand of such measures is examined in the next section.

Technological improvements can also revolutionize transit, as evidenced by clever initiatives such as the iPhone application for tracking Washington, D.C. transit vehicles in real time. New innovations are being developed, whereby technology enables integrated, demand-responsive networks of transportation services, including Computer-Aided Dispatching/Automatic Vehicle Location systems, Automatic Passenger Counters, Real-Time Passenger Information, and Interactive Voice Recognition technology for accessing real-time information telephonically.[14] Such advances would increase convenience and help open up a new world of transportation options for consumers in suburbs and cities alike. Transit information and ticket selling systems that are taxpayer supported should be open to all transit systems in a given area, whether public sector or private.

Chapter 3

New Policies: The Path to a More Economic Transportation System

Moving forward, we propose using the four principles outlined in Chapter 2 as the foundation upon which to deploy a set of national policies to help address pressing energy and transportation challenges. This is not a comprehensive list of measures, but one that is composed of reforms that are long overdue, and that would allow more transportation options for consumers, as well as add a much-needed vector to reduce the strategic importance of oil.

Policies for Increasing Transportation Choice

A. Deploy "HOT" Lanes and Congestion Pricing

User fees, such as tolls and congestion pricing, can be implemented to help maintain existing and build new highway, bridge, and tunnel infrastructure. User fees can also help reduce peak hour congestion by providing incentives to travel in off-peak periods, combine trips, or telecommute, thus reducing the amount of driving done in highly inefficient stop-and-go traffic and overall oil consumption. An emphasis on roadway-based user fees would help ensure that transportation investments are made where demand—and therefore toll revenues—are highest, ensuring a less wasteful allocation of highway dollars. There are different options for implementing user fees as illustrated in the table below.

TABLE 1
Types of Transportation User Fees

Congestion and cordon pricing: Variable tolls can be implemented on congested roadways so that toll cost is set to reduce traffic jams and achieve a specified level of service on the roadway. This can include time-of-day pricing in which higher tolls are charged during peak hours or more sophisticated dynamic pricing in which toll rates vary depending on the real-time level of congestion on the roadway. Dynamic pricing can be used to ensure that the road stays at a consistently high level of service.	**HOT/managed lanes:** Both HOV lanes and high-occupancy toll (HOT) lanes provide a separate lane for carpoolers with a higher level of service. HOT lanes allow single-occupant vehicles into these lanes for a toll; this toll can vary according to traffic levels to ensure a high level of service in the lane. Vehicles carrying two or more people would be exempted from the toll to encourage carpooling.
Intercity tolls: Per mile fees can be introduced to users outside of urban areas, interstates, and other limited access roads. Given that travel on rural roads is limited, the estimated traffic affected would be much smaller than for urban tolling options.	**Truck-only toll lanes:** Toll lanes dedicated exclusively to trucks allow freight to move more efficiently through congested areas. In addition, truck-only lanes may have safety benefits by separating truck and auto traffic.

Oil Demand Impact:	Together, these options could save nearly 80 million barrels of oil in 2020, and almost twice that in 2030 should pricing become more comprehensive.

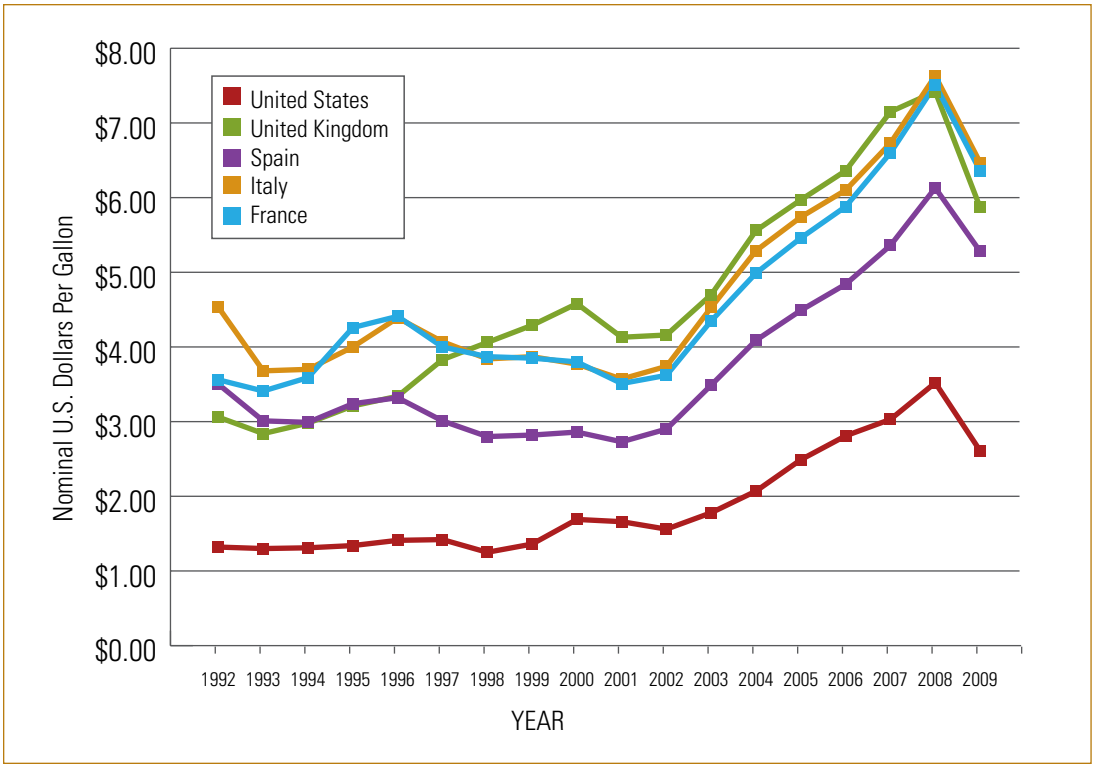
B. Ensure the Price of Fuel Better Reflects Oil Security Costs

To better reflect the significant national security cost of oil, an oil security fee could be levied. An oil security fee, incorporating the national security cost of oil into its price rather than paying for it in an indirect manner as is now done (e.g., through income tax). This would enable the market to work as more accurate costs are factored into people's transportation choices, assuming that vehicles enable fuel competition and modal choices exist. For instance, commuters may choose to drive fewer miles by combining multiple errands into a single trip, carpooling, telecommuting, or switching to public transportation.

This fee should not be confused with the already existing motor fuel tax, which automatically goes to the Highway Trust Fund. While Americans complain about high taxes at the pump, in fact we pay far more for energy subsidies and military "policing" of oil supply through our general taxes each year. This incentive to use more gasoline and diesel (because it makes the price of petroleum fuels appear cheaper) has dire consequences for the country's economy and the world position of oil as a strategic commodity. The 18.4 cent-per-gallon federal tax on gasoline has not changed in almost two decades.[1] This stands in stark contrast with other industrialized countries. A study of European industrialized nations over the last decade found that fuel surcharges are on average three times as much as direct highway costs, while in the United States they cover only half the costs.[2] These higher European gas taxes send a clearer signal to drivers of the true cost of oil and the true cost of their travel choices. In Europe, these gas taxes are used to finance social programs, not to fund the security cost of ensuring access to oil. Ironically, because the United States maintains the world's largest ground forces and naval presence in the Persian Gulf it is the U.S. taxpayer that actually pays the lion share of those costs. U.S. taxpayers effectively subsidize cheap oil for the rest of the world, and since the cost of defending oil is paid through taxes besides those paid at the pump, consumers are unaware of the true cost of this activity, not to mention other nations' freeriding.

FIGURE 5

Retail Motor Gasoline Prices in Selected Countries, 1992-2009[3]



Many transportation policy experts and economists argue that the current federal gas tax does not provide an effective price signal to drivers. Such arguments are often based on the economic concept of "externalities," negative or positive effects stemming from market transactions that are not accounted for in market prices. One way to improve market efficiency is to apply "Pigovian taxes," named after early-20th century economist Arthur Pigou who favored "internalizing" costs to ensure the accuracy of the price of a good or service.[4] Many have advocated adopting policies applying this concept to the price of fuel in the United States based in part on security and environmental externalities.[5]

Putting such a policy in place requires an assessment of the magnitude of the externality. Several analysts have examined the security question and developed estimates based on import requirements, vulnerability to price swings, and military expenditures necessary to protect oil supply.

There are various options for designing the fee, starting at the collection point. One option is to charge the fee at the wellhead, or the port-of-entry in the case of oil imports. This also allows for simpler policy design and implementation, applying it to a small number of "upstream" companies rather than "downstream" with its hundreds of thousands of retailers. Another option is to focus it on gasoline and petroleum diesel and charge it at the pump.

Potential revenue varies depending on the size of the levy. The table below shows possible scenarios; even the first option would generate a substantial amount of revenue (figures are based on 2008 oil consumption). The next question is: How should such revenue be allocated?

The tens of billions of dollars raised annually from an Oil Security Fee could facilitate a tax shift by offsetting some income or payroll tax.[6] Charles Krauthammer for example has proposed offsetting a $1 levy on a gallon of gasoline with an immediate $14 per week reduction in the payroll tax, since the average American consumes 14 gallons of gasoline per week. This model would best be adjusted on the basis of energy content (British Thermal Units, or BTUs) to include diesel fuel as well, as both fuels are petroleum based. The payroll tax offset could also potentially be replaced with an income tax offset, resulting in revenue-neutrality either way.[7]

Alternatively, some of the proceeds could be committed to paying down the portion of the annual deficit reasonably attributable to military and diplomatic efforts in the Persian Gulf. Based upon Congressional Budget Office estimates, spending in Iraq alone from 2009-2014 will total $156 billion (or $160.7 billion at 3 percent interest).[8]

Yet a third option is expending some of the funds on new infrastructure or services that would serve to insulate the economy against oil price shocks, for example by financing implementation of policies described in the Mobility Choice Blueprint which provide substantial "bang-for-the-buck."

Table 3, below, shows that policies to implement several key measures—telecommuting, road system efficiency via improved technology, and targeted public-private expenditure on rail—could be financed with a portion of fee revenue.

TABLE 2
Potential Revenue from Oil Security Fee

Fee per Barrel	Annual Revenue
$5	$35.6 billion
$10	$71.2 billion
$15	$106.8 billion

TABLE 3
Possible Expenditures

Mobility Choice measure	Cost to implement in billions of dollars per year
Telecommuting for federal employees	$0.005
Intelligent Transportation Systems	$3
Targeted High-Speed Rail (NEC)	$4.9
Total	**$7.905**

The first program, telecommuting, is based on implementation of H.R. 1722, the Telework Enhancement Act of 2010, which will launch a program to increase telecommuting in the federal workforce. The Congressional Budget Office has determined it would cost $30 million to implement from 2010-2015, while potentially influencing the 15 percent of the population employed by the federal government.[9] The Information Technology and Innovation Foundation, meanwhile, finds that improving technology across our transportation system would cost $3 billion spread over five-to-six years. And as several Republican Members of the House Transportation and Infrastructure Committee point out in a recent report, targeted investment in rail—real high-speed rail that cuts current travel times in half in the highly populated North East Corridor (NEC) connecting Boston and Washington, D.C.—in partnership with the private sector and the NEC states is preferable to more timid efforts in this economically important region.[10] While financing should come from private as well as public sector sources given the huge value that would be added to the value of property and commercial investments in the region, to illustrate scale we assume that the entire cost of the project—an estimated $98.1 billion over 20 years—is covered by the fee revenue.[11]

An oil security fee could have negative equity impacts insofar as low-income Americans will be paying a higher percentage of their income for gasoline than average consumers. Low-income households in the United States—those in the lowest fifth income bracket—currently spend about 10 percent of their income on gas and oil, while the top fifth spends only 2.5 percent. Increasing the cost of a good to a consumer regardless of their ability to pay is the definition of regressive, yet another definition of equity says itis fair for everyone to pay the real costs of their activity. We should reserve final judgment, however, until we can analyze not only the oil security fee, but its planned uses, a number of which have equity benefits that can counterbalance inequities in the charging of the fee.

Oil Demand Impact:	Implementing a fee equivalent to an additional 25 cents per gallon of gasoline in 2020 could moderate demand by almost 240 million barrels of oil, and by about 470 million barrels per year by 2030.

C. Increase Insurance Choice

Car insurance is a fixed cost for most drivers in the United States today—they pay the same amount per year regardless of how many miles they drive. Yet, the likelihood of an accident for a given driver increases as he or she drives more. As a result, low-mileage drivers essentially subsidize risk for high-mileage drivers, translating into another distorted price signal for the costs of driving.

Allowing insurance companies and drivers to convert the variable portion of insurance costs into a per-mile cost for drivers—a concept known as Pay as You Drive (PAYD)—would remedy this problem. A per-mile cost would provide opportunities for drivers to save money by reducing mileage and reward those drivers who drive less. Research shows that most drivers in the United States would actually *save* money under such a system, since a smaller pool of relatively high-mileage drivers accounts for most of the risk for car accidents and injuries.

To implement PAYD, state regulations that prevent insurance companies from offering consumers the option need to be lifted. Federal discretionary dollars can finance research by the Transportation Research Board (TRB) on how such policies can be structured, and to quantify the relative benefits of different mileage-verification methods. The federal government can also finance additional pilot demonstrations of the PAYD concept, such as the currently ongoing pilot in the Puget Sound region.

Oil Demand Impact:	If PAYD policies were made an option for all drivers, between 20 and 40 percent of drivers could be expected to use it as a way to reduce auto insurance premiums. Allowing PAYD as an option in all states could generate savings of 56 million barrels of oil per year in 2020 and almost 60 million in 2030.

D. Deploy Transit Vouchers to Cost-Effectively Provide Options to Low-Income Households

While lowering transit fares is a proven way to increase ridership, this comes at a cost to transit agencies in the form of lower fare box revenues that undercut those agencies' ability to maintain service in the long run and distorting the economics of transportation choices. To allow transit agencies to become more self-sustaining while meeting mobility goals, subsidies can be focused on helping people who actually need the financial support. To this end, rather than blanket subsidies to transit agencies, transit vouchers could be provided for low-income households while general fares are rationalized. This policy would help transit agencies avoid fare box losses by giving them the chance to charge higher fares for those consumers who can afford it.

In order to expand competition and increase the likelihood of transit demand being met with economic options, policies could be designed so that vouchers can be redeemed with both existing transit agencies and entrepreneurs running private sector buses, shuttles, vanpools, and jitney buses.

Research shows that lower- and higher-income riders have different responses to fare price changes, with some lower-income riders being more sensitive to cost.[12] As a result, our analysis shows that the ridership gains from targeted subsidies to low-income riders outweigh the ridership losses from higher-income riders who switch to other modes when faced with fare increases. This analysis recognizes that subsidies will attract some new transit riders who will switch from non-auto modes (such as walking or bicycling) that consume no oil.

Oil Demand Impact:	Even accounting for the relatively higher share of low-income transit riders who will make this switch, providing low-income transit vouchers would save nearly 0.7 million barrels of oil each year.

E. Allocate Transit Dollars to Optimize Oil Savings

Transit options would serve to reduce oil consumption as long as they consume less oil per passenger than those riders collectively would have consumed driving.[13] Therefore, those transit routes that have the highest load factors save the most oil. Taxpayer dollars should thus be focused on capital improvements that help maintain existing high-load routes. This might mean providing more frequent service during peak usage hours, which would in turn attract even more riders. Funds for new routes should be focused on those expected to be consistently high load.

A number of other strategies could contribute to improved service levels and expand service to additional new routes, among them removing obstacles to private sector transit activity. Technology can also play an important role in increasing speed and reliability through signal prioritization and synchronization, automatic vehicle location systems for real-time scheduling adjustments, and improved fare collection such as integrated transit fare systems that allow riders to use a single smartcard for all the modes and systems they may want to use, public or private. Service improvements such as express and limited-stop service can provide new and desirable options for riders.

More capital-intensive options focus on adding more buses and rail vehicles to increase the frequency of service and to allow transit systems to expand to cover larger geographic areas. For instance, bus rapid transit (BRT)—as demonstrated most extensively in cities such as Bogota (Colombia) and Curitiba (Brazil)—is a flexible and cost-effective way to provide much higher levels of service than traditional bus service, often by using a dedicated right-of-way to avoid congestion and reduce conflicts with general traffic. Compared to heavy- or even light-rail projects, BRT costs less and takes less time per mile to build. Operating costs are also lower.

Oil Demand Impact:	Increasing the level of service on routes that have better than average load factors could save more than 4 million barrels of oil per year in 2020, and more than 6 million in 2030. Expansion of service to reach new geographic areas, assuming that only routes with better than average load factors would be funded, could save almost 21 million barrels of oil per year in 2020 and more than 38 million barrels in 2030.

F. Increase Flexibility of Local Land-Development Rules

Transportation choices and land use are inextricably linked. By opening the market to a variety of land-use patterns, some of which will enable better economics for various mobility options due to their density, people can choose modes other than driving for some trips, thus reducing the number of car trips they need to make, the miles they need to drive, and the oil they consume. Studies have shown that residents of compact, mixed-use communities with convenient transit options have a 20 to 40 percent lower annual per household VMT than residents of typical American development.[14] Federal policies need to be revamped so that they do not subsidize inflexible development patterns and municipalities' eligibility for certain federal transportation funds should be conditioned on liberalization of rules to meet market demand: for example, if a development pattern in a given area does not enable transit to be high load, and thus economical and oil-saving, then taxpayer dollars should not be going toward developing transit in that area.

There is evidence of pent-up demand for development alternatives. One analysis of consumer residential preferences looked at Atlanta households and found that "the segment of the housing market that is interested in these alternatives is underserved—that is, there is unmet demand for alternative development in the Atlanta region."[15] Another analysis compared Boston and Atlanta and found that 70 percent of Boston residents who wanted to live in a walkable suburb actually did, while only 35 percent of those in Atlanta with the same desire actually lived in a walkable suburb.[16] A national survey of developers found that more than 60 percent agreed with the statement "In my region there is currently enough market interest to support significant expansion of these alternative developments," with a high of 70 percent in the Midwest and a low of 40 percent in the South Central region. In terms of location within metropolitan regions (central city inner suburb, outer suburb, or rural) the highest percentage (80 percent) reported an intent to develop more densely should land-use regulations be relaxed in inner suburbs.[17]

The two primary approaches recommended here are (1) relaxing of local regulations that prevent mixed-use development and increased density in neighborhoods near transit as a condition of receipt of federal taxpayer dollars for transit, and (2) reformed regional planning that combines land-use and transportation planning in a single document and ties transportation tax dollar funding to plan performance.

Oil Demand Impact:	These policies would lead to reductions in VMT that could save more than 3 million barrels of oil per year in 2020. This initial savings would more than triple by 2030 as these policies have more time to influence development. Due to the length of time it takes for individual properties to turn over to new uses and development patterns to change, reduction in regulation over land use represents a long-term policy option. Many of the most powerful effects of implementing these policies will be felt beyond the 2030 timeframe examined here.

G. Deploy Cost-Effective Intercity Rail Options as Justified by Cost Efficiency and Oil Displacement Potential

For medium distance trips, intercity rail can offer a more energy efficient alternative to auto and air travel. As with transit expansion, the efficiency of rail is contingent on implementing service with relatively high load factors, rather than introducing service with low ridership. Federal funds for rail can be targeted to expand service on lines that will attract enough ridership to operate with relatively high load factors, while reducing service on lines that provide a less valuable alternative to passengers, something that can perhaps be assessed by the size of the subsidy needed to attract significant passenger load (the higher the subsidy required to attract passengers, the less valuable an alternative the service provides in and of itself). Pew's Subsidyscope reported that "forty-one of Amtrak's 44 routes lost money in 2008 with losses ranging from nearly $5 to $462 per passenger depending upon the line."[18] The highest load routes lost the least money per passenger and in some cases were clearly profitable.

Oil Demand Impact:	If funds are dedicated to expanding ridership routes with at least 20 percent higher load factors than the Amtrak average, funding intercity rail could save half a million barrels of oil per year, with larger savings should spending be increased. Intercity rail strategies will also have synergies with transit expansion strategies, because better transit systems in destination cities reduce the need for passengers to have a car upon arrival. This further reduces the need for travelers to drive.

H. Deploy Smart Traffic Management

Intelligent transportation system (ITS) technologies are a win-win strategy: they provide a cost-effective way to simultaneously improve the operational efficiency of our nation's transportation system while reducing the fuel lost to congestion and idling. These technologies save time, money, and frustration for travelers. A wide range of technologies and operational improvements can be implemented:

- **Freeway management:** Roadway capacity and flow can be dynamically managed with real-time information on traffic conditions, collected by sensors and cameras. Ramp meters can be installed to regulate the flow of vehicles entering a highway to the optimal level at any given time, speed limits can be adjusted in real time to respond to changing conditions, and shoulders can be converted to travel lanes at peak hours or during congestion. Traffic management centers can coordinate ITS technologies across multiple roadways to best reduce congestion area wide.
- **Traveler information:** Up-to-date information on traffic conditions provided to travelers can enable them to choose the best route and avoid congestion. Variable message signs, 511 systems, and traveler information call centers can all be deployed.
- **Incident management:** A variety of techniques can be used to more quickly identify and clear incidents (accidents and other obstructions) that cause traffic jams, including free cellular call systems for reporting incidents, closed-circuit cameras, service patrols, and travel management centers to coordinate response.
- **Arterial management:** Improved signal synchronization and variable message signs can be used to improve traffic flow on arterial roadways. This can also be combined with priority access through intersections for transit.
- **Road weather management:** Inclement weather can badly snarl roadways. Implementing coordinated weather advisories, speed limit reductions, and snow and ice treatments promote safe and smooth travel operations in bad weather.

- **Vehicle Infrastructure Integration (VII) or IntelliDrive℠:** Not yet widely deployed, these systems would equip vehicles with technology that would communicate with roadside sensors and other vehicles to help drivers avoid accidents and make efficient use of roadway capacity.
- **Truck idling reduction:** Idling wastes both fuel and money for trucking companies and operators. Overnight idling at truck stops can be reduced through truck stop electrification, which provides heating and cooling for the driver in the sleeper cab, or by installing auxiliary power units on trucks that allow drivers to shut off the main engine. Weigh-in-motion (WIM) systems and electronic credentialing allow trucks to bypass weigh stations and safety inspections, eliminating the idling associated with these stations.

Oil Demand Impact:	By improving traffic flow on arterials and freeways and increasing overall system efficiency—especially in the nation's most congested urban areas—these technologies taken together could save almost 5 million barrels of oil per year in 2020 and almost 10 million barrels in 2030.

I. Commuting Options and Telecommuting Reduce Gridlock

A large share of travel—especially during peak hours—is to the workplace. There are many strategies that can encourage commuters to choose travel options other than driving alone. Telecommuting, flexible work hours, and compressed work weeks offer opportunities to entirely eliminate some trips to the workplace. The choice to take the "broadband highway" to work, shop, or run errands saves more oil than any alternative mode of transport. While telecommuting is on the rise, there are ways that policy measures can accelerate this trend. First, government agencies could set a good example by encouraging telecommuting and a compressed workweek for its workforce. Barriers to telecommuting in state and local tax codes can be eliminated, and tax incentives can be provided for telecommuting infrastructure setup and maintenance costs, similar to the tax-free benefits currently provided for other workplace transportation costs (parking and transit use).

Additionally, parking cash-out programs reward employees who find other ways to get to work. Online ride matching, vanpool services, and guaranteed ride home programs provide additional alternatives to driving alone. Outreach programs by larger employers to educate employees about available commute options can be very effective. Lastly, bulk discounts on monthly transit passes from transit agencies provide employers/employees incentives for greater transit use.

Oil Demand Impact:	Implementing commuting strategies could yield oil savings of more than 71 million barrels of oil each year.

The Growing Role of Public-Private Partnerships

While public policy is absolutely vital to expand mobility choice, the private sector also has a significant role to play in changing the transportation landscape. Indeed, the private sector has always played an essential role in our transportation policy. Nearly all pre-World War II American public transportation systems were private businesses, and to this day private contractors and subcontractors design, engineer, plan, and build our transportation infrastructure. In recent years, however, as revenue shortfalls (particularly from a diminishing fuel tax) persist, efforts to rethink and expand Public-Private Partnerships (P3s) have increased.

For the purposes of reducing oil consumption, P3s can help in many ways. They can facilitate the development of new roadway capacity, especially for HOT lanes and tolled roadways. They can bring employers, employees and transportation agencies together (like the Washington State Commute Trip Reduction Board) to reduce single-occupancy vehicle (SOV) commuting, congestion, and pollution. Private services can also supplement and expand existing public transit service and increase transit use through participating in Transit-Oriented Development.

In all cases, transportation experts agree that P3s are an increasingly important tool in the toolbox, though they are not the solution to all of our transportation challenges. The National Surface Transportation Infrastructure Financing Commission laid out recommendations for P3s to encourage the delivery of effective services while preserving the public interest.[19] These include:

- a preference for P3s to come out of formal regional plans, as opposed to ad hoc consideration of unsolicited proposals with an eye to local revenues;
- cost-effectiveness assessment to ensure a P3 provides more value per dollar than a project managed publically;
- thoughtful risk management and risk sharing; and
- strict conflict of interest, disclosure and transparency requirements.

The success of P3s, and their ability to bring the financial resources and operational acumen of the private sector to improving mobility choice, is dependent on both the private sector's willingness to do business differently when interfacing with government and on government's providing enough flexibility to make private participation worthwhile.

The Oil Demand Impact of Mobility Choice

The baseline oil consumption used in this analysis is calculated from the Department of Energy's Annual Energy Outlook (AEO) 2010, and includes all of AEO's assumptions regarding vehicle miles of travel (VMT) and vehicle fuel efficiency to 2030. Barrels-of-oil-equivalent was calculated using the energy content (BTUs) for gasoline and diesel fuel as compared to the energy content of a barrel of crude oil. Using this methodology, the measures outlined here could produce an oil savings totaling 462 million barrels of oil per year in 2020—about 6 percent of projected oil consumption by cars and trucks. By 2030, these strategies could save 779 million barrels, or more than 10 percent of projected on-road oil consumption. The table below shows the results of the oil savings analysis.

TABLE 3
Technically Achievable Oil Savings, in millions of barrels per year[20]

Mobility Choice Measure	2020	2030
1. Oil security fee of 25 cents per gallon	238	467
2. "HOT" lanes and congestion pricing	78	150
3. Allocate Transit Dollars to Optimize Oil Savings	26	45
4. Increase Insurance Choice	56	60
5. Transit vouchers to provide mobility choice for low-income households	0.7	0.7
6. Increase commuting options (including telecommuting)	71	71
7. Liberalize local land-development rules	3	10
8. Deploy smart traffic management	5	10
9. Deploy cost-effective intercity rail options as justified by cost efficiency and displacement	3	7
Total Oil Saved	**462**	**779**

Combining Oil Savings Strategies

A barrel of oil cannot be saved twice. To avoid double counting in our analysis, we used a multiplicative approach to combine strategy oil savings. For example, if strategy A results in a 10 percent oil savings, and strategy B results in a 10 percent oil savings, the combined effect will be (1-0.10) * (1-0.10) = 0.90 * 0.90 = 0.81, or a 19 percent combined reduction, rather than a 20 percent reduction if they were simply added. This approach is especially important when combining many strategies; 10 strategies at 10 percent effectiveness each would mean a 100 percent reduction if simply added, but a 65 percent reduction using this multiplicative approach.

It is clear that pricing strategies—particularly a per-gallon oil security fee, congestion pricing, and Pay-As-You-Drive—are among the most effective at reducing oil consumption. Such strategies are not without drawbacks. First, of course, is the political challenge in implementing new fees. However, the pressing need to reduce the importance of oil to our economy and the difficulty of paying for infrastructure maintenance, improvement, and expansion in the face of record budget deficits may make such fees more politically palatable.

In addition to pricing mechanisms, other strategies can also play an important role in expanding mobility choice, even though they individually achieve smaller oil savings. Almost all of the other strategies analyzed here enhance mobility or increase the efficiency, economics, or capacity of the transportation network, and thus provide important benefits beyond reduced oil consumption. Recognizing their contribution to oil savings provides an additional reason to implement these win-win strategies.

Chapter 4

Conclusion: Delivering Transportation Choices

As the United States continues to grow, perpetuating current transportation trends is all but certain to lead to increasing oil dependence. It is easy to identify a clear relationship between the federal transportation program, the amount of driving, and the amount of oil consumed. New comprehensive federal transportation policies have the potential to significantly affect the volume of traffic on our roads and the economics of our transportation system, even amidst fluctuating gasoline prices and a challenging period for economic growth.

Reducing oil's strategic importance requires a transformation of the U.S. transportation sector, which accounts for the lion's share of consumption. Much research and analysis has been performed regarding the potential to improve vehicle technology and open vehicles to fuel competition, with good reason. Unfortunately the potential of expanding mobility choice has been largely ignored. This report and our ongoing coalition activities are aimed at filling this gap and spurring action by policymakers and the private sector.

The scale of the challenge before us is immense, with current global oil consumption at or approaching the thousand-barrels-per-second mark. Pressing forward with the measures examined herein would complement technological improvements in transportation and help to meet that challenge head-on. Let's get started.

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