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Small Communities Benefits

Innovative Traffic Management Practices in Small Communities

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16. Abstract

Aiming to draw attention to progressive and innovative traffic management practices that could be viable in similar locations or situations, this report features five model small communities. The examples have been selected in order to achieve a balance of varying population sizes, traffic management solution types, and geographical locations. Monrovia, California (pop. 37,000) was experiencing collisions or near-misses between emergency vehicles and motorists at intersections. In response, the City deployed an emergency vehicle preemption and visual warning system. Towson, Maryland (pop. 52,000) constructed a modern roundabout to improve a dangerous, congested, five-way signalized intersection at the city center. Mount Desert Island, Maine (pop. 10,000), home to Acadia National Park, instituted a seasonal shuttle bus service to permit continued growth in tourism without continued growth in traffic congestion and vehicle emissions. Orem, Utah (pop. 84,000) installed a computerized traffic signal coordination system to improve traffic congestion in the central business district. And Aspen, Colorado (pop. 8,000) established a non-profit car sharing organization to reduce the parking demand, in a community where demand for residential parking exceeds supply.

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Executive Summary

When large cities are faced with traffic management problems, they often respond with complex and costly solutions that seem out of reach for small communities. New roadways, light rail lines, and many of the more ambitious intelligent transportation systems are far too expensive to build and maintain for smaller cities and towns. As a result, small communities across the United States have become adept at finding progressive and innovative traffic management solutions that are compatible with their more modest financial and human resources. The main purpose of this document is to highlight some achievements of these small communities and share their traffic management practices and success stories with other communities that might learn from such examples.

Aiming to draw attention to progressive and innovative solutions that could be viable in similar locations or situations, this document features five model communities. The five examples listed in Table 1 have been selected in order to achieve a balance of varying population sizes, traffic management solution types, and geographical locations.

Table 1. Five Distinct Communities, Five Distinct Solutions to Traffic Management Problems

Community	Population	County Population	Problem	Solution
Monrovia, California	37,000	9,519,000	Collisions or near-misses between emergency vehicles and motorists at intersections	Deploy an emergency vehicle preemption and visual warning system
Towson, Maryland	52,000	754,000	Dangerous, congested conditions at a sprawling, five-way intersection	Construct a modern roundabout and improve the streetscape
Mount Desert Island, Maine	10,000	52,000	Seasonal traffic tie-ups due to proximity of Acadia National Park	Operate a seasonal shuttle bus service
Orem, Utah	84,000	369,000	Traffic congestion in the central business district	Install a computerized traffic signal coordination system
Aspen, Colorado	8,000	15,000	Demand for residential parking exceeds supply	Establish a non-profit car sharing organization

Monrovia, California: Emergency Vehicle Preemption and Visual Warning System

In the spring of 2001, the City of Monrovia, California (population 37,000), equipped 10 signalized intersections with a highly advanced traffic signal preemption system. The new system combines signal preemption with visual warning and communications capabilities. Emergency vehicles are equipped with satellite-linked transponders that track their position and movements. When a vehicle in emergency response mode approaches an intersection equipped with the early warning system, the traffic lights change to give it the right-of-way. Illuminated warning signs mounted above the intersection display flashing icons that show motorists the direction of the emergency vehicle's approach. All of Monrovia's police cars, fire trucks, and ambulances are now equipped with the transponders that allow them to trigger the warning signs.

The decision to install this revolutionary system was taken following a spate of bad accidents involving fire and police vehicles in 1999. The city realized that driver education and driver training programs were only partially effective when it came to preventing such occurrences. Monrovia's fire chief, Peter M. Bryan, observed: "At a time when everyone seems to be driving quiet, sound-insulated cars with windows closed and radio or stereo music playing, our fire truck operators just cannot rely on lights, sirens, and horns to notify motorists of their approach."

> "This is cutting-edge technology that will enhance traffic safety and at the same time allow our officers and firefighters to get through traffic and respond quicker and safer to people in need of emergency services."
>
> – Joe Santoro
> Monrovia Chief of Police

Alarmingly, Monrovia's problem is not unique. In the United States in 1997, emergency vehicles responding to emergency calls, were involved in more than 15,000 accidents, resulting in 8,000 injuries, 500 deaths, and millions of dollars in liability and damages. Another troubling statistic: 40 percent of firefighters who die each year in the line of duty do so while en route to the scene of a fire or medical emergency.

The concept for the visual warning system dates back to the late 1970s, when inventor Jim Davidson was nearly struck by a fire truck he failed to see as it sped through an intersection. Shaken, he returned home, and began inventing a warning system that could have prevented his near-fatal mishap. By the late 1990s, Davidson founded a company that worked to propel his idea from the drawing board to the road. He sought the expertise of engineers at NASA's Jet Propulsion Laboratory (JPL) in Pasadena. Under JPL's Technology Affiliates Program, large and small businesses are able to tap the specialized expertise of JPL engineers to solve particular technical challenges. As James Rooney, the Technology Affiliates Program director noted, "A very important part of the NASA/JPL mission is not only to explore the universe and to develop the technology that meets that mission but also to see if we can work with companies to find good uses of that technology, especially when it includes humanitarian and global impacts." The strategic relationship between Davidson's company and JPL proved highly successful, and within months a prototype system was operational.

Source: E-ViEWS Safety Systems, Inc.

Monrovia, California fire trucks safely traverse an intersection equipped with emergency vehicle preemption and visual warning system.

In 2000, Monrovia began looking for a technological solution to the problem. At the same time, Davidson's company, E-ViEWS Safety Systems, Inc., based in Agoura Hills, California was seeking a place to demonstrate its new traffic safety equipment prior to the product's commercial debut. The product was called Emergency Vehicle Early Warning Safety System, or E-ViEWS. When Davidson's company offered to supply and install some 600,000 dollars' worth of equipment at no cost if Monrovia agreed to help assess its effectiveness, former Mayor Robert T. Bartlett jumped at the chance. "Monrovia is very open to high-tech solutions," police captain Terry Dochnahl observed. With JPL just seven miles away and a number of Monrovia residents employed in science and technology fields, the community's enthusiasm for cutting-edge solutions to traffic safety problems is not surprising.

In the spring of 2001, 10 Monrovia intersections along Huntington Avenue and Foothill Boulevard were equipped with visual display boards, mounted on traffic signal mast arms above the center of the intersections. Twenty police cars and 10 fire emergency vehicles were outfitted with transponders that communicate via microwave with receivers on the display boards. When an emergency vehicle is within 3,500 feet of a board, the police officer or firefighter activates the vehicle's transponder, causing the traffic lights at the intersection to automatically turn to yellow, then red, for cross-traffic and oncoming traffic. The board sends a signal back to the transponder, informing the officer or firefighter that priority has been approved. At the intersection, the visual warning display signs are activated. On the board, an icon in the shape of an emergency vehicle flashes brightly, indicating the

vehicle's direction of approach and departure. The icons appear to move across the board in step with the actual movement of the emergency vehicle as it passes through the intersection. Each emergency vehicle's contact with a board is recorded and stored in memory for later download at the site. Alternatively, the information can be sent electronically to a master traffic system.

Preemption and Warning System Benefits (from Traffic Intersection Facts and Figures brochure published by E-ViEWS Safety Systems, Inc.)

For communities, insurance companies, and motorists, an advanced signal preemption and visual warning system offers:

- A major reduction in intersection traffic accidents involving emergency vehicles;
- Dramatic reductions in fatalities and injuries due to intersection accidents and associated governmental employee disability claims;
- Significant reductions in city, county, and state liability lawsuits;
- Shortened emergency vehicle response time, resulting in life-saving outcomes for medical calls and greater crime fighting action;
- Lower insurance premiums for local governmental jurisdictions; and
- Reduced stress on emergency vehicle operators.

The response to the new system has been enthusiastic. On the day the system was inaugurated, the media turned out in force to photograph emergency vehicles sweeping through a broad intersection as an illuminated overhead sign flashed a warning to motorists and pedestrians.

It was not long before the new system was put to a real life test. In July 2001 the fire department responded to an emergency call from a Monrovia resident who had been left seriously bleeding after suffering an attack by a vicious dog. By using all preemption-equipped intersections, rescuers were able to shave several minutes off their response time, minutes that the fire department later reported had made the difference between life and death for the victim. "The injuries sustained by the attack were life threatening and response time was critical," engineer Tom Ochoa explained. "We used all the intersections equipped with the E-ViEWS Safety System. It performed perfectly and cleared all the intersections on Huntington Boulevard, well in front of the approaching fire trucks, allowing us to cut valuable minutes off our arrival time. The wounds inflicted were life threatening and every minute counted. I feel the E-ViEWS Safety System contributed greatly in the saving of a life."

The benefits have potential to go beyond emergency vehicle preemption at intersections. Placed along rail at-grade crossings, for example, similar systems can provide greater awareness of a train's arrival than whistle blowing and can help eliminate the need for loud whistles that disturb communities. Moreover, because the illuminated board is a sophisticated variation of a dynamic message sign, it can be made to display a variety of notices, such as construction or weather alerts.

Is an Emergency Vehicle Preemption and Visual Warning System Right for Your Community?

Any community that is concerned about conflicts between emergency vehicles and motorists at signalized intersections would benefit from considering some kind of preemption system. As a minimum requirement for deploying an emergency vehicle preemption system, a closed-loop, computerized signal system should be in place along the desired corridor. Communities interested in such systems should begin communicating with stakeholders such as law enforcement, EMS, fire department, and the municipalities in control of the traffic signal system. In addition to the more sophisticated E-ViEWS visual warning system, which costs about 25,000 dollars per intersection (including installation) simpler systems are also available on the market. Also, a number of companies sell preemption systems designed for a single location. Some communities might therefore consider starting small by installing a more basic preemption system at one key intersection. Funding sources can include Federal TEA-21 dollars, small bonds, City, County or State Transportation Funds. According to E-ViEWS, cities that install their system should reduce their tort liability claims by 75 to 85 percent, thereby, in most cases, paying for the system within three years.

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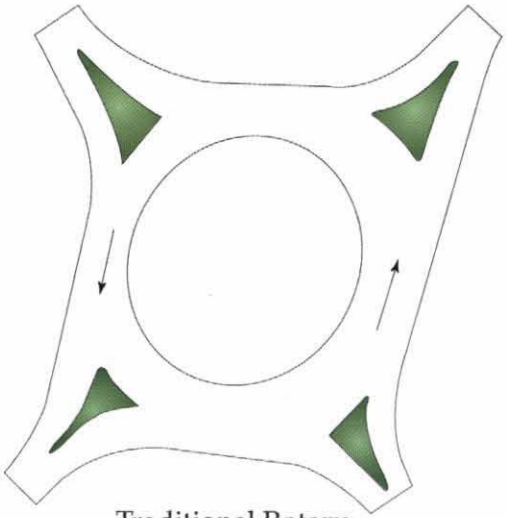
Towson, Maryland: Traffic Calming and Intersection Redesign

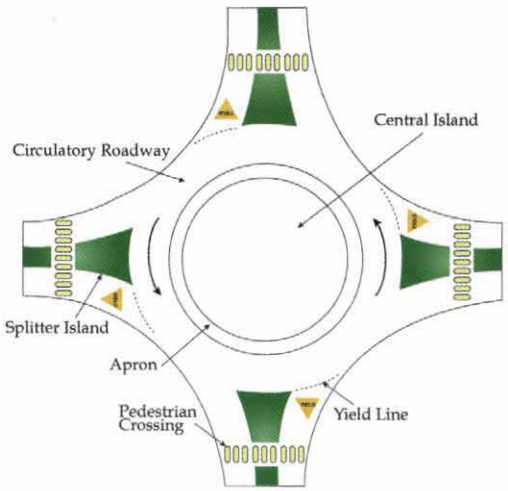
Prior to 1998, the five-way intersection that served as the gateway to Towson, Maryland (population 52,000) was a sprawling expanse of pavement punctuated by confusing signs and traffic signals. Where York Road (MD 45), Dulaney Valley Road (MD 146), Joppa Road, and Allegheny Avenue converged, accidents and traffic tie-ups were common, and the air was filled with exhaust fumes from cars idling at red lights. Traffic engineers rated the Level of Service during peak periods as "F", meaning motorists could expect delays of at least 80 seconds. Pedestrians, deterred by the noise, fumes, and press of cars that seemed to come from all directions, shunned the area, preferring instead the safety and predictability of the nearby Towson Town Center shopping mall.

The Maryland State Highway Administration (MSHA) tried a number of solutions to improve the way the intersection functioned. It rephased the traffic signals, closed York Road southbound, and modified the pavement markings. Nothing worked. Finally, in 1994, the MSHA suggested an innovative approach: a modern roundabout.

Not to be confused with the older, often chaotic rotary found mainly on the East Coast, the modern roundabout originated in Europe in the 1960s, where today it is widely used. In France alone, a country whose geographic size is roughly that of Texas, there are over 15,000 roundabouts! How does a modern roundabout differ from a rotary? Vehicles entering a roundabout are always required to yield to circulating traffic. To encourage compliance, the horizontal curvature of a roundabout is designed to produce slower entry and circulating speeds. As a result, speeds in a roundabout generally do not exceed 15 or 20 mph. Rotaries, in contrast, lack the proper geometry to force motorists to reduce their speed, either at entry or while circulating. In fact, many rotaries were deliberately configured to allow traffic to enter and exit the circle without slowing down. Studies by various state departments of transportation, the Transportation Research Board, and various European transport professionals and agencies have found that the probability and severity of a crash is considerably higher at a rotary than at a roundabout.



Traditional Rotary



Modern Roundabout

Roundabouts are safer than right-angle signalized intersections as well. A driver entering a roundabout need only look to the left for approaching vehicles. The favored roadway does not change with each signal cycle; vehicles entering the roundabout must always yield the right-of-way to vehicles already in the circle. Traffic moves slowly but continuously, without starts and stops, making drivers less frustrated and aggressive. Most importantly, the slow speeds at roundabouts make fatalities exceedingly rare. Even the likelihood of fender benders is reduced because there are relatively few potential conflict points at roundabouts – as few as eight at a four-way roundabout, compared to 32 at a four-way right-angle intersection.

Statistics attest to the safety of roundabouts: A study of 11 intersections in the United States where modern roundabouts have been constructed showed a 37 percent reduction in the number of crashes and a 51 percent reduction in the number of injuries. For this reason, both the Insurance Institute for Highway Safety and State Farm Insurance, the nation's largest auto insurer, encourage the widespread use of roundabouts.

It is important, however, to sound a cautionary note regarding pedestrian safety and roundabouts. Generally, it has been found that roundabouts improve safety for pedestrians for many of the same reasons they improve safety for motorists: Vehicles move at slower speeds, there are fewer conflict points, and fewer instances of aggressive driving. The splitter island also provides a refuge for pedestrians crossing the road in two stages. At a signalized intersection, however, signal phasing can be timed to stop traffic in all four directions and give pedestrians a dedicated WALK light. At a roundabout, in contrast, no signal system exists to protect the pedestrian. A roundabout, from a pedestrian's perspective, is thus similar to a signalized intersection with concurrent WALK and green signals, or at which right-on-red is permitted: Motorists ignorant of the law may refuse to yield the right-of-way and turn across the pedestrian's path.

Source: Maryland State Highway Administration.

A pedestrian crosses the street at the roundabout in Towson, Maryland.

Besides safety, a roundabout has a number of other advantages over a signalized intersection. A roundabout handles higher traffic volumes with fewer delays, because vehicles slow down on entry but generally do not have to come to a complete stop. Smoother traffic flows, in turn, mean lower vehicle emissions and fuel consumption. Roundabouts cost less to operate and maintain than signalized intersections because there are no electronic components and no electricity bills. Finally, a roundabout is more visually appealing than a signalized intersection because the center island can be landscaped and the clutter of poles and overhead wires can be eliminated.

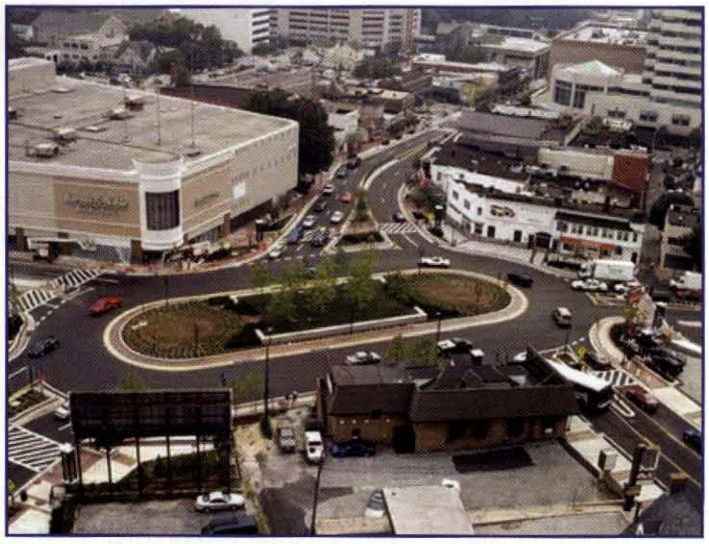
Maryland is unique among the 50 states in that its highway department initiated a roundabout program in the early 1990s. Like many European countries, it considers roundabouts as alternatives to right-angle intersections. In the past decade, close to 30 roundabouts have been built in the Old Line State, with more planned. As early as 1993, in Lisbon, Maryland, a roundabout replaced a four-way intersection of two state highways that had been marked by a two-way blinking red beacon. The number of accidents fell from an average of 7.4 each year before the roundabout to just 1.4 each year after the roundabout was constructed.

Source: Maryland State Highway Administration.

*Downtown Towson, Maryland **before** the modern roundabout.*

The Towson intersection presented a greater challenge, however. The city of Towson is an important economic and commercial hub, the county seat of Baltimore County (population 754,000), and a close suburb of Baltimore. Because the Towson intersection was in an urban area, construction of the roundabout could not be limited to a simple engineering project, but had to be accompanied by streetscape revitalization that would improve the economic viability of surrounding businesses. This meant paying careful attention to streetscape design, pedestrian access, and pedestrian safety. Additionally, because of the shape of the existing streets, the roundabout itself could not be perfectly round, but oblong.

From design to finish, the project took just three and a half years. A task force was formed to ensure the local business community was involved. "We made sure to put the local community in a leadership role," notes Dennis German, chief of the MSHA's Community Design Division. Throughout the construction phase, the contractor was answerable to local and community interests. The MSHA assigned a staff person to serve full time as an on-site liaison with business and property owners. The Towson Business

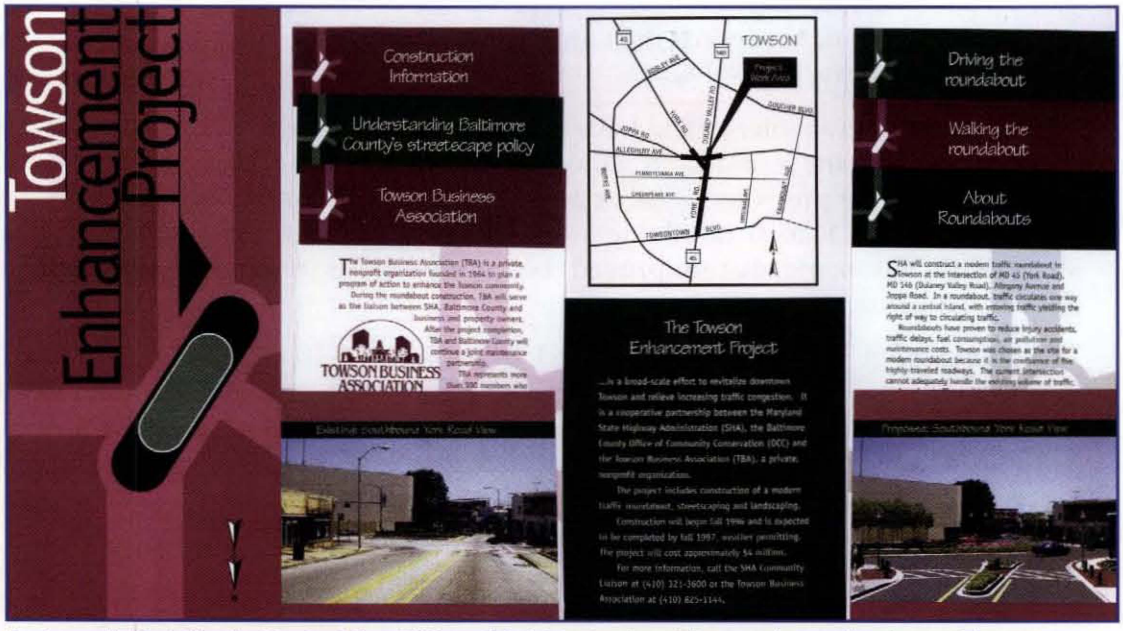


Source: Maryland State Highway Administration.

*Downtown Towson, Maryland **after** the modern roundabout.*

Association, which maintained close contacts with the local business community, participated in monthly "partnering" meetings attended by representatives of the MSHA, Baltimore County, and various contractors. In this way, business concerns were swiftly brought to the attention of state and county authorities. The "partnering" meetings also provided a forum for discussion and resolution of construction issues as they arose. The meetings were held in the Towson Business Association's offices a half-block from the project site, so that issues could be viewed and addressed firsthand.

The intersection began to function as a roundabout during construction, beginning in February 1998. Cones, barrels, and YIELD signs were used to make a temporary oval as work crews set about building a permanent central island, flared splitter islands, landscaped buffers, and ADA-compliant crosswalks. "Opening day was a media circus," recalls German. Work was completed in October of the same year, by which time motorists and pedestrians had learned to safely navigate the new intersection. Informational brochures distributed by the MSHA helped improve public awareness of the project, and explain the benefits of roundabouts in general.



Source: Maryland State Highway Administration.

Brochures distributed by the Maryland State Highway Administration for public outreach regarding the roundabout.

The cost of the entire Towson intersection redesign and improvement project was approximately five million dollars, while the roundabout alone cost 1.5 million dollars. Baltimore County is responsible for maintaining the streetscape enhancements and landscaping.

Safety at the Towson intersection has improved greatly thanks to the new roundabout. Unlike the old signalized intersection, which sometimes encouraged motorists to speed up as they entered it in order to "beat the red," the roundabout forces motorists to slow down. According to the police department, top speeds within the circulatory roadway generally do not exceed 22 mph. During the first year of operation, the accident rate fell by 50 percent and the rate of serious injury accidents fell by 65 percent.

> "Roundabout construction should be strongly promoted as an effective safety treatment at intersections. There's nothing to lose from constructing them and everything to gain. The proof is already there."
>
> –Richard Retting, Insurance Institute for Highway Safety

Pedestrians benefit because vehicle movement is slower and more predictable. Referring to the old signalized intersection, German observes: "Try to walk through that sea of asphalt and you don't know who has the green light." An effort was made to place crosswalks a short distance from the entrance to the circulatory roadway. Here, motorists exiting the roundabout have completed the turn and have not yet picked up speed, while motorists entering the roundabout are already preparing to yield the right-of-way. Additionally, pedestrians need only watch for traffic approaching from one direction – the left – before stepping off the curb, and then watch for traffic approaching from the right when they reach the splitter island. The splitter island itself allows pedestrians to cross in two stages. Still, conditions for pedestrians are not ideal. Because the roundabout is actually an ellipse (owing to the shape and size of the old intersection it replaced), motorists are given a straightaway that allows them to accelerate before exiting. They tend to approach the crosswalks at higher speeds than are desirable for pedestrian safety and are sometimes reluctant to yield the right-of-way.

Delays at the Towson intersection have also been reduced dramatically. Despite the slower speed of vehicles, the roundabout handles 4,000 cars per hour during afternoon rush hour, 400 more than the previous signalized intersection. Level of service at peak periods has been raised from F to B (implying wait times of just 10 to 20 seconds). As a result, air quality has somewhat improved because vehicles no longer sit idling in long lines at red lights.

The roundabout project has also helped spur the revitalization of downtown Towson. Wide, brick sidewalks were installed around the outside edge of the roundabout, along with street trees and landscaped buffers. The central island has been landscaped, and includes a half dozen oak trees. The streetscape has been extended along York Road as far as the main branch of the public library. A vacant department store was purchased by a developer and given a new, more attractive façade. Today, it is home to a large bookseller. These improvements have created a more pedestrian friendly environment. With the increase in foot traffic, a number of businesses have relocated to the area around the roundabout. In the words of Raymond Heil, landscape architect with the Baltimore County Department of Public Works: "The roundabout is now a focal point of the city."

Driving the Towson roundabout (from the informational brochure published in 1996 by the Maryland State Highway Administration):

A conventional four-legged intersection has 32 possible points of conflict, with the potential for relatively high-speed, right-angle or head-on collisions. The modern roundabout has only 10 conflict points, all of less severity.

In conventional intersections, drivers must observe traffic coming from the left, right and straight ahead. Since all traffic in the roundabout comes from the driver's left, a driver [entering the roundabout] needs to look only left and yield to the motorist to the left.

Unlike the situation at traffic signals, the favored roadway never changes at a roundabout. Head on collisions are virtually eliminated.

Some advantages of roundabouts include:

- Fewer delays approaching and negotiating the intersection;
- Reduced accident rates up to 80 percent;
- Decreased accident severity;
- Increased intersection capacity;
- Improved aesthetic appearance;
- Reduction in maintenance and operating expenses;
- Lower driving speeds;
- Equal opportunity for intersection entrances; and
- Easier and more comfortable driving, after an initial learning period.

The roundabout will serve as the gateway to the downtown Towson area. The island and surrounding areas will be landscaped in cooperation with Baltimore County and the Towson Business Association.

Is a modern roundabout right for your community?

A modern roundabout comes in many sizes, and can be modified to handle a wide range of traffic volumes. It can be a safe, efficient, attractive, environmentally friendly, and low-maintenance alternative to a complex signalized intersection or a dysfunctional rotary. Furthermore, modern roundabouts are effective traffic calming devices, and are potentially successful solutions for problematic unsignalized intersections as well. For those difficult intersections where traffic engineers have tried everything from retiming to restriping, a modern roundabout might just be the stone left unturned. As evident in the Towson example, a roundabout can also have many beneficial secondary effects, including an improved environment for economic redevelopment. Since additional right-of-way requirements are generally minimal, roundabout construction is a viable alternative to adding turn lanes that will require the taking of property. The most successful roundabouts involve the community (i.e., local businesses, municipalities, and the public) from the beginning stages of design. Those considering a roundabout in their community should take a look at the new publication from FHWA called *Roundabouts: An Informational Guide* (Washington, D.C.: U.S. Department of Transportation, 2000).

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Mount Desert Island, Maine: Seasonal Shuttle Bus Service

Mount Desert Island, Maine, is home to Acadia National Park, a 40,000-acre preserve of forests, mountains, lakes, and coastline. A true jewel among America's national parks, Acadia receives nearly three million visitors annually, a number that the National Park Service estimates could double by 2020. Maine's rugged, northern climate means that tourism is highest during the summer months, with more than 90 percent of visitation occurring between May and September. During June, July, and August alone, nearly 1.7 million people visit the island.

In recent years, park officials have become concerned that growing traffic and parking problems are making access to the park more difficult, detracting from the visitor experience, and posing a threat to the environment. Not only is the park itself at risk, but so are the island's four small towns, Bar Harbor (the commercial center), Southwest Harbor, Mount Desert, and Tremont.

In response, a seasonal shuttle bus service was introduced in 1999, serving both Acadia and the Mount Desert Island community. Called the Island Explorer, the service is a public-private partnership involving federal, state, and local agencies, as well as non-profit private partners. Its purpose is to permit continued growth in tourism without continued growth in traffic congestion and vehicle emissions. At the same time, it enhances the visitor experience by providing a convenient and less stressful alternative to driving. On board the Island Explorer, visitors can meet and socialize, or watch the scenery without worrying about missing the turnoff to the campground. Additionally, hikers can trek across the park's many one-way trails without having to loop back around to their cars.

As early as the late 1980s, an Acadia National Park general management plan identified traffic congestion and transportation needs as pressing issues. A transport feasibility study determined that a truly effective solution to the problem would serve both the park and the local community, whose interests were intertwined. Three potential solutions were considered: adding new parking lots, limiting the number of private vehicles allowed in the park, and introducing a fixed-route shuttle bus service. Because neither the park nor local residents favored additional parking, this option was definitively put aside. Vehicle quotas were seen as a somewhat drastic measure, one that should not be taken before efforts to convince visitors to voluntarily reduce automobile use had been made. This left the third solution, a shuttle service, as the most viable alternative.

By the mid-1990s, local residents had begun to complain that traffic was worse. This led to a decision by the Mount Desert Island League of Towns, which is made up of town mangers from towns on and near Mount Desert Island, plus a representative of Acadia National Park, to support the shuttle. The League of Towns contributed funds to hire a local transportation consultant with experience in small transit systems, Tom Crikelair of Tom Crikelair Associates, to carry out a preliminary analysis. Crikelair wrote a proposal that made its way to the Maine DOT. The proposal was approved and funds from the Congestion Mitigation and Air Quality (CMAQ) Improvement Program were obtained to purchase an initial eight buses and pay part of their operating cost. In 1999, the Island Explorer shuttle service was born.

Today, propane-powered buses serve seven island routes during the months of June, July, and August. These routes link destinations inside the park to hotels, inns, campgrounds, shops, and restaurants in all four island towns. The routes also serve the Hancock County Airport in Trenton, the Bass Harbor state ferry terminal, and the Bar Harbor international ferry terminal, which provides high-speed catamaran service to Nova Scotia. The Island Explorer is operated by Downeast Transportation, Inc., a non-profit transit company that contracts with the Maine DOT. Since 1994, Downeast has successfully operated a bus route serving campgrounds along State Route 3 on Mount Desert Island, including Blackwoods Campground in Acadia. In fact, the campground shuttle bus service provided the model for the expanded island-wide system.

> "I love this bus! No parking problems!!!"
> – Island Explorer passenger

The transit system is based on the principle that adequate tourist parking exists at the campgrounds and motels on Mount Desert Island, but is lacking in the local commercial districts and in the park. Overnight visitors are encouraged to leave their vehicles at the campgrounds and motels and to visit the park and the island via the Island Explorer. The Town of Bar Harbor and the Maine DOT worked together to redesign the village green to better accommodate the shuttle buses, adding a bus staging area, an information kiosk, benches, pedestrian paths, and new lighting and landscaping.

Source: Tom Crikelair Associates.

The Island Explorer discharges passengers in Bar Harbor, Maine.

The Island Explorer relies on a variety of funding sources. The most important of these has been the National Park Service, which has provided both direct funding of capital and planning efforts, and entry fees for operations. CMAQ funds were used to pay for the first eight buses and part of the operating costs. Other important contributions come from the U.S. DOT, the Maine DOT, the National Park Service, local municipalities, local businesses, and Friends of Acadia (a private, non-profit park support organization). Hotels pay a fee in order to have the bus stop at their front door. The local chamber of commerce solicits donations as well. In 2000, nine more buses were purchased using Federal Lands Highways Funds, bringing the total to 17. "The system gets a little bit better each year," Len Bobinchock, Acadia's deputy superintendent says proudly. "But it still needs to grow." In 2002, thanks to joint funding from the U.S. DOT and the Department of the Interior, all buses will be equipped with automatic vehicle location systems. Electronic departure boards located on the village green and at popular stops in the park will inform users when the next shuttle is due to arrive and depart.

The Island Explorer has proved extremely popular. For the summer of 1999, the system planners had established a goal of 1,000 riders per day. During the months of July and August, ridership ranged between 2,000 and 3,000 per day. Total 1999 ridership was 142,000, over just a 76-day period. In 2000, ridership increased by 39 percent, to 193,000. In 2001, ridership rose for a third straight year to 240,000, a 25 percent increase when compared with 2000, and a 75 percent increase when compared to 1999.

Ten reasons to take the free Acadia shuttle (from the 1999 visitor guide published by Downeast Transportation, Inc.):

- **Enjoy easy access to shops and restaurants.** Get off the bus in village centers in Bar Harbor, Northeast Harbor, or Southwest Harbor without searching for a parking space.
- **Improve scenic vistas.** Without lines of parked cars, we can all enjoy roadside views of granite, trees, and water, instead of shining steel, glass, rubber, and plastic.
- **Hike your first-choice trails.** Island Explorer bus riders will not be turned away by over filled trailhead parking areas.
- **Keep your family safe.** Bus riders do not unload bikes and kids while parked on the shoulders of narrow two-lane roadways.
- **Contribute to cleaner air.** Island Explorer buses burn clean propane fuel to reduce nitrous oxide, an ozone-producing pollutant.
- **Avoid two-hour parking tickets.** Most kayak tours, whale-watch trips, boat cruises, and trolley tours take longer than two hours. The majority of parking spaces in Bar Harbor are limited to no more than two hours.
- **Save 10 percent on tea and popovers.** Ride the bus to the Jordan Pont House and receive a 10 percent discount on lunch or tea and popovers served on the lawn overlooking Jordan Pond and Penobscot Mountain.
- **Keep bike lanes open.** By using the bus you will remove overflow parking from bicycle lanes on the Eagle Lake Road and the Park Loop Road.
- **Preserve village life.** Residents and visitors alike value our small-town quality of life. We will all enjoy it more if village streets are less crowded with cars and recreational vehicles.
- **Keep Acadia open.** Acadia National Park can accommodate more visitors, but not many more cars. By using the Island Explorer you will help postpone any future decision to limit access to Acadia National Park.

What lies behind the Island Explorer's remarkable success? The shuttle was carefully designed to offer a number of advantages over the private automobile, advantages that would make park visitors voluntarily leave their cars at their campground or motel. "Don't expect someone to make a personal sacrifice," Tom Crikelair warned local residents and officials at the start of the project. "Is the service you're envisioning good enough for you to use? If it isn't, tourists won't use it either."

Visitors are encouraged to use the Island Explorer because:

- Vehicles are clean, modern, and efficient. Twenty-eight passenger, fully accessible transit buses were purchased specifically for the service. Each bus is equipped with two bicycle racks with the capacity to transport four bicycles. The buses burn propane fuel, producing fewer emissions and less noise than diesel buses.
- The service provides a direct connection with most motels and campgrounds on Mount Desert Island at 30- or 60-minute intervals. Ideally, service would be more frequent on certain routes and at certain times, but the number of available buses proves the limiting factor.
- The service is "farebox free" for both passengers and their bicycles, that is, no fare is collected on board. An Acadia National Park visitor survey found that 48 percent of visitors surveyed would use a free shuttle bus service, but only 25 percent would use a bus if a fee were collected at boarding. Acadia's experience operating a more modest campground shuttle service prior to the Island Explorer bears out these statistics. In 1996 roughly 2,000 campers rode the shuttle, paying a two dollar fare to do so. The following year, when the fare had been eliminated, ridership reached 12,000. Ridership rose again to 15,000 in 1998, the second year after the change.

> "The Island Explorer represents an outstanding example of using innovative solutions to create sustainable tourism and more livable communities. We must find creative ways like this one to protect our parks while keeping their doors open."
>
> – Bruce Babbit, then Secretary of the Interior

- The service is promoted extensively. A marketing plan, including visitor guides, maps, timetables, posters, public service announcements, and television and radio messages were all developed. In 1999, more than 50,000 copies of the visitor guide were printed and inserted into the park's newspaper, the Beaver Log, and 70,000 visitor guides were produced as stand-alone items. Advertising campaigns rely on positive reinforcement, rather than stern language. "We advertise by showing people that if they use the service they can have a better experience," Bobinchock explains.
- The Island Explorer is strongly supported by the Maine Office of Tourism and the Maine Department of Tourism.

The shuttle benefits visitors to Acadia because it allows more people to experience the national park each summer than could otherwise if the private automobile were the only form of island transportation. The shuttle benefits local residents and businesses because it increases tourism revenues without increasing the strain on the island's over-burdened transportation infrastructure.

The number of vehicle miles traveled on the island is not necessarily declining as a result of the shuttle service. However, Ken Olson, the president of Friends of Acadia, likens traffic on the island to water in a slowly filling bucket. "We're scooping out a few cupfulls," he explains, "but the water keeps flowing in so the level barely changes."

When a camper leaves his car at his campsite and rides the Island Explorer into Bar Harbor, the parking space he would have occupied downtown is taken by someone else, perhaps by someone visiting the island for the day. While both the camper and the day-tripper benefit from this arrangement, the total number of cars parked on the streets of Bar Harbor remains the same.

Source: Downeast Transportation, Inc.

An Acadia National Park newspaper insert that promotes the Island Explorer service.

"The Island Explorer is a great service," avows Bar Harbor's town manager, Dana Reed. "We hope it is continued, and expanded into the shoulder season." In the future, Reed hopes that car-free travel options to Mount Desert Island will increase, as various transportation providers realize their own customers will not need a car when they reach their destination. For example, Vermont Transit Lines provides direct motorcoach service to Bar Harbor from New York City via Boston and Portland, but offers just one daily arrival and departure. Cruise liners frequently make Bar Harbor a port of call (approximately 47 cruise ships docked at the international ferry terminal in 2001), but usually do not remain long enough for passengers to fully explore the island on their own.

> "We have been here for three days and have not once had to bring our car into town. This is a wonderful service."
> – Island Explorer passenger

The future of the Island Explorer is clouded only by concerns over how to pay for service expansions to meet growing demand. It is not unusual for demand to exceed the capacity of the buses, typically in late afternoons when visitors return to their campgrounds and motels. At times, the on-board bike racks also become filled, forcing bicycle riders to wait for the next bus.

Planners are hoping to purchase eight more buses, perhaps with more capacity than the current 28 seats. They are also hoping to lengthen the operating season. One source of funding, that is favored by Friends of Acadia, would be a transit fee added to the existing Acadia National Park entrance fee. This would provide a dedicated source of revenue, allowing the park to cover 75 to 90 percent of the Island Explorer's costs. The dollar contribution of the Mount Desert Island towns would remain the same, but their percentage contribution would decline.

The possibility of year-round, separately funded shuttle service has also been invoked. This would benefit Mount Desert Island's sizable workforce that commutes every day from off-island. A feasibility study in now underway, funded in part by Jackson Laboratory, the region's largest employer.

Source: Tom Crikelair Associates.

Passengers board Island Explorer shuttles on Bar Harbor's village green.

Eventually, planners hope to create a transit hub and visitor center outside of Bar Harbor, perhaps off the island altogether. This would be a tremendous convenience to day-trippers, who would not need to search for parking spaces in downtown Bar Harbor or inside the park before boarding the shuttle. Natchez, Mississippi (population 18,000) has recently taken this approach to traffic management, building a transit hub/visitor center on the outskirts of the historic city in order to intercept visitors arriving on the main highway before they find themselves driving down Natchez's narrow, congested streets.

Is a shuttle bus service right for your community?

Public transportation is generally viewed as a solution appropriate to larger urban areas. However, in smaller communities, a shuttle bus service can play a vital role in improving access to tourist attractions, special events, or shopping districts without placing increasing demands on local roadways. It can thus help a community grow its economy without increasing the number of vehicle miles traveled. Communities that suffer from seasonal or episodic traffic congestion and parking problems are most likely to benefit from a shuttle service. A study recently prepared for the U.S. DOT (Federal Lands Alternative Transportation System Study, by Cambridge Systematics and BRW, October 2001) documented dozens of existing and potential public transportation services in communities that include, or serve as gateways to, national parks, fish and wildlife refuges, and Bureau of Land Management recreational lands. Numerous other needs for shuttle services exist in U.S. Forest Service lands, smaller communities that have privately-owned tourist attractions, and state/local recreational facilities. A service that is well designed – like the Island Explorer – enhances the visitor experience by providing a more convenient, relaxing alternative to driving. Communities considering a new or improved shuttle bus service should assemble stakeholders early in the process: the public (would-be users of the system), local businesses, tourist attractions, transit and transportation officials, and state, county, and local governments. It is important that a clear set of goals and objectives be set for the service as the planning process begins.

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Orem, Utah: Computerized Traffic Signal Coordination System

The city of Orem, Utah, has long been on the cutting edge of traffic management. It was the first city in the Beehive State to use video detection instead of loop detectors embedded in the pavement to trigger signal changes at intersections. It was the first to introduce countdown pedestrian lights at crosswalks, the first to build a modern roundabout, and the first to install preemption systems at all its traffic signals. It is no surprise, then, that as traffic snarls along its main travel corridors became more frequent, Orem was quick to deploy an equally innovative solution: a computerized traffic signal coordination system using fiber optic technology.

Orem is situated 45 miles south of Salt Lake City, just north of Provo. This strategic location contributed to Orem's rapid growth during the economic boom of the 1990s. Between 1990 and 2000, its population swelled from less than 68,000 to 84,000. This increase, combined with robust commercial growth, caused traffic volumes to rise at an even faster rate. In response, numerous road widening projects were undertaken, but in five key commercial corridors nearby development made the cost of land acquisition prohibitive. In 1997, amid concerns over worsening traffic congestion and air quality, Orem decided to deploy a coordinated signal system.

Source: City of Orem.

Traffic flows smoothly through an intersection in Orem, Utah. Mount Timpanogos is in the background.

A local transportation consulting firm, Fehr and Peers, was hired to provide seven signal timing plans for 38 chosen signals, 15 operated by Orem City and 23 operated by the Utah DOT within the city boundaries. The timing plans were chosen to cover the following scenarios: 1) weekday morning peak hour; 2) weekday midday peak hour; 3) weekday afternoon peak hour; 4) weekday off-peak; 5) weekend peak; 6) weekend off-peak; and 7) special events. Fehr and Peers also trained City Engineering staff to generate their own timing plans using a Windows-based software package, SYNCHRO.

Beginning in 1997, the 38 signals were interconnected and placed under centralized control using fiber optic cables. The 1.9 million dollar project was financed using congestion management funds from the local metropolitan planning organization, which incorporates Utah, Wasatch, and Juab counties. Since then, Orem has continued to grow, and with it the city's coordinated signal system. Today, a total of 44 signals have been interconnected, with eight more planned. Five permanent City Engineering staff members generate new timing plans every two years.

Signal coordination in Orem has resulted in an impressive reduction in delays, stops, and fuel consumption along the five targeted corridors, as depicted in Table 2. For example, travel time heading eastbound on a two and a quarter-mile stretch of University Parkway during the morning peak period has fallen by 41 percent, from nearly seven minutes to just four minutes. Travel time heading southbound on a five-mile stretch of State Street at midday has fallen 38 percent, from 13 and a half minutes to a little under eight and a half minutes. Overall, network delays are down 19 percent during the morning and noontime peak periods, and 14 percent during the afternoon peak period.

So efficient is the coordinated system, in fact, that travel time along some corridors come within just seconds of free flow conditions, even at rush hour. Driving down the five-mile length of State Street without stopping but while observing the 40 mph speed limit would take exactly seven minutes and 20 seconds. Real time travel, depending on the time of day, takes at most eight minutes and 40 seconds. Motorists appreciate the new system, although some have complained they are obliged to wait longer to make left turns onto cross streets. Happily, there have been few complaints of added wait times from motorists in cross-street traffic.

Table 2. Sample Time Savings Resulting from Orem's Coordinated Signal System

Street Corridor	Length	Average Daily Traffic Volume	A.M. Travel Time, Before Installation	A.M. Travel Time, After Installation	Percent Savings
State Street, southbound	4.88 miles	49,000	11m 00s	8m 01s	21%
University Parkway, eastbound	2.29 miles	40,000	6m 50s	4m 04s	41%
800 North, eastbound	3.31 miles	25,000	6m 24s	6m 26s	no savings
Center Street, eastbound	2.68 miles	26,000	7m 17s	5m 14s	28%
Orem Boulevard, southbound	2.16 miles	10,000	5m 15s	4m 16s	19%

Assuming an average daily traffic flow of 150,000 and an average time value of 10 dollars per hour, Orem's traffic signal coordination project is generating 11,318,000 dollars in yearly savings, or 75 dollars per person – a handy dividend, considering the less than two million dollar cost of the project.

Signal coordination in Orem has reduced daily pollution emissions as well. Because the 150,000 vehicles that use the five corridors each day spend less time idling at intersections, they emit, on average, about 261,500 fewer pounds of carbon monoxide (CO) and 8,800 fewer pounds of nitrogen oxide (NOx).

"When you look at the cost and consequences of street widening, traffic signal coordination is a tremendous bargain," concludes Richard Manning, Assistant City Manager and former Public Works Director. "It has allowed us to reap a tremendous return on our investment. It evolves with changing traffic conditions. When you widen a roadway, in contrast, you get one-time gains and no flexibility."

Is a computerized traffic signal coordination system right for your community?

Communities experiencing rapid traffic volume increases along corridors with closed-loop computerized signals would likely benefit from considering a traffic signal coordination system similar to Orem's. Installing a coordinated signal system can be an economical and effective alternative to widening roadways, where costs – particularly those of property acquisition – can be prohibitive. The effectiveness of these systems will depend on local travel patterns, particularly volumes of corridor cross-traffic. It is important to have a good set of traffic data and a clear set of goals and objectives before initiating this effort. The many signal coordination systems on the market today can be programmed to help optimize corridor timing, thereby reducing congestion and air pollution. Orem's practical foresight to include SYNCHRO training as part of the contract with Fehr and Peers made the complete system more flexible and thus allows it to evolve without hiring a consultant each time a new signal timing plan is needed. Additionally, potential add-ons exist that can make a coordinated signal system an even more attractive and powerful solution; these include real-time adaptive traffic signal control, transit priority, and emergency vehicle preemption.

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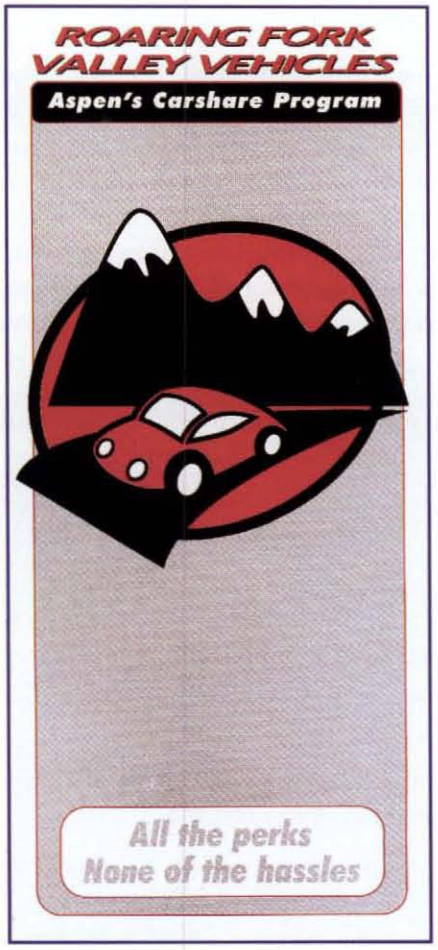
Aspen, Colorado: Car Sharing

A parking shortage in Aspen, Colorado? With a year-round population of just 8,000, this resort community tucked high in the Rocky Mountains would seem an unlikely setting for such a problem. But at Aspen's affordable housing developments, which house over a third of the area's employees and their families, demand for residential parking greatly exceeds supply. Many condominium and apartment complexes constructed in and near Aspen's attractive downtown over the past 25 years have been deliberately "underparked," sometimes with just one assigned parking space per two-bedroom unit. This reflects the high costs of building automobile infrastructure in Aspen; in this mile-high city surrounded by dense wilderness and steep valley walls, real estate prices are among the steepest in the nation. "Underparking" also reflects widespread community support for dense residential and commercial developments, but not for the large parking lots that normally surround them.



Source: City of Aspen.

Brochure for Aspen's Carshare Program.

Generally speaking, "underparking" works in Aspen. For many residents, a car is not a daily necessity in the compact community, where walking, cycling, and transit often take the place of driving. (Roaring Fork Transit Authority runs buses nearly 24 hours a day.) However, there is no denying that a car is highly desirable for many shopping and recreational trips, particularly to those areas not served by transit. The City of Aspen is therefore conducting a bold experiment designed to give all Aspen residents the convenience of automobile use without the parking headaches. Recently, it created Roaring Fork Valley Vehicles, a non-profit car sharing organization.

What is car sharing? Common in Europe for decades, car sharing made its appearance in the United States only in the late 1990s. Since then, however, its popularity has been growing steadily. In exchange for an annual fee, members of a car sharing organization are given access to cars parked in designated lots around town. Reservations, made over the phone or online, are required before use, and the cars must be returned to the same spot. Members pay by-the-mile and by-the-hour fees (usually with automatic credit card billing), while the organization pays for maintenance, insurance, and gas. Car sharing is not for everyone. It best suits people who do not drive to work every day; who sometimes need a second car; who can walk, bicycle, or take public transit around town; or who need a car for occasional shopping trips. Some car sharing organizations are for-profit businesses, while others are non-profit concerns. Regardless of

their organizational structure, however, many receive public support because of the broader economic, social, and environmental benefits they provide.

From a user's perspective, car sharing provides the benefits of private automobile use without the responsibilities, expense, and parking hassles of ownership. Car sharing can save hundreds or even thousands of dollars a year in automobile-related expenses. In 1999, according to the Bureau of Labor Statistics, the average U.S. household owned 1.9 motor vehicles and spent 6,614 dollars – or 3,481 dollars per vehicle – to purchase, repair, fuel, and insure them. Car sharing allows households to make do with one less car than they would otherwise need, or to postpone the purchase of a new vehicle.

From a city planner's perspective, car sharing reduces the number of cars vying for parking spaces in busy downtown areas, and consequently the pressure to build new parking facilities. When Boston-based Zipcar conducted a member survey, it found that 47 percent of Zipcar users delayed or avoided buying a car because of the service, while 11 percent sold their cars altogether. Since an average of 20 members use each Zipcar, one Zipcar replaces 10 privately owned vehicles in the metropolitan Boston area.

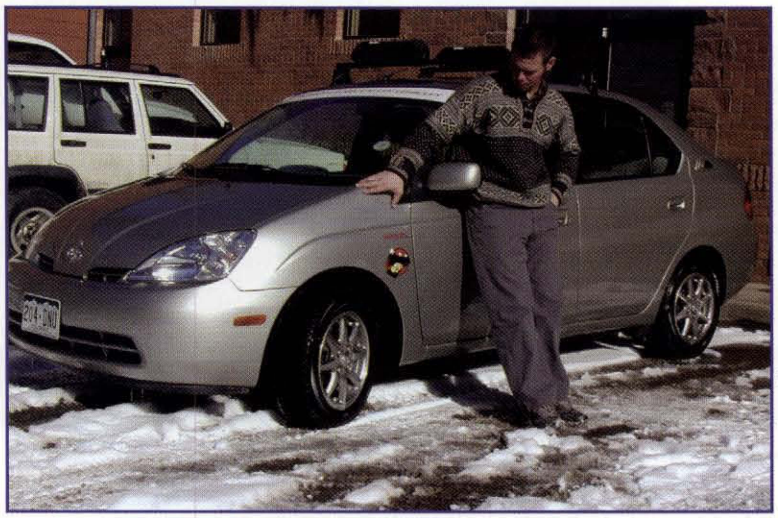
From an environmentalist's perspective, car sharing reduces pollution. People who own their own cars tend to use them frequently because the fixed costs of car ownership – vehicle purchase and insurance – are relatively high, while the variable costs – gasoline – are relatively low. This provides an incentive for car owners to drive as much as possible in order to "get their money's worth." This means that even short errands that could easily be done on foot or by bicycle, such as a half-mile trip to the video store, are done by car. Car sharing, in contrast, relies on a "pay-as-you-go" formula that discourages unnecessary automobile trips. This reduces congestion and vehicle miles traveled, a boon to gridlocked downtowns.

Checklist for a successful car sharing program in a small community (from Mark Chase, Director of Business Development at Zipcar)

- Does the community have an adequate public transportation system? Car sharing serves people who do not need a car to commute to work.
- Does the community have a dense, walkable downtown with centrally located shops and businesses? Car sharing is economical for people who use the shared cars less than twice a week and can walk, cycle, and take transit to many destinations.
- Is the population density of the community greater than 10,000 people per square mile? Car sharing needs a large membership base.
- Do car owners in the community pay high parking costs (more than 80 dollars per month)? Car sharing must be seen as an inexpensive alternative to car ownership.
- Are only low-income residents in the community without cars? If so, the car sharing program must be designed with their needs in mind. For example, reservations should be made via the telephone rather than via the Internet; short rather than long membership contracts should be offered to minimize up-front fees; and marketing efforts should emphasize the cost savings and convenience of car sharing ("your personal bus") rather than the more abstract environmental benefits ("your contribution to a cleaner planet").
- Is the car sharing system being considered a proven system? If it has already been put to the test in other communities, it is more likely to succeed.

The first communities to gain from car sharing were large cities. The first car sharing organization in the United States was Carsharing Portland, Inc., launched in 1998 with a 30,000 dollar grant and four leased Dodge Neons. The company swiftly grew to 25 cars, trucks, and minivans and 470 members before it was acquired by Seattle-based Flexcar in 2001. Flexcar has shown even more impressive growth. Founded in 2000, it benefited from a 600,000 dollar startup grant from King County Metro, Seattle's transportation authority, and 50,000 dollars from the City of Seattle. It is now the largest car-sharing organization in the United States, boasting 60 cars and more than 2,500 members in Seattle alone. Flexcar is followed closely by Boston's Zipcar, with 90 cars and over 1,800 members in three cities.

Now Aspen has set out to prove that small cities with big city parking problems also can benefit from car sharing. In March 2001, the City of Aspen formed Roaring Fork Valley Vehicles (RFVV) as a Colorado non-profit corporation. (This business structure was chosen for liability reasons; any automobile purchased by the city directly could only have been driven by city employees.) RFVV received a 30,000 dollar appropriation from the city council and a 30,000 dollar match from the Community Office for Resource Efficiency (CORE), an Aspen-based non-profit organization that cooperates with businesses, individuals, and government organizations to promote energy conservation in Colorado. CORE is anxious to raise awareness of hybrid automotive technology and to promote car sharing. Together, these funds provided RFVV with enough seed money for a three-year pilot project, including the lease of three vehicles. Administrative costs are distributed among various city departments, including Parking, Transportation, and City Managers. RFVV does not expect to be profitable after three years, nor does it measure achievement in these terms. Its business plan states clearly: "as long as [RFVV] is successful at reducing the demand for parking, and costs the city less than it would to create additional parking, the program will be successful." Toward this end, RFVV has set a goal of attracting 45 active members and three cars, or about a 15:1 ratio.

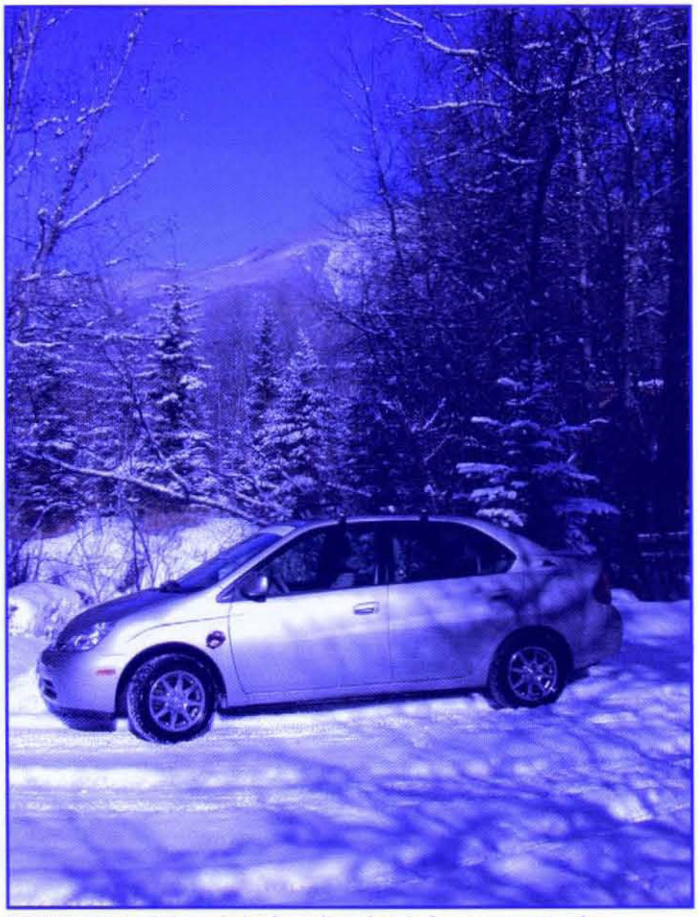


Source: City of Aspen.

Gavin Seedorf, Aspen's car-sharing coordinator, stands next to the city's first shared vehicle.

In March 2001, RFVV leased one Toyota Prius hybrid gasoline-electric four-passenger sedan for 36 months. The vehicle was assigned off-street parking in the town's commercial core, making it both easily accessible to users and visible to passers-by. To use the car, members pay a 25 dollar application fee, a four dollar per hour fee, and a one dollar per mile fee. Alternatively, for an annual membership of 200 dollars, the hourly and mileage fees are halved. To reserve the car, members call a toll-free number and access an automated system, which prompts them to enter their PIN code, the vehicle number, and the time and duration of the reservation.

Members gain entry to the cars by first using a key to open a lockbox mounted on a pole near the vehicle's assigned parking space. Inside the lockbox is the ignition key. Members must record their trip mileage in a logbook kept in the glove compartment. Members also must refuel the vehicles if the fuel gauge drops below one-quarter tank during their trip. For this purpose, a "fuel only" card, charged to RFVV, is kept in each car. Maintenance costs, including roadside assistance, are covered under the lessee service contract. A 500 dollar deductible covers repairs that result from an accident in which a member is deemed at fault. Repairs in excess of this amount are paid by the member.



Source: City of Aspen.

RFVV's Toyota Prius, a hybrid gasoline-electric four-passenger sedan.

By the end of 2001, RFVV boasted 15 active members, prompting it to acquire a second vehicle, a Volkswagen Jetta station wagon. The Jetta, which is better suited for longer trips and large loads, is parked about a half mile from the Prius, closer to businesses and closer to Aspen's transit depot. RFVV is in the process of boosting membership in the program through flyers, newspaper advertisements, and radio public service announcements. Part of the attraction of Aspen's car sharing program is the cars themselves; RFVV promises all new vehicles with automatic transmissions, power locks/windows, and compact disc players. For many would-be users, this means better, more reliable cars than they themselves might own. The Prius, a gasoline-sipping hybrid vehicle that can achieve 50 mpg, also has strong "green" appeal in this environmentally conscious community.

Gavin Seedorf, who administers the car sharing program for the City of Aspen, believes RFVV has a bright future. Providing a high level of customer service and satisfaction is his first priority, and he is content to grow the organization one member at a time. "We're taking it conservatively, rather than grow too big all at once," he explains. In the long run, Seedorf believes, conditions are right for car sharing to succeed in Aspen. Demand for parking will not go away, and will only worsen as time passes. "We need to tackle this problem before it gets completely out of hand. So the city is trying an innovative solution."

Is a car sharing program right for your community?

Car sharing works in communities whose downtowns display certain characteristics of large cities: a high-density mix of commercial and residential development where parking is scarce; walking and transit are common modes of transportation; and daily necessities can be purchased at a convenience store at the end of one's street. Above all, car sharing works in communities where residents have a variety of car-free options for getting to work, such as taking a bus or commuter train, vanpooling, or even telecommuting. In some communities, the presence of a large in-town employer (such as a college, university, or hospital) allows many people to walk to work. Car sharing programs can either be developed following the example of other successful programs or with the help of an established car sharing organization. Zipcar, for example, is willing to set up programs in communities where the economics make sense. Regardless of their organizational structure, car sharing programs benefit from starting small, learning, and growing over time.

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