

Launching a Post-Carbon Regime for American Surface Transportation: Assessing the Policy Tools

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Introduction

North America generates over one-third of the transportation-related emissions of carbon dioxide in the world. (World Resources Institute, 2006) Motor vehicles fueled by petroleum produced 78 percent of these emissions in 2007. (U.S. Environmental Protection Agency, 2009) The continent represents one of the three largest global automotive markets, with production, finance, and distribution facilities integrated under the North America Free Trade Agreement. As a practical matter, neither the Mexican nor the Canadian government has been able to adopt a stricter policy regime for automotive greenhouse gas (GHG) reduction than the U.S. government has been able to impose on its own citizens and automobile manufacturers. As the world learned in the aftermath of the Kyoto Treaty and again at the negotiations in Copenhagen in 2009, unless the U.S. can credibly promise to lower its GHG emissions, its preference for “free riding” undermines the credibility of international climate initiatives. Thus the American government’s constraint in crafting a surface transport policy regime to reduce both carbon inputs and GHG outputs poses a major stumbling block to the entire UN-sponsored approach to managing the risk of climate change.

Crafting such a carbon-reduction regime for the U.S surface transportation system presents many significant technical challenges. But the political challenges to introducing policies that can move transportation off carbon-based fuel are even more daunting. Enacting new laws and regulations that can overcome the political resistance of powerful groups with deeply imbedded interests in the current carbon-intensive mobility system will be no easy task. We expect that moving transportation toward a post-carbon energy

paradigm will prove at least as politically difficult as reforming the American health care system has been.

The aim of this paper is not to assess the technical parameters of policy tools that aim to reduce the carbon intensity of current mobility arrangements. There is a growing body of literature which gauges the efficacy of various policy tools that could be used to move the transportation system beyond carbon based fuels. (Gilbert and Perl, 2008; Cambridge Systematics, 2009; Sperling and Gordon, 2009) Rather, we intend to assess the political probability of actually adopting and implementing a carbon reduction policy or set of policies within the foreseeable future. To do this we identify and examine the institutional factors, interest group influence, and ideological obstacles in three key policy dimensions that have long inhibited the use of potentially effective tools for reducing petroleum consumption and greenhouse gas emissions. We then evaluate the impact that recent political and economic changes have had on these three transportation policy dimensions and assess the prospects for adopting and implementing GHG reduction policies in surface transportation.

The Coercion Spectrum in Policy Tools

Policy analysts often classify policy tools according to the varying degrees of public authority (legitimate coercion) that they depend on. (Hood, 1986) Table 1 illustrates this spectrum of policy tools as applied to transportation and climate change ranging from the least coercive market-based approaches to the most coercive appropriation of private resources through taxation. “Coercion” in this context can be defined as a government’s capacity to authoritatively impose negative consequences that are both certain and potentially severe on people and organizations that fail to comply with policy. In the American political and cultural tradition, the predominant mode of economic and social change occurs through market mechanisms. Individual choices made to buy, sell and invest are viewed as far more ideologically legitimate than public policies which compel individuals to adhere to particular rules and thus constrain their freedom. After all, it was coercion by government that the United States Constitution with its separation of powers, checks and balances, federal system, etc. was designed to limit to the greatest possible extent.

Given the relatively weak state tradition in the United States, one would expect that most policy tools adopted to reduce the transport sector’s carbon footprint will normally be chosen from the least coercive side of the spectrum, illustrated in Table 1. Taxes are perceived by many Americans as almost a form of legalized extortion. Lowering taxes has become a successful election campaign platform for both US Republicans and something fewer and fewer Democrats and Liberals care to vote against. Regulations on business (e.g. auto manufacturers) elicit hostility and suspicion from conservatives and evoke intense lobbying resistance from the targeted businesses. The political compromises reflected in the rules that do get adopted often result in great complexity, numerous loopholes, and a watering down of the original goals. Formal negotiated agreements between the national government and industry “peak associations” are rare in North America, although Canada and its auto manufacturers association reached a voluntary accord on GHG reductions in 2007. (Lutsey, N. and D. Sperling, 2007)

Table 1

Policies influencing auto fuel consumption and greenhouse gas emissions

				Least Coercive	Most Coercive	
TARGET POPULATION	Market Influence	Voluntary Behaviour	Subsidized Incentives	Negotiated Agreements	Mandated Regulations	Taxation
Individuals	Purchase Fuel-Efficient Vehicles	Rideshare; Take Transit	Tax Credits; "Cash for Clunkers"		Speed Limits; Odd-Even Driving Days	Carbon tax; Fuel Tax; Vehicle Tax
Vehicle Makers & Fuel Providers	Exploit Market Niches	Environmental Codes of Best Practice	Partnership for a New Generation of Vehicles (PNGV); Ethanol Mandates	Canadian & European GHG Agreements	CAFE Standards; ZEV Mandates	Gas Guzzler Taxes; Feebates
Other Organizations	Certification of more sustainable products (e.g. 'Energy Star')	Media Campaigns (e.g. 'What Would Jesus Drive?')	Canadian grants to NGOs for research and public education (e.g. Centre for Sustainable Transportation)		Employee Trip Reduction Programs; Land Use Controls	Parking taxes; Pollution and Congestion Fees

Source: adapted from Perl and Dunn. 2007, p. 3.

Subsidized incentives such as the federal "Cash for Clunkers" rebate program and the federal tax deduction for state sales taxes on new cars in 2009 were more popular, although they are also expensive for governments hard-pressed to fund existing public services. Voluntary behavior is the least controversial tool. It is also the most difficult to measure in terms of its extent and its impact. Market influences are potentially the most powerful tool for reducing GHG emissions from surface transportation. When the cost of motor fuel spikes dramatically, it leads to less driving and lower emissions.

Paradoxically, all of the pressure exerted on elected officials during price spikes is to "Do Something!" to bring prices back down, not to stabilize prices at a higher level to lock in the environmental and energy security gains. This pressure to perpetuate cheap energy prices and thus sustain the unsustainable arises from the automobile dependence that makes mobility alternatives appear unrealistic, if not actually threatening, to a majority of North Americans.

How Ideas and Interests Influence the Choice of Tools: Three Policy Monopolies

New policies are not inscribed on a “tabula rasa.” Every initiative is scrutinized not just for the broad benefits its supporters claim it will bring to the whole community, but also for the impact it will have on all the particular interests within the community. Political leaders cannot simply sail the ship of state in a straight line toward the most obvious solution to a serious policy problem. Political leaders must navigate through a dense and dangerous archipelago of powerful groups determined to protect the privileges they have acquired over the years. Space does not permit us to examine the all the political forces aligned around each policy proposal which has been suggested to reduce carbon emissions in surface transport. Instead we concentrate on examining in detail what we judge are the three most significant alliances of interest groups in the surface transportation system which have promoted policies resulting in excessive carbon combustion and the generation of prodigious amounts GHGs.

The term applied by political scientists for such enduring established interests is “policy monopoly.” A policy monopoly occurs when a powerful group or coalition of groups establishes predominant influence over an institutional venue (such as a Congressional committee and/or an administrative agency) which is responsible for policy making that affects the group’s interests. The monopolist group(s) then leverage their influence to limit the access and influence of competing interests and unorthodox ideas to that institutional venue. And, in order to do this, the policy monopolist strives to promote a positive “policy image” of the status quo by associating it with “core political values that can be communicated directly and simply through image and rhetoric … such things as progress, participation, patriotism, … fairness, economic growth – things no one … can contest.” (Baumgartner, F. and B. Jones, 2009: 7)

In the United States, the policy images of the automobile, the highway, the detached single family home and its plot of land, are portrayed in the most positive terms associated with a policy monopoly. They are associated with freedom, mobility that is both physical and social, individual choice, security, opportunity and other cherished values. Policies which support Americans’ freedom to own automobiles, operate them on expressways that are free (i.e., not tolled), work in a city but live in a leafy suburb, and take the kids to Disneyworld in the family sport utility vehicle are accepted as part of the “pursuit of happiness” proclaimed by the Declaration of Independence. Policies that; “restrict individuals freedom” to choose a vehicle; raise taxes on driving so that politicians can indulge in “wasteful spending,” zone families out of a their dream house; force people onto buses with strangers – especially if these intrusive rules and regulations are mandated by “faceless bureaucrats” in Washington are easily portrayed as elitist and un-American.

We focus on these three policy monopolies because we judge them to be the most significant political barriers to building a post carbon mobility regime. We argue that the first one, which we call the *“Fuel Tax – Trust Fund Monopoly”* has ensured that U.S. taxes on motor fuel are set far below the level of all the other developed auto-producing countries. Hence the price of motor fuel at the pump is low enough that Americans have

not been deterred from purchasing large vehicles with very poor fuel economy. In addition, the same system also captures all the fuel tax revenues which generate the bulk of money going into surface transportation infrastructure investment. These tax revenues are segregated in “trust funds” which invest overwhelmingly in highways, to the detriment of urban transit and intercity rail. Our second example, “*The CAFE Regulatory Policy Monopoly*,” has, for the past thirty years, thwarted efforts to promulgate federal and state regulations that would increase automobile and light truck fuel efficiency. Finally, the third and most diverse of our policy monopolies, “*The Suburban Growth Machine Monopoly*,” has ceaselessly promoted the decentralized, sprawling pattern of suburban development that creates auto-dependence and makes alternatives such as walking, bicycling, and public transportation very difficult and expensive to implement.

We will analyze the political conditions which permitted these three major policy monopolies to reinforce the growth of carbon based fuel use so successfully for many years. We then take note of recent changes in the political and economic environment of these three interrelated policy monopolies that have tarnished their policy images and weakened their inside-the-beltway influence. We conclude by suggesting how potential rival coalitions can exploit the growing weaknesses and contradictions in these increasingly vulnerable policy monopolies to introduce the kinds of policy tools that could launch a transition to a post-carbon policy regime in surface transportation.

The Fuel Tax - Trust Fund Monopoly

The United States has long had the lowest motor fuel taxes of all the developed nations. For example, the *New York Times* reported in 2008 that the average of the federal and state taxes on a U.S. gallon of gasoline was US \$ 0.49. In France the fuel tax level translated to U.S. \$5.06 per gallon of gasoline, and in the Netherlands it was U.S. \$5.57. (Marsh, B., 2008) European motor fuel taxes were thus more 10 times higher than the American level. The low taxes produce perennially low prices for gasoline and are a major factor in Americans’ preference for large, powerful, fuel-inefficient, carbon intensive vehicles.

These very low gas taxes are not due just to Americans’ aversion to taxes in general. An equally important factor has been the long-standing practice of sequestering gas tax revenues into “trust funds” which have been used almost exclusively to finance highways. This dedication of the most important stream of public revenue generated in surface transportation is a major reason why the other modes of surface transportation in America were overwhelmed by automobiles and now serve a far smaller share of the market than in all other developed countries. (Nivola, P. 2009)

The close linkage of low fuel taxes and dedication of the revenues to highways has created one of the most deeply-entrenched policy monopolies in U.S. transportation history. It is a textbook case of how to create a positive policy image to justify embedded privilege. The policy image is based on a Lockean idea of a freely chosen social compact between the citizens and the government. Citizen/Motorists consent to pay fuel taxes as user fees only if the revenues are dedicated to build and maintain highways, which in turn make automobile travel easier and more efficient. This close link between the tax and the purpose its revenues can be used for ensures that that the tax rates on

motor fuel should be no higher than what is needed to pay for the construction and maintenance of the roads. (Dearing, 1941)

As early as the 1920s, the political process of constructing the Fuel Tax – Trust Fund policy monopoly was well underway. The key event was a “historic compromise” between the interest groups that wanted to keep gas taxes low (oil refiners and distributors, automobile manufacturers, truckers, motorist associations, taxpayers leagues, etc.) and those groups that benefitted from and desired more spending on highways (construction companies, construction workers’ unions, cement and asphalt suppliers, consulting engineers, real estate developers, state and federal highway departments, etc.) By the 1950s, the majority of states had created special dedicated highway trust funds. When in the mid-1950s President Eisenhower was working with Congress and the transportation interest groups seeking ways to finance the U. S. Interstate Highway System, the key compromise in Congress involved discarding proposals for toll financing and general revenue bonding and basically replicating the model that was being used so successfully by the states (Rose, M. H., 1979; Seeley, B. E., 1987).

For decades, the Federal Highway Trust Fund was immensely successful at achieving both the low-tax and large construction goals that its supporters demanded of it. In the halcyon years between 1956 and 1982, it was not unusual for two thousand miles of interstate highway to be opened in a single year (Cox, W. and J. Love, 1996) During those years, the federal tax rate on gasoline rose no higher than 4 cents per gallon – around 1 cent per liter! Money flowed so freely that eventually desperate big city mayors, commuter rail interests, and others formed a public transit coalition and lobbied successfully to block passage of the surface transportation reauthorization act until the highway supporters agreed to swap out some of the trust fund’s money to revitalize public transit (Altshuler, A., J. Womak and J. Pucher, 1979)

But the halcyon years are over. The Interstate Highway System has been completed and without the promise of perpetually expanding road infrastructure, it has been increasingly difficult to overcome America’s deep resistance to taxation by invoking the appeal to a freely chosen social compact for building highways. Since 1982, the federal tax rate has been raised three times, and each time the process was more politically polarized and contentious. Partisan politics has disrupted the once cozy world of the policy monopoly. Tax increases of any kind for any cause have become political poison for Republicans and very dangerous for Democrats. The last federal gas tax increase – a hike of 4.3 cents per gallon in 1993 – was enacted without a single Republican vote in either House of Congress. (Hager, G. and D. S. McCloud, 1993.) During the presidential primary elections in 2008, both John McCain and Hillary Clinton called for a “gas tax holiday” to spare motorists from the burden of rapidly rising gas prices. (Reuters, 2008)

By Fiscal Year 2008, the revenues flowing into the Federal Highway Trust Fund were insufficient to meet the expenditures that Congress had authorized for maintaining and renewing the surface transportation system. It had to “bail out” the Trust Fund by transferring \$8 billion in general revenues into the fund to meet its obligations. In FY 2009 it had to transfer another \$7 billion in general revenues into the fund. (U.S. Department of Transportation, Federal Highway Administration, 2010) In addition, the

Congress postponed work on a new six-year extension of the surface transportation spending authorization bill, and passed a series of temporary extensions of the existing law to tide the transportation community over until 2010, or perhaps even later.

Many observers see the Trust Fund as facing serious political problems beyond just the current revenue shortfall. In American politics tax increases for any purpose have become very difficult propositions. The spending side of the coalition is getting desperate. Just paying for business as usual by taking money from the general fund is beginning to undercut the legitimacy of the “user pay” principle which upholds the social contract for the gas tax. Before the 2006 elections the Republican majority appointed a National Surface Transportation Policy and Revenue Study Commission composed of state and federal officials and representatives from the transportation sector, and chaired by Republican Secretary of Transportation Mary Peters. The commission’s key – and controversial -- recommendation on the trust fund’s problems was for Congress to pass a phased-in increase in the gasoline tax on the scale of 25 to 40 cents per gallon. This was too much for Secretary Peters and several other Republicans, who issued a minority report dissenting from the tax hike recommendation. (National Surface Transportation Policy and Revenue Study Commission, 2008)

When the Democrats took control in Congress in 2007, they appointed another study panel, the National Surface Transportation Infrastructure Finance Commission. Their recommendation called for a more modest 10 cent per gallon hike on gasoline and 15 cents on diesel fuel. They were much more sanguine about exploring other “innovative” means of raising revenue, especially satellite-based vehicle miles traveled (VMT) pricing. The revenues from these charges would be fed into the highway trust fund and replace the anticipated fall off in fuel taxes by 2020. (National Surface Transportation Infrastructure Finance Commission, 2009) But both reports acknowledged that such a transition would raise a host of difficult technical, administrative, and data privacy issues that will need to be resolved. And clearly, both implied that over at least the next decade (5 congressional and 2 presidential elections) motor fuel taxes will continue to provide the lion’s share of revenues for the Highway Trust Fund.

But without a substantial increase in the tax rate, revenues will fall even further below what the spending side of the coalition is urgently demanding. As more money from the general treasury has to be fed into the fund, its positive policy image as a self-financing user fee mechanism is increasingly tarnished. The basic compromise between the low tax groups and the spending groups is eroding. This raises the possibility that a coalition of groups such as “energy hawks” (groups concerned with reducing oil imports for national security reasons), environmental groups, and less well-funded surface transport modes might be able to exploit the split and reprogram the fuel tax to help achieve their preferred post-carbon goals in the future. We will explore this possibility in more detail in the conclusions.

The CAFE Regulatory Policy Monopoly

In 1975, in the first significant legislative response to a national “energy crisis,” Congress passed the Energy Policy and Conservation Act in the aftermath of the Arab oil embargo and the onset of gasoline shortages. One section of the law, “Improving Automotive Fuel

Efficiency," created the system of sales-weighted Corporate Average Fuel Economy (CAFE) standards for automobiles (49 United States Code 329). The act established 18 miles per gallon (mpg) as the CAFE standard for cars in 1978, 19 mpg in 1979, 20 mpg in 1980, and 27.5 mpg in 1985. Fuel economy standards for "light trucks" were allowed to be substantially lower than for automobiles.

From a political point of view, it is important to note that Congress explicitly chose to rely on the "command and control" of federal regulation aimed at a few large automobile manufacturing companies, rather than raise motor fuel taxes that would fall heavily on individual motorists and trucking interests. This choice reinforced the principle that federal fuel taxes were reserved for financing highways and were not to be used to encourage oil conservation. Automobile fuel efficiency was be fostered by a series of "technology-forcing" CAFE regulations that would steadily raise the fuel economy bar for auto makers.

The U.S. auto manufacturers' response to CAFE as it began to take effect under President Jimmy Carter was to "pick the low-hanging fruit" by reducing the weight of their vehicles and making use of some of existing fuel efficiency technologies such as front wheel drive, radial tires, improved aerodynamics, etc. This enabled them to meet the mile per gallon standards into the early 1980s. But as soon as the political control of the White House changed and the price of gasoline declined, they petitioned the Reagan administration to postpone the requirement that they meet 27.5 mpg by 1985. Not only was the postponement granted, but the Republican administration cancelled any further effort to establish higher post-1985 fleet economy targets as part of its broader replacement of the conservation-based energy policy paradigm with one based on military intervention to secure access to Middle East oil. (Perl, 2009).

The industry and conservative "think tanks" also launched a counter attack on the policy image of the CAFE regulations. The Democratic majorities in Congress that had enacted CAFE in 1975 had portrayed it as a way of reducing the country's dependence on oil imports without having to raise taxes on motor fuel or automobiles. By the mid-1980s, the industry was painting CAFE regulations as intrusive, uneconomic interference with consumers' freedom to choose vehicles they wanted. And by the mid-1990s their criticism was that CAFE was actually forcing the auto companies to manufacture unsafe, small, lightweight vehicles to meet the standards. (Johnson, J.D., 1997) No president and no Congress between 1981 and 2007 was willing to push the CAFE regulatory requirement beyond the 27.5 mpg target established in 1975. Even Bill Clinton and his environmentalist and future Nobel-prize-winning Vice President Al Gore chose not to confront the auto industry on higher CAFE standards. They choose instead to launch a joint government- industry research and development initiative, the Partnership for a New Generation of Vehicles (PNGV), which did not oblige the auto companies to actually use any of the newly fuel efficiency technology in the their products. (Dunn, 2006)

When the Republicans won control of both houses of Congress in 1994 they inserted an amendment into the budget authorization for the Department of Transportation forbidding it to spend any funds to even study increasing the CAFE standards. As a consequence of the inability to raise the CAFE standards, the average fuel economy of

the U.S. new vehicle fleet reached a peak of 22.1 miles per gallon in 1987 and by 2004 it had slid to 21.0 mpg. (U.S. Environmental Protection Agency, 2005, ii) The progress that had been made in reducing U.S. dependence on imported petroleum has all been erased. Net oil imports as a proportion of total U.S. oil consumption, which had been 35.1 percent in 1975, rebounded to 66.5 percent in 2008. (U.S. Energy Information Administration, 2009, 23)

In the elections of 2006, the Democrats won control of both houses of Congress for the first time since 1994. Gasoline prices were rising rapidly again and energy conservation groups and environmentalists capitalized on the public's desire for relief to push for the long delayed increase in CAFE standards. Support for CAFE hikes was initially weaker in the House than in the Senate, largely due to the influence of Representative John Dingell of Michigan, a staunch ally of the auto industry who was the chairman of the House Committee on Energy and Commerce. The first energy bill to come out of Dingell's committee, H.R. 6, did not contain any CAFE provisions at all. It passed the House 264-163. When the Senate voted 65 to 27 to amend H.R. 6 in June 2007 the bill acquired the 35 miles per gallon target for 2020. It was the first time since 1975 that higher CAFE standards had won a vote in the Senate. Dingell then came under substantial pressure from his own party leadership and realized that there had to be some kind of CAFE increase in the energy bill. Finally, after months of contentious legislative work, a last minute "backroom deal" between Congressman Dingell, Speaker of the House Nancy Pelosi, and Senate Energy Committee Chairman Daniel Inouye (instead of the customary House - Senate Conference Committee), resulted in a compromise bill, which was passed as the *Energy Independence and Security Act of 2007*. (Capiello, D. 2007a; 2007b)

The new law required an increase in the CAFE standards from 27.5 miles per gallon (mpg) to 35 mpg between the years 2011 and 2020. But it also added more complexity to the regulatory framework. It instituted a system of "attribute-based" standards, using the so-called "footprint" made by multiplying a vehicle's wheel base by its length. Each of the six different vehicle footprints would have different CAFE standards to meet, with larger vehicles having lower fuel economy improvement targets. In addition, the new law allowed manufacturers to "carry back and carry forward" compliance credits for five years, trade credits among their footprint categories and also trade credits with other manufacturers. President Bush, hailed the new law as a breakthrough which would be a "major step toward reducing our dependence on oil [and] confronting global climate change." The automakers stated that the target would be costly and hard to meet. They accepted it but indicated it was as far and as fast as they could possibly go. (Alliance of Automobile Manufacturers. 2010) In the wake of such a legislative "breakthrough," the Republican administration and even most Democrats in Congress seemed willing to let the process play out over the next 12 years.

That patience was undermined by the dizzying pace events of 2008-2009. The world financial crisis of autumn 2008 and Barak Obama's election as president opened a new window of opportunity to speed up progress in implementing the new standards. In November 2008 the heads of General Motors, Ford, Chrysler and the United Automobile Workers union came to Washington to ask Congress for financial help in the face of the

looming insolvency of the auto sector. Congress initially rejected their pleas. In December, the departing administration of George W. Bush took \$13.4 billion from the \$750 billion Troubled Assets Relieve Program (TARP) for the Wall Street banking crisis and diverted it to the auto industry. (Sanger, D. E., D. M. Herszenhorn and B. Vlasic, 2008) When Barak Obama took office in January 2009, he persuaded Congress to authorize more federal money for the industry. In return he effectively made GM and Chrysler government-owned enterprises. He dismissed the Chairman of General Motors, and directed Chrysler to merge with FIAT. He formed an Auto Task Force to lead both companies through court bankruptcy proceedings in record time. He also took a series of other steps aimed at restoring consumer confidence in the U.S. auto industry and inciting them to buy new cars. These included a “Cash for Clunkers” program which paid consumers up to \$5,000 to trade in their older, less fuel-efficient vehicles, federal financial guarantees of the manufacturer’s warrantee on new vehicles, and a new deduction on their 2009 federal income tax for the state sales taxes they paid when they purchased new cars. (The White House. 2009a)

All of these unprecedeted actions gave the President the political leverage to push the target date for compliance with the new CAFE standards forward. On May 19, 2009 he announced that the goal of 35 miles per gallon would be reached by 2016 instead of 2020. He also announced that the Environmental Protection Agency would begin regulating carbon dioxide emissions under the Clean Air Act and would work with the more Detroit-friendly Transportation Department in developing the rules and the tests for determining whether the companies were meeting the new CAFE targets. (The White House, 2009b) In 2004, the auto sector would still have strenuously resisted this effort in the courts, in Congress, and in the media. In the desperate state of financial and political weakness they found themselves in by 2009, all they could do was accept the fait accompli and hope for a steep upswing in consumer demand for new vehicles. Whether a return to prosperity will be enough to enable the industry to recover its political strength and freeze the 2016 standards for many years they way they froze the 27.5 miles per gallon standard for 32 years is a question we will return to in the conclusions.

The Suburban Growth Machine Monopoly

The physical configuration of America’s built environment has played a major role in increasing the carbon-intensity of living and working arrangements over the decades since 1950. Whereas 19th and early 20th century American development had been typified by the spatial and social bifurcation of the big city and the rural town, following the Second World War, America experienced rapidly expanding suburban communities that altered the relationships between the built and natural environment, and recast the social dynamics that had arisen in cities and rural towns. This unfolding of new communities across the landscape was initially characterized as urban sprawl, and is now often referred to as suburban sprawl.

Gilbert (2003: 199) defines urban sprawl as “... a condition where the rate of increase in the urbanized area of a region is substantially higher than the rate of increase in its population.” The development pattern that produced this growing consumption of space per person became increasingly ubiquitous in postwar America. Over more than a half-century, “Interstate Highways dominated public construction, while automobile-oriented

buildings accompanied by parking, such as tract houses, fast food franchises, office parks, and shopping malls dominated private building.” (Hayden and Wark, 2004: 8) The cultural effects of this built environment have been profound, and hotly debated.

Many critics of postwar sprawl judged it from ecological, esthetic and quality of life perspectives and found it to be irredeemably flawed. One of sprawl’s most strident detractors, James Howard Kunstler, deplored the automobile suburb as “noplace” – “a trashy and preposterous human habitat with no future.” In his 1993 book, *The Geography of Nowhere*, he went on to warn that “the great suburban build out” is bankrupting us both personally and at every level of government.” He condemned sprawl as “the mindless twitchings of a brain-dead culture, artificially sustained by the intravenous feeding of cheap oil.” (Kunstler, J. H., 1993; 105-114.) Writing 12 years later, Kunstler suggested that America’s sprawl had passed the point at which it could be transformed into a more sustainable mode of living without a devastating energy crisis. He went on to predict a ‘long emergency’ when oil depletion would trigger social and political turbulence that would likely undermine American society. (Kunstler, J. H., 2005) Kunstler’s recognition of the dangers of personal and public bankruptcy entailed in endless suburban growth appeared prescient in light of the global financial crisis of 2008. His subsequent prediction of the virtual collapse of the American economy as oil prices skyrocket has not yet come to pass. But Kunstler - and many other writers concerned about the impact of peak oil, e.g. C.J Campbell (2004), or Richard Heinberg (2005) - now appear much less alarmist given the vulnerability to high oil prices that was revealed in suburbia during 2008.

Defenders of sprawl charge that the critics exaggerate its costs and undervalue its benefits. (Gordon, P. and H. Richardson, 1998; Gordon, P. and H. Richardson, 2000) They argue that policies to combat sprawl are bound to be both inefficient and ineffective. The free market is the best way to determine land use and settlement patterns. Sprawl is an inevitable corollary of affluence in a society where people are perpetually striving to improve their material standard of living. (Gordon, P. and H. Richardson, 2001) Robert Bruegmann (2006: 17) maintains that “... if the question is ‘Why has sprawl persisted over so many centuries and accelerated in the modern era, the most convincing answer seems to be that growing numbers of people have discovered that it is the surest way to obtain the rich, satisfying life all citizens crave.’” He goes on to suggest that there is a class bias built into academic and professional concerns about sprawling land use reflected in the fact that “The reform leaders come overwhelmingly from an elite group of academics, central city business executives, and employees of non-profit organizations.” (Bruegmann, 2006: 20) When the alternative to sprawl is presented as curtailing growth, then the political will to take on the growth machine paradigm evaporates.

When the first oil crisis hit in the mid-1970s, the critics of sprawl turned their attention to its wasteful energy impacts. *The Costs of Sprawl*, an important book written by the Anthony Downs, president of the Real Estate Research Corporation (Downs, A., 1974) launched a research debate that has continued to this day into the energy inefficiency of the sprawl pattern of growth. (Burchell, R., A. Downs, S. Mukherji, and B. McCann, 2005) Few studies claimed that sprawl was more energy efficient than denser, more centralized cities. But there were important differences in evaluating what public policies

could do to change the thrust of outward expansion or make it more energy efficient. Even Downs himself seemed at times to despair of turning the tide, as in his 2004 book, *Still Stuck in Traffic* (Downs, A. 2004).

But researchers with a quantitative bent have continued to demonstrate the unsustainable energy inputs, and corresponding carbon outputs, required to service America's sprawling settlement pattern. More and more Americans live in places where almost any trip requires covering a distance that is too long for walking or bicycling. With this low density settlement below the population threshold to support even heavily subsidized public transit, there is truly no alternative to driving to pursue the basic necessities of life. Peter Newman and Jeffrey Kenworthy (1999: 60) introduced the concept of auto dependence, which they demonstrated to be both an empirical reality for a growing number of Americans, and a self-fulfilling planning paradigm in which "a city develops on the assumption that automobile use will predominate so that it is given priority in infrastructure and in the form of urban development." Kenworthy (2007: 51) determined that "U.S. cities lead the world [in energy intensity] at over 60,000 MJ [megajoules]. per person per year of energy used for cars and motorcycles." When ranking 84 major cities in energy used in private transport per capita, Atlanta led the world at over 100,000 MJ per capita. This energy intensity is 111 times greater than Ho Chi Minh City, whose citizens use the least energy per capita in their mobility.

Despite longstanding and extensive criticism, the policy image of suburban and exurban settlement across America still maintains an important measure of political legitimacy that bolsters the strength of its policy monopoly. In the face of increasingly apparent environmental and social problems, sprawl remains the default mode of regional development. For decades, sprawl has been synonymous with regional growth which was seen to be the cornerstone of urban economic development. Logan and Molotch (2010: 391) note that "... one issue consistently generates consensus among elite groups and separates them from people who use the city principally as a place to live and work: the issue of growth." This perspective, in which sprawl is seen to be an integral component of America's economy lies at the heart of its perennial support by a coalition including developers, builders, real estate professionals, architects, mortgage companies, savings and loan institutions, large and small banks, "big box" stores and other businesses which have profited from the auto-dominant, sprawling "sell-scape" that has been such an important part of the American suburban growth machine since 1950.

The best known attempt to displace sprawl with an alternative paradigm that can withstand the allegation of "reduced opportunity" for business, workers, and residents has been labeled "Smart Growth.", Burchell et. al. (2000; 823) define smart growth as:

... an effort, through the use of public and private subsidies, to create a supportive environment for refocusing a share of regional growth within central cities and inner suburbs. At the same time, a share of growth is taken away from the rural and undeveloped portions of the metropolitan area.

While the Smart Growth paradigm has been put into practice through specific urban and suburban redevelopment projects, there remain well entrenched national level programs that provide far more incentive to proceed with sprawling land development. Hayden and Wark (2006: 10) highlight four particular federal government programs that provide much of the ‘fuel’ for regional growth machines’ production of sprawl. These include: “Federal Housing Administration (FHA) insurance for mortgages to home purchasers (1934 – present); federal income tax deductions for home mortgage interest, points and property taxes (1920 – present); federal corporate tax deductions called accelerated depreciation for greenfield commercial real estate (1954 – 1986); and federal funding for highways (1916 – present).” These fiscal and administrative programs would have to be dramatically reformed in order to put an end to the suburban growth machine’s sprawl producing policy monopoly.

But as the sudden meltdown in America’s financial system revealed during 2008, major reform could be precipitated by an external shock. As long as economic growth was compatible with ‘business as usual’ land development, replacing the tried and true model of sprawl with a Smart Growth paradigm that *might* be better proved to be a tough sell. But sprawl is showing itself to be vulnerable to energy scarcity, and particularly to the spike in oil prices that made moving in and around suburban America more costly. For those who had bought their way into the farthest reaches of suburbia on sub-prime credit, the gasoline price increases of 2008 moved the odds of repaying their mortgages from a long shot to an impossibility. Cortright (2008: 1) provides the data to back his assertion that “The gas price spike popped the housing bubble.” His analysis of real estate values shows that the steepest declines have occurred in auto-dependent suburbs where prices have dropped sharply as the cost of automobile has increased. If this connection between rising motor fuel prices and declining housing values in far-flung, low density suburbs continues, it suggests that the policy monopoly behind suburban sprawl may not be able to survive for very long in an era of oil depletion or climate-driven carbon constraint.

The Politics of Launching a Post-Carbon Policy Regime

We have demonstrated that low motor fuel prices and taxes are one of the key factors underlying our three policy monopolies. The very *raison d'être* for the Fuel Tax – Trust Fund policy monopoly is to keep motor fuel taxes low, while still funding massive highway construction. The CAFE Standards monopoly was created to achieve greater vehicle fuel efficiency by regulation rather than increasing fuel taxes and prices. The Suburban Growth Machine monopoly depends on low fuel prices to allow people and businesses to keep growing outward. We have seen how a sharp increase in the price of motor fuel is the one thing that has been proven to reduce vehicle miles driven, to lead to (brief) shifts toward purchase of more fuel efficient vehicles, and recently to reduce real estate values more on the metropolitan fringe that closer to the center. Higher fuel prices are thus the simplest and most straightforward tool to undercut the political strength of the three monopolies and produce progress toward a post-carbon regime.

Motor fuel prices can be raised by economic market forces or by political decisions to increase taxes. European nations have historically used taxes to keep motor fuel prices

far above their market value. America has made the opposite choice, partly due to its view of taxes as a form of government coercion and markets as an engine of individual freedom of choice. Our Table 1 puts markets and taxes at opposite ends of the coercion spectrum. We recognize, however, that markets have been the engines of massive economic and social changes in American history. And when policy makers have chosen tools that are aligned with and reinforce market forces their effect is magnified. Usually it is easier to nudge market forces along by government subsidies. Examples would include the land grants to western railroads in the 19th century, and Federal mortgage insurance for suburban housing in the 20th century. But there are instances in which tax increases have been explicitly used to reinforce desirable trends. The steady increase in tobacco taxes to discourage smoking is an example.

We are left with an apparent conundrum: higher fuel prices can make it easier to sell fuel efficient vehicles, reduce “excess” driving and in the long run encourage more compact communities. But the market-driven peaks and valleys in fuel prices have not been able to “move the market” toward fuel efficiency in a permanent manner. There are many analysts who maintain that another and even steeper and more lasting peak in oil prices is coming. In *Transport Revolutions*, Gilbert and Perl (2010: 119 – 122) conclude that the peak in total global oil production is most likely to occur by 2012, if not earlier. In an era of global oil depletion, societies will either have to introduce combinations of technology and reorganization that reduce the demand for oil faster than its dwindling supply or face a vicious cycle of energy price increases, economic retrenchment, oil price fallbacks, reduced oil output (given the massive investments required to tap the remaining conventional and unconventional oil reserves) and further oil price increases (Glibert and Perl, 2010: 290 – 292). If not broken, this downward spiral would eventually lead to the economic and social collapse described in Kunstler’s *Long Emergency* (2005).

If peak oil arrives in the next year or two it will cause very serious economic dislocation, and not just for the automobile industry. But if the peak and its “super spike” in fuel prices are still five or more years away, it might be possible to soften the impact by taking action now. An essential part of that action must be to begin to shift the American surface transport sector in the direction of Europe, Japan and China. All these markets have motor fuel that is three times or more expensive as in the U.S. A new American regime of motor fuel taxes would aim at instituting a steady rise in fuel prices but in a less disruptive way than a sudden spike. It would also aim at not letting retail gasoline prices slip backwards should crude oil prices temporarily decline. In this fashion, higher motor fuel taxes could be portrayed, correctly in our view, as an inconvenient but essential protective expenditure, like the tens of billions spent on airport security. Higher gasoline taxes would rapidly begin to reduce the economy’s vulnerability to the potential economic catastrophe of a super spike in world oil prices, just as airport security expenses reduce travelers’ vulnerability to terrorism.

Is the U.S. political system capable of making creative use of such a coercive tool as gasoline taxes? We believe that the answer is literally: “It’s now or never!” The alignment of political and economic forces is as favorable for such a policy breakthrough as it has ever been. The three policy monopolies we have analyzed have never been as vulnerable they are now. The financial positions of the Highway Trust Fund, the U.S. auto manufacturers, and the home mortgage industry have collapsed and all have had to

be rescued by massive federal loans and subsidies. Their policy images as self-financing keys to a growing economy have been badly tarnished by the “bailouts. What remains to complete the destruction of the embedded privileges of these policy monopolies is the effective consolidation of a new coalition of their adversaries to hammer key changes through the Congress.

Using Motor Fuel Taxes More Creatively

We have described how pressure has been building in Congress to put the Highway Trust Fund back “in the black.” It has been 17 years since the last federal gasoline tax increase and the groups on the spending side of the Fuel Taxes - Trust Fund monopoly have been campaigning for what in traditional terms would be seen as a “substantial” increase in the current 18.4 cent per gallon federal motor fuel tax. What are the political prospects for this “catch-up” fuel tax increase? Congress will not vote on a motor fuel tax increase before the November 2010 congressional elections. The “lame duck” session of the out-going congress after the 2010 elections, or the early months of 2011 before the next presidential campaign gets into high gear, will be the first window of opportunity. The next would be after the 2012 presidential election, particularly if Barak Obama is reelected with an increased Democratic majority in Congress. The political strategy would involve an emerging coalition of energy hawks, environmentalists and currently under-funded transportation modes such as urban transit and inter-city passenger rail to “play hardball” and block passage of the fuel tax increase that the spending coalition so desperately needs. This is the same tactic the urban transit lobby used to get some access to the Highway Trust Fund in the 1970s. (Altshuler, Womak and Pucher, 1979) Their price this time for unblocking the bill and restoring trust fund solvency would be an overhaul of its mandate which would put a new goal, carbon reduction, on a par with the old goal of building infrastructure.

How high and how fast would fuel taxes rise? Recall that the two recent congressionally-mandated commissions called for increases between 10 cents and 40 cents per gallon, just to restore adequate funding for existing programs. The political deal to unblock the funding bill would require enough new revenue to satisfy the highway spending side. Let us say that they settle on 20 cents per gallon of new money for highways. The deal might well have to provide an equal amount for the non-highway side, which includes both the existing but underfunded urban transit account and a new and very needy intercity high speed rail account. In 2009 the U.S. federal government’s economic stimulus legislation appropriated \$9 billion to launch high speed rail development programs in ten corridors around the nation. But without a continuing future flow of dedicated federal matching funds the financially hard-pressed states will not be able to put up their share of the infrastructure investments and the projects could languish on the drawing board as so many have in the past. (Dunn and Perl, 1996)

The real innovative use of the fuel tax tool will be creation of a “standby” tax to prevent the sudden spikes and slides in gasoline prices that have confused car buyers and car makers over the years. Some might argue that a stand-by gas tax is a proven political loser. They will point to how President Jimmy Carter was humiliated when his proposal for a stand-by gas tax was rejected by a Congress controlled by his own Democratic party. We would argue that the failure of Carter’s proposal was because he

bungled the politics and that his failure does not discredit the idea itself. Carter believed Congress should have approved it strictly on its own merits. What he did not do and should have done was to couple it with an increase in the regular gas tax for the highway lobby. In 1979 and 1980 the spending side of the lobby was already pressing for a nickel per gallon increase. They might well have accepted a stand-by tax as the price for the badly needed boost in highway funds. As it turned out, the highway lobby got the 5 cent increase it wanted from the Reagan administration after Carter left office. (Dunn, 1998; 38)

There is no denying that a stand-by gasoline tax will still be a tough sell in Congress. The one condition that would make adopting a standby tax much easier would be a rapid spike in gas prices while the bill was working its way through the legislative process. If gas prices rose above \$6.00 per gallon and the stand-by tax was set to take effect only when prices threatened to fall below \$5.00 per gallon it would be much easier for the Senators and Representatives to defend their vote to their constituents. Even at \$5.00 per gallon, it would still leave American fuel tax levels well below other industrial nations. However, it would be a last chance to take advantage of the powerful tool that motor fuel taxes can be for the next decade or more before they are replaced by new pricing methods such as VMT charges.

Using Market Opportunities More Creatively

Several important synergies become possible in a surface transport market with substantially high fuel prices. First, higher motor fuel prices will affect the calculations of car buyers as they consider what type of vehicle to purchase. This in turn would tend to push the product planning, development, pricing and marketing strategies of auto companies toward more fuel efficient vehicles. It would also make it easier for the federal government to raise and refine CAFE regulations in the period 2016 - 2020 and beyond. Finally, the combination of higher fuel costs and expansion of urban transit and intercity rail service would help promote shifting a growing share of surface passenger miles onto more energy efficient modes.

In the long run higher fuel prices will also promote more compact land use patterns. The suburban growth machine policy monopoly has already been dealt a serious blow by the bursting of the housing bubble, the flood of mortgage defaults and the recession. "Playing hardball" here means strenuously resisting a return to business as usual. The new coalition of energy hawks, environmentalists, and public transit modes could ally with supporters of major financial reforms and require that the public sector mortgage lenders, Federal National Mortgage Association (Fannie Mae) and Federal Home Loan Mortgage Association (Freddie Mac), or their successors, take a more proactive role in setting energy efficiency standards for new homes and perhaps even require public transport access and walkable design standards for new developments. This will elicit strong resistance not only from builders but also from many zoning and planning boards,. But there is already a growing cadre of local activists pushing for such post carbon policies in towns all across the nation. Having clear signals from multi-billion dollar mortgage agencies that GHG-reducing designs will be looked on favorably would be a huge boost to their efforts.

China as a Partner for Post-Carbon Mobility

The emergence of China as a major auto producer represents an invaluable opportunity to accelerate the transition to a post-carbon policy regime. Motor vehicle sales in China surpassed sales in the U.S. in 2009. The vast majority of these vehicles were powered by petroleum internal combustion engines. But there are many indications that the Chinese government is guiding Chinese auto companies toward developing propulsion systems that will reduce China's dependence on imported oil. With its economies of scale, its low labor costs, and its ability to adapt rapidly to international manufacturing standards, China will soon lead the world in electric vehicle production. (Bradsher, 2010) This comes just as it is poised to enter the American automobile market. Warren Buffet, the American billionaire investor, has taken a \$230 million equity position in the Chinese company BYD, which began as a maker of batteries for cell phones and iPods. Now the company makes a plug-in electric car with a range of 62 miles on a charge and has gasoline engine for back up. It sells in China for around \$22,000, about half of what the Chevy Volt electric will sell for in America. (Gunther, 2009) Another Chinese car company claims it has developed a pure battery electric vehicle which can cover 250 miles on a single charge. (Younkman, 2009)

U.S. policy makers will have an opportunity to informally negotiate the conditions under which Chinese automobile companies enter and establish themselves in the American market. There will inevitably be protectionist pressures from the American auto sector, particularly the auto workers union. In return for politically deflecting this backlash, the U.S. government can expect the Chinese government to help manage how the market penetration proceeds. The U.S. should not seek the kind of purely protectionist "Voluntary Export Restraint" agreement that the Reagan administration negotiated with Japan. (Dunn, 1986) Rather, both the U.S. and Chinese governments should provide guidelines and incentives for Chinese companies to prioritize transfer of electric vehicle technology and manufacturing capabilities to North America, alone or in partnerships with established U.S. companies. Indeed. Both sides have already begun the dance of deal-making. In November 2009, President Obama and President Hu Jintao announced a U.S. – China Electric Vehicles Initiative. The agreement calls for the two countries to develop joint standards for products and testing, joint demonstration programs for electric vehicle technology, a joint technical roadmap for solving issues related to introduction of electric vehicles into the U.S. environment, and a joint forum to bring together key stakeholders in both countries to identify new possibilities for collaboration. (The White House, 2009) If guided by a policy framework with proper concern for carbon and climate issues, China's arrival in the North American auto market can be the signal that finally convinces the established auto companies that getting serious about moving to a low-carbon posture is a matter of industrial life or death.

China's ability to manufacture high quality - low price transportation equipment can help in other surface transportation modes as well. It has the fastest growing high speed train network in the world, one that will soon be nearly 13,000 kilometers long (Chen and Zhang, 2010). It recently announced a \$4 billion contract to partner with Bombardier to build 80 new high speed train sets in China. (Globe Investor, 2009) Its urban transit manufacturing sector is also rapidly growing, as is the number of Chinese cities that are getting new metro rail systems over the next five years. The current five year plans call

for at least 1,500 km. of new metro rail and light rail line to be built between 2006 and 2010. (China Construction, 2010) The opportunity to craft a mutually beneficial framework by which the U.S. can take advantage of China's dynamism in high speed and urban rail equipment construction could be a jobs-creating, oil import-reducing, and prosperity-enhancing boon to American prospects as it deals with the difficult climate and energy choices ahead.

Conclusions: The Takeaway

Almost all the policy initiatives that the U.S. has taken so far to lower carbon combustion in surface transportation have fallen on the less coercive side of the spectrum. Most of these actions have had little effect. Those that did have some effect had less impact than they might have had due to politically protected "loopholes" like the light truck - SUV exemption in the CAFE standards. In the absence of a major external shock to the system, the odds are that this kind of carbon reduction "business as usual" politics will continue.

We argue that the downside risks of an external (oil) shock to the system are too serious to be ignored. Reformers need to be able to take advantage of the political weakness and fractures in the policy monopoly coalitions that have perpetuated the unsustainable carbon intensity of the current system. We believe that the increasingly dire financial needs of the highway spending coalition will oblige Congress to pass a motor fuel tax increase sometime in the next several years. This creates the opportunity for a new coalition of environmentalists, energy hawks and under-funded surface transportation modes to demand major modifications of the trust fund-based financing regime.

We also note that world oil prices will become more volatile with increasingly destructive price fluctuations. This creates another political opportunity for reform of the motor fuel tax system: creation of a stand-by fuel tax. This official floor for gas prices would firmly link market forces and policy goals together and keep them pushing in the direction of steady reductions in the carbon intensity of the U.S. surface transportation system.

This seemingly most coercive of measures, a simple market-driven price signal reinforced by a tax, would in fact leave the most room for individual mobility choices of all kinds. Consumers would be free to choose more fuel efficient vehicles and manufacturers from all over the world would compete to meet their demand. Families and business could choose fewer trips, more accessible locations or alternative modes of transit. Researchers, entrepreneurs and investors in new carbon reduction technology would be able to calculate potential profits without worrying about the demand disappearing if oil prices plunged from their peak. Congress, the states, and other governments would still be able to subsidize their favorite fuels and groups. But progress toward a post-carbon regime for surface transport would proceed largely independent of the fickle winds of politics and the dead-end paths of policy monopolies.

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