Reducing Single-Occupancy Vehicle Use in Northern New England;

Unlimited Access, Employee Incentives and Ridesharing

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UVM Transportation Research Center

June 30, 2014

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Acknowledgements

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1. INTRODUCTION

This report focuses on the approaches used by organizations promoting sustainable transportation to reduce single-occupancy vehicle use. Transportation contributes about one-third of GHG emissions in the U.S. and personal automobile use is the leading contributor. For example, in the journey to work, about 84% of trips in the U.S. are in automobiles, and 74% of the trips are individuals driving alone. [1]

In this research, we identified 120 organizations promoting sustainable transportation in Vermont, New Hampshire and Maine. Participants were defined as organizations involved in sustainable transportation policy, through either having a registered lobbyist, appearing in the news media as an advocate for a policy position, having testified in the Legislature, or presenting plans that promote policies related to sustainable transportation. The organizations also had to be officially incorporated as a nonprofit, business or government agency and have an office in one of the three states. We asked each organization to identify successes in reducing single-occupancy vehicle use and in promoting sustainable transportation policies and programs (e.g., walking, biking, public transit).

Thirty-five of those organizations responded, and we parsed these responses to identify organizational focus on reducing driving behavior. In the following sections we present survey results focusing on the three most frequently mentioned programs/policies to reduce single-occupancy vehicle use—unlimited access programs, employee benefit programs and ridesharing.

1.1. Obstacles to reducing SOV use in Northern New England

Before turning to our discussion of solutions offered by the organizations, it is worth noting that obstacles to reducing existing driving patterns were frequently highlighted by respondents. Household vehicle ownership, dispersed settlement patterns, the lack of real alternatives, and infrastructure that privileges the car all serve as major obstacles to reduce SOV use. [2]

Respondents raised all of these issues as constraints on changing driving behavior, pointing also to the lack of political leadership in promoting change.

"There is nothing happening in Vermont that will significantly shift mode share away from SOVs. The state, particularly the state DOT (VTRANS) needs a big paradigm shift, like what is happening in some large U.S. cities and in Northern Europe"(Vermont respondent).

"It is difficult to reduce the use of private automobiles when a workforce is spread over a wide geographic area and in the climate that we have" (Maine respondent).
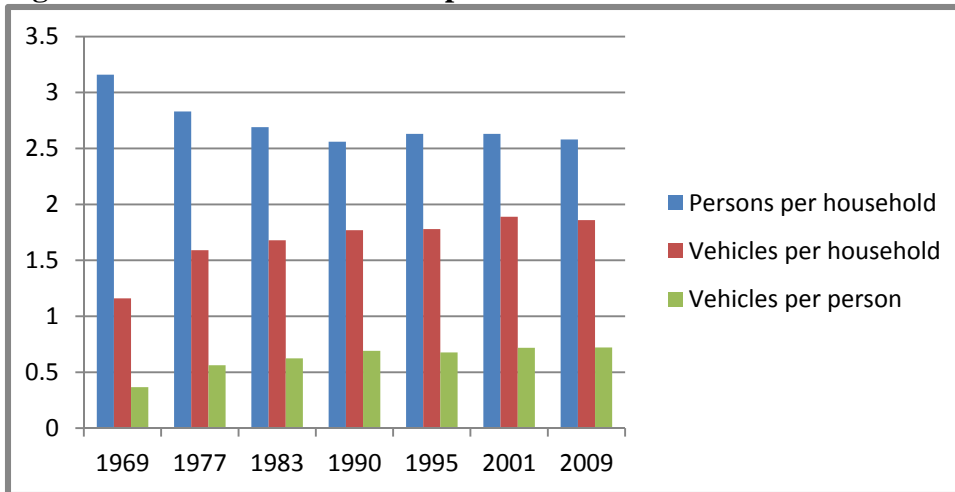
"I live in a state where, frankly, the level of investment in public transportation and other alternatives to the private automobile is nothing short of pathetic. Unless federal

*guidelines are amended to dictate that a certain percentage of federal funding for
transportation projects needs to be spent on alternative transportation options, this is
unlikely to change anytime soon"* (New Hampshire respondent).

1.2 Background on Single-occupant vehicle use in the three states

Single-occupancy vehicles have been the primary mode of transportation in the United
States for decades [6], [7] despite increasing fuel prices and road congestion. An increasing
number of vehicles per household combined with shrinking household size have
increased per-household car ownership over the past half century. Two-car households
are common, and the youngest and oldest segments of the driving population drive with
increasing regularity compared to 50 years ago. [6], [7]

Figure 2-1. U.S vehicle ownership statistics over time

Vehicle miles traveled per capita in all three states exceeded the national average of
10,003 in 2005. Eighty percent of the region's population lives in Maine and New
Hampshire, states where the percentage of trips made by SOV exceeds the national
average.[3] Trips by public transportation account for less than one percent of the region's
modal split, far below the national average of 5% [3] (Table 2-1).

Table 2-1. Modal split among Northern New England commuters (2009)

	VMT/Cap	SOV	Carpool	Transit	Walking	Other
Northern New England	11,068	79.2%	9.2%	0.7%	3.9%	7.0%
Vermont	12,380	74.8%	10.0%	0.9%	5.4%	8.9%
New Hampshire	10,212	82.2%	8.0%	0.6%	2.8%	6.3%
Maine	11,298	78.3%	10.1%	0.7%	4.2%	6.8%
United States	10,003	76.1%	10.0%	5.0%	2.9%	6.0%

Although rural areas have less transit use, [8]–[10] even densely settled parts of the region have modal splits weighted toward SOV dependence, [3] including metropolitan statistical areas with urbanized centers exceeding 50,000 individuals. (Table 2-2).

Table 2-2. Modal split among commuters from selected MSAs (2009)

	SOV	Carpool	Bus	Walked	Other
Burlington-South Burlington MSA	75.3%	9.8%	1.7%	5.6%	7.6%
Manchester-Nashua MSA	84.7%	7.7%	0.5%	1.6%	5.5%
Portland-South Portland MSA	78.8%	9.1%	1.2%	3.9%	6.9%

It is only among city residents in the heart of the urban core that we find substantial decreases in SOV use. For example, 57.6% of Burlington residents commute by SOV, while 66% of Portland residents do the same.[3] These cities also see significantly higher rates of transit and walking commutes. The exception is the City of Manchester, where single-occupant vehicle use actually *exceeds* statewide rates (83.3% vs. 82.2% in 2009).

1.3 Few incentives, opportunities to change habits

As of 2010, only 47% of the region's population lived in urban areas, [3] defined by the U.S. Census as dense clusters of at least 2,500 people. [11] The remaining population is spread throughout rural areas (Figure 2-2) challenging non-car alternatives such as biking, walking and public transit. [8] [9]
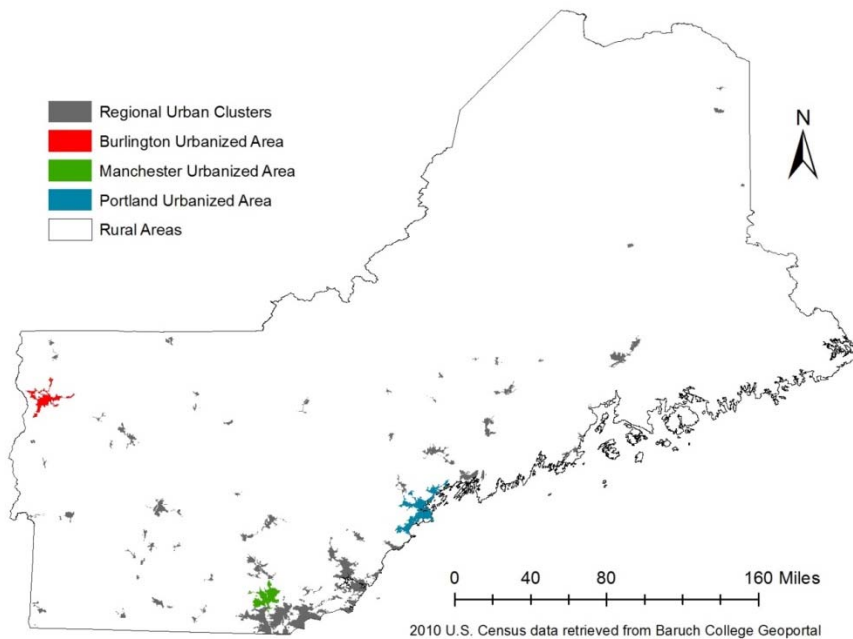

Figure 2-2. Northern New England's urban landscape

The population of Northern New England is also significantly older on average than other regions of the U.S., which adds to the challenges in promoting alternatives to the SOV. The regional median age (42 years) is more than five years above the national average (37 years). [12]

Access to public transportation is limited outside metro areas. DuFresne et al.[8] and VTrans [13] show that Vermont's bus network has a presence in all counties, but the spatial and temporal constraints of the bus routes leave many communities unserved or underserved. DuFresne et al. [8] uses the provider Rural Transportation Services (RTS) as an example. RTS serves four counties in northeastern Vermont, but it only has two fixed-line routes, reaching four towns. Residents in the other 50 towns cannot rely on public transportation to meet their needs.

In New Hampshire, Antal et al. [14] finds only half of state residents had access to a reliable public transportation system, despite a majority of the population residing in urbanized areas. Only 35.7% of state residents said public transportation was available when they needed it, and 34.1% said it was not available where they wanted to go. Maine's public transportation network also faces challenges. The majority of services are municipal in scope, and the fleet sizes reflect the small size of the average Maine community. [15]

The low and nonexistent cost of parking serves as an incentive to car use over other modes. The city of Burlington reports 35% parking vacancy during the busiest part of the week. [16] The city of Manchester has similar citywide vacancy at peak hours, with public parking in the central business district remaining 20% vacant at peak. [17] Metered parking is limited to urban cores, and most car users pay little or nothing to park. The low cost of parking disincentivizes the adoption of alternative modes. For example, an Australian study found that a 10% increase in parking cost resulted in a 2.91% increase in mass transit trips. [18]

2.0 SUCCESS STORIES

In January 2013, we circulated a survey to 120 organizations conducting sustainable transportation in Vermont, Maine and New Hampshire. About one quarter (34) responded, and we augmented that by searching through web sites and news articles. In all cases we were looking for research-based programs with metrics that showed increased use of alternative modes. We have broken down the most effective programs into three categories: unlimited access, employee incentives and ridesharing.

2.1 Unlimited Access

Unlimited access (UA) refers to an approach where transit rides are charged to participating employers—who pay a reduced rate per ride—rather than to the individual users. [19]

A major adopter of UA programs over the past decade has been universities, seeking to reduce the considerable infrastructure costs needed to support SOV commuters. [19]–[21] UA programs increase ridership on transit and provide several additional benefits, which we detail below. [19]

Universities are often the largest employers in an area, so their UA programs can have a profound impact in shaping the regional transit system. [21]The increased demand for services by UA-affiliated employees leads to increased service provision by the transit provider. [19] UA programs add riders which then allows the transit agency to add service, therefore attracting more riders and achieving a positive upwards feedback loop. [19], [22]

Unlimited access has the indirect benefit of reducing local road and parking congestion. In comparing the effect of UA on two neighboring universities—one with UA and one without—Dorsey [21] predicts that if the student and faculty ridership of UA-affiliated students and employees transferred to the non-UA university, the drop in SOV commutes would vacate up to 2,500 parking spaces (and 5,000 trips) daily.

2.2 CATMA's Unlimited Access Program

Beginning in 2003, the Campus Area Transportation Management Association (CATMA) has coordinated with local universities to offer no-cost bus rides to students, faculty and staff on all fixed lines of the Chittenden County (Vermont) Transportation Authority (CCTA). The number of participating institutions has expanded since implementation, and now includes the three largest in the area: the University of Vermont, Champlain College and Saint Michael's College. [23] Middlebury College joined in 2012, connecting to downtown Burlington via long-distance express line several times daily.

The only up-front obligation of eligible riders when boarding the bus is to slide a valid university identification card into a payment terminal. CATMA presents institutions with invoices at the end of each month. The payment approach is unique in that institutions are only responsible for actual rides taken, rather than being charged a set fee per user. Bulk pricing means rides are less expensive than if purchased on-site, averaging between $0.90 and $0.95 per ride between FY 2008 and FY 2010 as opposed to $1.25 for a typical single-ride ticket. [23]

University transit ridership has grown significantly since the implementation of unlimited access. Program-wide ridership has increased 57% since FY 2008, from 263,634 to 458,427. The expanding ridership reflects the addition of new institutions as well as increased use among existing members.

No institution better portrays CATMA's success than the University of Vermont (UVM). With over 14,000 students and faculty, [24] UVM is the largest institution participating in the UA program. [23] UVM's initial trial period in spring semester 2003 averaged 5,549 rides per month. The program took a leap forward in 2003

when CCTA worked with a group of Environmental Studies students in a sustainable transportation planning class (ENVS-195) to design and develop a campus marketing plan, (See Figure 3) with ridership nearly tripling following that campaign.

Since then ridership has steadily increased at more than 10% annually over the subsequent decade. As of 2012, University of Vermont students and employees used the service nearly 40,000 times per month during the school year.

Unlimited access has changed the overall commuting behavior and satisfaction in the university community. [23] The ease of riding public transportation without an up-front cost has reduced SOV commutes among students and employees. Among students living more than a half-mile from campus, driving alone decreased from 79.4% in 2003 to 49.2% in 2010. Transit ridership among off-campus students increased from 3.7% to 20.8% over the same period, as the modal split diversified overall [23] (Figure 3-1).
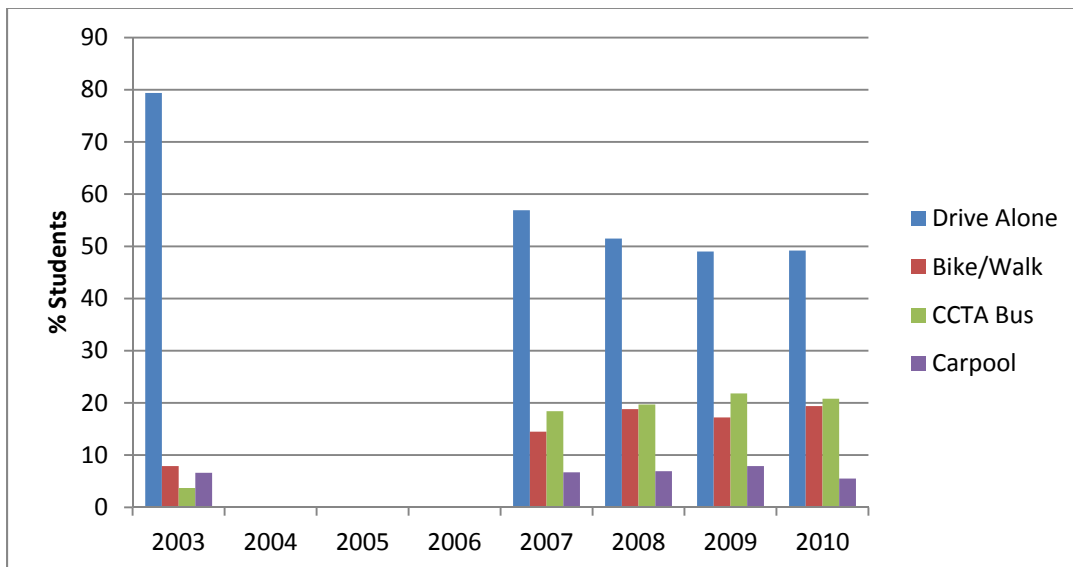

Figure 3-1. Modal split among UVM students > 0.5 mi from campus

There are signs that the UA program has impacted the overall transit system in the region. Unlimited access trips accounted for more than 15% of CCTA's 2.7 million unique rides in FY 2012. [23], [25] This significant impact on overall ridership has brought more federal dollars to CCTA, which have helped to fund the continuing expansion of transit provision in the Burlington metropolitan area and neighboring counties. [26]–[28] More full-fare riders have chosen to utilize public transit as service expands. Examples include:

- doubling the frequency of service during peak hours along the Essex Junction (#2) route increased ridership by 21.6% between FY 2009 and FY 2012.

- expanding the LINK Express routes in frequency and bus capacity led to 5-15% increases in ridership in FY 2012. [25]

The LINK Express routes connect major Vermont communities to the Burlington metropolitan area. The service is especially attractive among UA-eligible riders, who need pay neither the $4.00 one-way fare nor the fuel and parking costs associated with the usual SOV commute. These trends coincide with the doubling of the percentage of commutes by transit in Vermont since 2007, far exceeding the adoption rate throughout northern New England over the same time period (Figure 3-2). [3]
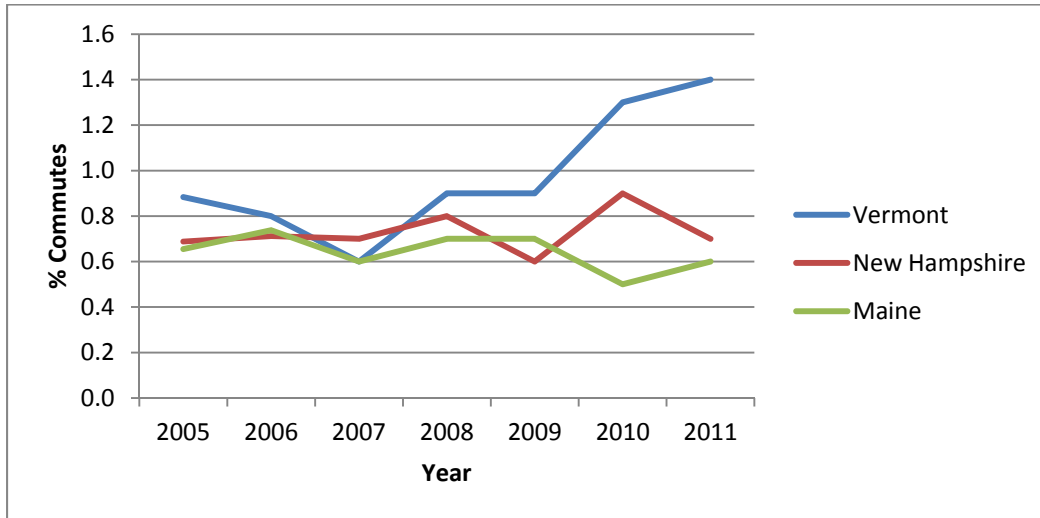

Figure 3-2. Commutes by transit in Northern New England

2.3 Advance Transit

Advance Transit is the fixed-route and paratransit service for the Upper Valley, along the Connecticut River near the towns of Norwich, VT, and Hanover, NH. The service connects outlying areas to the amenities of the micropolitan core, including Dartmouth College, Dartmouth-Hitchcock Medical Center and other large area employers. The service is free to all riders thanks to public and private partnerships. These partners have not only contributed financially to the service, but they have also "been strong advocates for the utilization of the system by their staff and patrons," according to NHDOT's Public Transportation Administrator Shelley Winters.

Ridership has increased along Advance Transit's New Hampshire routes since the implementation of fare-free service, providing over 800,000 rides in 2012. The surge in passengers has made Advance Transit one of the most productive transit providers in the state on a per-unit basis—e.g., passengers per mile, passengers per hour. The potential exists for significant reductions in SOV trips as the program expands.

2.4 Employee Incentives

Commuting is one of the most consistent and in-elastic trip types. [29] Commuters may be locked into automobile travel unless they live near enough to their workplace or transit lines to utilize other modes of transportation. They may also continue to travel in their own vehicle despite the presence of alternatives. This is partly due to factors such as increased reliability, flexibility and privacy. Employers can play a tremendous role in shaping worker transportation patterns. Here we present two innovative employer-based programs aimed at reducing SOV use.

2.5 AllEarth Renewables

AllEarth Renewables, a renewable-energy manufacturer based in Williston, Vermont, implemented an innovative program to incentivize smart energy consumption in 2012. [30], [31] Titled "Renewables & Efficiency: A Workplace Initiative to Reduce Emissions (REWIRE)," the program provides each employee with an annual bonus of $6,000 to cover all energy needs including vehicle use, home heating and electricity. The company asks its employees to track their household energy use, and then deducts $0.15 for each kilowatt-hour used. Employees receive the remainder of their bonus at the end of the year. The bonus can be substantial, but if an employee uses more than $6,000 worth of energy (40,000 kilowatt-hours), he or she does not receive a bonus. Employees are not penalized for exceeding the bonus's energy budget.

The incentive to receive as much of the bonus as possible compels employees to reevaluate their energy expenditures, especially those related to transportation. The vehicular component of energy use is measured by estimated annual miles driven by all household vehicles, meaning that the endogenous cost of energy through public transit or active transportation is not included. Many employees have turned to carpooling to share energy use on their daily commutes, while other employees have opted for public transportation to eliminate their transportation energy use altogether. [31] By reducing SOV trips, employees not only spend less on fuel and parking but also earn a larger annual bonus. [30]

2.6 Cx Associates

Cx Associates, a building commissioning firm in Burlington, implemented a six-point Green Incentives program to get its employees out of their vehicles. [32] The company started by charging its employees for parking after conceding that "free" parking had a community-wide economic cost. It coupled this penalty with several initiatives to direct individuals away from their cars. These include company-paid bus passes, carpool

placement and $200 gift certificates to purchase walking and biking accessories. Employees used to traveling by car are rewarded with gift certificates to local restaurants "for every 50 miles cycled or 25 miles walked as part of their commute," says Operations Manager Eric Hauser. [32] For employees who decide to drop their vehicles altogether, Cx Associates pays the annual fee of a CarShare Vermont membership.

2.7 Maine Medical Center

In June 2008, Maine Medical Center implemented a multifaceted transportation management plan at the request of the City of Portland. [33]The plan encourages its 4,500 employees to utilize alternative modes of transportation on their daily commute. Carpoolers and vanpoolers receive gated card access to convenient ground-level parking. New bike lockers and bicycle repair equipment were installed, and existing racks were rearranged to more convenient locations. Employees may purchase METRO Bus multi-ride tickets at half price from several locations throughout the hospital.

The program exceeded expectations in its first year of operation. [34], [35]Fifteen percent of employees enrolled in the program. Carpooling was the most popular alternative mode, with around 400 users, which almost doubled initial projections. Walking and biking attracted more than 100 users each. Transit adoption did not meet analyst expectations, though it should be noted than less than one-third of the hospital's employees live in the city itself. Nevertheless, 1,200 subsidized multi-use tickets were sold during the first year. Vanpooling did not catch on, perhaps due to the logistical difficulty of forming and operating a consistent vanpool.

2.8 The University of New Hampshire

The University of New Hampshire in Dover has an "elaborate and ongoing transportation demand management plan," says Marc Laliberte, program manager of UNH Transportation Services. It combines transportation and land-use tools to reduce automobile dependence on campus. Employees and students may ride the university transit network free of charge, including four intercity lines designed for commuters. Individuals with standard parking passes may apply for special carpool permits, which permit the driver to park near the campus core. The university plans to increase on-campus housing, which will bring a larger proportion of the student body within walking distance of their courses. Other long-term goals include raising parking fees, augmenting transit schedules and improving transit shelters.

The 2012 UNH Transportation System Data Check [36] shows decreasing automobile use among students and employees. There was a 6% decrease in total parking permits issued between 2007 and 2012 despite campus growth. This decrease was greater among on-campus students. Meanwhile, transit ridership has consistently increased. The University's transit system registered a total of 1.2 million rides between 2011 and 2012. The intercity buses have seen higher gains, including a dramatic 20% increase in

ridership during the first half of 2012. The University's transit service is now the largest transit system in the state, reducing SOV ridership by hundreds of thousands of vehicle miles travelled annually. [37]

3.0 RIDESHARE PROGRAMS

As mentioned above, growth in car ownership, dispersed land settlement patterns, highway investments, travel behavior and socioeconomic changes have all contributed to a dramatic increase in automobile use in the U.S. over the last 80 years.

Increased ridesharing improves efficiencies in the transportation system by reducing road and parking infrastructure costs. This is because if more people shared rides, especially at peak periods, then there would be less demand for added road and automobile infrastructure. Furthermore, increasing vehicle occupancy rates reduces vehicle emissions through reducing individual vehicle use. For these reasons, state governments have turned to promoting ridesharing as a key strategy in reducing single-occupancy vehicle use. For example, average vehicle occupancy rates in the U.S. for work trips are about 1.1 per vehicle, down from 1.3 in 1977. Increasing occupants per vehicle would result in less SOV trips, reducing pollution and saving consumers money.

Survey respondents identified state rideshare programs as the most successful programs in changing driving behavior and reducing SOV use.

Our greatest success? "*Probably the Go! Vermont program and Way to Go week*" (Vermont respondent).

"So in terms of decreasing the use of personal automobiles, that's been primarily the Go Maine program. It's the carpool/van pool program" (Maine respondent).

These programs also incorporate a shared parking infrastructure, called Park and Rides, where carpoolers meet to share rides. This respondent explains the relationship between Park and Ride lots and the rideshare program:

The Department's Rideshare program includes over 30 Park and Rides located strategically throughout New Hampshire. The Department recently implemented new rideshare software. Park and Rides work effectively throughout New Hampshire because New Hampshire's sprawling development patterns often favor private vehicle use" (New Hampshire respondent).

3.1 Ridesharing

Ridesharing, also known as carpooling, is defined as driving with two or more persons in the vehicle. [38] It is the second-most popular commuting mode in northern New England. The share of commutes by carpool has remained at around 10% since 2009, with the exception of New Hampshire.[3] The modal split has been on par with the national average over the same period (Figure 3-3).
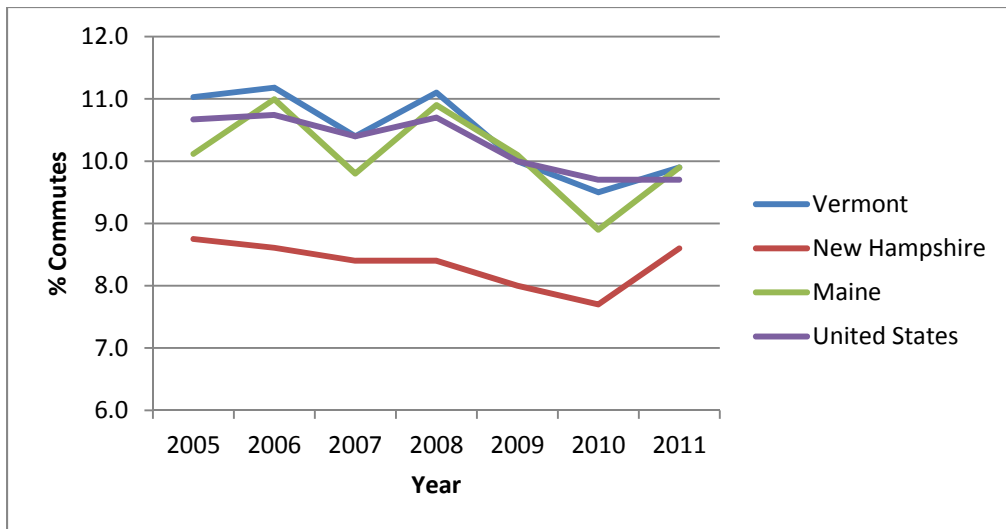
Figure 3-3. Commutes by carpool in Northern New England

Ridesharing is a low-cost method to reduce the number of SOV trips, but it has been slow to catch on for a number of reasons, including private vehicle ownership rates, dispersed settlement patterns and trip-training (See TRC Report Carpooling in Vermont, 2012). State and local governments have sought to increase the rate of carpooling adoption by developing digital infrastructure alongside physical carpooling amenities. These ridesharing portals connect commuters with similar travel patterns who would otherwise not know each other. They also offer resources and information that make carpooling more attractive.

3.2 Organizational Rideshare Programs in Vermont, New Hampshire & Maine

While primary funding for these programs stems from state DOTs, each state has configured them slightly differently. They all share a statewide emphasis, with the overall goal being to increase per-state vehicle occupancy rates. While individual ridesharing is happening outside of these programs, here our focus is on organizational approaches to ridesharing and reducing SOV use.

Vermont: Go! Vermont (http://www.connectingcommuters.org) is the state's digital resource hub for commuter transportation options. Ross MacDonald, Go! Vermont's program manager, says the website was introduced after an extensive marketing campaign geared toward early innovators and schedule-consistent commuters. Its website saw 150 web hits per day after rolling out, with 7 to 12 calls and emails daily inquiring about the service. Six hundred individuals signed up for the ride-matching service in the first month of operation. Go! Vermont members are entitled to a "guaranteed ride home benefit," which reimburses users for emergency transportation, e.g., due to mechanical issues or sudden illness of the rider or driver. [39]

Go! Vermont's ability to cater to the needs of individuals has made the service attractive to commuters, and MacDonald indicates the program continues to grow. The service's website now has 200 web hits daily. Over 1,000 people have registered with the rideshare

service since it re-emerged under Zimride in October 2012, leading to 1,700 registered trips as of May 2013. The number of calls and emails inquiring about the service has slowed down as the public becomes more aware of the program and information is spread by word of mouth. MacDonald expects the number of vanpools to increase to 20 by the end of FY 2014, transporting at least 140 individuals daily and reducing SOV trips by nearly twice that amount every weekday. The program's continuing success is facilitated by industry partnerships, such as the use of Efficiency Vermont's call center and Zimride's rideshare service. The service also coordinates vanpools wherein groups of individuals are subsidized to purchase vans for regular commute routes.

Maine: GO MAINE (http://www.gomaine.org) is similar to Go! Vermont. Both services disseminate information regarding transportation alternatives to commuters, in addition to rideshare coordination and advocacy. GO MAINE orchestrates ride matching using an in-house service for consistent commuters and one-time trips. Like Go! Vermont, it has an "emergency ride home guarantee" so carpoolers do not need to worry about being stranded without their vehicles. GO MAINE differs from its Vermont counterpart in that it does not directly involve itself in coordinating vanpools. Rather, it directs users to third-party rental agencies with vanpool experience. It also provides information on insurance, licensing and taxation for enthusiastic commuters wishing to start their own tax-exempt vanpool nonprofit or LLC (Starting your own vanpool, n.d.). GO MAINE is still in the early stages of diffusion and the results have not yet been shown to shift a significant proportion of SOV trips off the road. [40]

New Hampshire: New Hampshire lacks a centralized, publicly funded commuter resource hub. Green Commute NH (http://commutergreennh.org) is the general information terminal for individuals looking to shift from SOV commutes. The website aggregates transportation-related events from across the state onto a single platform, though the majority of its profile is devoted to specific "challenges" where individuals compete to replace SOV trips with alternative transportation methods—ridesharing included. NH Rideshare (http://www.nh.gov/dot/programs/rideshare/) is the state's primary carpooling resource, and it is complemented by regional carpooling initiatives such as the Monadnock Rideshare Board (http://www.cvtc-nh.org/ride-display.php). The state and regional programs link drivers and riders on an individual basis, but they differ from the other states' services by not referencing vanpooling in any capacity. They instead place heavy emphasis on intermodal commuting by referencing park-and-ride lots and mass-transit services that can work in tandem with ridesharing. [41]

4. CONCLUSION

While the social, economic, demographic and land-use obstacles to reducing SOV use are formidable, this research suggests that there are examples where government agencies and non-profits are reducing individual vehicle use. Reducing SOV use will take a combination of public policies (restricting parking, unlimited access programs) as well as organizational and individual behavior changes. Organizations can clearly play a role as we show here, but major changes will have to occur in both public policy and societal norms to address the institutional barriers that constrain change.

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