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02 The Case for Bike-Share



Image: NYCDOP

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WHAT IS A BIKE-SHARE?

Bike-share programs are networks of public use bicycles distributed around a city for use at low cost. Bicycles can be picked up at any self-serve bike-station and returned to any other bike-station, which makes bike-shares ideal for Point A to Point B transportation. A New Yorker living on Avenue D in Manhattan could, for example, ride a bike-share bicycle to Union Square, leave the bicycle there and hop on the subway without worrying about bicycle theft. A New Yorker returning home to Elmhurst, Queens, could bicycle the last mile instead of waiting for the bus or transferring trains. Designed specifically to augment public transportation offerings, bike-share programs are defined by their low cost, the high concentration of their bike-stations over the program area, and their easy, 24 hour operations. Data from existing programs indicates that bike-share programs are popular. Velib', the Paris bike-share program, has an average of 75,000 rentals per day.¹

Bike-shares differ from other forms of transportation infrastructure in the speed at which programs can be implemented. In Paris, Velib's initial 700 bike-stations and 10,000 bicycles were installed in less than 6 months; the program doubled in size six months later. In Montreal, Bixi's solar powered bike-station design, which is installed in pre-fabricated modular units, will reduce implementation times even further. Administrators estimate that Bixi installation time could be as short as 20 minutes per bike-station because excavation is not required.²



*A Velib' user selects a bicycle from a bike-station.
Image: Marty Jerome (www.blog.wired.com)*

To use a bike-share bicycle, people sign up for daily, weekly or annual memberships. The memberships can be purchased online or at any bike-station. With their membership card in hand, users swipe their card or enter their password, select a bicycle from a bike-station, and go. Returning a bicycle is even easier. Users find a bike-station near their destination, roll the bicycle into an open docking station and are done. Most programs offer the first ½ hour free and provide a 15 minute grace period if there are no free docking stations at the users' destination. Bicycles not returned within 24 hours are considered stolen, and a set fee is automatically charged to the users' credit card.

The history and evolution of the bike-share concept is instructive. The first bike-share opened in Amsterdam in 1968 but was quickly overrun by theft. Many of Amsterdam's "White Bikes" were stolen and many others found wrecked or stripped for parts in the city's canals. The program closed shortly after its introduction. Subsequent efforts

¹Erlanger, Steven, "A Fashion Catches On in Paris: Cheap Bicycle Rentals," The New York Times, 13 July 08

²Phone Interviews with Alain Ayott, Executive Vice President, Montreal Parking Authority/Stationnement de Montréal; 3 & 11 July, 2008

in other cities to improve bike-shares by using uniquely designed bicycles with specialized parts that had no resale value, by locating bicycles at bike-stations or by requiring a coin deposit to retrieve a bicycle similar to those used for airport luggage carts, all failed to substantially reduce bicycle theft because there was no way to track the bicycles once they left the bike terminal.³

Anti-theft mechanisms, such as requiring subscriptions, bike-stations and wireless technology, have largely limited theft in modern (also known as 3rd Generation) bike-share programs, allowing bike-shares to become viable options in the 21st century. Use of the bicycles is limited to subscribers, linking each bicycle hire to a user's credit card. Operators use networked self-serve bike-stations which communicate with a central computer system and Radio Frequency Identification (RFID) technology to monitor the location of bicycles in the system. In Barcelona, the use of these mechanisms has meant that the Bicing system has a theft rate of only 3% despite a high citywide general theft rate.⁴

Bike-share programs differ substantially from recreational bicycle rentals. These differences underscore the transportation benefits of bike-shares. Bike-stations (where bicycles can be picked up or dropped off) are located in close proximity to one another, as well as to major transit hubs and are placed in both residential (origin) and commercial or manufacturing (destination) neighborhoods, which makes bike-shares ideal as a commuter transportation system. Velib' bike-stations, for example, are located approximately every 4 blocks (300m) which allows for easy access. In contrast, bicycle rental programs typically only have a few locations where bicycles can be rented, and to which they must be returned, and are mostly found in major tourist areas or in parks. Bike-stations are self-serve which allows users to access bicycles 24 hours a day, 7 days a week. Bicycle rentals are staffed which



A Velib' bike-station in Paris. Bike-stations are integrated into the streetscape. Image: xtof (www.flickr.com)



Users select bicycles from a Bicing bike-station in Barcelona. All stations are self-serve. Image: euthman (www.flickr.com)

³ DeMaio, Paul and Jonathan Gifford, "Will Smart Bikes Succeed as Public Transportation in the United States?" *Journal of Public Transportation*, Vol.7, No.2, 2004, p.3

⁴ BikeOff Project: Design Against Crime, "Bicing Barcelona: ClearChannel Adshel Public Bicycle System," (http://www.bikeoff.org/design_resource/dr_PDF/schemes_public_bicing.pdf); Accessed 12/2/09 & Ajuntament de Barcelona Website, "Survey of Victimization in Barcelona 2006," (<http://www.bcn.es/estadistica/angles/dades/anuari/cap08/Co803030.htm>); Accessed 12/2/09

increases their operating costs and limits their operating hours and number of locations.

The pricing of bike-share programs also differentiate them from bicycle rentals. As bike-share programs are designed to enhance existing transit options, membership rates and use fees are kept low. Most bike-share programs offer the first ½ hour of use for free in order to encourage use and, set increasing prices (\$1-\$2) for each subsequent ½ hour in order to keep bicycles constantly circulating. Most recreational bicycle rentals in New York charge up to \$20/hour or \$95/day. The bicycle rental program on Governor’s Island charged \$5/half hour, well above public transportation prices and limited to a small, isolated area.

Lastly, bike-share programs differ from bicycle rentals in the characteristics of the bicycles. Bike-share bicycles are sturdy, heavy and designed to withstand considerable use and abuse. The average bike-share bicycle is used 10-15 times per day and has a life expectancy of 3-5 years.⁵ RFID technology allows program operators to monitor bicycle location. The built in locking mechanism connects the bicycles directly to the bike-stations. Bike lights are automatically illuminated when the bicycle is in use.⁶ Because they are meant for people who may not be wearing “bicycling attire,” bike-share bicycles are designed so that the chain, gear shifts and brake mechanisms are completely enclosed and protected from dirt or tampering. Adjustable, but not removable, seats make the bicycles easy to use. Parts are specialized reducing the temptation for salvage or resale of parts. Bicycle rentals bicycles do not have this combination of features.

5 Grasso, Richard, Senior Vice President Business Development & Martina Schmidt, Director SmartBike US, ClearChannel Adshel, Phone Interview: 30 April, 2008

6 Velib’ Website, “Velib Press Kit,” (www.velib.fr); Accessed 8/26/08

POTENTIAL BENEFITS OF BIKE-SHARE PROGRAMS

Bike-share programs offer a number of real, tangible benefits to New York City. These benefits range from increased transportation options for New Yorkers, out-of-city commuters and visitors, to better health outcomes including a potential reduction or slowing of obesity rates. A New York bike-share program would help foster a positive, “green” image for the city which can in turn result in increased tourism and a strong business climate. The potential to replace some personal car or taxi trips with non-polluting bicycle trips can help the city reach its PlaNYC goals of reducing greenhouse gas emissions. Some reports from the European bike-share programs indicate a small, but significant, reduction in vehicular traffic and congestion which can be attributed to the presence of bike-share programs and increased cycling. Lyon saw a 44% increase in bicycle riding within the first year of their Velo’v program’s.⁷ Bicycle riding in Paris has increased 70% since Velib’ was introduced in July 2007.⁸

Transportation Benefits:

Bike-share systems create new options for short trips, enhance mobility around the city and increase access to the city’s existing transit services. In a survey of bike-share users in Paris, 89% said that Vélib’ allowed them to move around Paris more easily and 54% said that they traveled more in Paris with advent of the Velib’ program.⁹ New York’s compact geography and increasingly robust bicycle infrastructure make it ideally situated to reap significant transportation benefits from a bike-share program. Commuters in particular may benefit from bike-shares. In Paris, 61% of Velib’ annual pass holders use the program regularly to get to work or school.¹⁰ In Barcelona, 60% of the Bicing bike-share program subscribers used Bicing in their commute.¹¹ In New York, most New Yorkers live and work in the same borough, suggesting that many commuting trips could be within bicycling range.¹²

Bike-share systems encourage transit use by extending the distance that people will go to reach transit, by allowing them to avoid slow buses/connector services, and by providing links between subway stations that otherwise do not connect. For example, over 14,000 northwest Brooklyn residents (Greenpoint, Williamsburg, Fort Greene, etc) work in northwest Queens (Long Island City, Astoria, Sunnyside). While the distance between these areas is short, insufficient transit means that 42% of these commuters drive to work each day.¹³ In addition, for some households, the introduction of a bike-share program may help them avoid or postpone the purchase of a car, as trips to transit or other short trips could then be made by public bicycle.

7 Buhrmann, Sebastian; Rupperecht Consult Forschung & Beratung GmbH; “New Seamless Mobility Services: Public Bicycles.” Niches Consortium & JCDecaux, “CycloCity: A Revolutionary Public Transit System Accessible to All.” Philadelphia Presentation, 2008; (http://bikesharephiladelphia.org/PDF%20DOC/V%C3%A9lo%20V_A_REVOLUTIONARY_PUBLIC_TRANSPORT_SYSTEM_ACCESSI.pdf); Accessed 9/02/08

8 Bremner, Charles & Marie Tourres, “A year on, the cycle experiment has hit some bumps,” *The London Times*, 8 July, 2008

9 Velib’ Website, “Now We Know You Better;” (http://www.velib.paris.fr/les_newsletters/10_aujour_d_hui_nous_vous_connaissions_mieux); Accessed 8/26/08

10 *ibid.*

11 Clear Channel Outdoor Website, “SmartBike™” (<http://www.smartbike.com/>); Accessed 3/24/08

12 NYC Department of City Planning, Transportation Division. “NYC Peripheral Travel Study: Journey-to-Work Trips of NYC Workers Employed Outside Manhattan.” October 2008, p.146

13 *ibid.*

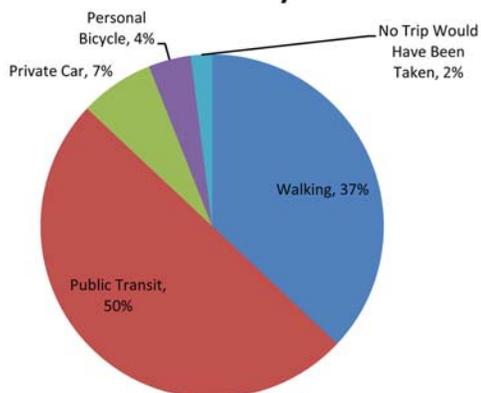
At the same time, bike-share systems can relieve pressure on overburdened transit lines, by allowing subway riders to bicycle to less crowded and/or more direct routes or by replacing short transit trips altogether. A survey of Velo'v users in Lyon found that 50% of trips made with Velo'v would previously have been made on transit.¹⁴ In New York, a subway commuter living on the Upper East Side and working in lower Manhattan or Midtown currently walks to the Lexington Avenue subway (4/5/6), one of the most congested subway lines in the city. With a bike-share program in place, that commuter might bicycle to an express stop or choose to bypass the 4/5/6 all together and bicycle to 63rd or 59th Streets where transfers are available for the F and N/R/W trains. Similarly a bike-share system would allow a Morrisania or Mott Haven resident working at Columbia-Presbyterian, City College or Columbia University, to bicycle to the D train instead of taking a bus or the crowded 2, 5 or 6 train into Manhattan and turning around to go back uptown into work.



"0€ at the Pump;" an advertisement promoting the benefits of bicycling. Image: Mairie de Toulouse

Bike-share programs, which typically can be introduced in a matter of months, can be especially valuable as New York faces increasing subway congestion and no clear, quick answers for relief. Massive construction costs limit development of additional new subway lines and restrict capacity expansion options such as platform extensions on existing lines. A recent MTA proposal to eliminate seats in rush hour trains indicates the seriousness of the problem. For anyone who has ever tried to take the cross-town bus at rush hour, a bike-share program would offer obvious advantages and could complement current NYCDOT efforts to speed up bus service.

Trips Replaced by Velo'v Would Have Been Made By...



The financial incentives to use a bike-share program grow as the cost of driving and transit increases. In Paris, 62% of Velib' users cited the program as way for them to reduce transportation costs.¹⁵ Rising US gas prices in 2007-8 led to an increase in bicycle sales and bicycle commuting. According to the New York Sun, "many of these new cyclists are from areas not commonly associated with the "Bike Belt" — neighborhoods such as the Upper West Side and Williamsburg in Brooklyn — but are instead from Queens and other places where driving to work has long been common and affordable" and where public transportation is often limited.¹⁶

14 Buhrmann, Sebastian; Rupprecht Consult Forschung & Beratung GmbH; "New Seamless Mobility Services: Public Bicycles." Niches Consortium; p.5

15 Velib' Website, "Now We Know You Better;" (http://www.velib.paris.fr/les_newsletters/10_aujourd_hui_nous_vous_connaissons_mieux); Accessed 8/26/08

16 Phillips, Anna; "High Gas Prices Cause Bike Shortages in N.Y." *The New York Sun*, 30 May, 2008

While it is unlikely that all of New York City's drivers will suddenly step out of their cars and get onto a bicycle, evidence from European bike-share programs suggests bike-share programs may be linked to small, but significant, decreases in car use and traffic congestion. In Lyon, France, the 3,000 bicycle Velo'v bike-share system shifts 1,000 car trips to bicycle each day. 7% of Velo'v trips would have otherwise been made by car.¹⁷ Within the first six months, 2 million Velo'v trips had been made, replacing an estimated 150,000 car trips.¹⁸ In Paris, 20% of Velib' users said that they used their personal cars less since becoming members.¹⁹ Assuming bike-share bicycles replaced just 1% of all non-commercial vehicle trips in Midtown and Lower Manhattan, the system could eliminate almost 9,000 car trips daily in New York City.²⁰ Rising gas prices may further stimulate this trend. By freeing up room on the city's subways and buses, especially for short trips, a bike-share program could encourage New Yorkers with longer commutes, who might otherwise drive, to take the train.

Economic and Job Creation Benefits:

Bike-share programs have proven to produce substantial revenues from fees and increased tourism and bicycle-related sales. The revenues and jobs generated by bike-share programs depend on program size. In Paris, Velib', which has 20,600 bicycles, earned over €30 million in its first year in membership and use fees.²¹ Since the costs of the program are covered by the JCDecaux billboard contract, this money goes entirely to the city of Paris as revenue. Washington DC also receives all membership and use fees generated from SmartBike, although the small size of the program means that these revenues will be much lower. As advertising revenues in New York City are likely to be substantial, a bike-share franchise could generate significant revenue. The sale of one day "tourist" passes in particular could be a large revenue stream. In addition, sales of bicycle-related products such as helmets, reflective gear and personal bicycles also tend to rise with the advent of a bike-share program, stimulating economic growth and producing additional sales tax revenue.



A bike-share redistribution team in Barcelona. Image: ClearChannel Adshel

Bike-share programs are job creators and a number of programs have targeted that job creation toward youth and at-risk populations. Bike-share programs require staff to maintain the bicycles,

17 Buhrmann, Sebastian, Rupprecht Consult Forschung & Beratung GmbH, "New Seamless Mobility Services: Public Bicycles." Niches Consortium; p.5

18 *ibid.* p.2

19 Velib' Website, "Now We Know You Better;" (http://www.velib.paris.fr/les_newsletters/10_aujourd_hui_nous_vous_connaissons_mieux); Accessed 8/26/08

20 Trip estimate numbers are from the NYMTC Best Practices Model and from NYC & Co. estimates on leisure tourism

21 Nadal, Luc, "Bike Sharing Sweeps Paris Off Its Feet," *Sustainable Transport*, Institute for Transportation and Development Policy, Fall 2007, Number 19 & Erlanger, Steven, "A New Fashion Catches On in Paris: Cheap Bicycle Rentals," *The New York Times*, 13 July 2008

re-distribute them when necessary and administer and oversee the systems' central computer network. In Paris, JCDecaux employs more than 400 full-time and part-time staff, with a minimum guarantee of 20 hours/week. Job types are varied as the program requires everything from mechanics and warehouse staff, to call center technicians, service staff, sector managers and supervisors who interact with the public.²² In addition, a large New York City bike-share program could create jobs elsewhere in New York State as facilities would need to be developed to manufacture the bicycles and bike-stations.

Health Benefits:

Bike-share programs, because they do not require users to own, store or maintain a personal bicycle, tend to introduce new people to bicycling and make bicycling a part of peoples' lives in new ways. 96% of Velo'v users in the first year had not ridden in Lyon before.²³ In addition, once they start, bike-share users tend to bicycle frequently. ClearChannel Adshel found that 45% of their membership used a bike-share bicycle more than five times per week.²⁴

Thus, bike-share programs offer significant options for improvements in the health and quality of life of many New Yorkers. In New York, the majority of adults do not meet the levels of physical activity recommended to protect health and prevent disease.²⁵ For adults to maintain health, at least 30 minutes of moderate intensity physical activity is recommended a minimum of 5 days a week.²⁶ Such exercise can be broken down into short time spans, as small as 10 minutes, and can easily be encouraged by a bike-share program that allowed New Yorkers to bicycle to the subway station instead of taking the bus. Improved health outcomes can also come with cost savings for city and state health care providers. According to a study by the California Department of Health Services, a 5% improvement in the rates of physical inactivity and healthy weight over five years could save California more than \$6 billion, while a 10% improvement could save nearly \$13 billion.²⁷

The public health benefits of increased bicycling are substantial. In one Danish study provided by the NYC Department of Health and Mental Hygiene's (NYCDHMH) Bureau of Chronic Disease Prevention and Control, those who did not cycle to work had a 39% higher mortality rate than those who did, even after adjusting for other relevant factors including leisure time physical activity.²⁸ Another source found that a fifteen minute bicycle ride to and from work five times a week can burn the equivalent of 11 pounds of fat in a year.²⁹

22 Velib' Website, "Velib Press Kit," (www.velib.fr); Accessed 8/26/08

23 Holtzman, David, "Bike-Sharing," *Planning*, May 2008, p.21

24 Clear Channel Outdoor Website, "SmartBike™" (<http://www.smartbike.com/>); Accessed 3/24/08

25 NYC Department of Health and Mental Hygiene, 2007 Community Health Survey

26 New York City Department of Health and Mental Hygiene's Bureau of Chronic Disease Prevention and Control & Haskell, W.L., et al., *Physical activity and public health: updated recommendation for adults from the American College of Sports Medicine and the American Heart Association*. *Circulation*, 2007. 116(9): p. 1081-93

27 Chenoweth, D., *The economic costs of physical inactivity, obesity and overweight in California adults: health care, worker's compensation, and lost productivity*. California Department of Health Services, Public Health Institute, 2005

28 Andersen, L.B., et al., *All-cause mortality associated with physical activity during leisure time, work, sports, and cycling to work*. *Arch Intern Med*, 2000. 160(11): p. 1621-8

29 Bupa. *Cycling and health*. [cited 2008 August 8]; http://www.bupa.co.uk/health_information/html/healthy_living/lifestyle/exercise/cycling/cycling_health.html

The health benefits of small amounts of bicycle use are particularly important given rising obesity rates in the United States and the associated costs. According to one study, compared with their normal weight counterparts, obese or overweight Americans spend 36% more on health care services and 77% more on medications (the comparable numbers for current smokers are 21% and 28%, respectively).³⁰ If American obesity trends continue rising without additional behavioral or medical technology changes, by 2020, up to one-fifth of health care expenses could be devoted to treating obesity consequences. In New York State, Medicaid expenditures on long term care could rise to \$5.7 billion by 2016 with per capita costs increasing from \$280 to as much as \$350.³¹ Dutch studies also found correlations between level of activity and worker productivity. Workers who met recommended levels of vigorous physical activity (at least 20 minutes each time, three times a week) had fewer sick days than their counterparts who did not. These workers had four fewer sick days per year on average.³²

City Image Benefits and Connections to PlaNYC:

While harder to quantify, a bike-share program could also help New York build on its image as a “green” leader set by the Mayor’s PlaNYC 2030 and stimulate overall gains in quality of life in the city. PlaNYC 2030 is one of the most comprehensive proposals ever published for any city’s future. In addition to the goals it set forth, many of which are currently in process of being implemented by the city, PlaNYC has helped to redefine New York City as an innovative, “green” city. A New York City bike-share program which could be implemented relatively quickly could positively contribute to these efforts, particularly in contrast to other much needed but capital intensive transportation investments such as subway expansion.

Bike-share programs around the world have met with overwhelmingly positive national and international print, internet and televised media. Coverage has appeared throughout the European press (in tourism markets that the city is courting) and on innumerable transportation and travel blogs. Montreal’s Bixi program was featured by Time Magazine as one of its 50 Best Inventions of 2008.³³ This approbation and attention has already had tangible positive image benefits in Paris. In 2007, Velib’ won the British Guild of Tourism Writers’ “Best Worldwide Tourism Project” award.³⁴ Similar publicity for a New York bike-share could help the city meet its goal of 50 million visitors by 2015.

Lastly, as evidenced by recent NYCDOT projects like Summer Streets, New Yorkers respond positively to increased opportunities for bicycling, which bodes well for a bike-share program. Velib’ has a 94% satisfaction rate among users, many of whom credit the program with giving Paris a

30 RAND Health. *Obesity and Disability: The Shape of Things to Come*. 2007 [cited 2008 August 13]; Available from: http://www.rand.org/pubs/research_briefs/RB9043/

31 *ibid.*

32 Proper, K., et al., *Dose-response relation between physical activity and sick leave*. *Br J Sports Med.*, 2006. **40**(2): p. 173-8.

33 Time Magazine Website, “Time’s Best Inventions of 2008: #19 Montreal’s Public Bike System,” *Time Magazine*, (http://www.time.com/time/specials/packages/article/0,28804,1852747_1854195_1854146,00.html); Accessed 1/7/09

34 British Guild of Tourism Writers Website, “BGTW Tourism Awards – 2007: PARIS VÉLIB;” (http://www.bgtw.org/index.php?option=com_content&task=view&id=934&Itemid=77); Accessed 9/02/08

positive image and dramatically increasing their ability to move about the city.³⁵ As one review of Velib' noted, "when they speak of Vélib's, Parisians smile, even those like a waiter who admitted not having ridden one."³⁶

35 Velib' Website, "Now We Know You Better;" (http://www.velib.paris.fr/les_newsletters/10_aujourd_hui_nous_vous_connaissons_mieux); Accessed 8/26/08

36 Rayman, Eric; "Finding Liberté on Two Wheels;" *The New York Times*, 14 October, 2007