Yale 2013 Sustainable Transportation Survey Summary Report

In 2007 Yale University established a baseline mode split for the entire commuting population. At the time Yale's total population was 19,914; 13,771 or 69.8% represented employees, and 6,143 or 30.8% represented Graduate students. The overall drive alone rate was 44%. By 2013 Yale's total population was steady at 19,725; 13,249 or 67.2% employees and 6,476 or 32.8% GS. The significance of a relatively stable population is that there is little effect on one-way trips to campus. If travel by car to campus is stable, car-related greenhouse gas emissions should be as well. While the overall population remains stable, Yale's employee and graduate student use of the automobile actually declined. Driving alone to campus went from 44% in 2007 to 37% in 2012 and has remained steady at 37% in 2013. One can infer then that greenhouse gasses should have decreased as well.

What the survey results have also shown over time is that in order to get the more recalcitrant drive alone population to change their habits, Yale will need to put in place additional benefits that would incentivize employees to actually try a different mode such as providing a discount on a monthly train or bus pass. More incentives are discussed in the section "Incentives to Stop Driving Alone to Campus."

Highlights of the 2013 Survey Results

In October of 2013, for the seventh consecutive year, Yale Faculty, Staff, Postdocs, and Graduate/Professional Students were surveyed to track their commute behavior and patterns over time. Working with a similar population to last year, a representative sample of 997 was taken again in 2013.

The comparison chart below indicates the changes in population from 2012 to 2013. Since 2012 the overall total population only increased by 1.57%; even though the actual percent representing each category of the total population remained the same from 2012 to 2013.

The sample breakdown compared to 2012 is as follows:

University Affiliation	Total population 2013	Total population 2012	% of Total 2013	% of Total 2012	Number 2013	Number 2012
Faculty	3,532	3,406	18%	18%	179	175
Postdoc	1,118	1,082	6%	6%	56	55
C&T	3,636	3,548	18%	18%	184	182
M&P	3,968	3,951	20%	20%	201	203
	995	993	5%	5%	50	51
Graduate Student	6,476	6,440	33%	33%	327	331
	19,725	19,420	100%	100%	997	997

Table 1

The 2007 survey established baseline data for the entire commuting population and the comparison chart above indicates the changes in population from 2012 to 2013. In 2013 there were only very slight changes to the employee categories as a percentage of the survey sample group.

One of the goals of providing more sustainable transportation options on the Yale campus is to reduce car-related greenhouse gas emissions. Therefore, the more relevant target audience is Yale employees. Although they comprise 67% of the total population, they represent approximately 93% of the population parking in Yale's parking facilities. Because of this, the following survey results have been sorted to exclude Graduate Students unless otherwise indicated. The total number of responses referenced from the chart above (997) was reduced to 670—representing employee responses only in 2013—in all charts and references below.

How Yale Employees Commuted to Campus in 2013 vs. 2012

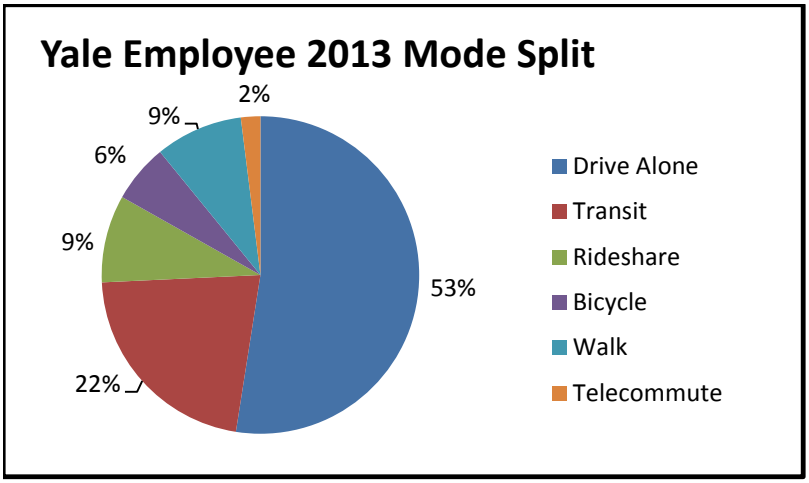
The commuting habits of Yale employees over the past year have changed only slightly, with the most notable difference found in the 3% drop in the walking rate. Driving alone has decreased slightly by 1%, while ridesharing and bicycling both increased by the same amount since 2012. At the same time, the transit mode share remained constant since 2012. Teleworking remained a small share of the mode

split again in 2013 at 2%; we do not expect to see an increase in this alternative work option until an official Yale policy is announced and implemented.

Table 2 below shows the 2012 mode split in comparison to 2013 mode split. Graph 1 illustrates the mode breakdown for Yale employees in 2013.

	2013	2012
Drive Alone	53%	54%
Transit	22%	22%
Rideshare	9%	8%
Bicycle	6%	5%
Walk	9%	11%
Telecommute	2%	1%

Table 2



Graph 1

Employee vs. Graduate Student Commute Modes 2013

As shown in Table 3 below, there is a significant difference in the rate of employees versus graduate students driving alone. There is also a large difference between the biking and walking rates of graduate students versus employees because graduate students typically live in closer proximity to campus. It is also interesting to note that there is only a slight 1% difference in transit use by graduate students versus employees.

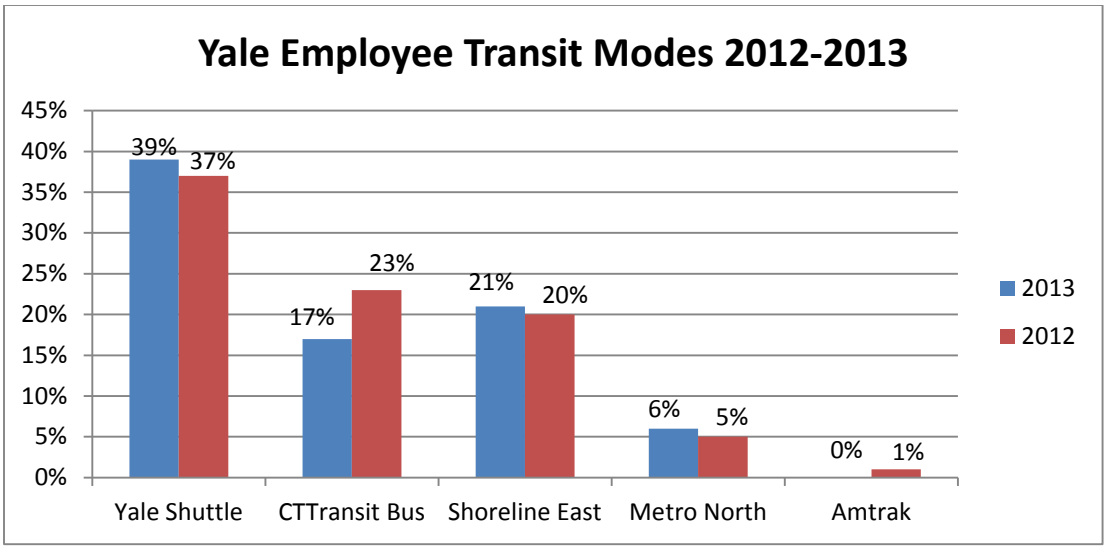
2013	Employees	Graduate Students
Drive Alone	53%	6%
Transit	22%	21%
Rideshare	9%	2%
Bicycle	6%	22%
Walk	9%	46%
Telecommute	2%	2%

Table 3

The largest change in the graduate student mode split since 2012 is a 4% increase in the bicycling mode share. It is also important to note the graduate student drive alone rate increased slightly in 2013 by 1%, while transit and walking both decreased by 2%.

Public Transit Mode Comparison

The Yale Shuttle has remained the most frequently used mode of transit over the past year with 39%, a 2% increase since 2012, of employees choosing the free Shuttle over other modes of public transit. Graph 2 below indicates the 2013 transit mode breakdown as it compares to 2012.



Graph 2

In Graph 2 above, the use of all modes of public transit (besides CTTransit and Amtrak) increased since 2012. CTTransit[1] bus use among transit riders decreased by the largest margin of 6%, while the Yale Shuttle increased by 2%, and Metro North & Shoreline East trains increased by 1% each. CTTransit Express Bus accounted for 3% of the overall drop in the CTTransit mode since 2012.

Based on Yale's total 2013 employee count, an important factor to note is that approximately 8% of all employees (or 1,067) rode the Yale Shuttle as their primary mode of transportation in 2013. An example trip could be an employee drives a car to the shuttle stop, parks on a side street, walks to the Shuttle stop, takes the Shuttle for the longest part of the commute, disembarks and walks to the office.

Incentives to Stop Driving Alone to Campus

The top three incentives in the 2013 survey that could motivate employees to switch from driving alone to alternatives are as follows:

#1) FLEXIBLE HOURS: 14.55% of Yale employees who drive alone to campus indicated on average[2] that they would likely change their mode choice if they had flexible hours to accommodate transit, carpool or vanpool schedules, compared to 14.64% in 2012. Using a rule of thumb for actual behavior change[3], that only 10% of those who answer a "what if" choice question would actually consider switching modes, could mean a potential of 102 employees would likely change.

#2) MONTHLY CASH ALLOWANCE IN EXCHANGE FOR PARKING SPACE: 14.40% of Yale employees who drive alone to campus indicated on average they would likely change their mode of transportation if they could receive a monthly cash allowance in exchange for their parking space. Interest in this incentive has decreased by 0.84% since 2012. Potentially 101 employees would likely convert from driving alone to using alternative modes.

#3) DISCOUNT ON MONTHLY TRAIN/BUS PASS: almost 11% of Yale employees who drive alone to campus indicated that they would likely change their commute mode if they were given a discount on their monthly train or bus pass, equating to the cost of a monthly CTTransit bus pass. This compares to 11.5% of employees in 2012. A potential 77 employees would likely switch from driving alone to using the bus or train. Note: at the time of the survey, a monthly CTTransit bus pass cost $47. The current cost is $54.

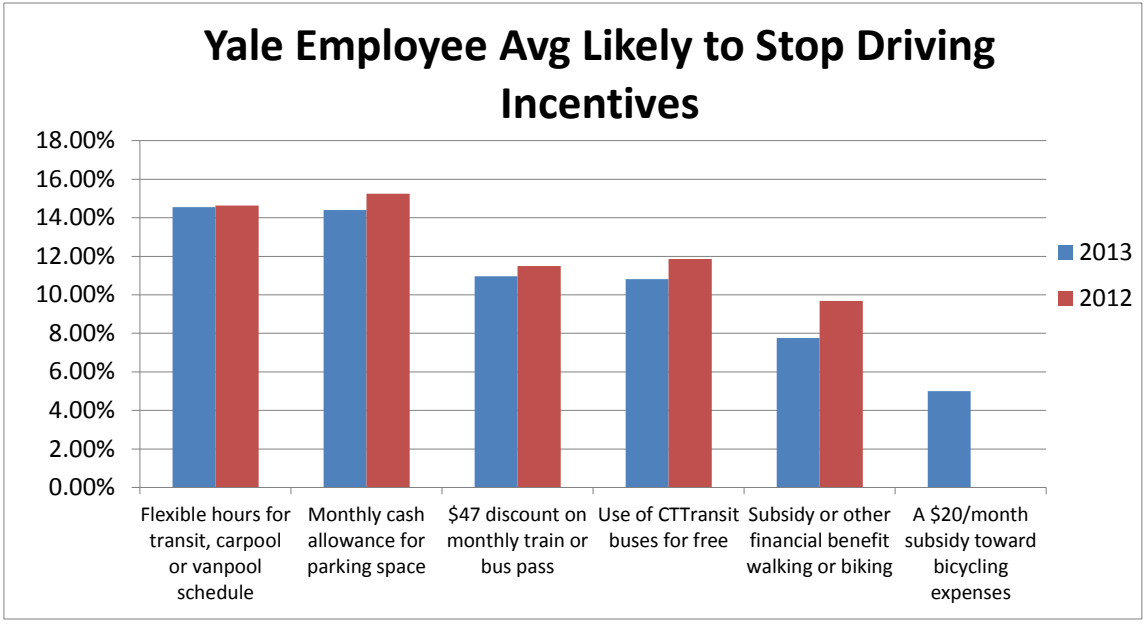
[1]CTTransit mode includes "CTTransit Bus" and "CTTransit Express Bus"

[2]"Likely" is the average of "very likely" and "somewhat likely" answers.

[3]Note: the actual change number is based on the 2013 drive alone rate of 53% of all employees or 7,022 employees. Of the employees who drive alone, 14.55% say they would likely change or 1,011 employees. Recognizing the probability that 10% of the 1,022 would likely change, approximately 102 employees might actually switch from driving alone to using alternative modes.

Yale employees continue to express their interest in more flexible hours, a monthly cash allowance in exchange for their parking space, and a discount on monthly transit passes as the incentives that would encourage them to stop driving alone.

The most important difference is that in 2013 employee interest in a monthly cash allowance for a parking space fell from first to second rank, while flexible hours to accommodate transit; carpool; or vanpool schedule rose to the first position. The "$47 discount on your monthly train or bus pass" also moved up to the third position, replacing "Use of CTTransit buses for free" in the top three incentives that would motivate employees to stop driving alone to campus. The latter change may be related to the 6% drop in usage of CTTransit among transit riders seen in the 2013 survey or the recognition that riding for free is most likely unattainable.



Graph 3

It is also important to note that "A $20/month subsidy toward bicycling expenses" only displays data from 2013 because it was added as a new incentive option for this year's survey. On average, 5% of Yale employees expressed interest in a $20/month bicycle benefit.

The 6% drop in use of CTTransit by employees as seen in this year's mode split may be an indication that Yale needs to do more to advertise the availability of these bus options and incentivize its commuters to choose alternative modes. A subsidy to use CTTransit or other rail options like Metro North, Amtrak, or the Shoreline East train could be potential options to include in the benefits Yale offers its employees that could decrease the drive alone rate further in the future.

Reasons for Driving Alone

Tables 4 and 5 below show the top five reasons for driving alone have been fairly consistent over time. The same reasons have been ranked 1st, 2nd and 3rd respectively from 2009 through 2013. The only difference between the employee responses from 2012 is "drive alone takes less time" and "need car for errands and appointments" swapped positions, with the former moving up to the second position. Also "transit does not work with my schedule" dropped off of the top 5 drive alone reasons in 2013.

What are your reasons for driving alone?	%	2013
Hours on campus are irregular	28%	1
Drive alone takes less time	24%	2
Need car for errands or appointments	23%	3
Need car in case of emergencies	16%	4
Enjoy my privacy, prefer to drive alone	15%	5

Table 4

What are your reasons for driving alone?	%	2012
Hours on campus are irregular	27%	1
Need car for errands or appointments	23%	2
Driving alone takes less time	22%	3
Transit does not work with my schedule	18%	4
Need car in case of emergencies	17%	5

Table 5

Employee Top 10 Zip Codes

In the 2013 survey, the data indicates that 30% of Yale employees live in New Haven (zip codes 06511, 06515, 06510) with the surrounding towns of Hamden and Branford rounding out the top three in 2013.

Towns 2013	Number	Percent	Zip Codes[4]
New Haven	202	30%	06511, 06515, 06510
Hamden	68	10%	06517, 06514
Branford	38	6%	06450
Guilford	34	5%	06437
North Haven	24	4%	06473
East Haven	19	3%	06512
Wallingford	18	3%	06492

Table 6

Towns 2012	Number	Percent	Zip Codes[5]
New Haven	159	24%	06511
Hamden	88	13%	06517, 06518, 06514
Branford	41	6%	06405
Guilford	32	5%	06437
North Haven	30	5%	06473
West Haven	30	5%	06516
East Haven	28	4%	06512
Woodbridge	20	3%	06525

Table 7

The only changes in geographic location of Yale employees is the inclusion of Wallingford in the top 10 zip codes in 2013, while West Haven and Woodbridge zip codes dropped off the top 10 list on this year's survey.

Employee Only 2013 Top Ten Zip Code and Mode Summary

Beginning in 2013, we began calculating **employee only** commute trips by zip code and by mode in order gain a better understanding of the modes employees are using to commute from the top 10 zip codes. Below is the Yale Employee Only Top 10 Zip Code by Mode Summary Table:

[4]Note town data is gathered by zip code; 2013 New haven zip codes= 3 and Hamden zip codes = 2

[5]Note town data is gathered by zip code; 2012 Hamden zip codes = 2

Yale 2013 Employee Summary Table Top Ten Towns & Zip Codes								
Number of Employees	**Town/Zip Code**	**Drove alone**	**Transit**	**Bike**	**Walk**	**Car/vanpool**	**Other[6]**	**Total**
160	New Haven (06511)	16%	30%	14%	29%	2%	9%	100%
46	Hamden (06517)	54%	20%	15%	0%	9%	2%	100%
37	Branford (06405)	59%	24%	0%	0%	11%	5%	100%
34	Guilford (06437)	65%	15%	0%	0%	12%	9%	100%
25	New Haven (06515)	36%	28%	12%	0%	8%	16%	100%
24	North Haven (06473)	79%	8%	0%	0%	4%	8%	100%
22	Hamden (06514)	55%	18%	0%	0%	18%	9%	100%
19	East Haven (06512)	74%	16%	0%	0%	11%	0%	100%
18	Wallingford (06492)	56%	0%	0%	0%	33%	11%	100%
17	New Haven (06510)	6%	24%	12%	47%	0%	12%	100%
402	**Top 10**	**60%**	**of all employees**					
670	**All EEs**							

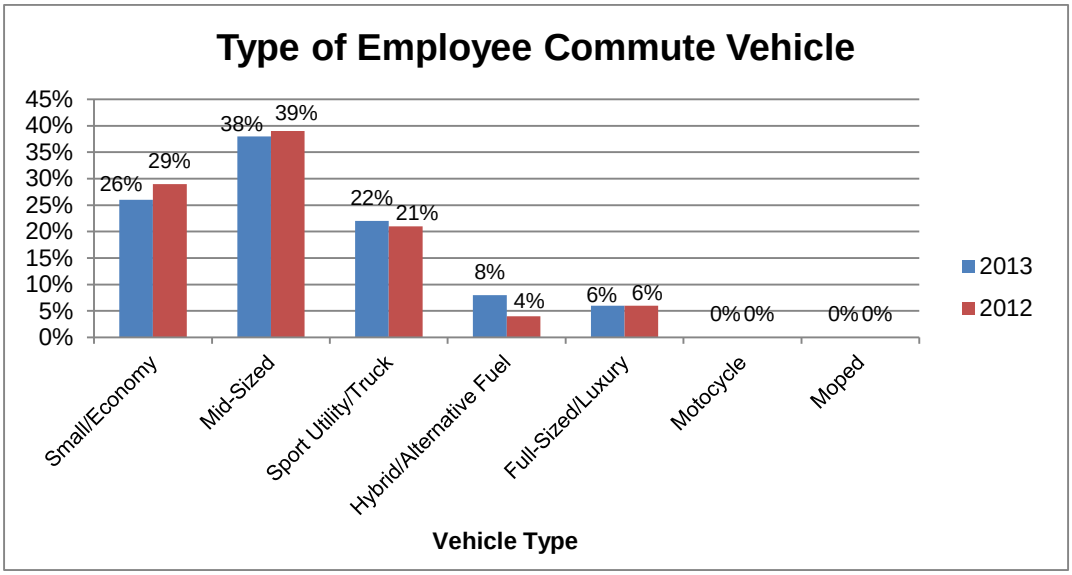
Table 8

Table 8 above provides additional detail on where the bulk of Yale's employees are commuting from and their mode choice. Yale may want to utilize this breakdown to more effectively target its transportation programs. For example, 16% of employees drive alone from zip code 06511, 36% drive alone from 06515 and 6% drive alone from zip code 06510 for a total of 58%. More than half of the employees surveyed commute alone a relatively short distance. Perhaps targeting employees who live in the zip codes that make up New Haven would benefit a closer look for a carpooling campaign.

Employee Vehicle Type

Graph 4 below shows several interesting developments since 2012 concerning employee vehicle type:

1) Ownership of Small/Economy vehicles decreased by 3% while Mid-sized decreased by 1% overall
2) Ownership of "Hybrid/Alternative Fuel" vehicles increased by approximately 4%, and
3) Use of "Sport Utility or Truck" increased by 1% since 2012.



Graph 4

Yale may want to consider supporting infrastructure, such as charging stations for electric vehicles around campus to increase consumer confidence in purchasing this type of vehicle.

[6]Other includes flextime, telecommute (work from home), or out of the office, with no clear majority

Greenhouse Gas Emission Reduction from Sustainable Transportation

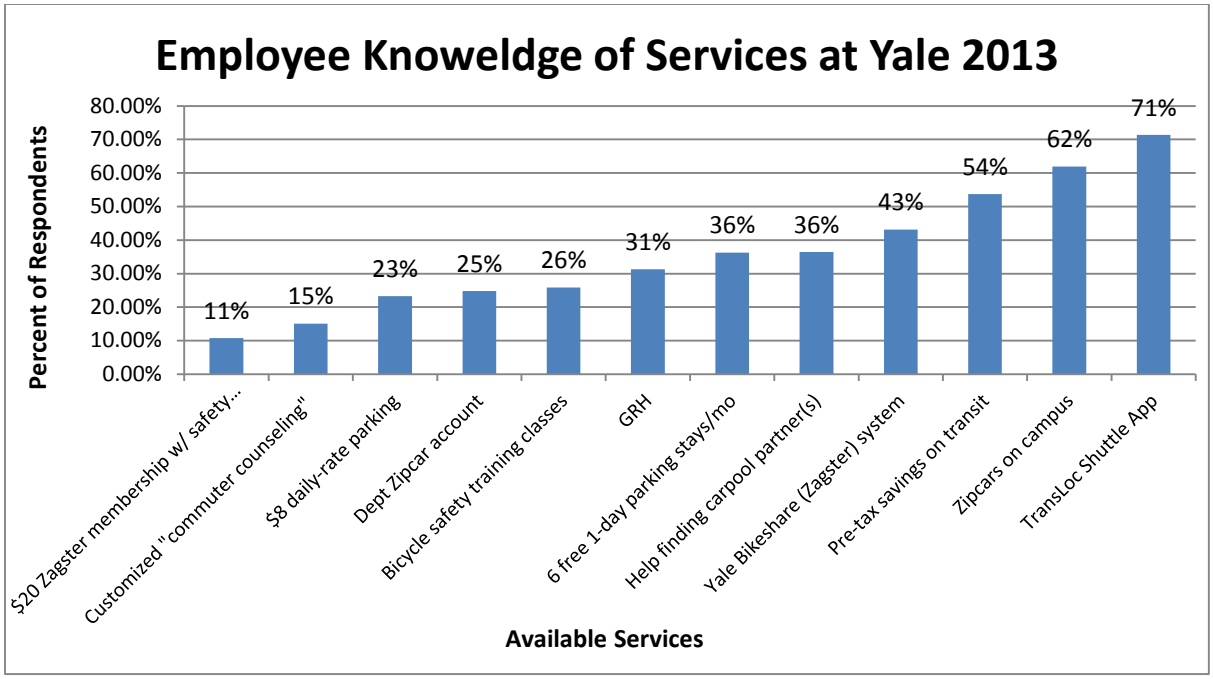
In order to further reduce Yale's greenhouse gas emissions it is critical that more of Yale's commuting population shift from driving alone to transit, carpooling, bicycling, walking and teleworking.

It is important to note that for every additional 100 people who choose to carpool, the university could reduce its carbon footprint by 13,200 pounds of CO_2 per year. For every 100 people who switch to transit, CO_2 emissions could be reduced by between 8,400 and 20,160 per year depending on the type of transit.

Employee use of transportation modes that cause no CO_2 emissions (walking, biking and teleworking) has remained the same since 2012 at 17%. It is important to point out that bicycling to campus increased by only 1% and telecommuting remained very low at 2% in 2013. It will take additional employee incentives to motivate employees to switch to non-emission modes and further reduce greenhouse gas emissions.

Commuter Familiarity with Yale Transportation Services

In the last several transportation surveys commuters at Yale that drive-alone at least one day per week were asked if they knew that Yale offered certain services to commuters. On the 2012 and 2013 surveys, all commuters were asked if they knew that Yale offered a similar list of commuter services to get a more complete picture of how well the University is marketing these services to its commuters.



Graph 5

According to Graph 5 above Yale employees are very familiar with the TransLoc shuttle app, and a majority also knows about the availability of Zipcars on campus and receiving pre-tax savings on their transit or buss pass. However, less than half of the employees surveyed have knowledge of the other eight commuter services offered at Yale including "customized commuter counseling", departmental Zipcar accounts, and the $20 Zagster membership reimbursement for taking the Bicycle Safety Training Class.

The results of this analysis clearly highlight the incentives that Yale could focus their marketing efforts on in order to increase the number of commuters taking advantage of these existing services. Increasing awareness of existing programs would be a very cost effective way that the University could potentially increase use of alternative transportation among the current commuting population.

Summary

The following are a few highlighted facts from the 2013 survey review:

- The most notable changes in the 2013 employee mode split were seen in the drive-alone rate decreasing from 54% to 53%, bicycling increasing by 1%, while walking dropped by 3% since 2012. Almost every mode of public transit saw an increase in use since the 2012 survey, with only CTTransit seeing a significant decrease of 6% in 2013.

- The top two incentives that would encourage employees to use alternative modes this year switched positions since the 2012 survey:

    1) Flexible hours
    2) A monthly cash allowance in exchange for parking space
    3) $54 discount on monthly train or bus pass

  On average, 5% of Yale employees expressed interest in a $20/month bicycle benefit. 2013 was the first time this benefit was included as an option on the survey.

- Employee survey respondents chose the same top three primary reasons for driving alone again in 2013:
    1) Hours on campus are irregular
    2) Driving alone takes less time
    3) Need car for errands or appointments

- The 2013 survey provides evidence that an increasing percentage (30%) of Yale employees live in New Haven (up from 24% in 2012). In light of this and the 3% drop in the walking rate, it is worth considering what Yale could do to motivate its employees that live locally to walk to campus. While a financial incentive might be difficult administratively to implement, other incentives such as distributing route maps, organizing walks or even providing umbrellas in case of sudden foul weather can help encourage employees to choose the alternative option. If safety is a concern perhaps a walking route map that covers the safest route to various neighborhoods could be established along with a walking buddy link on Yale's website.

- According to the 2013 survey results, Yale employees are very familiar with the TransLoc shuttle app (71%), and 62% also know about the availability of Zipcars on campus and 54% are familiar with the option to receive pre-tax savings on their transit pass. Less than half of the employees surveyed have knowledge of the other eight commuter services offered at Yale. They include:
    - Up to 6 free 1-day parking stays/month to registered car/vanpoolers and transit riders
    - A Guaranteed Ride Home for employees registered for car/vanpools or transit
    - Assistance finding a carpool partner, and discounted parking for people who carpool
    - Free personally-customized "commuter counseling" from Transportation Options
    - Daily-rate parking at $8/day
    - Departmental Zipcar account that allows hourly or daily use of a car, billed to a Pcard
    - Bicycle rental through the Yale Bikeshare (Zagster) program on campus
    - Bike Safety Training Classes offered by Yale Environmental Health & Safety
    - $20 reimbursement of annual Yale Bikeshare (Zagster) membership fee for completing the Bicycle Safety Training Class

  The results above indicate a need for additional marketing about existing commuter services for Yale employees and graduate students to help increase use of alternative modes and subsequently reduce driving alone to work.

Conclusion

Since Yale began surveying its commuting population in 2007, the drive-alone rate has dropped by 6.4% overall and 5% for commuting employees. According to the survey results over time, Yale has achieved its original goal of reducing drive-alone trips by 3%. Looking towards future sustainability planning, if Yale sets a new goal of reducing drive-alone trips and greenhouse gas emissions it will have to consider implementing incentives that increase convenience and decrease the cost to employees for their preferred alternatives to driving alone. These include: flexible hours; a monthly cash allowance in exchange for parking space, and a discount on monthly train or bus pass to actually motivate commuters to choose a more sustainable commute mode.

Yale employees have consistently chosen a monthly cash allowance in exchange for their parking space as one of the preferred incentives to stop driving alone. Parking costs and location are always a major consideration for commuters who drive alone to work; therefore changes in parking fee structure, reduction in overall parking spaces, or a monthly cash allowance could be enough to further reduce the drive-alone rate.

The Yale Shuttle continues to be the favored transit option among employees, with 2% more utilizing this mode in 2013. The Shoreline East train ranks second among employee ridership, 18% behind the Yale Shuttle. Given the high level of utilization of the Shuttle and the 6% drop in ridership on CTTransit seen in the 2013 survey, Yale may want to provide transit subsidies as part of its employee benefits package. A transit subsidy would go a long way in supporting the use of other public transportation modes.

Several questions were added to the 2013 survey to gauge interest in and usage of the Yale Bikeshare (Zagster) program. An analysis of the responses regarding the new campus bike share system will be included in a subsequent report to Yale Transportation Options.

An official telecommute policy is also an incentive that would provide employees an additional non-emission mode option at Yale. Without any additional incentives, Yale's drive-alone rate and GHG emissions are likely to only fluctuate with changes to the configuration of its population rather than from actual mode change.