

## **2      TRANSPORTATION MANAGEMENT**

**TRANSPORTATION MANAGEMENT INDICATORS**
**Table 2. Transportation Management Indicators for Carnegie Mellon, FY2004**

Report Section	Indicator	Reason	FY2004	Units
2.1	Is there a Transportation Office at CMU?	Indicates university commitment to transportation planning	No	Y/N
2.2.1	Number of Parking Permits requested	Indicates a measure of personal vehicle use	3,008	# requested
2.2.1	Number of Parking Permits awarded	Indicates parking capacity	2,632	# awarded
2.2.1	% Parking Permits requested that are awarded	Indicates potential for Carnegie Mellon to satisfy parking demand	88%	%
2.2.1	<i>Number of flexible time permit holders</i>	<i>Indicates number of people who drive for part of the day.</i>	<i>FWD</i>	<i>#/yr</i>
2.2.1	Cost range of parking permits	Indicates willingness to pay for parking	\$525 - \$1,370; \$816	\$low - \$high; \$average
2.2.2	Total number of parking spaces at CMU	Total parking availability	2,744	#
2.3	<i>Pay as you go customers</i>	<i>Indicates number of people who are willing to pay for parking during the day</i>	<i>FWD</i>	<i>#/yr</i>
2.3	<i>Number of casual (nonpermit) parkers who park after-hours</i>	<i>Indicates demand for parking during off hours when it is free</i>	<i>FWD</i>	<i>#/yr</i>
2.3	<i>Number of days the parking garage is at capacity</i>	<i>Indicates demand for parking and capacity utilization</i>	<i>FWD</i>	<i>#/yr</i>
2.3	Number of people using metered parking/Number of metered spaces at CMU	Essentially, number of metered spaces -- assume always full	51	#/yr
2.4.1	Number of car poolers at CMU	Indicates motivated car pooling groups	74	#/yr
2.4.1	Number of car pool spaces reserved	Indicates university commitment to carpools. Also indicative of demand for carpools	32	#/yr
2.4.1	People who use regional rideshare	Indicates self-motivated rideshare users	25	#
2.4.2	Number of bus passes distributed to faculty and staff	Indicates number of faculty and staff who may ride bus regularly	1,841	#/yr
2.4.2	Number of bus passes distributed to students	Assumed to be number of students on campus.	8,271	#/yr
2.4.2	Number of rides taken by CMU pass holders	Indicates utilization of PAT system	1,013,872	#/yr
2.4.3	Survey of bikes in bike racks	Determines how many people ride bike to school by surveying a subset of racks	Fall: 126/177	# bikes/# spots in rack
2.4.3	Count of bike rack spaces on campus	Ratio of bikers to bike racks is a std. measurement (LEED)	1,056	#
2.4.3	Count of bike rack	Indicates placement and dispersion of bicycle	54	#

Environmental Indicators for Carnegie Mellon University: Baseline Assessment 2004

Report Section	Indicator	Reason	FY2004	Units
	locations on campus	racks		
2.5.1	# of vehicles used by CMU	Indicates number of vehicles owned by the university	70	# vehicles
2.5.1	# of departments who use a CMU vehicle	Indicates the number of departments who have a need for personal vehicles	19	# departments
2.5.2	Types of fuels used	Indicates variety of fuels used	4	# types
	Gasoline		50	# vehicles
	Diesel		3	# vehicles
	CNG		6	# vehicles
	Electric		7	# vehicles
2.5.2	Annual mileage of each university owned vehicle	Used to obtain a mpg value	75,000	Miles annually
2.5.2	Fuel consumption of vehicles	Obtain a university mpg value	21	mpg

## **TRANSPORTATION MANAGEMENT INDICATORS RATIONALE**

The transportation sector is divided into two major areas: how people commute to and from the campus, and the types of vehicles used on campus by the university.

### **2.1 Transportation Management Plan and Office**

In the 2002 Campus Master Plan, the University proposed to design and implement a transportation management program for Carnegie Mellon in order to reduce the number of cars that travel to campus. This would be achieved by implementing a transportation office that would develop and promote the use of alternative modes of transportation and advise the campus community of transportation options for the surrounding neighborhoods. To date, this proposal has not been implemented. The existence of this office is a forward-leaning indicator.

### **2.2 Parking Indicators**

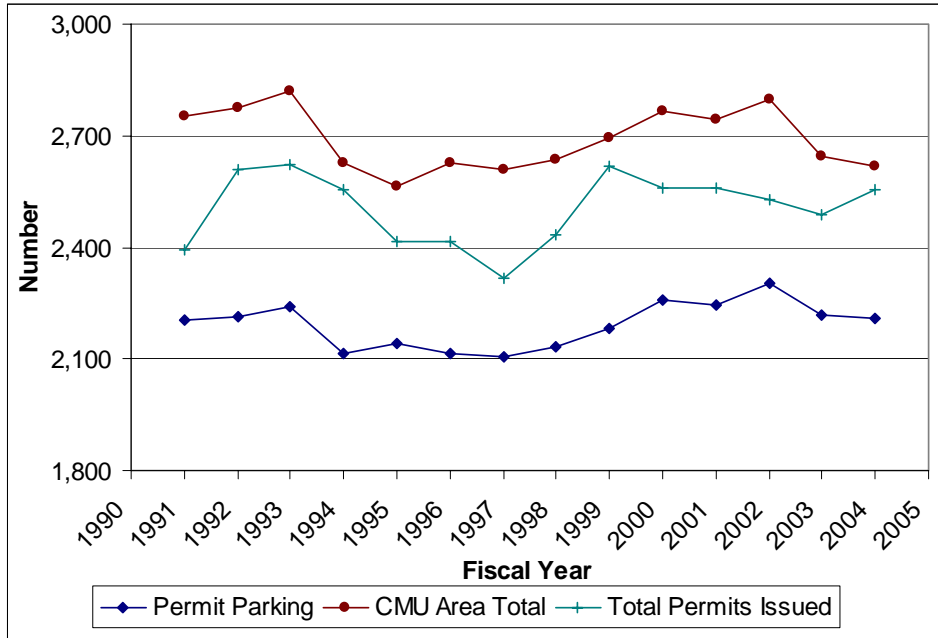
Many people in the Carnegie Mellon community choose to drive to campus daily. In order to measure the number of people who take a personal automobile to the University and the ease with which these people are able to take their vehicle, the supply and demand for parking on campus is used.

#### *2.2.1 Parking Permits Applied for and Awarded*

The number of parking permits applied for and awarded measures the demand for and supply of guaranteed parking. Carnegie Mellon has 25 parking lots<sup>1</sup> containing a total of 2,301 parking spaces. Each year a number of people apply for a parking space in the lot and may or may not be awarded the space. The number of permitted spaces available and the number of parking permits issued are presented in Figure 2-1. Currently, Carnegie Mellon does not use flex-time parking incentives which would allow a person who is required to be on-campus for the afternoon only to pay a lower rate with the understanding that there is an equivalent person who must be on-campus for the morning only, and therefore the space would be utilized by two customers for the entire day. The number of flex-time permits issued is a forward leaning indicator.

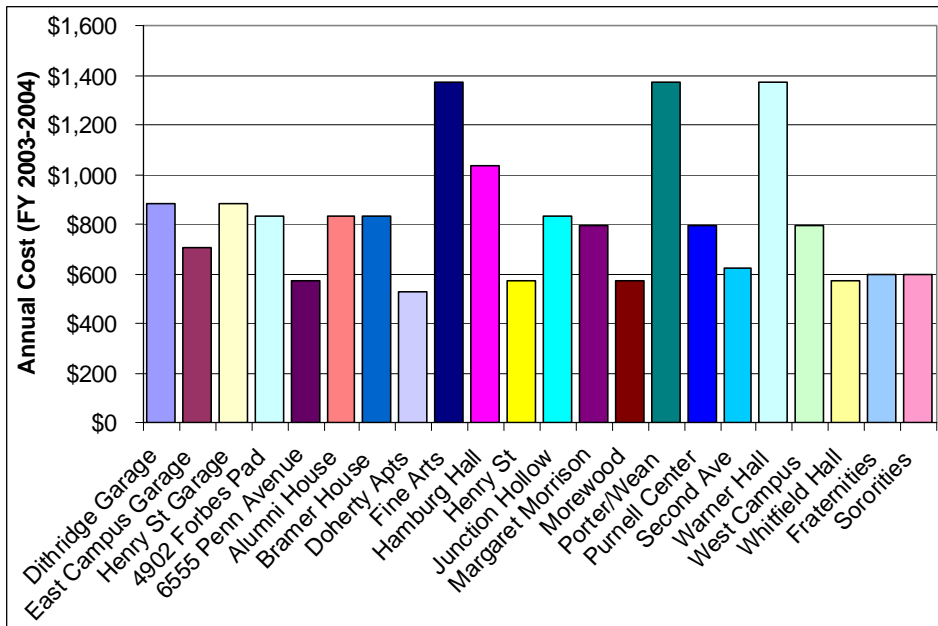
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<sup>1</sup> Carnegie Mellon Parking Services. "Parking Maps." <http://bizservweb.pc.cc.cmu.edu/parking/Default.aspx?tabid=76>. Accessed September 06, 2004.



**Figure 2-1. Number of Permitted Spaces Available and Parking Permits Issued at Carnegie Mellon, 1991 - 2004**

The cost of the parking permits may also be used to indicate the willingness-to-pay of the campus community for parking. Each of the 25 lots has individual parking permits with individual pricing. The range of prices and the average cost of a parking permit can be used in conjunction with the parking demand to indicate a correlation between number of parkers and price of parking. The permit cost for 22 of the lots are shown in Figure 2-2.



**Figure 2-2. Parking Permit Prices at Carnegie Mellon, FY2004**

2.2.2 *Number of Parking Spaces at Carnegie Mellon*

Carnegie Mellon parking includes a two-story garage, containing 2,301 spaces. There are also metered parking spaces and other street parking spaces on the Carnegie Mellon campus. The number of parking spaces available has historically been a source of contention at Carnegie Mellon, where many people feel the supply is too scarce compared to the demand of the campus community. The Carnegie Mellon campus is constrained by the surrounding City of Pittsburgh, and new parking construction does not always become a priority when constructing other academic buildings on the limited empty spaces available. The number of parking spaces available is an indicator that may show, over time, any changes in the importance that the University places on easily available parking. The number of permitted parking spaces is shown in Figure 2-1, and the number of non-permitted spaces is shown in Figure 2-3.

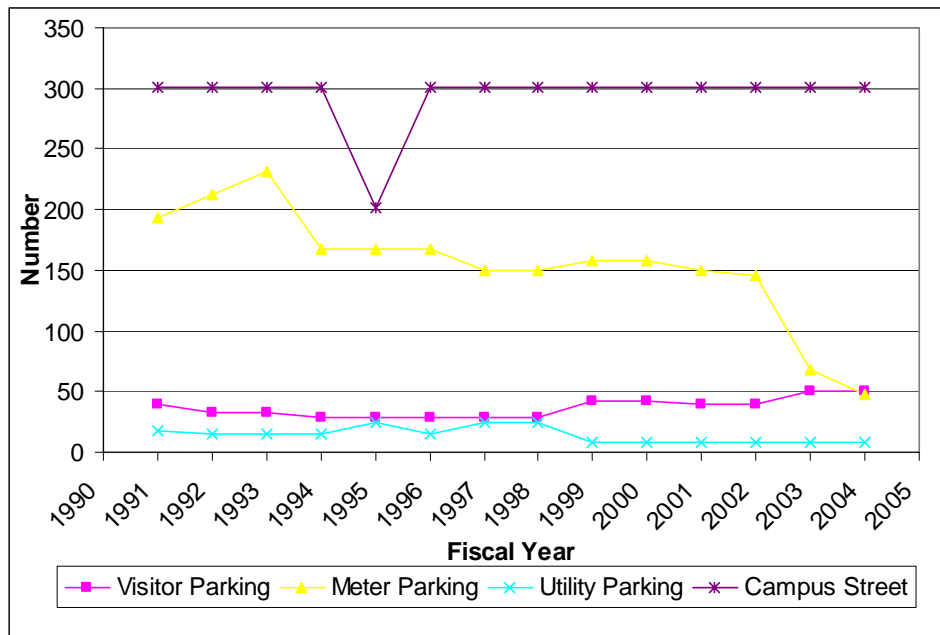


Figure 2-3. Number of Non-Permit Parking Spaces Available at Carnegie Mellon, 1991 - 2004

2.2.3 *Number of Casual Parkers at Carnegie Mellon*

There are a number of people who do not have parking permits but still choose to drive to and park at Carnegie Mellon. One indicator of this is the volume of pay-as-you-park customers who park in the garage and pay on a daily basis. Currently, these data are not accessible from the parking database and therefore this is a forward-leaning indicator pending changes to the data collection by Parking Services. There are incentives available to these garage users, including

discounts if they pay with a prepaid Campus Parking Card,<sup>2</sup> which makes this option more attractive to a person who may have other transportation options to and from Carnegie Mellon and only occasionally feels it necessary to drive a personal automobile. In conjunction with this, the number of days the parking garage is at capacity annually shows how fully the pay-as-you-park customers utilize the garage. The garage is assumed to be at capacity each day currently, and this is a forward-leaning indicator pending expansion to the existing parking structure.

There are a number of metered parking spots around the Carnegie Mellon campus, and the number of people who use metered parking is another indicator which measures the demand for parking on an as-needed basis. It can be assumed at the time of this writing that these metered spaces are always at capacity during the day during the academic year, so the number of metered spaces on the Carnegie Mellon Campus is a surrogate measurement for the number of users of metered spaces. This assessment does not include the parkers who use Schenley Park parking spaces (metered and otherwise) because it cannot be determined how many of these spaces are used by the Carnegie Mellon community exclusively. The Carnegie Mellon garage is free after business hours and on the weekends, and there are a number of people who take advantage of this fact. These people may be part-time students with evening classes or full-time students who use one mode of transportation during the day, and then return home and use a personal vehicle in the evening. The after-hour users also include people attending events on-campus in the evenings or on the weekends. The number of parkers who use the garage after peak hours is an indicator that shows to some degree the number of people who use campus parking after hours.

### **2.3 Alternative Modes of Transportation**

Alternative modes of transportation used to travel to the Carnegie Mellon campus include ride sharing and transit as well as bicycling. There are several ways a member of the Carnegie Mellon community can participate in ride sharing. The public transportation system in Pittsburgh is very comprehensive, and the location of Carnegie Mellon location in Oakland is central to many bus routes. In addition, Pittsburgh has a strong bicycling tradition<sup>3,4,5</sup> that can be seen in the number of bicyclists who are members of the Carnegie Mellon community.

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<sup>2</sup> Carnegie Mellon Parking Services. "Pay as You Park: Campus Community."

[http://bizservweb.pc.cc.cmu.edu/parking/Portals/1/parking\\_campus.pdf](http://bizservweb.pc.cc.cmu.edu/parking/Portals/1/parking_campus.pdf). Accessed September 06, 2004.

<sup>3</sup> City of Pittsburgh. "Bicycling Plan." [http://www.city.pittsburgh.pa.us/cp/html/bicycling\\_plan.html](http://www.city.pittsburgh.pa.us/cp/html/bicycling_plan.html), Accessed September 13 2004.

<sup>4</sup> About.com. "Biking in Pittsburgh." <http://pittsburgh.about.com/cs/biking/> Accessed September 13, 2004.

<sup>5</sup> Bike Pittsburgh. <http://www.bike-pgh.org/>. Accessed September 13, 2004.

### 2.3.1 *Ride Sharing*

There are several different ways a person can take advantage of regional ride sharing. The most simple is to take part in an informal car-pool, often with colleagues who travel from the same location. This population is difficult to quantify. There is a regional ride sharing facilitation service in Allegheny County called CommuteInfo<sup>6</sup> with whom a person can register in order to take part in one of their organized car pools or van pools. CommuteInfo also provides bicycle lockers. It should be noted that car pool information might be conservative, as it is possible that members of the Carnegie Mellon community may organize informal car pools on their own.<sup>7</sup> The number of participants in CommuteInfo's ride-share programs is an indicator of the number of people in the Carnegie Mellon community who are motivated enough to use alternative forms of transportation to research and pay for this registry service. Also, Carnegie Mellon registers car pools within the community and provides them with parking spaces at a discounted cost. The number of car pools registered by Carnegie Mellon and the number of reserved car pool spaces provided by Parking Services is an indicator of the number of people who take advantage of this incentive.

### 2.3.2 *Public Transportation*

Carnegie Mellon has a negotiated bulk price for Port Authority bus passes.<sup>8</sup> All full time students are eligible for the bus pass, and faculty and staff must apply through Human Resources for a pass which is considered a pre-tax benefit. Port Authority bus passes distributed by Carnegie Mellon and the number of bus rides taken by the Carnegie Mellon community are indicators of the campus community use of transit. The number of rides taken include both trips commuting to and from campus and all other trips "paid for" by the Carnegie Mellon bus pass. This is an indication of the Carnegie Mellon community's reliance on the bus system at all times, but there is no similar measurement for personal car use or bicycle use. Figure 2-4 shows the monthly CMU community ridership since the inception of the PAT bus pass program.

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<sup>6</sup> CommuteInfo. <http://commuteinfo.org/>. Accessed September 10, 2004.

<sup>7</sup> Personal communication, Linda Kay Schwarer. June 28, 2004.

<sup>8</sup> Carnegie Mellon Parking Services. "Port Authority Transit Stickers Program." <http://bizservweb.pc.cc.cmu.edu/parking/Default.aspx?tabid=45>. Accessed September 04, 2004.

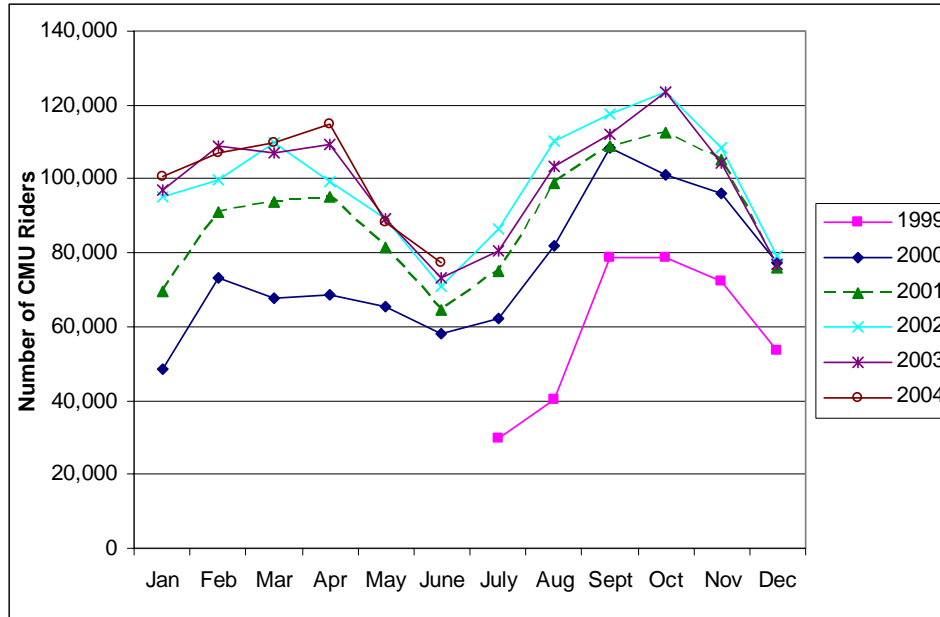


Figure 2-4. Carnegie Mellon Port Authority Transit Bus Ridership by Month, 1999 - 2004

### 2.3.3 Bicycle Use

As mentioned before, there is a strong bicycling culture in the City of Pittsburgh. Despite the difficult terrain there are many people who use bicycles as their primary form of transportation. This is even more true on a university campus, where students may not have access to a vehicle or the means to afford one. Bicycles are an inexpensive and easy way to get to and from campus.

A census of the number of people who ride a bicycle to school would be useful but difficult to perform annually, and might misrepresent the fact that a number of people bicycle when the weather is fair, and ride the bus when the weather is poor. The number of bicycle racks available on-campus and the number of locations with bicycle racks are easily counted indicators. Facilities Management attempts to respond to the need for bicycle parking with a sufficient number and distribution of bicycle racks to provide as many conveniently located parking spots as are desired.<sup>9</sup> An annual survey of the bicycle racks determines the use of these racks. This indicator can be compared to other standards such as the U.S. Green Building Council LEED Alternative Transportation credit for commercial buildings requiring bicycle

<sup>9</sup> Pers. Comm., Kevin Burke, Project Architech. 2 August 2004.

storage for 5% of the building occupants (15% for residential buildings).<sup>10</sup> Together, these indicators provide a measure of supply of bicycle facilities and the demand for these facilities.

## **2.4 Vehicle Use by Carnegie Mellon**

On-campus, a number of departments and services have vehicles for occasional or daily use. These groups range from heavy users, such as Facilities Management or the Police Department, to lighter users such as the Drama or Chemistry Departments. The Carnegie Mellon fleet includes all vehicles which are managed by Risk Management. These vehicles may have been obtained through University Purchasing or by grant monies, but all are insured through Carnegie Mellon.

### *2.4.1 Number of Vehicles used by Carnegie Mellon*

The number of vehicles used is indicated by a count of vehicles and the number of academic departments or other groups who use at least one University vehicle in the Carnegie Mellon Risk Management inventory. This simple count provides a level of vehicle use across the university.

### *2.4.2 Fuel Types used by Carnegie Mellon Vehicles*

There are several different types of fuels currently used at Carnegie Mellon, including gasoline, diesel, electric, and CNG. Each fuel type has different implications for the local and global environment, as well as different economic implications. The different types of fuel and the number of vehicles which use each fuel indicates the diversity of fuels used at Carnegie Mellon. Concurrently, the mileage of the vehicles used at Carnegie Mellon has similar environmental and economic implications. The University does not prescribe that log books be kept to determine the fuel efficiency of the Carnegie Mellon fleet vehicles, but the fuel efficiency of the Carnegie Mellon fleet can be obtained by determining the annual mileage of each vehicle and the fuel consumption of each vehicle. These values are used to calculate a miles-per-gallon which indicates the approximate amount of efficiency in vehicles the University has achieved.

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<sup>10</sup>U.S. Green Buildings Council, 2003. "Green Building Rating System For New Construction & Major Renovations (LEED-NC) Version 2.1" [http://www.usgbc.org/Docs/LEEDdocs/LEED\\_RS\\_v2-1.pdf](http://www.usgbc.org/Docs/LEEDdocs/LEED_RS_v2-1.pdf), Accessed September 14 2004.

