

Memo to the Next President of the United States regarding Transportation Policy

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1 Introduction

Until a bridge collapses, gas prices go sky-high, a plane is hijacked, or workers go on strike, transportation seldom garners public attention. When the system is working as expected, its daily problems fester as a dull sore on the public consciousness. Problems like the billions of hours wasted in congestion on roads and at airports, air pollution, dependence on foreign energy, and 43,000 Americans killed each year on public roads are just sitting there, not getting noticeably worse, but not getting noticeably better. Somehow America has resigned

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itself to mediocrity in the transportation sector. Further, the past decade has shown in many respects (in particular congestion and infrastructure condition) the system is deteriorating.

As a Presidential candidate, Senator Obama has established progressive positions on a few transportation issues described on the Barack Obama website¹, but his most notable position in the area is his strong stand against Senator McCain's proposed summer holiday for the federal gas tax which would have eliminated income into the federal Highway Trust Fund, and thus choked off future spending. Yet the area remains largely undefined, and has not been prioritized, on the Obama website, 22 issue areas are identified, and transportation is an after-thought, alphabetically the last of the six "additional issues". In contrast, the McCain campaign does not list transportation among 14 listed issues. I do not know the political salability of the transportation issue, but I believe it is something that touches people's lives, which the federal government can improve by changing policies. Establishing and achieving an uplifting vision for transportation will provide a lasting legacy for the United States.

In the next year a surface transportation authorization bill will again be in play. All of the traditional special interests are proposing all of the same policies, usually with more funding. While many of those policies do warrant support and more funding, the time has come for a game-changer, something that will put the transportation system on a new trajectory.

There are several issues that needs to be addressed:

1. What constitutes the *Best Transportation System*?
2. What should be done by the *Public Sector*?
3. What is the appropriate *Federal Role*?

Some of the major transportation *problems* are discussed below, as well as what I suggest are *visions* that the next President of the United States should adopt. These visions are achievable, with a clearly defined federal role, but will not occur without a leader setting the direction and implementing supportive policies.

2 Environment and Energy

Three environment and energy problems rise to the fore.

1. *Climate change*
2. *Air pollution*
3. *Rising price of fuel*

While the past three decades have seen a public policy success in terms of reduced air pollution and associated health effects in the United States, carbon emissions have been increasing unabated.

¹Barack Obama: Strengthening America's Transportation Infrastructure <http://www.barackobama.com/issues/pdf/FactSheetTransportation.pdf>

Globalization and development have implications for transportation. International trade will continue to grow, placing demands on long distance transportation systems serving both passengers and freight. Due to the fast growth, especially in cities in developing countries, many of the issues the United States has faced (and not solved) will be presented to a new set of places without the same resources and the luxury of time the United States had in its development. Increased pressures to consume scarce resources (especially oil and construction materials) will undoubtedly drive up prices and decrease the reliability of their steady supply. Increasing population, both worldwide and in the U.S., and the desire to improve ones situation by traveling to better opportunities, will in the absence of a radical change in the vehicle fuel source, continue to exacerbate environmental problems such as pollution and carbon emissions and drive up prices.

The consequences of carbon emissions are recognized as causing significant problems, and a major source of carbon emissions are transportation systems, especially autos and aircraft. The policy responses to this are varied, from changing land use and travel behavior, to promoting alternative technologies, to regulation of supply and price. A number of policies, such as use of corn-based ethanol to power motor vehicles, have unintended consequences.

The rising price of fuel diminishes transportation demand, which helps alleviate the other externalities that transportation causes (e.g. climate change, pollution) but also eliminates the benefits transportation provides.

All three problems can be addressed with the same solution, changing the source of energy used to power most transportation from fossil fuels burned on the vehicle to some form of electric power. While this does not solve all problems, it moves environmental problems away from the transportation sector and its very difficult to regulate mobile source pollutants to much more contained power plants. With appropriate energy policy, it changes the source from a single type of energy to the multi-variate sources that can be used to generate electricity. We are beginning to see markets move in this direction, with hybrid and soon plug-in hybrid vehicles becoming more popular.

Vision 1 Within eight years more cars sold in the United States will be powered primarily by electricity and bio-fuels than by fossil fuels. All buses and passenger trains will use electricity or bio-fuels.

There are a number of other supportive policies, many described on the Barack Obama's Plan for a Clean Energy Future ²; similar policies on cap-and-trade are identified on the McCain website ³. Cap-and-trade does not provide the same level of incentives for individuals to change behavior as a more direct carbon tax.

Moving from fossil fuels to electric power, however, creates one more problem, how to finance surface transportation, which has historically been financed from user fees collected as gas taxes. This is discussed in a later section.

²Barack Obama's Plan for a Clean Energy Future <http://www.barackobama.com/issues/energy/>

³John McCain Climate Change policy <http://www.johnmccain.com/Informing/Issues/da151a1c-733a-4dc1-9cd3-f9ca5caba1de.htm>

3 Safety

According to the USDOT, motor vehicle crashes killed 42,642 people in 2006⁴ and injured countless more. Almost everyone knows someone who was killed or injured in a car crash. A study sponsored by the American Automobile Association monetizes the cost of urban crashes as \$164.2 billion⁵. Sadly, the real problems of safety have been overshadowed by sensationalist fears about security⁶. The resources, both financial and attention, given to security have drowned out a much more serious problem.

There are many initiatives that aim to reduce highway crashes, ranging from driver education, better road engineering, increased enforcement and more stringent laws to requirements for additional safety equipment on cars, and they have produced solid incremental improvements, the crash rate (crashes per million vehicle miles) is much lower than it was several decades ago. Roads and vehicles are safer, emergency medical services are better, and cell phones speed notification of emergency services, but people remain fallible. In the end, until the driver is taken out of the loop, cars will continue to kill.

Taking the driver out of the loop, i.e. cars that drive themselves, may seem far-fetched, but investments in intelligent transportation systems (ITS) and smart cars have brought this distant future within grasp.

The DARPA Urban Challenge⁷ recently tested a number of autonomous vehicles in an urban like setting. In the absence of a driver, these cars were able to navigate complex urban streets in the presence of other vehicles. If moved out of the laboratory into full deployment, a number of positive changes can be expected:

- Make travel safer for both those in the car and outside.
- Provide mobility for those who currently lack, including the elderly, disabled, and children.
- Enable passengers to spend time doing other valuable things while in their vehicle.
- Reduce parking problems in inner cities, as cars can drop passengers off at the door and park themselves remotely

In the near term, vehicles will be assistive⁸ more than autonomous, as there are many technologies that are street-ready and can be deployed that aid the driver; the full set of technologies required for fully autonomous travel will require additional development. Infrastructure can be made intelligent-vehicle friendly, making the job of the computers driving the cars easier.

⁴USDOT Budget (2009) <http://www.dot.gov/bib2009/htm/NHTSA.html>

⁵Cambridge Systematics with Michael Meyer (2008) Crashes vs. Congestion Whats the Cost to Society?

⁶In contrast with surface transportation, the aviation sector has significantly improved safety. Remarkably, the number of large commercial US jet plane crashes since 2002 is zero, though there have been incidents with commuter airlines.

⁷DARPA Urban Challenge <http://www.darpa.mil/GRANDCHALLENGE/>

⁸Assistive technologies include helping the driver by controlling speed through adaptive cruise control, providing lane departure warnings, and automatic parallel parking among other tasks

Vision 2 Within eight years Americans will be able to ride autonomous smart cars that drive themselves in mixed traffic.

To achieve this vision, the federal government should (a) sponsor research both directly and through prizes and (b) provide a legal framework for liability associated with smart cars lest manufacturers be unwilling to supply them. With appropriate motivation, in eight years the technology should be ready for the first autonomous cars to be sold to consumers.

4 Infrastructure

Since the collapse of the I-35W Bridge on August 1, 2007, six other bridges in Minnesota have been closed for replacement or significant repair. The average section of the interstate highway system is 40 years old, and many elements are reaching the end of their useful life. Unfortunately, maintaining existing infrastructure is unglamorous work that does not attract politicians and does not generate ribbon-cuttings, but is a core responsibility of those who own the bridge. Because of the political nature of state transportation funding, there is a trade-off between new construction, which brings with it media attention, and the quiet work of operations and maintenance. Had more attention been paid previously to maintaining the existing system, the infrastructure crisis would not now be upon us.

Vision 3 Within a year, an independent federally-funded Bridge Inspection Service will begin to inspect and publicly report on the quality of all bridges on the National Highway System.

The Bridge Inspection Service will be politically independent of the agency that owns the bridges, but will need to cooperate to develop mechanisms for continuous monitoring. The service will also assist states in developing accurate structural models of bridges so that they can be re-assessed for appropriate vehicle weight limits. This will be paid for by road users.

The deteriorating infrastructure is coming just as globalization, the logistics revolution, and rise of containerization place additional demands on the transportation system to be reliable. Industry has established a just-in-time production system that relies on infrastructure. The economy demands transportation systems that do not merely have a low average time, but have a low variance in that time, so that the system is predictable. The industry seeks systems that can move more material at lower cost. While railroads are effective at long-haul trips, trucks can go places trains cannot.

Vision 4 After thorough evaluation, within eight years, bridges and pavements on the US Interstate Highway System will be upgraded to handle trucks carrying up to 100,000 pounds, increasing the efficiency of the trucking industry and by reducing the number of vehicle trips, increasing safety for other road users. These improvements will be paid for by the trucking industry, which directly benefits from the improved system. In heavily traveled corridors, a system of truck-only toll lanes will be constructed.

5 Congestion

Countless hours are wasted by Americans sitting in traffic, time that could be better spent doing almost anything else. Reasonable estimates place the cost of congestion on the order of \$100 billion per year ⁹.

Simply put, the *unpriced* demand for facilities often exceeds capacity for a period of time, causing congestion. There are three strategies for this: acceptance, capacity addition, and demand reduction. Current policy is a mix of all three, with a large dose of acceptance, a small dose of adding capacity, and a mere smidgen of reducing demand.

Building capacity is expensive, it is usually most expensive where congestion is worst, as many of the easy capacity fixes have already been taken. While there are some short-term strategies for making existing infrastructure operate more efficiently (adding effective capacity), the gains from this are limited, and most of these strategies have been employed in the most congested areas already.

To date, most attempts at demand reduction have used persuasion to encourage people to behave differently, without much success. Exhortation only goes so far in the absence of a visible crisis (such as World War II, when behavior did shift both because of exhortation and due to real shortages). Implementing prices however has largely not been tried as a means of reducing traffic. There are some experiments, most notably in Singapore, London, and Stockholm, which have implemented congestion charges and successfully reduced demand. Illustrating the political difficulties, a proposal to implement a congestion charge which would have been associated with significant federal grants in New York City was rejected earlier this year.

In the US, some of the most interesting experiments have been about converting existing but often underutilized carpool (high-occupancy vehicle) lanes to allow use by any vehicle which pays an electronically collected toll. There are a number of successful conversions to what are called high-occupancy/toll (or HOT) lanes. While HOT lanes will not eliminate congestion, it can provide a reliable congestion-free alternative for a price.

Networks that provide reliable and predictable transportation for a varying charge complement existing networks that provide unreliable and unpredictable transportation for free. Everyone is in a hurry sometimes, and the HOT lanes that have been deployed have seen use from people in all income groups. Conversion of existing fixed-price toll facilities to variable pricing is an ongoing trend that will aid in the management of the urban transportation system. Networks of these facilities can be utilized by Bus Rapid Transit (BRT) vehicles to speed transit commutes. The problem remains what to do about the vast unpriced system. The discussion below about transportation financing suggests a direction.

Vision 5 Within eight years American travelers can choose to travel congestion-free by car or bus through America's largest metropolitan areas.

⁹Texas Transportation Institute's Urban Mobility Report (2007) places the annual cost of congestion in US urban areas at \$78 billion http://tti.tamu.edu/documents/mobility_report_2007_wappx.pdf, but this is almost surely an underestimate

6 Security

The events of September 11, 2001, wherein a failure in the security of a transportation system presaged a radically change in airport security and how people use and view air travel. That and subsequent terrorist attacks in Madrid and London reinforce the trade-off between security and efficiency, the open train and transit systems were easily attacked, and while security systems allowed the attackers to be caught, they were not much use at prevention. In contrast, the post-9/11 air travel system provides a greater, though by no means perfect, deterrent, which adds significant time costs (travelers need to arrive at airports much earlier to be guaranteed to make their flight) and greatly reduces traveler flexibility.

The response to 9/11 was an over-reaction. The actual terrorist threat was given inflated importance, and as a result we made our own lives worse. Life has risks, we need to accept that no system is threat-proof. As the passengers of United Flight 93, who fought back against the hijackers showed, the events of 9/11 will not be repeated, we cannot constantly be responding to yesterday's attack.

We need to have security, but not to the detriment of efficiency. This applies to arriving at the airport and train station, and entering the country at border station by both ground and air. An American citizen carrying a valid passport and not carrying dangerous items should be able to move freely and quickly, without needing to disrobe or unpack their entire suitcase for inspection.

Vision 6 Within four years American travelers will enter airports and transit, and train stations and cross borders, passing both security and immigration controls without delay while ensuring security.

This will require planning, smoothing out the scheduling of security personnel, deployment of better technologies that don't inconvenience the passenger as much, and yes, some tolerance for risk.

7 Financing

The existing gas tax will remain viable for a few more years, but as the fleet transitions from dependence on the gasoline powered internal combustion engine to other sources of power, revenue from the gas tax will steadily decline, and new sources will be required to maintain existing investments, much less expand the system. Electronic tolling is emerging as the likely alternative.

The revolution in transportation finance enabled by information technologies, global positioning systems, and electronic toll collection presents new opportunities that can better tie transportation revenue to use and outcomes. Charges can vary by time of day and location, with discounts when facilities are uncongested. This would encourage people who have choices to travel outside of peak times, and thereby allow better management of the use of the system to reduce traffic congestion (and other environmental spillovers) and increase system reliability.

Financing using a new means like road pricing in some form or another must be careful not to be distortionary. Tolling one road will push traffic onto another untolled road. Tolling

the safer road will push traffic onto the less safe road. Therefore we will need to have a system-wide rather than facility-by-facility piecemeal deployment to make this work.

The new financing system will ultimately replace the gas tax, but maintain the user-funding basis of transportation that built the Dwight D. Eisenhower Interstate Highway System.

Vision 7 Within eight years a new source of transportation revenue based on time and place of use will be deployed, replacing the federal and state gas tax. This funding will support highway and transit networks.

8 Governance

Article I, Section Eight of the U.S. Constitution authorizes Congress *To establish post offices and post roads*. Further, the Commerce Clause gives Congress power *To regulate commerce with foreign nations, and among the several states, and with the Indian tribes*. These are legal foundations for a federal role in transportation.

In early US history, there was debate over federal funding of turnpikes, with the Maysville Road turnpike veto by Andrew Jackson notable as the rationale for the veto was the road was wholly within one state. Clearly over time, this view has eroded, and Congress now appropriate funds to road projects that are not only within one state, but not on the 47,000 mile Interstate Highway System or even the broader 160,000 mile National Highway System. Worse, highway user funds are allocated to non-transportation uses. Many of these projects are dubbed *earmarks*, which Senator John McCain has drawn attention to. Of itself, if Congress is appropriating and authorizing money, it has a right to determine where it goes. The problem lies in the earmarks which:

- Waste public resources,
- Attract public derision, to wit the famous *Bridge to Nowhere*,
- Squander scarce attention to transportation policy,
- Tempt states and localities to mis-allocate resources to attain earmarked federal matching funds, and thus,
- Exhaust and undermine confidence in transportation investment.

Every element of wasteful spending reduces popular support for transportation spending where it is needed. Even if, objectively, earmarks are a relatively small part of the federal transportation budget, they receive a disproportionate level of media coverage. Earmarks also distort federalism, bringing the federal government onto local problems where it does not belong.

Reforms within Congress are needed to manage this process, but the threat of a veto can be used to discourage this. One must recognize that Congress has in the past over-ridden vetoes of highway legislation.

Vision 8 Returning to the vision of Democratic President Andrew Jackson, items in federal transportation legislation that do not serve a national purpose will be vetoed.

Most surface passenger transportation in the US is provided by government agencies. New models have been tried with success in the United Kingdom and other countries, where privately owned and operated companies operate franchises to provide local and intercity bus and rail services. This has driven down costs and resulted in improved service and significantly increased ridership. Intercity highways in many countries are privately operated toll-roads. These roads generate a stable source of revenue that pay back bonds held by pensions and other organizations seeking a consistent rate of return. The federal government can incentivize states to follow this example, initially as demonstration programs, and if successful for more widespread deployment.

Vision 9 Extending the bipartisan efforts of transportation deregulation in the late 1970s and early 1980s, within four years, highway and transit services and infrastructure will begin to be competitively provided by independent (public, private, or non-profit) organizations under appropriate local or federal oversight. Infrastructure will be provided under a public utility model, ensuring quality of service in exchange for earning a rate of return.

A major problem with the federal budget is that it does not properly account for long term investments. Most states and municipalities and any responsible corporation separate out capital and operating budgets, the federal government should follow their lead.

Vision 10 Within one year, the United States federal government will establish separate capital and operating budgets. This will be coupled with a federal program to guarantee loans and bonds for highway and transit infrastructure projects.