

Reframing Automobile Fuel Economy Policy in North America: The Politics of Punctuating a Policy Equilibrium

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ABSTRACT *The USA and Canada generate over one-third of the transportation-related emissions of carbon dioxide in the world. Motor vehicles produce a majority of these emissions. This paper examines how the US Corporate Average Fuel Economy (CAFE) regulatory standard for light-duty vehicles has established an underlying fuel economy policy paradigm for the highly integrated North American automotive sector. While these standards pushed North American vehicle fuel efficiency higher in the late 1970s and early 1980s, the standards have not been significantly increased since 1985. The paper details the institutional, economic and political factors that have blocked higher CAFE standards. It describes difficulties with the legal efforts to shift the main venue of fuel economy regulation from the US federal government to the state of California. In light of the Canadian tradition of establishing voluntary agreements between the government and the auto manufacturers in lieu of formal regulation, it assesses the possibility that the voluntary agreement on reducing automotive greenhouse gas emissions signed between Ottawa and Canadian auto manufacturers in April 2005 will be a step toward a new style of negotiated advances in fuel economy and greenhouse gas reduction goals throughout North America.*

Introduction

Since the Kyoto Protocol to the United Nations Framework Convention on Climate Change was signed in 1997, global greenhouse gas emissions from the transport sector have continued to rise. Unlike some other economic domains such as manufacturing and housing, where growth in economic activity has been at least partially decoupled from growth in carbon dioxide (CO₂) emissions, growth in activity in the transport sector remains tightly linked to growth in CO₂ output (Schipper *et al.*, 2000, pp. 8–9). The International Energy Agency (IEA) (2001, p. 8) notes that within the transportation sector, ‘the light-duty vehicle sector constitutes one of the biggest challenges for reducing oil use and reducing CO₂ emissions’. The IEA study notes that the fuel economy of light-duty vehicles

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Table 1. Carbon dioxide (CO₂) emissions from the transportation sector, 2002

Country	CO ₂ (megatonnes)	Percentage of world total	Rank	CO ₂ per capita (tonnes)	Rank*
USA	1761.4	35.48	1	6.1	1
Japan	253.1	5.10	2	2.0	30
China	236.5	4.76	3	0.2	103
Russia	184.8	3.72	4	1.3	43
Germany	168.9	3.40	5	2.0	24
Canada	150.5	3.03	6	4.8	2

*Rankings are adjusted by eliminating two small states, Luxembourg and Qatar, from the first two positions.

Source: Constructed by the authors in January 2006 using data made available by the World Resources Institute (2006) through its Climate Analysis Indicators Tool (CAIT), version 3.0 (2006). Note that a login is required for access, but there is no charge. For the CAIT, see <http://cait.wri.org/>

stagnated in all the major European, Asian and North American auto manufacturing countries between 1985 and 1995. Since 1995, the fuel economy of light-duty vehicles has increased in Europe and Japan—but not in North America.

Data compiled by the IEA and analysed by the World Resources Institute, and displayed in Table 1, show that the USA and Canada contribute 38.5% of the world's total transportation-generated CO₂ emissions, and they rank first and second among the world's nations in terms of per-capita CO₂ emissions from transportation (World Resources Institute, 2006). Motor vehicles are the largest source of CO₂ emissions in transportation, accounting for approximately 20% of CO₂ output from all sectors (manufacturing, electric power, residential, etc.) in the USA (Harrington and McConnell, 2003, p. 8) and 24.1% of total emissions in Canada (Canada, 2005e). Thus, nowhere in the world is it more important to understand the obstacles to—and the opportunities for—adopting policies to reduce greenhouse gas emissions from light-duty motor vehicles than in North America.

The present paper assesses the spectrum of established policy mechanisms and more recent initiatives aimed at reducing oil consumption and greenhouse gas emissions of motor vehicles sold in North America. It analyses the political, intellectual and institutional factors that have produced a long deadlock in US automobile fuel economy policy. It also examines the political dynamics that led to Canada's 2005 agreement on reducing greenhouse gas emissions negotiated between the federal government and the Canadian motor vehicle manufacturers. The paper then considers the influence that Canada's initiative might have on US fuel economy policy, given the integration of motor vehicle production and sales in North America. It seeks to identify the mechanisms by which the US policy deadlock might be broken, and the time frame that would be necessary to initiate significant reductions in auto sector fuel consumption and greenhouse gas emissions in the entire North American light-duty vehicle market.

Regulating the Automobile: North America's Policy Inheritance

Over a 30-year period governments have initiated a range of policies to address the safety, environmental and energy-use challenges posed by the growth of motorized mobility. Policy analysts tend to classify policy instruments by the nature of governing resources that are deployed, which themselves rely on varying degrees

Table 2. Policies influencing auto fuel consumption and greenhouse gas emissions

	Least coercive					Most coercive
Target population	Market influence	Voluntary behaviour	Subsidised incentives	Negotiated agreements	Mandated regulations	Taxation
Individuals	purchase fuel-efficient vehicles	rideshare; take transit	tax credits		speed limits; odd-even driving days	fuel tax; vehicle tax
Vehicle makers	exploit market niches	environmental codes of best practice	US Partnership for a New Generation of Vehicles (PNGV) and hydrogen research programmes	Auto Pact; Canadian and European agreements	US Corporate Average Fuel Economy (CAFE) standards	gas guzzler taxes
Other organizations	certification of more sustainable products (e.g. 'Energy Star')	media campaigns (e.g. 'What Would Jesus Drive?')	Canadian grants to non-governmental organizations for research and public education (e.g. Centre for Sustainable Transportation)		fleet purchase mandates	

of public authority (Hood, 1986). Table 2 has adapted this perspective to categorize the automotive policies that target fuel consumption, and, more recently, greenhouse gas emission reduction. Generally speaking, the less coercive policy mechanisms were introduced after the more coercive approaches.

The principal policy instrument for reducing greenhouse gas emissions from petroleum consumption by light-duty vehicles in North America has been the US Corporate Average Fuel Economy (CAFE) regulatory regime. The CAFE standards were enacted in 1975 as part of America's response to the Arab Oil Embargo of 1973–74 and the subsequent energy crisis. In the mid-1970s, of course, the CAFE goal was to reduce America's dependence on oil imports, not to limit greenhouse gas emissions. The CAFE standards, which were phased in over 10 years, were designed to raise the average fuel economy of new cars from 13.1 miles per gallon (mpg) in 1975 to 27.5 mpg by 1985.

By most, if not all, accounts the CAFE standards achieved their goals in the initial 10-year time frame. A sceptical minority of economists (Crandall *et al.*, 1986, p. 121) argued that in 1978–82 “the improvement in fuel economy for the industry was very close to what would have been expected without the CAFE standards”. But most energy experts would have agreed with David Greene and colleagues, who called the CAFE standards “a major triumph of national energy policy”. They estimated that if automobile fuel economy had not increased over 1975 levels, motorists would have used 35 billion gallons more gasoline in 1987 than they actually did. These experts calculated that consumers spent US\$260 billion less on gasoline in 1975–87, in 1987 dollars (Greene *et al.*, 1988, pp. 216, 220). For the USA as a whole, net oil imports dropped from 35.1% of all US oil consumption in 1975 to 27.3% in 1985 due, in no small measure, to CAFE (US Energy Information Administration, 2005, p. 15).

These measures were followed by less coercive policy approaches that supplemented regulations and taxation. In Canada, the US standards were introduced in 1982 by a voluntary agreement between the Canadian government and the Canadian Vehicle Manufacturers Association, whose members were subsidiaries of the same multinational manufacturers that supplied the US market. Less coercive approaches largely eclipsed the initial wave of regulation. In the 30 years since CAFE's initial adoption, the 27.5-mpg standard for automobiles has never been raised. The initial gains from the regulations have been steadily eroded by a number of factors. There were over 95 million more vehicles on US roads in 2003 than in 1975, and the total amount of vehicle-miles driven has risen by 1.5 billion miles (US Department of Transportation, Bureau of Transportation Statistics, 2005). In addition, there has been a dramatic increase in the proportion of new cars classified as ‘light trucks’ (pickups, vans and sport utility vehicles (SUVs)), which are held to a lower CAFE standard (21 mpg in 2005). In 1975 light trucks constituted only 19% of total sales of ‘light-duty vehicles’ in the USA.¹ In 2004, they accounted for over 50%. In 2004, the average new vehicle was heavier, higher in horsepower, and faster accelerating than it was in 1975. The average fuel economy of the US light-duty vehicle fleet rose from 13.1 mpg in 1975 to 22.1 mpg in 1987. Since then it slipped to 21.0 mpg in 2004 (US Environmental Protection Agency, 2005, p. ii).

While less coercive policy approaches did produce technology advances, these did not translate into an automotive fleet that used less fuel per passenger-km. The gains in terms of reduced dependence on energy imports that were the original goal of the CAFE system have been erased. Net oil imports as a proportion of total US oil consumption increased to 57.8% in 2004 compared with the 35.1% that

appeared so risky in 1975 (US Energy Information Administration, 2005, p .15). And, of course, emissions of CO₂ from the transport sector have continued to increase.

For the most part, North America's automotive policy inheritance has been cumulative; that is, no regulations were repealed, few taxes have been abolished, but less coercive agreements and partnerships have been added into the mix. The result is a range of policy approaches that generate different relationships between government, industry, non-governmental organizations, and citizens with respect to automobile technology and use. The question of what it would take to reconfigure this mix of policy approaches and governance modes into an effective regime for mitigating climate change remains to be answered. But such a transformation will likely require a new configuration of authority relationships between governments, auto producers, and auto users. Unravelling some of the policy inheritance from past initiatives and knitting it into a new organizational fabric for the automotive sector can benefit from a clear understanding of how these diverse policy elements came into being.

Sudden Punctuation and Positive Feedback: US Auto Politics, 1966–75

Before 1966, there were no industry-specific regulations governing automobile manufacturing in the USA. Companies could design and manufacture virtually any kind of vehicle they could sell with no interference from the government (Rae, 1984). After that date this status changed rapidly and dramatically. The catalyst that directed pent-up public discontent at US auto companies, was Ralph Nader and his crusade for auto safety. Nader's *Unsafe At Any Speed* (1965) charged General Motors (GM) with deliberately ignoring design flaws in its Chevrolet Corvair model that were responsible for hundreds, perhaps thousands, of unnecessary deaths. Nader, the outsider, was joined by insider policy entrepreneurs such as Senator Abraham Ribicoff, chair of a Senate subcommittee that was holding hearings on auto safety. When GM was exposed as having hired private investigators to find information that could discredit Nader, GM's president was forced to apologize personally. Mashaw and Harfst, (1990, p. 55) find that:

An issue that had been slowly heating up boiled over. ... [S]enators tripped over each other in the stampede to express their outrage. The press response was equally powerful. ... A pro-Nader, pro-safety, pro-federal intervention feeling swept over the country.

It became clear that automobile regulatory policy was essentially a power vacuum. In addition to safety, there now appeared to be many other auto-related problems that could be addressed by federal regulation. Soon, all of the positive feedback processes associated with the punctuated equilibrium process (e.g. bandwagon effect, media mimicry, social contagion/social learning, and the creation of new policy subsystems and public interest groups) rushed in to fill the new policy-political space created by the destruction of the prior no-regulation policy monopoly (Baumgartner and Jones, 1993, 2002).

This sudden punctuation unleashed three successive waves of prescriptive regulation on the auto industry, focusing first on vehicle safety, then on reducing exhaust emissions, and finally on reducing automobile energy consumption. The general approach to auto regulation that was adopted in this period has been

labelled 'technology forcing'—mandating that automakers incorporate equipment into their vehicles that most consumers would not purchase if it were optional, extra-cost equipment. Seat belts, air bags, and catalytic converters are obvious examples. Consumers would have to pay somewhat higher prices for their cars, but they would receive real benefits in the form of safer, less polluting, more energy-efficient vehicles.

Designing Corporate Average Fuel Economy (CAFE): The Politics of Federal Fuel Economy Regulation

The oil shock of the Arab Oil Embargo of 1973–74 brought home America's growing dependence on imported oil, and pressure mounted on policy-makers to do something about the energy crisis. The Energy Policy and Conservation Act (EPCA) (US Congress, 1975) was the first major legislative response to what appeared to be a different world of scarce and expensive energy. Many analysts, particularly economists, faulted EPCA for avoiding the hard decisions they believed were necessary to address the long-term problems (Nivola, 1986). The legislation failed to deregulate oil prices, which had been government-controlled since President Nixon's New Economic Policy of 1971. It failed to raise taxes on gasoline as a way to conserve energy, despite a push by Democratic Representative Al Ullman, Chair of the House Ways and Means Committee, to enact a 25 cent per gallon tax increase over 3–5 years. It failed to enact stiff 'gas guzzler' taxes on automobiles with very low fuel economy (Nivola, 1986). But one section of the EPCA bill, labelled 'Improving Automotive Efficiency', created the system of sales-weighted CAFE standards for automobiles (US Code, 2000). The act established 18 mpg as the CAFE standard for cars in 1978, 19 mpg in 1979, 20 mpg in 1980, and 27.5 mpg in 1985. For 1981–84, the act directed the Secretary of Transportation, through the National Highway Transportation Safety Administration (NHTSA), to establish annual mile per gallon increases in the standard. The secretary, via the NHTSA, was also given authority to set mile per gallon standards for light trucks, and to establish standards post-1985 for both cars and trucks. In the other direction, the secretary was authorized to lower the 27.5 mpg standard by as much as 1.5 mpg if it was not technologically feasible or economically practicable to achieve it in a given model year. A comprehensive listing of American and Canadian automotive fuel economy standards appears in Table 3.

In view of how strongly and successfully the auto industry resisted CAFE increases in subsequent years, it might seem surprising that it was not able to prevent the legislation from being enacted in the first place. Its inability to stop CAFE was due to a combination of economic and political circumstances that was very rare in US politics. First, the industry was still on the defensive politically. Its post-Nader image as arrogant and abusive was still prevalent in public opinion and the halls of Congress. Second, everyone believed that there was a lot of room for improvement in the fuel economy of US-made cars. The auto companies themselves had recently promised to make a voluntary 40% improvement in fuel economy in return for a delay in enforcing clean air standards, and President Gerald Ford had recommended accepting its proposal in his 1975 State of the Union address (*Congressional Quarterly Weekly Report*, 1975, pp. 140–143). Third, the President, a former Congressman from Michigan, was in a weak position to sell Detroit's offer of voluntary improvements to Congress. He was the country's first 'unelected' president, i.e., he had been nominated in 1973 by Nixon and

Table 3. Canadian company average fuel consumption (CAFC) goals versus US corporate average fuel economy (CAFE) standards (litres/100 km)

Model year	Passenger cars		Light-duty trucks	
	Canada (CAFC)	US (CAFE)	Canada (CAFC)*	US (CAFE)**
1978	13.1	13.1		
1979	12.4	12.4		
1980	11.8	11.8		
1981	10.7	10.7		
1982	9.8	9.8		13.4
1983	9.0	9.1		12.4
1984	8.7	8.7		11.8
1985	8.6	8.6		12.1
1986	8.6	9.1		11.8
1987	8.6	9.1		11.7
1988	8.6	9.1		11.7
1989	8.6	8.9		11.7
1990	8.6	8.6	11.8	11.8
1991	8.6	8.6	11.6	11.8
1992	8.6	8.6	11.6	11.8
1993	8.6	8.6	11.5	11.7
1994	8.6	8.6	11.5	11.7
1995	8.6	8.6	11.4	11.7
1996	8.6	8.6	11.4	11.7
1997	8.6	8.6	11.4	11.7
1998	8.6	8.6	11.4	11.7
1999	8.6	8.6	11.4	11.7
2000	8.6	8.6	11.4	11.7
2001	8.6	8.6	11.4	11.7
2002	8.6	8.6	11.4	11.7
2003	8.6	8.6	11.4	11.7
2004	8.6	8.6	11.4	11.7
2005	8.6	8.6	11.4	11.2
2006	8.6	8.6	11.4	10.9

Actual Canadian fleet CAFC has been approximately 7.5% lower than the CAFC goals since they were established in 1978, and is currently 7.5 l/100 km.

*Before 1988, CAFC goals applied to light-duty trucks with a gross vehicle weight rating of up to 6001 lb. After 1988, the limit was increased to 8501 lb.

**For model year 1979, CAFE standards applied to light-duty trucks with a gross vehicle weight rating of up to 6500 lb. For model years 1980 and newer, the standards apply to light-duty trucks with a gross vehicle weight rating of up to 8500 lb. Between 1979 and 1981, separate standards applied to two- and four-wheel drive vehicles. A combined standard was not established until 1982.

Sources: US Department of Transportation, National Highway Traffic Safety Administration (2005), Canada (2006).

confirmed by Congress to succeed Vice-President Spiro Agnew, who resigned amid a bribery scandal. In August 1974, Ford succeeded (then controversially pardoned) Nixon when Nixon had to resign because of the Watergate scandal. Fourth, the November 1974 Congressional elections returned unusually large 'post-Watergate' Democratic majorities to the Congress, particularly in the House of Representatives. Democratic control of the lower chamber jumped from a lead of 239 to 192 to a margin of 291 to 144. Congressional Democrats were eager to

assert their policy leadership in areas ranging from foreign policy to energy policy. Finally, the United Auto Workers (UAW) Union did not agree with the companies' position. It supported establishing fuel economy standards. In return the UAW demanded and got separate mile per gallon calculations for a company's domestic and imported vehicles to prevent it from meeting the standards by bringing in fuel-efficient 'captive imports' from its overseas plants (Reuther, 2001). In later years, the UAW would join the companies in opposing significant increases in the standards. Its motive was the same in both instances: to preserve domestic jobs for its members.

In sum, the CAFE standards survived the legislative elimination process when many other measures failed because, as Nivola (1986, p. 225) notes, "The mileage regulations ... were regarded ... by most politicians, as a fairly painless way of subduing gasoline demand". And, in an exception that would later become very significant, for customers who actually needed to drive larger, less fuel-efficient vehicles such as pickup trucks or work vans, the law permitted these vehicles to meet lower mile per gallon standards. Thus, compared with higher taxes or regulations restricting driving, mandating improved fuel economy for vehicles was the most politically acceptable policy option.

The automakers' initial response to CAFE was to 'downsize' their cars, especially their largest and heaviest models. They also began to make more use of certain existing fuel-saving technologies such as front-wheel drive, radial tires, fuel injection, better aerodynamics, etc. In 1979–80, gasoline prices again skyrocketed in the wake of the Iranian revolution. President Jimmy Carter made energy conservation the centrepiece of his domestic policy agenda. The schedule of annual increases in CAFE standards took effect in 1978 at 18 mpg and increased in increments of 1 or 2 mpg in each successive year, until reaching 27.5 mpg in 1985.

Post-1985 Corporate Average Fuel Economy (CAFE) Standards: The Road Not Taken

Competitive market pressures were also pushing the companies in the direction of increased fuel economy. Sales of fuel-efficient Japanese imports rose steadily, increasing from 5.7% of the market in 1971 to 21.2% in 1980 (American Automobile Manufacturers Association, 1997). By 1979, Chrysler Corporation was sinking under the weight of an ageing, gas-guzzling product line and Japanese import competition. In return for US\$1.5 billion in federal loan guarantees, the company was restructured in a process that required short-term financial sacrifices from shareholders, workers, creditors, and dealers. Fuel-inefficient models such as the Imperial were dropped and replaced by more economical ones based on the K-car platform. The experience was eye-opening for the Carter administration. According to Reich and Donahue (1985, p. 282), "the central discovery for federal officials was the payoff from putting conditions on public help". When the financial hard times also hit Ford and GM in 1980, administration officials, led by Transportation Secretary Neil Goldschmidt, proposed another intervention to help all domestic auto producers. The *quid pro quo* in this plan would be an offer of trade protection against Japanese imports in return for an installation of a 'tripartite' style of industrial policy bargaining among management, labour, and government to restructure the industry and return it to competitiveness. Goldschmidt suggested that part of the bargaining should focus on significant increases in the post-1985 CAFE standards. Rather than politically imposed standards, there would be agreement from industry from the beginning about the new fuel

economy targets. The government would enact a 'stand-by' gasoline tax to ensure that auto buyers would continue to have an incentive to purchase economical cars.

This approach recognized that the prosperity of the auto industry was a very important public interest. But it also asserted that industry-specific prosperity was not the only goal. It should not always trump all other public interests such as energy efficiency and reducing the nation's dependence on petroleum imports. All this sent a strong and consistent message to US automakers that major improvements in fuel economy were inevitable and that the companies had better make the best of it in their product planning and marketing decisions. Detroit seemed to be getting the message. In July 1980, GM president E. M. 'Pete' Estes announced that GM's projected fleet fuel-economy average in 1985 would be 31 mpg (Sorge, 1980). Carter directed the NHTSA to begin the process of deciding how much higher the federal fuel-economy targets should be raised in the period after 1985, and the NHTSA issued a Notice of Proposed Rulemaking on higher standards. This was the high tide of CAFE's political acceptance.

Anatomy of an Impasse

Table 4 highlights the events and actions that gave rise to a longstanding impasse over CAFE that began soon after Carter was defeated. Without covering these events in detail, the paper will simply identify political factors that have been associated with the impasse. As soon as Ronald Reagan was elected President, the Big Three saw an administration ideologically hostile to regulation and a Congress more concerned with protecting autoworkers' jobs than with fuel economy regulations. Detroit's planning for fuel economy in its products quickly lost priority. The problem of Japanese imports was handled by a 'voluntary' restraint agreement (VRA) on exports of Japanese vehicles to the USA that the Reagan administration negotiated with Tokyo. At the same time, the new Republican administration announced 34 deregulation actions to help the auto industry recover (Kahn, 1981). One of these was cancellation of the Notice of Proposed Rule Making on higher CAFE standards that had been issued by the Carter administration. These events that took place in the early months of the Reagan administration mark the beginning of the political impasse over higher CAFE standards for motor vehicles that has lasted for over 25 years.

Since 1981, no president, Republican or Democrat, has made a serious effort to increase CAFE beyond the initial 27.5 mpg level. Reagan was openly hostile to CAFE. At the request of the auto manufacturers, his transportation secretary rolled the standard back 1.5 mpg, the maximum permitted by law, for model years 1986–89. Both presidents George Bush approved minor upward adjustments of CAFE while resisting Congressional efforts to require much larger changes. Early in his presidency, Bill Clinton decided not to attempt a CAFE increase. Despite growing evidence that transportation in general and automobiles in particular were major factors contributing to global warming (Greene and Santini, 1993), in 1993 Clinton opted instead for the Partnership for a New Generation of Vehicles (PNGV), a joint government–industry research effort aimed at producing a family sedan that could reach 80 mpg by 2003. The PNGV did produce interesting research and development work, but its fatal flaw was a lack of any requirement that the auto companies actually build and sell 80-mpg family sedans (Sperling, 2001). In fact, none of the super sedans actually reached even

Table 4. Milestones in the US political impasse over US Corporate Average Fuel Economy (CAFE), 1981–2005

1981—Ronald Reagan cancels the National Highway Transportation Safety Administration’s (NHTSA) proposed rule making on the CAFE increase
1985—Reagan rollback of CAFE to 26 mpg for model years 1986–89
1986—Inflation-adjusted price of gasoline plummets to below 1978 levels
1989—George Bush sets CAFE for cars at 27.5 mpg for model year 1990
1990—Light trucks constitute 37.8% of US vehicle production
1991—Bryan bill to increase CAFE dies in the Senate energy deal
1993—Bill Clinton and Al Gore announce a Partnership for a New Generation of Vehicles; do not push for higher CAFE
1995—Republican House attaches CAFE—freeze rider to the Department of Transport (DOT) budget
2001—CAFE-freeze rider removed at request of the George W. Bush administration
2002—National Academies assert a higher CAFE can use existing technology
2002—George W. Bush cancels a Partnership for a New Generation of Vehicles (PNGV), announces FreedomCAR and hydrogen initiatives
2002—John McCain–John Kerry amendment for major increase in CAFE defeated 38 to 62 in the Senate
2002—Light trucks constitute 58.4% of US vehicle production
2003—George W. Bush increases the light truck CAFE standard to 22.2 mpg in 2007
2003—Dick Durbin amendment for a major increase to CAFE defeated 32 to 65 in the Senate
2003—NHTSA proposes ‘reformulation’ (not an increase) of CAFE
2005—Durbin amendment to increase CAFE defeated 28 to 67 in the Senate

the demonstration model stage. George W. Bush cancelled the programme just as the vehicles were about to be built. The PNGV’s technology innovations that did make the transition from research prototypes to production vehicles actually worked to reduce fuel economy, because they were applied to improving the power and acceleration of their vehicles instead. As *The New York Times* noted (Wald, 2005, p. 16), even the vaunted hybrid technology “is being used in much the same way as earlier under-the-hood innovations that increased gasoline efficiency: to satisfy the American appetite for acceleration and bulk”.

In November 1995, the new Republican majority in Congress added a provision to the Department of Transportation’s Fiscal Year (FY) 1996 budget appropriation forbidding the NHTSA to spend any money “to prepare, propose, or promulgate any regulations ... prescribing corporate average fuel economy standards for automobiles” that were higher than the existing standards (US Congress, 1996). The same proviso was added to the Department of Transport’s (DOT) budget appropriations for the next 4 years, through FY 2001. George W. Bush’s administration terminated PNGV in 2002, replacing it with the Freedom Cooperative Automotive Research (FreedomCAR) programme and a Hydrogen Fuel Initiative, long-term research partnerships that also include no requirement for building or selling vehicles with any new technology. Legislative proposals to toughen CAFE standards generated much publicity in 2002 and 2003, but the efforts were defeated in the Senate by large margins and did not even come to a vote in the House.

George W. Bush’s White House took note of the growing sentiment to do something on auto fuel economy, especially when Congress asked the National Academies to study the possibility of increasing CAFE. The administration had the Republican Congressional leadership drop the prohibition on the NHTSA spending money to study CAFE increases. Later the National Academies’ study was released in 2002 and found that higher mileage standards could be met with

existing technology at reasonable cost (National Research Council, 2002). Bush was able to point out that the NHTSA was hard at work studying the matter. In April 2003, the NHTSA announced a modest and phased-in increase in the CAFE standard just for light trucks. In model year (MY) 2005, the new standard would be 21.0 mpg, 21.6 mpg in MY 2006 and 22.2 mpg in MY 2007. At the end of 2003, the NHTSA announced that it would begin studying how to 'reform' the way CAFE would handle light trucks and opened a lengthy process of soliciting public input.

On 29 March 2006, the NHTSA published its reformed light truck fuel economy standards. The most notable characteristic of these reformed rules is their complexity. There is no longer a single standard for all light trucks. Instead, an individual company's CAFE targets are based upon a measure of vehicle size called a 'footprint', which is calculated by multiplying its wheelbase by its average track width. There are six footprint categories with a descending 'staircase' of fuel economy targets. The vehicles with the smallest footprint are at the top of the stairs with the highest mpg target, and the largest vehicles at the bottom with the lowest target.

An individual manufacturer's 'compliance obligation' would be calculated as the harmonic average of the targets for its vehicles weighted by the distribution of its production volume among the different footprints. The NHTSA notes that this means that the compliance obligation cannot be precisely calculated until the manufacturer's final production figures for the model year are known. In addition, auto companies are allowed to choose between complying with the new flexible 'reformed' rules or the old and inflexible 'unreformed' CAFE standards, which will be 22.5 mpg in MY 2008, 23.1 mpg in MY 2009, and 23.5 mpg for MY 2010. By MY 2011, all manufacturers will be required to use the 'reformed' standards, which the NHTSA 'estimates' will average 24.0 mpg.

Space does not allow a description of the many other complexities of this 'reform'. Suffice it to say that the Bush administration has responded to the criticism of the original CAFE light truck loophole by creating a system that presents the opportunity to take advantage of even more loopholes. Environmental and energy advocacy groups were predictably critical, charging that the new regulatory regime would fail to cure the oil addiction that Bush decried in his 2006 State of the Union address (Claybrook, 2006; Sierra Club, 2006; Union of Concerned Scientists, 2006). The auto manufacturers, on the other hand, struck a positive chord. They note that the NHTSA's decision means that fuel economy standards will have increased for seven straight years (MY 2005–11). They point to their efforts to enhance the nation's energy security by offering over 100 models with over 30-mpg highway ratings. They emphasize that "the government has a tough balancing act to perform". It must consider many elements when setting standards, including "technological feasibility, cost, safety, emissions controls, consumer choice, disparate impacts on manufacturers, and effects on American jobs" (Alliance of Automobile Manufacturers, 2006).

For the auto companies, the political deadlock on CAFE generated a lucrative policy monopoly. They have learned to live comfortably with 'the devil they know' and can exploit all the loopholes and advantages of the current and 'reformed' standards. For the supporters of more stringent fuel economy regulations, the annual Senate debates—and defeats—from 2002 to 2005 may have seemed more like a ritual than a real opportunity to change policy. They have not been able to take advantage of increasing oil imports, terrorism, wars in

Afghanistan and Iraq, the National Academies report, and even sharply higher gasoline prices, to break the impasse. Widespread concern about global climate change has added a new level of argument but no new votes for higher mileage standards.

The facts reviewed above suggest that America's policy impasse over CAFE has originated from the top of its executive branch and legislative leadership. It was Reagan's victory in the 1980 presidential election that stopped the momentum toward higher post-1985 standards. Clinton decided to create the PNGV partnership as an alternative to regulation rather than risk a fight over CAFE with pro-auto Democrats in Congress in 1993–94, when his party held majorities in both houses. And George W. Bush's pro-business, anti-regulation stance would seem solid enough to block CAFE's progress even if the Republicans should lose control of one or both houses of Congress. With support for the status quo so well entrenched in Washington's political establishment, the end of this particular policy impasse appears more likely to originate from some initiative 'outside the Beltway' in one or more venues where advocates for change have been hard at work in recent years.

Changing Venues I: California

For any policy objective related to US automobile emissions, California presents the most plausible opportunity for a shift in venue to trigger change. Because it experienced severe automobile air pollution problems earlier than other states, California began issuing its own air pollution regulations before major policies were enacted at the federal level. The state's leading role in air pollution control was recognized at the federal level when Congress passed the Air Quality Act of 1967, which offered California (and only California) a waiver to set its own air quality standards, as long as they were at least as stringent as the federal rules. The Clean Air Act of 1970 continued to permit California to set stricter emissions standards, and also allowed other states that were unable to meet ambient air quality standards to adopt California's more stringent motor vehicle emissions standards (California Air Resources Board, 2005). The 1990 Clean Air Act amendments clarified that Congress's intent was to permit only two motor vehicle emissions regulatory standards: the federal standard and the California standard, thereby preventing a proliferation of regulatory hurdles for auto manufacturers. California is almost always ahead of the federal government in setting standards, but it is not totally independent in this area. When setting its rules, it must obtain a 'waiver' from the US Environmental Protection Agency from Washington's general federal 'pre-emption' in setting air pollution standards (Carlson, 2003, pp. 281–291).

Zero-emission Vehicle Mandate

California has been open to use technology-forcing regulations that went well beyond what the federal government was willing to enact. In 1988 the California legislature directed the California Air Resources Board (CARB) to take "whatever actions are necessary, cost-effective, and technologically feasible ... to achieve the maximum degree of emission reduction possible from vehicular and other mobile sources". In 1990 the CARB issued its low emission vehicle (LEV) and zero emission vehicle (ZEV) regulations. The ZEV mandate was an unprecedented technology-forcing regulation that required that 2% of an auto company's sales be

ZEVs by 1998. The ZEV sales quota then rose to 5% in 2001 and 10% in 2003. At the time the mandate was issued, there was general agreement that only electric vehicles (EVs) could meet a zero tailpipe emissions standard (Grant, 1995; Shnayerson, 1996).

The auto manufacturers complained that the mandate's schedule could not be met, that electric battery technology was not yet ready for widespread introduction, and that meeting the sales quotas would force them to sell electric cars far below their cost. Under pressure, the Air Resources Board modified the mandate by removing the 'ramp up' quota requirements for 1998 and 2001. But it left the 2003 quota of 10% of sales in place. The auto companies then sued CARB, arguing that some of the revised mandate's provisions amounted to an attempt to regulate automobile fuel economy, a power reserved exclusively to the federal government by the Energy Policy and Conservation Act (EPCA) of 1975. In the case of *Central Valley Chrysler-Plymouth v. Witherspoon*, the federal district court in Fresno issued a preliminary injunction prohibiting CARB from enforcing the sales quotas in 2003 or 2004 because the ZEV mandate was an effort to regulate fuel economy and was pre-empted by EPCA. This case was resolved in 2003, when the CARB modified the terms of the mandate and the companies agreed to drop their lawsuit (California Air Resources Board, 2003a, b).

Under the new regulations automakers can get credits toward their ZEV quota for various kinds of partial zero emission vehicle (PZEV), which is defined as a vehicle that has 90% lower tailpipe emissions than the average 2003 new car, has zero evaporative emissions and a 15-year or 150 000 mile warranty on its emissions reduction technology. Manufacturers could also choose an alternate compliance path in which they would produce fuel cell vehicles to meet their corporate sales weighted share of a gradually rising statewide quota of fuel cell vehicles, referred to as advanced-technology ZEVs. This schedule called for annual sales of 250 fuel cell vehicles in the state by 2008, with quotas gradually rising to 50 000 fuel cell vehicles sold between 2015 and 2017 (California Air Resources Board, 2003a).

The Pavley Bill on Greenhouse Gas Reductions

An even more ambitious step toward regulating auto emissions was taken in 2002, when the California legislature passed and Governor Gray Davis signed assembly bill 1493, the so-called Pavley bill (California State Assembly, 2002), named after the bill's sponsor, Democratic Assemblywoman Fran Pavley. The bill directed the CARB to develop regulations to reduce the emission of greenhouse gases emitted by passenger cars and light trucks. CO₂ is specifically listed as among the greenhouse gases to be regulated. It is clearly an 'emission', since it is an inevitable by-product of the combustion of motor fuel. But it had not previously been deemed a pollutant by either California or the US government.

The legislative politics of getting the bill passed was controversial and complex. Pavley's bill initially started out as A.B. 1058 and was strongly opposed by auto interests and conservatives, who launched a media campaign that attacked the bill for giving the regulators in the CARB too much power to infringe on people's right to use their cars. When the original A.B. 1058 bill stalled in the assembly, it was revived by a technique known as 'gut and amend' often used at the end of a legislative session to get a controversial

measure through with little public notice. The major changes that appeared in the text of the revised bill were aimed at easing people's fears of regulation run amok. The new language stipulated measures that the CARB and the state could not pursue to achieve the desired greenhouse gas reductions. For example, they could not raise taxes on vehicles, fuel, or miles travelled. They could not ban the sale of a particular category of vehicle, such as SUVs. Nor could they reduce the speed limit, limit the weight of vehicles, or limit the number of vehicle miles travelled, e.g. by mandating car pooling. Even with these limits, the bill barely passed in the 80-seat Assembly, where it received 41 votes, all from Democrats. In the 40-seat Senate, the bill received 23 votes; again, all from Democrats (California State Legislature, 2002). A dimension of bipartisanship was added to the mix when Democratic Governor Gray Davis was recalled and replaced by Republican Arnold Schwarzenegger, who announced that he strongly supported the Pavley bill. He also promised to fight any legal challenges the auto companies might bring against the bill and the new CARB regulations it authorized.

In September 2004 the CARB's Board of Directors approved a detailed set of regulations to implement the Pavley bill (California Air Resources Board, 2004b). These regulations apply to vehicles sold beginning in model year 2009 and increasing each year until 2016. The CARB staff had assessed a whole range of 'near-term' or 'off-the-shelf technologies' to identify possible packages that could achieve the 'maximum feasible and cost-effective' reductions in greenhouse gas emissions. Because the standards are ostensibly aimed at reducing greenhouse gas emissions, they are officially stated in terms of grams (g) of CO₂ per mile. But two independent researchers have converted them into miles per gallon equivalents for easy comparison with CAFE standards (An and Sauer, 2004). One can thus see that the Pavley bill's requirement to increase fuel economy would be significant. In 2009, the regulations would require passenger cars and light-duty trucks weighing up to 3750 lb to achieve 27.6 mpg. This rises to 33.3 mpg by 2011, to 40.1 mpg. in 2014 and to 43.3 mpg by 2016.

The amount of improvement being required by these standards is very ambitious. Consider that an increase from 27.6 to 43.3 mpg in 8 years amounts to a 56.8% improvement—a greater increase than the original federal CAFE schedule, which only required a move from 18.0 mpg in 1978 to 27.5 mpg by 1985: a 52.7% increase. The CARB staff has projected that the new regulations will reduce greenhouse gas emissions from new vehicles in California by between 25 and 30% by 2016. It estimated the costs for installing the new technology to be around US\$1050 per vehicle in 2016. It calculated that the extra costs would be more than offset by lower operating expenses, mainly less gasoline consumption (California Air Resources Board, 2004a, b).

The auto manufacturers were predictably hostile to the new regulations, and immediately began making their objections known to the public. They asserted that the CARB staff seriously underestimated the costs of meeting the new regulatory standards, which they put at US\$3000 per vehicle. At that price, industry claimed there would be no real benefits in it for Californians, since the gasoline savings over the life of the vehicle would be less than the up-front cost (Alliance of Automobile Manufacturers, 2004a). Even the greenest of the auto companies, Honda, voiced doubts. In an interview with *The New York Times* (Hakim, 2004), John German, Honda's Corporate Manager for Environment and Energy said,

“We don’t know how to do it right now. It means using unknown, unproven technology”.

Legal Barriers

More significantly, the auto companies went back to court. On 7 December 2004 the industry’s lobbying arm, the Alliance of Automobile Manufacturers, joined with a group of automobile dealers in California’s Central Valley in another suit filed in the federal district court in Fresno to challenge the CARB regulations. Their position was based on the same grounds as the suit they settled in 2003, namely that federal law gives the federal government exclusive authority to set automotive fuel economy standards, pre-empting any state attempts (Alliance of Automobile Manufacturers, 2004b). This industry challenge to California’s regulatory initiative will take time to work its way through the American legal system. And until any court, whether district, appellate or, ultimately, the US Supreme Court, has to decide on a specific case, one can never be sure how the judiciary will rule on an issue. But in a 2004 pre-emption case, *Engine Manufacturers Assn. v. South Coast Air Quality Management District*, the US Supreme Court held that a California effort to mandate fleet operators to purchase low emission and alternative fuel vehicles that met strict Air Resources Board emissions standards was pre-empted by the federal Clean Air Act (Duke Law, Supreme Court Online, 2004). In a study of pre-emption issues relating to California air quality regulations, University of California—Los Angeles Law School professor Ann Carlson (2003, pp. 306, 309) notes that the Supreme Court “has frequently sided with parties seeking federal pre-emption of state statutes and regulations”. On the specific issue of how the Supreme Court would decide a challenge to the A.B. 1493 regulations, Carlson notes that “California appears to have the stronger doctrinal arguments ... but the trend in the Supreme Court and within the Bush Administration may well tip the balance to the challengers”.

There is yet another legal/constitutional barrier to California’s proposed greenhouse gas emissions regulations. The Bush administration has taken the position that the Clean Air Act does not give the federal Environmental Protection Agency the authority to regulate CO₂ as an air pollutant (Carlson, 2003; US Environmental Protection Agency, 2003). California (and ten other states and 14 environmental groups) have challenged the Bush administration in the US Court of Appeals for the District of Columbia over this question. In July 2005 that court held, by a two-to-one vote, that Bush’s EPA Administrator properly exercised his discretion in denying the plaintiffs’ petition to require that the EPA regulate CO₂ emissions (US Court of Appeals for the District of Columbia Circuit, 2005). If the US Supreme Court were to affirm the lower court’s position, that could also stymie the Pavley bill’s implementation, since it would be very difficult for California to argue that it can regulate CO₂ emissions as air pollutants if the federal government cannot. Thus, the key to California’s leadership aspirations in reducing greenhouse gas emissions from automobiles by technology-forcing regulations is in the hands of the courts. As the editor of a special symposium on the legal issues surrounding A.B. 1493 (*UCLA Journal of Environmental Law and Policy*, 2002) wrote:

whether California’s approach to automobile emissions foreshadows a coming wave of sister state environmental regulation or is merely an aberration from a land of tree-hugging extremists remains to be seen.

California Dreaming?

Is one to dismiss all of California's efforts to enact technology-forcing regulations that prod manufacturers into reducing greenhouse gas emissions—and incidentally increasing fuel economy—as simply 'California dreaming'? It is true that the 1990 ZEV mandate had little impact on the market. Only about 200 EVs were sold or leased in California in 2002, and the number fell to near zero in 2003 (Orski, 2003). Nor can it be said that the CARB's efforts have appreciably slowed sales of Hummers, Excursions and Escalades. Trying to force manufacturers to design and market vehicles they do not believe will be as profitable as their preferred fleet mix has proved much more difficult than CARB and clean-air activists imagined in 1990. But in another sense it can be argued that California has indeed taken the lead in auto fuel economy policy development.

All its efforts, including the 1990 ZEV mandate, the 2002 greenhouse gas reduction bill, and the 2004 CARB CO₂ regulations, have pushed both technological and policy research on development and marketing of automotive emissions and propulsion technology considerably further than federal policies would have (Swope, 2003). While implementation of this new technology has lagged, California's clear commitment to reducing automotive emissions has fostered growth of an impressive collection of human and organizational resources in the fields of analysis, research, development, and public education. One analyst (Gilson, 1999) has argued that this kind of sustained public support can create 'agglomeration economies'—economies of scale external to the firm when many companies are located in close geographic proximity. Another (Carlson, 2003) has noted that the state has become "a magnet for the clean vehicle community", with at least 75 advanced auto technology centres, and a growing number of private firms and university research laboratories focusing on the development of numerous advanced technologies for cleaner fuels and cleaner, more fuel-efficient vehicles.

This is what former CARB Chair and past Secretary of California's Environmental Protection Agency, Dr Alan Lloyd, was driving at when he told *The New York Times* (Hakim, 2003) that although he expected A.B. 1493 to be upheld in court, "if we lose in the legal arena we're going to win in the court of public opinion". Lloyd sees a future in which demands for action on autos' contribution to global warming will only continue to grow. For example, a *New York Times* reporter (Dixon, 2004) noted that "While battery-powered vehicles made barely a ripple in the marketplace, they inspired near-religious zeal among many who bought or leased them". When Ford and GM decided not to support EVs and opted not to sell these vehicles to customers as occurs at the end of a typical car lease, some customers refused to return their EVs. Some even sued Ford and GM to force the sale of EVs to interested leasees. Researchers such as those at the University of California—Davis Hydrogen Pathways programme continue to develop and demonstrate how alternative fuels and propulsion systems could enable vehicle manufacturers to meet and exceed the new CARB standards (University of California—Davis, Institute of Transportation Studies, 2005). If the courts rule out the kind of mandates inherent in technology-forcing regulation, California policy-makers will continue to search for different tools, and for allies in other states—and even in other countries—to advance the goals of emissions reduction and fuel economy.

Changing Venues II: Canada's Attempt to Reconcile Automotive Manufacturing with the Kyoto Protocol

The automotive industry looms even larger among Canada's policy subsectors than it does in the USA. It plays a central role in Canada's industrial economy, given the relatively limited scale of Canada's manufacturing base. Canada's Auto 21 research network (Canada, 2005a) characterizes automotive assembly and production as 'the true engine' of economic growth. The auto industry as a whole employs one in every seven Canadians, and this share rises to one in six in Ontario, Canada's most populous province. The auto sector accounted for 12% of Canada's total manufacturing gross domestic product in 2002. Automobiles generate the country's largest share of export earnings, some C\$93 billion in 2002, with C\$90.5 billion going to the USA. The overall automotive sector trade surplus was C\$11.5 billion globally, and C\$26.9 billion with the USA (Canadian Vehicle Manufacturers Association, 2005). Public officials at all levels of government take the auto sector's economic future seriously.

Thus, for most of the past 40 years the main aim of Canadian auto policy has been to attract as much investment in manufacturing and assembly plants to Canada as possible. When it comes to regulating auto-related problems such as emissions and fuel economy, Canada has been largely a 'policy taker', accepting US regulations and standards. Now, however, the Canadian government directly faces a difficult policy conundrum in having to reconcile the tradition of letting the USA take the lead in these regulatory areas with implementing a commitment to reduce CO₂ emissions embodied in its ratification of the Kyoto protocol.

Canada's Kyoto commitment launched a search for reconciling automotive policy goals that had never before been pursued in tandem. One goal is to preserve the very real economic advantages that accrued over years of adept incentives for US auto producers to build more vehicles and components in Canada. The second goal is to move Canada from being a policy taker to a policy maker in determining fuel economy and greenhouse gas emission standards for motor vehicles. Such a balancing act would, in itself, be a major achievement. An even more profound outcome would arise from Canada being used as the fulcrum of a venue change strategy that leverages the North American policy impasse on auto fuel consumption and emissions toward greater efficiency.

The Auto Pact's Legacy: Jobs and 'Voluntary' Compliance Standards

In 1965 Canada and the USA signed the Automotive Products Trade Agreement. This 'Auto Pact' is sometimes identified as Canada's initial commitment to free trade and economic integration, which was an enabler of the North American Free Trade Agreement (NAFTA). But the Auto Pact demonstrated at least as much of a policy commitment to managing trade through specified production targets as it did an enthusiasm for the economic efficiencies that could be generated by a market-led integration of continental automotive production. The Auto Pact's policy inheritance has an important bearing on contemporary automotive emissions policy and thus merits some attention to its origins and its impacts.

Academic input influenced Canada's initial episode of automotive policy innovation. In 1962 the University of Toronto economics professor Vincent Bladen authored a one-person Royal Commission report that proposed broadening the terms of Canada's then-existing tariff regime on automotive imports,

which required that 60% of a vehicle's components be produced in Canada in order for the manufacturer to import the vehicle free of duty. That essentially protectionist scheme resulted in parallel production runs for most US vehicles, higher costs, and higher prices to Canadian consumers. Bladen introduced the concept of 'extended content'. Rather than producing vehicles and parts only for sale in the domestic market, Bladen's approach was to count Canadian automotive content that was exported to the US as part of the industry's domestic production. Wonnacott (1987, p. 5) notes that "Bladen recommended that the Canadian *content* requirement be replaced with a Canadian *value added* requirement". This principle became a core element of the Auto Pact, in which Canada allowed the duty free import of new vehicles and original equipment parts for manufacturers that maintained the value of automotive production at or above 1964 levels and also kept an equal or higher ratio of vehicle production value to domestic sales in 1964.

It is important to note that the Auto Pact was negotiated on two levels. The official agreement between US and Canadian governments on tariff remissions was linked to, and complemented by, so-called 'letters of undertaking' that were signed by Canadian automobile producers (all subsidiaries of US manufacturers at the time). These letters committed automakers to Canadian production by at least 60% of the growth in Canadian automotive sales, plus an additional C\$260 million by the 1968 model year (Wonnacott, 1987, p. 6). By linking negotiated 'voluntary' commitments from automotive manufacturers to a trade liberalization pact between governments, Canada succeeded in obtaining targeted industrial outcomes that would likely have been declared illegal as government undertakings under international trade law. A US official was quoted by Keohane and Nye (1977, p. 207) as criticizing the auto industry for selling short trade liberalization to advance a narrower industrial agenda, stating:

We knew about the Canadian plan to blackjack the [auto] companies, but we expected the companies to be hard bargainers. They didn't have to give away so much [on production guarantees]. It must have been profitable to them [to do so].

Where US trade officials saw industry undermining liberalization, Anastakis (2004, p. 121) saw a form of neo-corporatism in action, suggesting that "The automakers' position in the negotiations ... was that of an equal to the two governments". Working with both industry and the US government accommodated Washington's desire for trade liberalization while simultaneously advancing Canadian ambitions for increased automotive investment and production.

The Auto Pact's industrial legacy contributed to making auto manufacturing a centrepiece of Canada's economy, while its institutional legacy launched a neo-corporatist policy network dynamic that drew Canada's federal government and the automotive industry into a collaborative relationship in policy formulation. This style of policy-making is qualitatively different from the pluralist and often more adversarial relationship between government and industry found in the US. For the most part, the legislative, regulatory, and judicial mandates that were placed upon the US automotive industry were avoided in Canada in favour of negotiated commitments expressed in memoranda of understanding. The usual policy result was that the Canadian government and auto manufacturers agreed

to transplant standards that had been developed in the USA through voluntary implementation with a low level of bureaucratic monitoring.

Negotiation in Lieu of Regulation: Company Average Fuel Consumption (CAFC) Standards

Given the close integration of US and Canadian automotive production, Canada could not ignore the 1975 US Corporate Average Fuel Economy (CAFE) regulations. That year, a “joint government-industry voluntary fuel consumption program” was launched to “promote energy conservation in the transportation sector through the design, manufacture and sale of fuel efficient motor vehicles” (Canada, 2005c). Canada’s launch of collaborative voluntary standards enabled auto manufacturers and government officials to begin a dialogue on automotive fuel economy that has continued, in various forms and forums, through to the present day. In 1976 the government and the auto industry agreed upon introducing a CAFC measure that was equivalent to the mandatory Corporate Average Fuel Economy (CAFE) standards in the USA. The principle of voluntarily accommodating the US regulatory standards in the Canadian motor vehicle fleet was thus established.

By 1981 the Pierre Trudeau government responded to the second oil shock with a more interventionist energy policy. In addition to the National Energy Program, which raised federal influence over oil production, the government sought to introduce an ‘off-oil’ policy that would reduce consumption in a number of sectors (Canada, 2003). As part of this strategy, in 1982 Parliament passed the Motor Vehicle Fuel Consumption Standards Act that would have created a full-blown regulatory framework for establishing and enforcing automotive fuel economy standards (Canada, 2004). But after the House of Commons and the Senate approved this legislation, the auto industry agreed to comply with the terms of the Act on a voluntary basis, and the legislation was thus held back from proclamation by the Governor General, the final step in bringing Canadian law into force.

The results of this approach can be seen in Table 3, which details the standards that industry has set for each model year since 1978. It is interesting to note that the actual fuel consumption performance of the Canadian vehicle fleet sold in each model year has been slightly below (and thus better) than the CAFC target. As becomes apparent, Canadian manufacturers’ voluntary approach to complying with the never-promulgated law has mirrored US CAFE standards quite closely. Natural Resources Canada, which appeared to have taken precedence over Transport Canada in managing voluntary automotive fuel economy compliance, presents this alternative to legislated regulation as a great success. Natural Resources Canada (Canada, 2005d) states:

The [auto] manufacturers have made good on their offer and have met programme objectives at a significantly reduced cost to both government and industry compared with a mandatory approach.

While this approach has not always satisfied consumer and environmental groups, which occupied a distinctly secondary tier in the auto policy-negotiating process, it did open the door to focusing on automotive fuel economy in the context of Canada’s 2002 Kyoto protocol ratification. As the deadline for Canada’s Kyoto compliance drew closer, environmental and climate change groups

stepped up their calls for formal regulations on the auto sector to make a substantial reduction in the CO₂ emissions of their vehicles. During its campaign for government regulation of automotive greenhouse gas emissions, the Sierra Club of Canada released a poll showing that 94% of Canadians support greater automotive fuel economy (Sierra Club of Canada, 2004). Parliamentary debate also revealed differences within the Liberal government about how formally to pursue automotive fuel economy policy. An exchange between the Hon. Charles Caccia and the Hon. Sue Barnes highlighted the preference of those outside Cabinet for a more formal legislative framework for setting automotive fuel economy policy. Caccia, who served as Environment Minister from 1983 to 1984, and chaired the House of Commons Environment Committee from 1997 to 2004 (Parliament of Canada, 2004, p. 1800), stated:

On 30 March I asked the Minister of Natural Resources when he would recommend to cabinet the proclamation of the 1982 Motor Vehicle Consumption Standards Act. ... The minister's reply was not very encouraging. He provided no evidence of future regulation, but rather support toward the continued reliance on so called voluntary measures. It seems to me ... that the reply given by the minister was not sufficient. ... I therefore urge the government, because of the commitment to the Kyoto agreement, to announce a mandatory fuel efficiency program

Barnes, Parliamentary Secretary to the Minister of Justice and Attorney General of Canada, spoke for the government of then Prime Minister Paul Martin (Parliament of Canada, 2004, p. 1815) stating:

While the performance of Canadian manufacturers [under the voluntary fuel efficiency standards] has been excellent in the past ... [t]here is a need for improvement. ... Canada has ratified the Kyoto agreement and committed to reduce our greenhouse gas emissions. ... Given this, the motor vehicle fuel efficiency initiative was first announced in action plan 2000, and the 25% target was announced in the climate change plan of November 2002. Our goal ... is to reach a voluntary initiative with manufacturers on a new target for 2010, based on a 25% improvement from our current voluntary company average fuel consumption standards.

Under the mounting pressure of Kyoto compliance, the Canadian automotive policy network was put to a serious test. On one level was the familiar dilemma. If Canada pressed fuel economy regulation too hard and too far, it could have very negative economic consequences if companies reduced sales and production of certain models. Yet without improvements in CO₂ emissions from the auto sector, Canada had no hope of complying with Kyoto. On a different level, though, some Canadian policy-makers and policy advocates thought they saw an unprecedented opportunity to make progress on emissions reduction not just in Canada, but in the entire North American market. If Canada could somehow add momentum to California's initiative to do an 'end run' around the US federal government policy impasse and push all the auto companies in the North American market toward greater fuel efficiency and emissions reduction technology, the potential positive impact would be much greater than any specific Canadian achievement.

Cross-border Campaign to Align Canadian Automotive Emissions with Kyoto

Despite the public statements by Ministers in 2003 and 2004 that Canada was working on a voluntary agreement with the auto industry that would support its Kyoto plan, negotiations were going nowhere fast. As late as August 2004 Natural Resources Canada and auto industry representatives were still discussing the procedural framework for negotiations and had not yet begun to address substantive issues (anonymous interview). Initiating new standards on energy and the environment without US precedents presented a novel challenge to the neo-corporatist automotive policy network. But Canada's ratification of Kyoto created the opportunity to mobilize environmental non-governmental organizations (ENGOS) on both sides of the border to challenge that network in unprecedented ways.

In 2004 and early 2005 the relatively closed dialogue between government and industry over Canada's automotive policy options was at least partially eclipsed by competition for new policy directions that approximated the rivalry between competing coalitions set out in the 'advocacy coalition framework' model of Sabatier and Jenkins-Smith (1993). On the one side were the automotive advocates ranging from car manufacturers and their extensive network of suppliers and dealers to the southern Ontario mayors, Chambers of Commerce, and Members of Parliament where automotive production was concentrated. Some unions were among these advocates, but unlike its US counterpart, the Canadian Auto Workers had endorsed Kyoto and supported fostering automotive technology that cut emissions and fuel use. These advocates insisted that the undeniable prosperity generated by decades of industrial integration with the USA would be jeopardized by 'made in Canada' environmental regulations. Challenging this position were environmental advocates who embraced the core values of a sustainable transportation 'vanguard' described by Dunn (1998). They viewed government's authority as a positive, and necessary, means of triggering change for the better in automotive technologies and travel behaviour. Unlike previous automotive policy deliberations in Canada, the environmental advocates were well integrated with their counterparts in the USA, and well prepared to contest policy development on both sides of the border.

Canadian ENGOS wasted little time after Kyoto was ratified in making the case to their US counterparts that Canada needed strong advocacy to avoid the 'under-implementation' of environmental policy noted in many studies (Harrison, 1996; Lee and Perl, 2003), and that Canada's success with the Kyoto implementation could pay political dividends in America. In 2004 a summit-style meeting of US and Canadian ENGOS was sponsored by the Oak Foundation to set priorities for approaching foundations to fund climate change policy implementation campaigns. Canada's then-languishing negotiations on automotive greenhouse gas emissions were identified as among the most promising opportunities to generate a positive policy influence (anonymous interview). The William and Flora Hewlett Foundation went on to grant the Sierra Club of Canada US\$100 000 to launch its 'Canadian CAFE' campaign.

Besides supporting two full-time campaigners in Ottawa, US allies supported the Canadian advocacy coalition through tactical coordination and political interventions. A key example of such cross-border coordination occurred during Environment Minister Stephane Dion's first trip to Washington, DC. As has become customary in the post-NAFTA era, US cabinet secretaries schedule

introductory meetings with their Ministerial counterparts in Canada (or vice versa) soon after they take office. After comparing notes with EPA administrator Michael Leavitt, Dion held a meeting with US ENGOs to gauge their advocacy agenda. US ENGO representatives attending the meeting had been primed by Canadian counterparts to press the Minister on how important reducing automotive emissions would be to meeting Canada's Kyoto commitment, which caught the Canadian delegation by surprise (anonymous interview). Upon returning to Ottawa, Dion ordered a review of the auto file and sought staff recommendations on what his department could contribute to advance the negotiations (anonymous interview). Dion became an increasingly active participant in the auto industry negotiations, both directly and by seeking to persuade his cabinet colleagues that regulation would be needed as a 'backstop' to a voluntary scheme to reduce greenhouse gas emissions, much the way that the Motor Vehicle Fuel Consumption Standards Act had served as the backstop for the CAFC programme.

Another example of strategic deployment of US ENGO assets to influence the Canadian debate occurred in November 2004 when the Sierra Club of Canada invited California Assemblywoman Fran Pavley to Ottawa. There she met with both the Environment and Natural Resources Ministers and gave media interviews about California's legislated mandates on greenhouse gas reduction for automobiles. The Pavley trip was sponsored by a US foundation to coincide with another cross-border meeting of ENGO activists in Ottawa. During Pavley's meetings an invitation was extended for Canadian Ministers to make a 'fact-finding' trip to California.

Environment Minister Dion and Transport Minister Lapierre made that visit in January 2005, when government negotiations with the auto industry were in full swing. Dion drew attention to the California option as a regulatory alternative should negotiations with Canadian automakers prove unsuccessful, telling *The National Post* (Gordon, 2005) that "it will be their [industry's] choice, but we want to make sure we have a firm agreement". These implications were not lost on the automotive advocacy coalition, which soon responded that luxury cars and SUVs would have to be withheld from sale in Canada if the government imposed California-style regulations (*Calgary Herald*, 2005).

If Dion's tactic of putting regulations on the table helped push the auto coalition toward serious negotiations, another minister had to take regulation off the table to close the deal. In early 2005 leadership of the negotiations was taken over by Industry Minister David Emerson, who also chaired the Cabinet's ad-hoc committee on environmental sustainability. Emerson had written his PhD thesis on the economic integration of Canadian and US automobile production following the Auto Pact, and was trusted by auto advocates as somebody who would not 'sell out' the industry. He was also trusted by Martin as someone who could bring the auto industry to signing a deal and avoid the political uproar and uncertainty that would attend passing regulatory legislation in a Parliament where no party held a majority of seats.

The deal, signed on 5 April 2005, committed the industry to achieve annual reductions of an equivalent to 5.3 megatonnes of CO₂ by 2010, with incremental reductions commencing in 2007. One of the memorandum's appendices noted that the 'business as usual' estimate of motor vehicle emissions in 2010 was 90.51 megatonnes, meaning that the industry's 5.3 megatonne undertaking would amount to a 5.8% reduction, just below Canada's 6% Kyoto commitment

and well below the 25% target that the federal government had identified it was seeking at the start of negotiations (Canada, 2005b). This 6% level was noted by Mr Tony Taylor, speaking for Natural Resources Canada at the 2005 conference of the Auto 21 research network. Yet the day after the Memorandum of Understanding (MOU) was unveiled, *The New York Times* (Austen, 2005) reported that Canada's new policy would yield a 17% reduction in automotive greenhouse gas emissions "if the voluntary program is carried out properly after it goes into effect in 2007", indicating just how open to differing interpretation such targets based upon forecasted estimates of future performance can be.

Whether the auto industry will achieve a 5.3 megatonne reduction, and what that would translate into in terms of Canada's Kyoto performance, remains to be seen. The industry points out that their goal is formulated in megatonnes of CO₂ equivalent saved from a 2010 'base case' that allows for a growth of vehicle use and shifts in the kinds of vehicles sold, not percentage improvements in corporate fleets, and not improvements in specific vehicles. A recent review of the agreement by a researcher at the University of California—Davis emphasized the interpretive problem of deciding what to count:

[I]f industry is credited with certain emission reductions that result from ongoing trends and already adopted regulations, only minimal fuel economy improvements by 2010 would be required to meet the 2010 emission reduction targets. (Lutsey, 2006, p. 30)

The judgement calls made in implementing this agreement could be influenced by the different direction on Kyoto hinted at by Stephen Harper's Conservative minority government, which took over from the Martin Liberals on 6 February 2006. Prime Minister Harper did not wait to distance his government from Canada's previous approach to Kyoto, cancelling federal funding for the 'One Tonne Challenge' campaign on 1 April 2006 (Mittelsaedt, 2006). This programme had supported the outreach and educational activities of non-governmental organizations encouraging Canadians personally to cut back on greenhouse gas-producing activities. In parliamentary debate, Harper stated:

The previous government spent billions of dollars without achieving the forecasted results for greenhouse gas and pollution. This government has no intention of spending taxpayers' money without achieving results. (Curry, 2006)

Environment Minister Rona Ambrose has emphasized a long-term approach to climate change, suggesting "We need solutions that are out by 50, 100 years, not two years, five years" (Sallot, 2006).

Where such an approach to climate change policy will ultimately leave Canada's agreement with the auto industry on greenhouse gas reductions by 2010 remains to be seen. What is clear is that the relatively insular dialogue between government and industry that had prioritized aligning Canadian automotive, environmental, and energy norms with the US approach was interrupted in 2005, at least for a time.

Conclusions: Institutions, Politics and the Choice of Policy Instruments

The institutions that have been created to influence the development and deployment of automotive technology in North America reflect a range of, not entirely compatible, assumptions regarding the relationship between public and private sectors and the responsibility for changing the auto's impact on the environment. The regulatory measures that were set in place during the 1970s posited a leading role for government in forcing the auto industry to place a higher priority on fuel economy and reduced environmental impact. During the 1980s, the Canadian government introduced a voluntary approach for auto manufacturers to meet fuel and environmental standards. In the 1990s, the USA sought to nurture technological innovation through partnerships between government and industry. And in 2005, Canada has expanded negotiated agreements as a first step in the automotive sector's effort toward meeting greenhouse gas reduction targets. Over the past three decades, then, governments have been willing to introduce new policy approaches, but reluctant to repeal or remove old ones. Further policy innovation could be facilitated by, and may well require, untangling these different expressions of public authority.

Regulation: The Foundation of Automotive Policy Initiatives

US regulation was the original instrument that launched efforts to improve automotive energy consumption and reduce emissions—yielding initiatives that have spread across North America and beyond. Without the regulatory framework established by an atypically activist US Congress during the 1970s, there would have been no context, and thus little prospect, for Canada to negotiate a voluntary compliance framework on fuel economy and emissions with auto manufacturers. There would also have been little motivation for the auto industry to pursue government technology partnerships as an alternative to stricter regulation. And there would be less reason for auto manufacturers to consider future voluntary agreements such as Canada's recent accord on reducing greenhouse gas emissions without the alternative of expanding that existing regulatory regime. Although regulatory standards have remained largely constant since 1985, the regulatory foundation of automotive fuel and emissions policy remains an important influence on all the other approaches that have been built on top of it.

It is no surprise that both the executive and legislative branches of the US government have left the regulatory foundations of automotive fuel economy policy untouched from 1985 to 2005. America's constitutional 'separation of powers' and 'checks and balances' were designed to facilitate just such an aversion to expanding government's power by providing multiple access points where societal interests could pressure elected officials to restrain their exercise of authority. Despite the evident success of CAFE in the early 1980s, Reagan rejected consideration of any further increases in the years after 1985, and both presidents Bush have continued to block change toward significantly higher standards. Early in his first term, Clinton had other priorities, including balancing the budget and a healthcare initiative. To avoid a distracting fight with the auto industry, he reframed the problem from a regulatory issue into a government–industry partnership to develop new fuel efficiency technology. When the Republicans took control of both houses of Congress in 1994, they effectively blocked any further policy initiatives on fuel economy by the Democratic Clinton administration.

Since Canada is a parliamentary system where the power to regulate is highly centralized in the Prime Minister and Cabinet, it is more surprising that Ottawa has not revisited the auto industry's voluntary CAFC standards, especially in light of the emissions reduction obligation that arose from ratifying the Kyoto protocol. The economic importance of Canada's auto sector and its tradition of government and industry bargaining over auto policy has reinforced the path of voluntary agreements, with the 2005 memorandum of understanding on greenhouse gas reductions offering a potential for increasing the fuel economy of Canada's vehicle fleet in ways that would break away from America's regulatory trajectory.

In certain respects, California has attempted to exercise more regulatory power than Canada. The unique legal status it attained in the early years of air pollution regulation has enabled it to become an 'outpost of opposition' to Washington's political deadlock over CAFE. The state's energy and environmental activists have pushed ahead with policy-oriented learning through the research on regulatory costs and impacts performed at CARB, and in the growing clean car community of organizations such as the California Fuel Cell Partnership. If California's legal argument that its power to regulate automotive air pollution also extends to regulating CO₂ emissions is upheld, it would be a necessary—and perhaps a sufficient—cause of policy 'punctuation', i.e. rapid policy change (Baumgartner and Jones, 1993; True *et al.*, 1999). At least ten other US states and Canada have indicated they would also adopt the California greenhouse gas emission standards in short order. Thus, California would be the most likely jurisdiction to expand the regulatory foundation of automotive policy, an action that could then stimulate considerable changes in other policy instruments and their use.

Taxation: An Unlikely Trigger of Policy Innovation

While transportation's economic efficiency could be vastly enhanced by 'getting the prices right', taxation appears an unlikely instrument to trigger a future wave of automotive policy innovation. Despite the fact that excise taxes on fuel make an integral contribution to America's road transportation system, through the federal highway trust fund and state transportation trust funds, they are politically accepted because of an association with the 'user pays' principle. The principle that motor fuel taxes stay beyond the grasp of politicians and go directly to road infrastructure development and upkeep is deeply entrenched in the US political psyche and echoed by the moral appeal to maintaining such arrangements informally in Canada. An army of highway lobbyists and their lawyers stands ready to defend this user pays principle against depredations of the general treasury. Any moves to raise taxes on gasoline, or on gas guzzlers, to expedite the transition to a more fuel-efficient automotive fleet are certain to trigger an outcry from the highway lobby, and raise the ire of tax-averse voters in both the USA and Canada. Harper is well aware that Canada's previous Conservative-led minority government fell on a budget vote in 1979, when then Prime Minister Joe Clark sought an 18 cent increase in the gas tax to spur energy conservation (Simpson and Sheppard, 1979). Highly visible gas tax hikes, especially at times when energy prices are on the rise, would seem unlikely, given history, unless some policy paradigm shift ensued.

Voluntary Behaviour—Most Popular When Others Do It

The USA and Canada are both very receptive to policy options that allow, enable or even encourage choices that head in the 'right' direction on climate change without mandating such action. States, provinces, cities and townships, and private organizations by the thousands are already adopting and implementing a wide variety of measures to seek to reduce greenhouse gas emissions in areas ranging from electric generation to waste management operations. Many of these initiatives also focus on transportation and automobile use. Some involve public purchasing initiatives, such as purchasing alternative fuel vehicles for city buses. Some jurisdictions provide tax breaks as a reward for those purchasing hybrid or other low impact vehicles. A recent study of state level climate initiatives (Rabe, 2004, pp. xiv, 145) claims that 'American states may be emerging as international leaders at the very time the national government continues to be portrayed as an international laggard on global climate change'. But the same study notes that even progress made by states such as New Jersey, which is one of the leaders in attempting to promote greenhouse gas reductions, 'raises as many questions as it answers. Can its emphasis on collaboration and voluntary strategies deliver greenhouse gas reductions over the long term? Are its programs sustainable ...?'

Even more difficult to assess are the effectiveness of public relations campaigns aimed at changing consumer and driver behaviour, such as the effort to change the image of the SUV. Activists have tried to mobilize moral and religious sentiments against the SUV by asking: 'What would Jesus Drive?' Journalists have debunked the common assumption that SUVs are safer for their passengers by highlighting their tendency to rollover (Bradsher, 2002). Columnists such as Tom Friedman (2005) of *The New York Times* have argued that gas-guzzling vehicles put money into the hands of Middle Eastern regimes that, directly or indirectly, support terrorism. Even Ralph Nader has been unable to do any serious damage to the SUV and the auto industry's image in recent years. But as long as gasoline prices remained relatively cheap, more consumers chose to purchase fuel-inefficient vehicles than appeared to be influenced by these various exhortations to think of different ways to move around.

Market Influences—How Big of a Push?

One suspects that only very large and rapid macro-economic shifts could push North America's auto fuel economy trend towards a major reorientation or paradigm shift. The kind of macro-economic change most likely to boost auto fuel economy standards would be another oil shock. A growing number of analysts are predicting that the conditions for just such a shock will arise soon (Campbell, 2005; Deffeyes, 2005; Simmons, 2005). And in the immediate aftermath of the 2005 run-up in prices due to hurricanes Katrina and Rita, America's oil-refining infrastructure appeared directly vulnerable to climate change effects (Mouwad, 2005). The US Department of Energy has forecast oil prices in the US\$50 per barrel range, while Goldman Sachs investment analysts are calling for a continued 'super spike' that could see this price double in the next few years (Luciw, 2005; US Energy Information Administration, 2006).

A significant motor fuel price increase that appeared to be long lasting would have the most influence on vehicle demand. This could deflate the market for SUVs and other fuel-inefficient vehicles without the need for explicit policy initiatives. If

this shock were to be big enough, it would also mark the beginning of the end of other trends that have made North American communities into such intensive users of automotive energy (e.g. sprawl, single-occupant commuting, etc.). But there would be many victims from an abrupt 'end of cheap oil' who might well wonder why such a drastic change was not foreseen and appropriate measures to mitigate the damage not put in place when the alarm over such an eventuality had been sounded many years ago (Campbell and Laherrère, 1998). Kunstler (2005) suggests the potential for social unrest in a period of rapid adjustment to future energy shortages is considerable.

Prospects for a Pro-active Automobile Fuel Economy Policy in North America

It is the chance to avoid this economic and environmental 'hard landing' and the resultant political backlash that could draw politicians and the auto industry together to create a new framework for improving fuel economy. In Canada, the Martin government's Kyoto commitment provided a credible counterweight to auto industry concerns about the cost of change. For a time the threat of job losses did not trump environmental concerns. The industry had to contend with the possibility that the government would impose new fuel economy regulations that went beyond the harmonized cross-border standards. The April 2005 agreement gave both the government and the industry something they needed. The government got a promise of progress on greenhouse gas (GHG) reductions. The industry received sufficient flexibility in defining how this would be achieved and in monitoring progress toward those goals that its sales and profits would not be put at risk. While it is too early to determine whether the Canadian experience with a negotiated agreement will deliver a major improvement in GHG reductions/fuel economy, it does suggest that government and industry can find common ground when they both believe that an agreement, even an ambiguous one, is preferable to inaction. There are clear signs that both the US auto industry and the Bush administration now desire to be seen to be moving beyond America's political impasse over fuel economy. The questions are how far and what form such a deal will take.

The most important factor pushing the US auto industry toward a willingness to negotiate is its weakening financial position of the two largest companies, GM and Ford. The performance of these companies shows signs of triggering an industrial crisis not seen since Chrysler's brush with bankruptcy in the late 1970s. Both have steadily lost market share for decades to foreign-owned producers. In 1970, GM and Ford combined had a 68% share of the US market for new cars and light trucks. By 2004, their share had declined to 47%. For automobiles alone, their market share was down to 38%. In the last decade Asian auto companies have made large inroads into what used to be the Big Two's most lucrative SUV and pick up truck markets (Train and Winston, 2005). The year 2005 turned into a disaster for both companies. Ford lost over US\$1 billion on its North American automotive operations for the year and announced it was cutting 30 000 jobs and closing 14 factories over the next several years (Maynard, 2006a). GM initially announced it had lost US\$8.6 billion for the year; then had to revise its loss upward to US\$10.6 billion. GM, too, announced major layoffs (Maynard and Bajaj, 2006a). In addition, it reached an agreement with the United Auto Workers union for a buyout package aimed at paring even more workers from its payroll (Maynard and Peters, 2006). More ominously, GM began to sell off assets to raise

operating capital. It sold a 78% share of its commercial finance business for US\$1.5 billion and was negotiating to sell controlling interest in its GM Acceptance Corporation for a reported US\$11 billion (Maynard and Bajaj, 2006b). Ford and GM face both a sizeable direct economic burden, and a competitive disadvantage, from their so-called 'legacy costs' of healthcare and pensions for retired workers. Such costs helped drive auto parts supplier Delphi into receivership earlier in 2005 (Hakim and Peters, 2005) and raised the spectre of reorganization for GM under Chapter 11 bankruptcy. This financial vulnerability has led executives for the two companies to a renewed interest in what Washington could do to help restore them to prosperity. Ford's Chairman and CEO, Bill Ford, speaking before the Business Round Table, urged government to convene an energy summit with the energy and auto industries to reduce America's dependence on foreign oil. Among other things the auto companies are said to want from the summit are tax breaks and other financial incentives to help companies develop alternative fuels and vehicles, and public subsidies to convert existing factories into high-tech facilities to manufacture advanced technology vehicles (Healey, 2005; Maynard, 2006b).

Second, the entire auto industry is facing a growing legal, political, and financial 'overhang' of risk and uncertainty from California's commitment to regulating greenhouse gas emissions. A loss in its pending lawsuit against the California regulations is unlikely, but would trigger a significant regulatory surge. Auto manufacturers would gain considerably from an integrated set of greenhouse gas and fuel economy standards across North America, and thus be quite motivated to negotiate with state and federal politicians for a single regime that would be less demanding in both standards and enforcement mechanisms.

Finally, there is the question of the industry's preference to minimize the risk that future political developments could produce a government in Washington that is much more willing to impose regulatory standards than President Bush and the current Republican Congress. The election of a Democratic president in 2008, especially if the Democrats regained control of one or more houses of Congress, would be an extremely serious blow to the industry's effective resistance of further regulation.

The American auto industry, particularly its two largest firms, GM and Ford, is thus in a weaker bargaining position than it has been in for many years. The question is what kind of a bargain does the Bush administration and the Republican Congressional leadership want to drive? The Bush administration may have shared industry's allergic reaction to government regulation, but the same logic may leave Washington less inclined to support other initiatives that have been applied to resolving past automotive industrial crises. Ideology leaves the Bush administration cold to the sort of detailed interventionism (or 'bailout') that Carter and the Democrats employed to prevent Chrysler from going bankrupt. When asked how his government would respond to a growing crisis at GM and Ford, Bush suggested that the industry's salvation lay in developing "a product that's relevant", adding "I think that it's very important that the market should function" (Maynard, 2006b). Nor can American manufacturers expect relief from a Reagan-era style 'voluntary' protectionism initiative against Asian automakers. Toyota, Honda, Nissan, Hyundai and others' investments in North American assembly plants have bought effective insulation from any attempt to reduce their market share through trade policy.

But one part of a rescue package that the administration could offer and that all the firms in the industry could agree on is a political 'inoculation' against large CAFE increases after 2006. Despite their reputation for fuel efficiency, Asian automakers have their eyes on further penetration of the lucrative SUV and pickup truck markets and would prefer not to be constrained by higher regulatory standards. The best strategy to prevent major CAFE hikes down the road is to lock in minor ones soon. That is exactly what the Bush administration did on 29 March 2006 with its 'reformed CAFE' plan for light trucks (US Department of Transportation, National Highway and Traffic Safety Administration, 2006). It locked in targets no higher than 24 mpg until 2011. There are indications that the Bush administration would pursue a similar strategy with the CAFE standards for automobiles (Fialka *et al.*, 2006; Herbert, 2006). With Detroit 'negotiating' with a government that takes a dim view of environmental mandates, one could expect new CAFE targets for automobiles to be set not much higher than 30 mpg. In addition, these 'reformed CAFE' automobile standards, like the 2006 standards for light trucks, would be accompanied by greater complexity and more loopholes. They would be phased in over a period extending to 2014 or beyond. The benefit of this 'political inoculation' for the Bush administration and for the auto industry would be that duly enacted CAFE standards would create a more significant legal and political constraint on more ambitious increases by future administrations and congresses than would a purely 'voluntary agreement'.

Such a deal would be easier if Republicans still held majorities in both houses of Congress, since it could be reached more amicably under such circumstances. It would certainly be attacked as far short of what is technically possible by environmental and energy groups, as well as the 35–40 Senators of both parties who supported losing legislative efforts to increase CAFE over the years. Such opposition would likely become more effective as energy and environmental concerns mount in the future. Energy and environmental advocates would certainly accept no less than level of overall reductions in CO₂ emissions that was agreed to in the 2005 Canadian Memorandum of Understanding. Even this falls below what the 2002 National Academies study concluded could be obtained with existing technology (National Research Council, 2002). The California GHG standards would require autos and smaller light trucks to meet a standard equivalent to 38.2 mpg by 2012 and to 43.4 mpg by 2016 (An and Sauer, 2004), suggesting where more a more activist president and Congress might try and take CAFE if it were extended later, rather than sooner.

Europe offers further lessons for American political leaders, should their appetite for government intervention grow in the face of energy or environmental dangers. Europe has three separate, but similar, voluntary agreements between the European Union Commission and the European, Japanese and Korean auto manufacturers associations. These accords go beyond the California standards. For example, the terms of the agreement with the Association des Constructeurs Européen d'Automobiles (ACEA, i.e., the European Automobile Manufacturers Association) committed European automakers (including GM, Ford and Daimler-Chrysler) to achieve an average CO₂ emission level of 140 g per km in their new cars sold in the European Union by 2008. This represents a fuel economy level of approximately 44.2 mpg. In addition, they agreed to review the potential for moving the new car fleet towards a goal of 120 g of CO₂ per km (or 51.1 mpg) by 2012 (An and Sauer, 2004, p. 24; Association des Constructeurs Européen d'Automobiles, 2004). Environmental groups that watch the industry's progress noted

that in 2005 it had fallen behind in achieving these agreed outcomes. European Union car makers' products averaged 160 g of CO₂ per km in 2005, only a 1% reduction from 2004. That means they would have to cut CO₂ emissions by 4.3% each year for the next 3 years to reach their target. The largest reduction under the agreement was only 2.9%, achieved in 2000 (EurActiv, 2006). Of course, even in falling short of their goals, auto manufacturers in Europe will have achieved levels of fuel economy that are far higher than the same multinational corporations have been able to produce in North America.

Sooner or later, North American automobiles will have to become much more efficient in response to energy, economic and environmental pressures. What remains to be seen is how rapidly US and Canadian policy-makers can find ways to introduce a more effective mix of policies from among the instruments identified in Table 1. In Ottawa, Martin's minority government played a relatively weak hand as best it could. The 2005 voluntary agreement on GHG reductions remains in force under Canada's first Conservative government in 13 years, although if this change in government will affect its implementation remains to be seen.

In Washington, four successive administrations since 1981 have avoided stricter regulations and higher taxes in favour of modestly subsidised research partnerships. Following years of stalemate, the current Bush administration can claim it has raised auto fuel economy standards more than any administration since CAFE was enacted in 1975. But it is fair to say that the administration has not pushed the standards 1 mile per gallon beyond where the auto companies were planning to go anyway. At this point, the best hope for a major raise in American fuel economy standards lies with the lawyers arguing the case for upholding California's GHG regulations in court. If they prevail, the stage would be set for a rapid diffusion of these standards across the USA and, very likely, into Canada.

Such an outcome would certainly spur deployment of new automotive fuel-efficiency technology much faster than occurred over the last two decades. But if this does not happen, one should look for a more decisive break with past policies to occur under the pressure of a hard landing into energy and environmental crises. Here, much of the policy inheritance that accompanied the stagnation of automotive energy efficiency from the mid-1980s to the early 21st century would be jettisoned as a new regime was drawn up on a clean slate. Old ideas about what the automotive sector could do for America and Canada, and the interests that had maintained such a consensus, would be swept aside by forces beyond the control of the policy actors who had faced one another down over the question of improving automotive fuel economy during the two decades between 1985 and 2005.

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Note

1. 'Light trucks' were defined, very broadly, by the 1975 law that created CAFE as "automobiles which are not passenger automobiles". Subsequently, there has been a substantial amount of discussion and reclassification of vehicles into and out of the light truck category, mainly to suit the convenience of auto manufacturers (Bradsher, 2002, pp. 23–30). By definition, therefore, 'passenger automobiles' are not light trucks. 'Light-duty vehicles', on the other hand, include all vehicles — both passenger automobiles and light trucks — of fewer than 8500 lb gross vehicle weight rating, i.e. the weight of the vehicle plus its rated cargo capacity (Dieselnet, 2006).

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