

**Sustainable Transportation at Smith College,
Northampton, MA**

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7 May 2003

EVS 300

Abstract

Smith College contributes to local air pollution due to the number of faculty and staff who drive alone to work daily and the number of students who drive their vehicles to and from campus annually. Faculty and staff have no incentive to use alternative transportation because the college subsidizes their parking, charging just \$5 per year. An increase in decal price coupled with a parking cash-out system would provide faculty and staff with the financial incentive to utilize alternative transportation. Students drive their vehicles to campus from hundreds of miles away, contributing to air pollution; those who are not able to obtain parking decals park on residential streets, leading to congestion. Implementation of the ZipCar program would eliminate the need for students to bring personal vehicles to campus, as it would provide them with the convenience of their own car without the inconvenience of parking and upkeep.

Introduction

Internal combustion engines and transportations sources are the most significant contributors to community air pollution, contributing to global warming and adversely effecting human health (Vesley, 1999). Smith College contributes a significant amount of car emissions, both in the number of faculty and staff who drive alone to work, and the number of students who have vehicles on campus. In this paper I will assess the faculty/staff commuting situation as well as the student vehicle situation, and offer solutions for both.

FACULTY/STAFFMethodology

Commuting

To assess the number of faculty and staff commuting to Smith College and to determine the methods of transportation they used, we acquired the 2002 Commuter Survey from the Smith College Office of Institutional Research. The results of the survey are summarized in Table 1.

Costs

We attempted to assess the cost to Smith College of maintaining an individual parking space using the following equation:

$$\text{Total area of parking surfaces (excluding the garage) X cost per gallon of IceB'Gone X gallons of IceB'Gone per square meter X annual number of applications of IceB'Gone} + \text{annual cost of restriping} + \text{operating budget of parking garage} = \text{cost of maintaining all parking areas} / \text{total parking area X area of parking space}$$

The total area of parking surfaces was determined by isolating the parking areas on an aerial photograph of campus and calculating the area in m² using GIS. IceB'Gone is a liquid de-icer applied prior to storms; information on cost and application rate of IceB'Gone were provided by Bob Dombkowski, Smith College Physical Plant, Grounds Section Supervisor. Information on restriping and the operating budget of the parking garage were provided by Bob Pattee, Director of Smith College Physical Plant. We measured and estimated the area of a single parking space.

Smith College currently plans to build numerous new parking spaces. To assess the impact these new spaces would have on the cost of maintaining a single parking space on campus, we multiplied the cost per new space by the number of proposed spaces,

resulting in the total cost of the construction. We then calculated the maintenance cost in the manner described above, subtracting the maintenance costs of any existing spaces that would be lost. We then divided this number by the new total number of parking spaces to determine the additional maintenance cost per space.

The calculations described above yielded an estimation of the cost to Smith College of maintaining a single parking space. We then compared this figure with the price of a faculty/staff parking decal to determine whether the faculty/staff pays the exact cost of maintaining their parking space, they are paying an additional cost, or their parking is subsidized by the college.

Results

Commuting

Nine-hundred ninety-seven faculty, staff, and commuting students responded to the 2002 Commuter Survey. The results are summarized in Table 1.

Table 1. Results of Smith College 2002 Commuter Survey for Faculty, Staff, and Commuting Students. 997 Respondents. (Office of Institutional Research)

	Number of trips per work week	% of total trips per work week
Drive Alone	3,176	74.5
Carpool	225	5.3
Vanpool	0	0
Public Transportation	25	0.6
Bicycle	180	4.2
Walk	588	13.8
Combined	30	0.7
Other	37	0.9
Total	4,261	100

Costs

We estimated the cost of maintaining a single parking space to be approximately \$12.79 per year. All relevant measurements and calculations are included in the Appendix. We then calculated the cost of building the 150 new parking spaces that are proposed, and determined that the cost of construction would be \$120,000. We calculated the increased maintenance cost for the new spaces and determined that if the added expense were distributed evenly over all parking spaces, it would increase the maintenance cost by \$39.89 per space.

The current cost of a faculty/staff parking decal is \$5 (Pattee). Based on our calculations, the cost of maintaining a single space is greater than the amount a faculty or staff member pays for the privilege of parking there. We therefore determined that Smith College subsidizes faculty and staff parking by charging them less than the cost of maintaining a parking space.

Discussion

Commuting

Based on the results of the 2002 Commuter Survey (Table 1), nearly $\frac{3}{4}$ of all trips to campus in a given work week are made by individuals who drive alone. To encourage individuals to utilize alternative methods such as public transportation, walking, and bicycling, we have generated a map entitled Alternative Transportation Routes, Northampton, MA (see attached), which includes the PVTA bus routes, hiking/bicycle trails, and the rail trail. However, faculty and staff currently pay so little park on campus, there is little incentive for them to make use of alternative transportation. We propose an increase in the current price of a parking decal to correct this.

Additionally, we propose the college provide preferential parking spaces for carpool vehicles, and more bicycle racks. Preferential parking for carpool vehicles would increase the convenience of carpooling, therefore making it a more attractive form of transportation than it currently is. We propose preferential spaces in the parking garage, on Green Street, in Ainsworth Lot, behind McConnell Hall, and in the Residential Quad. Existing bike racks are indicated on the map entitled Parking Areas on the Smith College Campus, Northampton, MA (see attached). We propose additional bike racks near administrative buildings and sheltered bike racks in the parking garage.

Costs

It is important to note that our calculation of the cost of maintaining a single parking space is an underestimate. We were unable to obtain accurate information on the cost of labor and fuel for snow removal, so it is impossible to know how much it really costs to maintain a parking space, but it is not less than our estimate.

We propose that Smith College increase the cost of a parking decal to reflect the true cost of maintaining a parking space. If individuals are forced to pay more for a parking space, it will provide them with a financial incentive to pursue alternative transportation.

Further incentives would be provided if Smith College implemented a parking cash-out system. Under this system individuals who chose not to drive alone to campus would be paid some amount equal to or less than the cost of maintaining a parking space. This would provide an added incentive to utilize alternative transportation, as they would be saving money by not purchasing a decal and would be paid an additional amount by the college.

Barriers and Solutions

We realize that there are barriers to implementing our proposals. Faculty and staff are accustomed to paying \$5 per year for parking, and would resist a price increase. New England weather also poses a problem: individuals who are willing to walk, bike, or take the bus during fair weather may be less willing to do so in the rain or snow. To help combat this problem we propose a pay-by-the-day system, allowing individuals who participate in the parking cash-out system to drive their vehicle when needed, paying a daily fee. Faculty and staff could be allotted a given number of free days per year, after which they would be charged.

Some Physical Plant employees are required to use their personal vehicles on campus, which prevents them from utilizing alternative transportation. The contracts are on 1 to 3 year cycles, so this clause could be written out over a period of years and they could instead use electric vehicles provided by the college (Pattee).

STUDENTS

Methodology

Students who wish to bring a vehicle to campus may enter a parking decal lottery; students who purchase decals may park in green-line spaces located throughout campus and in the parking garage. We consulted the Smith College Public Safety webpage to determine the exact number of students with parking decals.

Results

According to the Smith College Public Safety webpage, there are 242 green-line spaces and 40 spaces in the parking garage designated for quad residents. The number of

students with parking decals is therefore fewer than 300, but this is an underestimate of the actual number of students with vehicles on campus. Officially, first years are not permitted to bring vehicles to campus, but there is no way to prevent first years or other students from bringing vehicles and parking them off-campus.

Discussion

It is not possible to accurately assess the number of student vehicles on campus except to say that it is not fewer than 282. Many of these vehicles are driven to Northampton from hundreds of miles away, adding to national air pollution as they drive across the country. Students who are not able to purchase a parking decal often park on residential streets surrounding campus, leading to congestion and strained relationships between Smith College and the community. To decrease the number of student vehicles on campus we propose that Smith College employ ZipCar.

ZipCar is a pay-per-use service that allows individuals the convenience of owning their own car with none of the hassle. The college would open an account with ZipCar and order any number of vehicles. Vehicle options include Honda Civic (regular and hybrid), Element, VW Beetle, Golf, Jetta, Passat, Toyota Prius Hybrid, Matrix, RAV 4 (electric), and Mini Cooper. Once the college had established its fleet, students and faculty could reserve cars online in one-hour increments. They would pick up their car from the designated parking space, unlocking the door with their ZipCar membership card. If the car needed to be refueled the individual would visit any gas station and bill the gasoline directly to ZipCar. At the end of their time the individual would return the vehicle to the designated ZipCar parking space. Individuals would pay an hourly rental

fee directly to Smith College, who would in turn pay a fixed monthly fee per car to ZipCar.

Participating in the ZipCar program would provide multiple benefits. First, it is estimated that each ZipCar removes ten vehicles from campus (Chase). This would alleviate the parking shortage both on campus and in the surrounding community. Second, students may be less inclined to drive their personal vehicle across the country if they know they will have access to a ZipCar, opting instead to take public transportation and limiting the amount they contribute to national air pollution. Third, if the college chose to take advantage of ZipCar's hybrid vehicles, it could further limit the amount of gases being released. Lastly, ZipCar can be a source of revenue for the college, if monthly rentals are greater than the monthly fees paid to ZipCar.

Barriers and Solutions

The biggest barrier to the effective implementation of the ZipCar program at Smith College is the fact that ZipCar currently only insures drivers over the age of 21. Given that the majority of the student body is under 21, they would be barred from participating in the ZipCar program unless Smith College was able to insure them independently. The college currently insures drivers of all ages who drive SOS, Athletic Association, SGA, and shuttle vehicles; we propose that the school offer the same insurance to individuals under the age of 21 who wish to participate in ZipCar and are able to pass the Smith College driving test.

ZipCar can only generate revenue for the college as long as the demand exceeds the expenses. Demand will likely fluctuate throughout the year, decreasing during

summer recess when the majority of students leave campus, which could result in a financial loss. However, because Smith College is so close to ZipCar's home base in Boston, Massachusetts, they would be willing to take all or some of the cars back during the summer months, permitting Smith to retain an appropriately-sized fleet to meet its summer needs.

Conclusion

The implementation of some or all of the suggestions proposed here would provide students, faculty, and staff with the financial incentives to utilize alternative transportation, as well as the convenience to make them attractive. We recognize that sustainable transportation is a regional problem that requires regional solutions. Improving bus service throughout the Pioneer Valley, creating more bike lanes to facilitate safe cycling, city-wide implementation of ZipCar, and long-term land use planning to allow for more alternative transportation-friendly areas would all enhance the solutions we have proposed for Smith College Campus. As with any environmental movement, these changes must go hand in hand with increased education for them to be effective.

Appendix

Total area of parking spaces excluding the garage: 29,665.7 m²

Cost per gallon of IceB'Gone: \$0.80 (Dombkowski)

Gallons of IceB'Gone per m²: 0.0007 (Dombkowski)

Annual number of applications of IceB'Gone: 30 (estimation)

Annual cost of restriping: \$1000 (Pattee)

Operating budget of parking garage: \$35,000

Cost of maintaining all parking areas: \$36,498.38

Total parking area on Smith College Campus: 39,657.33 m²

Area of individual parking space: 13.9 m²

Cost of building a new parking space: \$800

Number of proposed new spaces: 150

Literature Cited

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