



RIDERSHIP FORECAST AND MARKET ANALYSIS

Washington D.C.'s Capital Bikeshare

Boston's Hubway

New York City's Citi Bike

Minneapolis' Nice Ride Minnesota

Comparison Of Case Studies To
Hudson County

Ridership Forecast

Equity Strategies



Several bike share programs, in cities of comparable size and characteristics to Hudson County, provide a unique opportunity to inform this feasibility study, and offer multiple years of data. Four peer systems were selected from among active systems based on their similarities with Hudson County in terms of population size, program scale, and integration with transit. For example, the population of Hudson County, which is about 660,282, is close to Boston's (645,966) and Washington, D.C.'s populations (646,449)⁶. In addition, Hudson County's proximity to New York City made Citi Bike a sensible choice for a case study. The selected programs also highlight several different ownership and operational models. For example, Citi Bike is privately funded and operated, while Nice Ride is owned and managed by a non-profit. Capital Bikeshare and Hubway are "regional systems" that include multiple jurisdictions, which would also be applicable to Hudson County as well. In addition, highlights of Hoboken's pilot program are included. The following peer systems are discussed in more detail below:

- Washington D.C.'s Capital Bikeshare
- Boston's Hubway
- New York City's Citi Bike
- Minneapolis' Nice Ride Minnesota

⁶ Source of population figures: 2013 ACS 1-Year Estimates.



Bike Share Case Study

Full Year 2013

Washington, D.C. Area

www.capitalbikeshare.com

Description

Capital Bikeshare launched in 2010 with 110 stations and 1,100 bicycles, as a collaborative effort between Arlington County and Washington, D.C. Since then, the system has expanded to the neighboring jurisdictions of Montgomery County and the City of Alexandria. The regional system now includes over 300 stations and over 2,000 bicycles, and is the third largest system in the U.S.

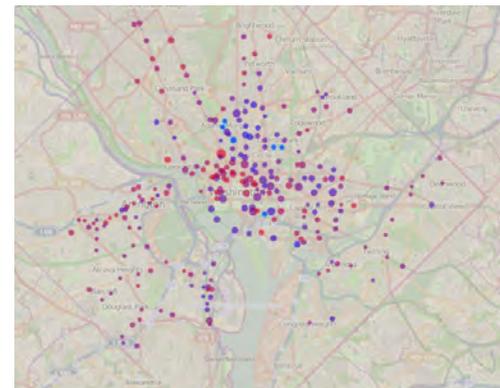
System Characteristics

Equipment:	PBSC Urban Solutions (Bixi)
Equipment Type:	Solar/modular
Equipment Ownership:	Jurisdictional
Operator:	Alta Bicycle Share
Operations:	Year-round (365 days)



System Size¹

Bikes:	2,500
Stations:	244
Docks:	4,092
Service Area: ²	22.8 sq. mi.
Station Density:	10.7 stations / sq. mi.

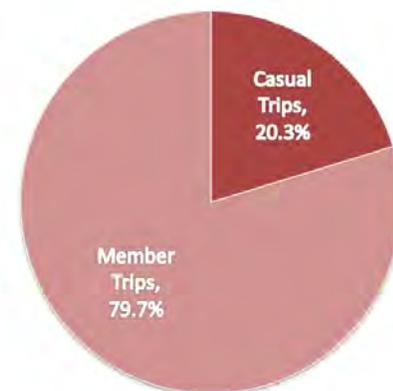


Demographics

System Population: ³	1,999,147(2012)
Metro Area Population: ⁴	5,225,000 (2013)
Estimated Annual Tourists: ⁵	18,900,000 (2012)
Average System Population Density:	3,366 people / sq. mi

Membership and Ridership⁶

Casual Subscriptions:	256,451
Annual Members:	24,024
Casual Subscriber Rides:	530,709
Annual Member Rides:	2,086,393
Total Rides:	2,617,102
Rides per annual membership:	86.8
Rides per casual subscription:	2.1
Population per bike:	800
Percent population with annual membership:	1.2%
Casual subscriptions per station:	1,051
Tourists per casual subscription:	74



Total 2.9 rides per bike per day



Bike Share Case Study
Full Year 2013

Washington, D.C. Area

Capital Funding Sources⁷

Initial System (1,100 Bikes, 110 Stations)

FHWA (D.C. portion) \$6.2 million

Revenue Model

Sponsorship, membership and usage fees are reinvested into the system through a collaborative agreement of the regional members. Jurisdictions pay a flat per-dock fee to operator in current agreement.

Membership Fees

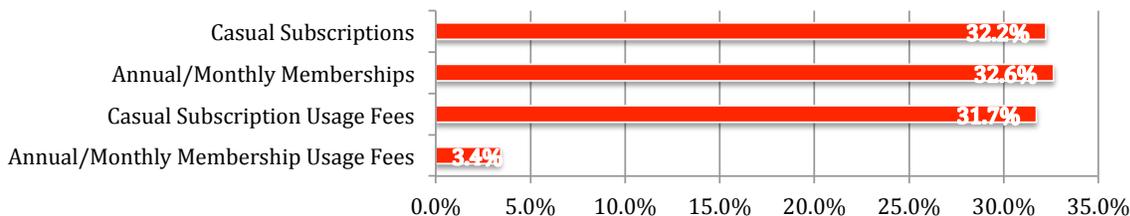
Annual:	\$75
Annual Corporate:	\$50
Annual Monthly Payments: ⁸	\$84
Monthly:	\$25
72 Hours:	\$15
24 Hours:	\$7

Usage Fees

First 30 minutes free
Additional 30 minute increments:
- Annual: \$1.50 (2 nd half hour); \$3 (3 rd half hour);
\$6 (per additional half hour) (max \$70.50/day)
- Casual: \$2 (2 nd half hr); \$4 (3 rd half hr); \$8 (per additional half hour)
(max \$94/day)

Breakdown of User-Generated Revenue⁹

Breakdown of User-Generated Revenue



Operating Costs¹⁰

Operating expense per dock per month:	\$114
Operating expense per ride:	\$2.32
Fare box recovery: ¹¹	98%

¹ As of December 2013

² Service area is calculated as the area encompassing every station plus a ¼ mile buffer around each station.

³ 2012 US Census Estimates. State & County QuickFacts. Includes total population for the City of Alexandria, VA; Arlington County, VA; Washington, D.C.; and Montgomery County, MD

⁴ Metropolitan Washington Council of Governments. CLRP Long Range Transportation Plan

⁵ Destination DC

⁶ Accessed from CapitalBikeshare.com on January 30, 2014. Data is for 2013.

⁷ Capital Bikeshare website

⁸ Monthly installments of \$7

⁹ Capital Bikeshare Monthly Reports

¹⁰ Capital Bikeshare Monthly Reports

¹¹ Fare box recovery is the percentage of operating costs recovered from annual memberships, casual subscriptions, and usage fees.



Hubway

Bike Share Case Study

Full Year 2012

Boston, MA

Description

Hubway launched in 2011 in the City of Boston, growing as a regional system now serving the communities of Boston, Cambridge, Somerville, and Brookline by 2012. It has garnered multiple sources of funding, including FTA and CDC, many sponsorships, from title to station, and piloted a helmet vending machine solution.

System Characteristics

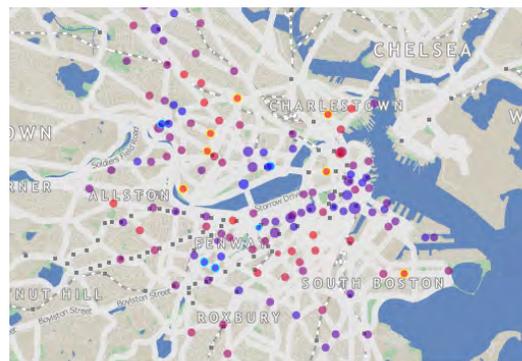
Equipment:	PBSC Urban Solutions (Bixi)
Equipment Type:	Solar/modular
Equipment Ownership:	Jurisdictional
Operator:	Alta Bicycle Share
Operations:	Seasonally March to November (Cambridge year round pilot starting 2014)



www.thehubway.com

System Size¹

Bikes (Total EOY Average):	1,000 704 ²
Stations (Total EOY Average):	104 79
Docks (Average):	1,407
Service Area ³ :	21.9 sq. mi.
Station Density:	3.6 stations / sq. mi.



Demographics

System Population ⁴ :	878,786 (2012)
Metro Area Population ⁵ :	4,640,800 (2012)
Estimated Annual Tourists ⁶ :	22,500,000
Average System Population Density ⁷ :	14,027 people / sq. mi.

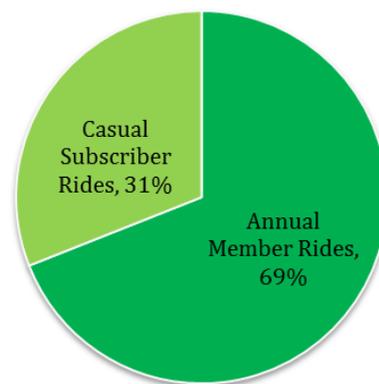
Membership and Ridership⁸

Casual Subscriptions:	68,752
Annual Members:	7,048

Casual Subscriber Rides:	168,498
<u>Annual Member Rides:</u>	<u>365,257</u>
Total Rides:	533,755

Rides per annual membership:	52
Rides per casual subscription:	2.5

Population per bike:	1,248
Percent population with annual membership:	0.8%
Casual subscriptions per station:	870
Tourists per casual subscription:	327



Total 3.0 rides per bike per day



Hubway

Bike Share Case Study

Full Year 2012

Boston, MA

Funding Sources⁹

Initial System (610 Bikes, 60 Stations)

Grants	\$4.5 million	Sponsorship	\$1.5 million
FTA	\$3 million	Title – New Balance	\$600,000 over 3 years
BPHC / CDC	\$450,000	Station sponsorships– over 30	\$50,000 each, paid over 3 years
CMAQ	\$250,000		

Business Model

Jurisdictions fund capital and operations through different combinations of public funding, membership and usage fees, advertising and sponsorship, with profit sharing for each jurisdiction.

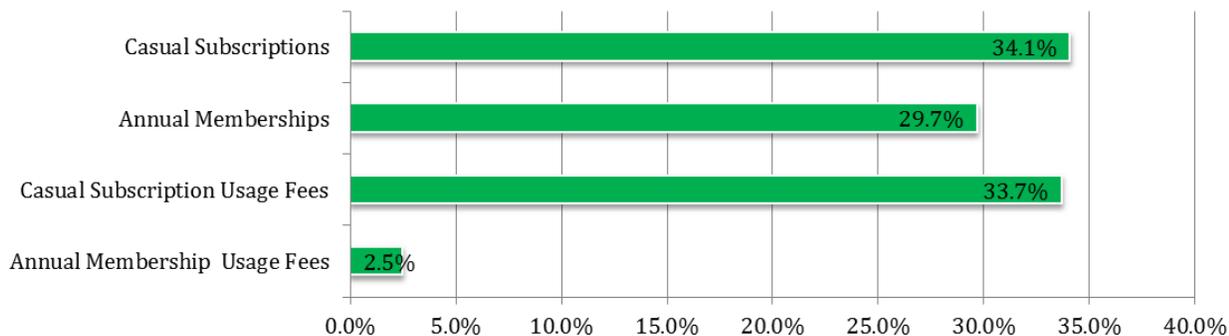
Membership Fees

Annual:	\$85
Annual Corporate:	\$50
Annual Discounted:	\$5
Monthly:	\$20
72 Hours:	\$12
24 Hours:	\$6

Usage Fees

First 30 minutes free
Additional 30 minute increments:
- Annual: \$1.50 (2 nd half hour); \$3 (3 rd half hour);
\$6 (per additional half hour) (max \$75/day)
- Casual: \$2 (2 nd half hr); \$4 (3 rd half hr); \$8 (per additional half hour)
(max \$100/day)

Breakdown of User-Generated Revenue



Operating Costs¹⁰

Operating expense per dock per month:	\$121.75
Operating expense per ride:	\$2.87
Farebox recovery ¹¹ :	88.3%

Equity Strategy¹²

\$5 subsidized annual memberships through Boston Public Health Commission. 600 sold through EOY 2012.

¹ Information based on data included in the Metropolitan Area Planning Council’s *Bicycle Share Operation Services* RFP issued in November 2013. It includes data from system launch up to September 2013. The data presented represents 2012.

² End-of-Year (EOY) represents the system inventory at the end of 2012; the Average is the weighted average of system inventory over the course of 2012.

³ Service area is calculated as the area encompassing every station plus a ¼ mile buffer around each station.

⁴ System population is calculated as the sum of the populations in Boston, Cambridge, Somerville, and Brookline. Population sources: United States Census Bureau, 2012.



Hubway

Bike Share Case Study

Full Year 2012

Boston, MA

⁵ Metro population area is the population of the Boston-Cambridge-Newton, MA-NH Metropolitan Statistical Area, United States Census Bureau, 2012.

⁶ Greater Boston Convention and Visitors Bureau. Statistics & Reports, 2012. Accessed January 2014:
<www.bostonusa.com/partner/press/statistics/>

⁷ Population density calculated from population and land area totals for Boston, Cambridge, Somerville, and Brookline. United States Census Bureau, 2012.

⁸ Membership data from the MAPC's *Bicycle Share Operation Services* RFP issued in November 2013, Appendix E. Ridership data from *Hubway by the Numbers*, 2012. Accessed online at www.hubway.com.

⁹ City of Boston Press Release: Mayor Menino Signs First-Ever Bike Share Contract Launching Hubway in Boston, 2011.
<http://www.cityofboston.gov/news/default.aspx?id=5075>

¹⁰ Contract between City of Boston and Alta Bicycle Share, April 2011, using Annual Cost Cap for Operating Costs.

¹¹ Fare box recovery is the percentage of operating costs recovered from annual memberships, casual subscriptions, and usage fees.

¹² Hubway Subsidized Membership Flyer <<http://www.thehubway.com/assets/pdf/flyers/pbhc-subsidized-membership-flyer.pdf>> and Inclusivity is a big hurdle for bike share programs, May 7, 2013 <<http://axisphilly.org/article/the-big-hurdle-for-bike-share-programs-inclusivity/>>



Citi Bike

Bike Share Case Study

Year End 2013

New York City, NY

Description

Citi Bike launched May 2013 in New York City in lower Manhattan and Brooklyn. Initial launch was delayed due to software problems and Hurricane Sandy. It is the largest system in the United States and is unique in that it is privately funded.

System Characteristics

Equipment:	PBSC Urban Solutions (Bixi)
Equipment Type:	Solar/modular
Equipment Ownership:	Private
Operator:	NYC Bicycle Share (subsidiary of Alta)
Operations:	365 days, 24/7

System Size¹

Bikes:	6,000
Stations:	330
Docks:	11,571
Service Area:	16.75 square miles
Station Density:	19.7 stations per square mile

Demographics

System Population ² :	4,218,300 (2013)
Metro Area Population ³ :	19,831,900 (2012)
Estimated Annual Tourists ⁴ :	52,700,000
Population Density ⁵ :	45,043 people / sq. mi.

Membership and Ridership⁶

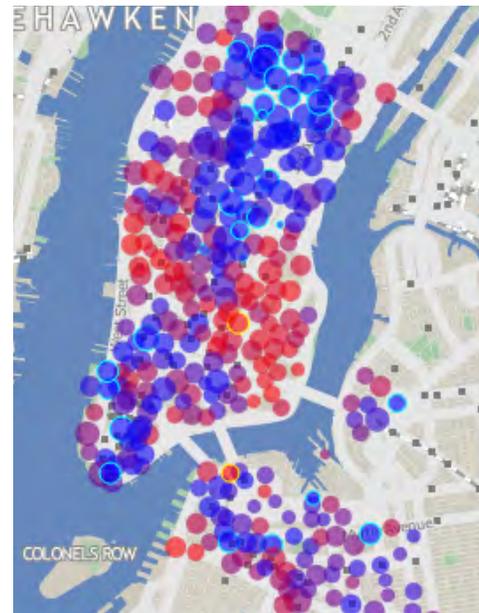
Casual Subscriptions:	354,326
Annual Members:	96,125
Casual Subscriber Rides:	734,665
Annual Member Rides:	5,387,542
Total Rides:	6,122,207

Rides per annual membership:	56
Rides per casual subscription:	2.1

Population per bike:	703
Percent population with annual membership:	2.3%
Casual subscriptions per station:	1,074
Tourists per casual subscription:	149



www.citibikenyc.com



Total 4.7 rides per bike per day



Citi Bike

Bike Share Case Study

Year End 2013

New York City, NY

Capital Funding Sources⁷

Initial System (6,000 Bikes, 330 Stations)

Citi Bank (over 5 years)	\$41 million
Master Card	\$6.5 million
Total Capital Costs ⁸	\$47.5 million

Business Model

Privately owned and operated. Capital costs paid for through financed sponsorship, operating costs covered through membership and usage fees with profit sharing for the City of New York and Citi Bike.

Membership Fees

Annual:	\$95
Annual Corporate:	N/A
Annual Discounted:	\$60
Monthly:	N/A
Weekly:	\$25
72 Hours:	N/A
24 Hours:	\$9.95

Usage Fees

Annual Members:	First 45 minutes free;
Additional charges:	- \$2.50 (75 min); \$9 (105 min); \$9 (per additional 30 min)
Casual Subscriptions:	First 30 minutes free;
Additional charges:	- \$4 (1 hr); \$13 (1.5 hrs); \$12 (per additional 30 min)

Operating Costs⁹

Operating expense per dock per month:	N/A
Operating expense per ride:	N/A
Fare box recovery ¹⁰ :	N/A

Equity Strategy¹¹

All NYC Housing Authority residents and members of select New York Community Development Credit Unions receive a \$60 annual membership (\$35 off of full price). As of July 23, 2013, 285 NYCHA residents had registered.

¹ L. Gordon-Koven & N. Levenson, Citi Bike Takes New York, Rudin Center for Transportation Management and Policy, NYU Graduate School of Public Service, <http://wagner.nyu.edu/rudincenter/wp-content/uploads/2014/03/CitiBikeTakesNewYork.pdf>

² System population includes the populations of Manhattan and Brooklyn. United States Census Bureau, 2013. January 2014.

³ Metro area population based on the population of the New York – Newark – Bridgeport, NY-NJ-PA metropolitan area. United States Census Bureau, 2012. January, 2014.

⁴ NYC The Official Guide, Statistics Page, <http://www.nycgo.com/articles/nyc-statistics-page> 2012. January, 2014.

⁵ System population density is calculated as the sum of population divided by the sum of land areas for Manhattan and Brooklyn. United States Census Bureau, 2012. January, 2014.

⁶ Citi Bike, System Data, Year End 2013. <https://citibikenyc.com/system-data>

⁷ New York City Bike Share, NYC DOT, 2014. <http://a841-tfpweb.nyc.gov/bikeshare/faq/>

⁸ Sponsorship funding paid over 5 years, financed by a loan from Goldman Sachs.

⁹ Because it is a privately funded system, information on operating costs is not publicly available.

¹⁰ Fare box recovery is the percent operating costs recovered from annual memberships, casual subscriptions, and usage fees.

¹¹ Citi Bike Discounted Annual Memberships, <http://citibikenyc.com/pricing/discounted>. Citi Bike Signups Scarce Among Poor New Yorkers, Data Show, <http://www.dnainfo.com/new-york/20131022/lower-east-side/nycha-residents-make-up-less-than-05-percent-of-citi-bike-riders>, October 22, 2013.



Nice Ride

Bike Share Case Study
Year End 2012

Minneapolis, MN

Description

Nice Ride Minnesota launched in June 2010 in the City of Minneapolis and quickly expanded into Saint Paul, MN the following year. To date, there have been no reported thefts and two crashes.

System Characteristics

Equipment: PBSC Urban Solutions (Bixi)
 Equipment Type: Solar/modular
 Equipment Ownership: Non-profit owned
 Operator: Nice Ride MN
 Operations: Seasonally April through October



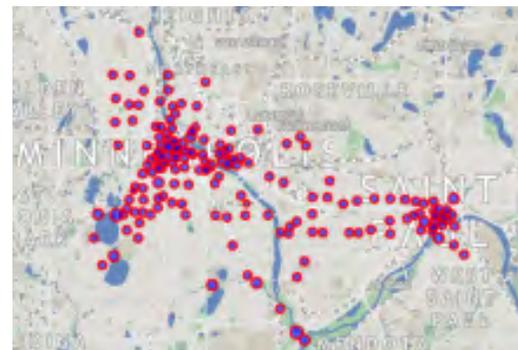
www.niceridemn.org

System Size¹

Bikes: 1,328
 Stations: 146
 Docks: 2,656
 Service Area²: 34 sq. mi.
 Station Density: 4.3 stations / sq. mi.

Demographics

System Population³: 683,650 (2012)
 Metro Area Population⁴: 3,422,264 (2010)
 Estimated Annual Tourists⁵: 17,900,000
 Average System Population Density⁶: 6,452 people / sq. mi.

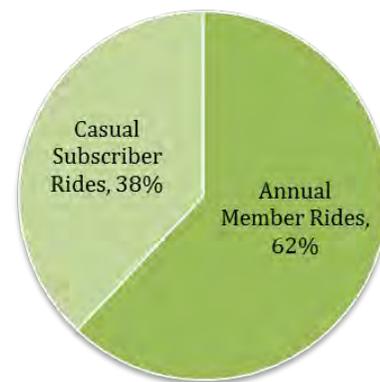


Membership and Ridership⁷

Casual Subscriptions: 54,451
 Annual Members: 3,500
 Casual Subscriber Rides: 103,850
Annual Member Rides: 170,197
 Total Rides: 274,047

Rides per annual membership: 49
 Rides per casual subscription: 1.9

Population per bike: 515
 Percent population with annual membership: 0.5%
 Casual subscriptions per station: 373
 Tourists per casual subscription: 329



0.8 rides per bike per day



Nice Ride

Bike Share Case Study

Year End 2012

Minneapolis, MN

Capital Funding Sources⁸

Initial System (700 Bikes, 65 stations)

Sponsorship	\$1,250,000
Grants	\$1,750,000
Other	\$141,000
Total Capital	\$3.14 million

Revenue Model

Non-Profit owned and managed with revenues generated from fundraising, sponsorship, membership and usage fees.

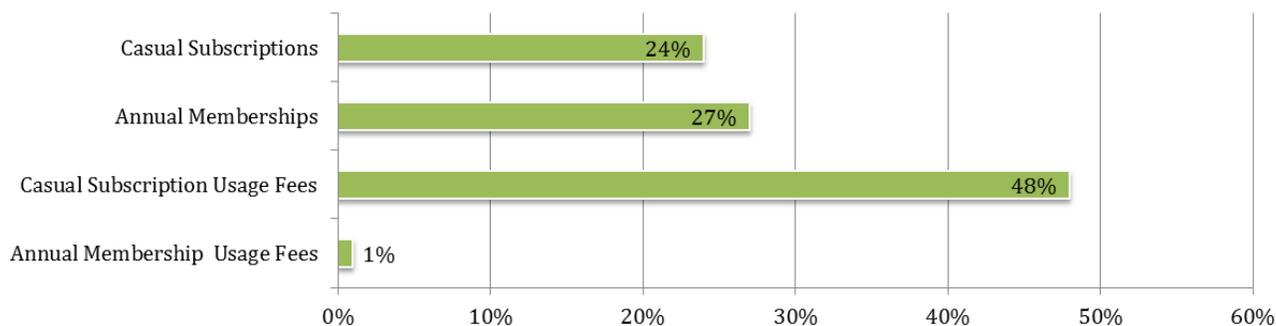
Membership Fees

Annual:	\$65
Annual Student:	\$55
30 Day:	\$15
24 Hours:	\$6

Usage Fees

- Annual members:
 - First 60 minutes free
 - \$3 (60-90 mins); \$6 (per additional half hour) (max \$65/day)
- Casual members:
 - First 30 minutes free
 - \$1.50 (30-60 mins); \$3 (60-90 mins); \$6 (per additional half hour) (max \$65/day)

Breakdown of User-Generated Revenue



Operating Costs¹

Operating expense per dock per month:	\$35.59
Operating expense per ride:	\$3.58
Fare box recovery ⁹ :	54%

Equity Strategy

Target sponsored 600 free memberships for low-income residents. In addition, Nice Ride hired a staff person to sell discounted \$20 memberships. The outreach resulted in a few partnerships and events but almost no subscriptions.¹⁰

¹ Nice Ride Annual Report, 2012. Per dock per month cost calculated over 12 months, although system is not operational November through April.

² Service area is calculated as the area encompassing every station plus a ¼ mile buffer around each station.

³ System population includes the populations of Minneapolis and St. Paul. United States Census Bureau, 2012. January 2014.

⁴ Metro area population based on the population of the Minneapolis – St. Paul – Bloomington, MN-WI metropolitan area. United States Census Bureau, 2012. January, 2014.



Nice Ride

Bike Share Case Study
Year End 2012

Minneapolis, MN

⁵ Meet Minneapolis, http://www.minneapolis.org/sites/default/files/u7/pdfs/MediaKit_Meet.pdf

⁶ System population density is calculated as the sum of population divided by the sum of land areas for Minneapolis and St. Paul. United States Census Bureau, 2012. January, 2014.

⁷ Nice Ride Annual Report, 2012.

⁸ Nice Ride Annual Report, 2012.

⁹ Fare box recovery is the percent operating costs recovered from annual memberships, casual subscriptions, and usage fees.

¹⁰ Bringing Bike Share to a Low-Income Community: Lessons Learned Through Community Engagement, Minneapolis, Minnesota, 2011, http://www.cdc.gov/pcd/issues/2013/12_0274.htm.



COMPARISON OF CASE STUDIES TO HUDSON COUNTY

Table 4.1 below includes key statistics from the comparable cities. Statistics from the proposed system in Jersey City/Hoboken/Weehawken by Bike N Roll/nextbike, discussed in more detail below, are included as a comparison.

Table 4.1. System Comparison

	Launched	Covered Population	Population Density (People / Sq. Mi.)	Estimated Annual Tourism (millions)	Population per Bike	Annual Subscription	Annual Members	Casual Members	Annual Members / Population
NYC (Part Year 2013)	2013	4,128,000	45,043	52.7	703	\$95	96,000	354,000	2.3%
Boston (2012)	2011	879,000	14,027	22.5	1,249	\$85	7,000	69,000	0.8%
Washington DC (2013)	2010	2,000,000	3,366	18.9	800	\$75	24,000	256,000	1.2%
Minneapolis (2012)	2010	684,000	6,452	17.9	515	\$65	3,500	54,000	0.5%
Average					817				1.2%
Hoboken Pilot	2013	52,034	39,212			\$15 / month	182 live monthly	443	
Hudson County (BNR Proposal)⁷		313,000⁸	29,070	N/A	391	\$95	5,000	23,000	1.6%

⁷ Figures are from the BNR proposal ("Bike the Skyline"); final contract/implementation figures may vary. Only exception is that the number of stations in the proposal was 45, but has been updated to 102 since the proposal.

⁸ Estimated population of Phase I system, as included in the BNR proposal.

**Table 4.1. System Comparison (cont'd)**

	Bikes	Stations	Docks	Annual Members / Bike	Casual Members / Station	Rides / Casual Member	Rides / Annual Member	Trips / Bike / Day	Bikes / Station	Dock / Bike Ratio	Docks / Station	Stations / Sq. Mi.
NYC (Part Year 2013)	6,000	330	11,571	16.0	1,073	2.1	56.0	4.7	18.2	1.9	35.1	19.7
Boston (2012)	704	79	1,407	9.9	873	2.5	52.0	3.0	8.9	2.0	17.8	3.6
Washington DC (2013)	2,500	244	4,092	9.6	1,049	2.1	86.8	2.9	10.2	1.6	16.8	10.7
Minneapolis (2012)	1,328	146	2,656	2.6	370	1.9	49.0	0.8	9.1	2.0	18.2	4.3
Average				9.5	841	2.2	61.0	2.9	11.6	1.9	22.0	9.6
Hoboken Pilot	25	7		7.3	63	6.2		0.7	3.6			
Hudson County (BNR Proposal)	800	102		6.3	288				10.0			9.4



Following is a summary of the comparative metrics between Hudson County and the comparable systems. Minneapolis has been included in the average (as shown in Table 4.1), although its metrics on population and other demographics are clearly different than the other dense northeastern cities, because it has a different business and operating model (not-for-profit) that adds to the variety of systems studied. Therefore, the averages can be considered conservative:

- **Population:** The proposed Hudson County system has a smaller population coverage, but higher population density than most of the other systems. The Hudson County system area's population is noted as 29,070 people/sq. mile, which is much more dense than the population density of Boston's system area (14,027 people/sq.mile) and Washington's system area (3,366 people/sq. mile).
- **Population per Bike:** The average of the comparable systems is 817 persons per bike, whereas the BNR proposal indicates 391 persons per bike. This indicates that the Hudson County system is more saturated than any of the other comparable systems in terms of bike density.
- **Tourism:** No tourist statistics could be identified to compare with the other cities.
- **Annual Members:** Using the BNR annual member estimate of 5,000, the annual members/population ratio is similar to other cities, such as Boston, which has about 7,000 annual members. However, the annual members per bike is lower than other cities (at 6.3 members per bike compared to 9.5 in other cities). This ratio may be suppressed because of the higher bike saturation as indicated above. Nevertheless, the annual member estimate in the BNR proposal could be conservative.
- **Casual members:** The average of the other systems indicates 844 casual members per station, with the BNR proposal at 288. The BNR proposal could be conservative.



Some other data, not quantified in the table above, reflects transit usage and bike infrastructure. With about 39% of residents commuting via public transportation, transit usage is higher in Hudson County than in all the other cities, except for New York⁹. However, bicycle infrastructure in Hudson County is not as developed compared to any of the other cities.

In summary, population density and transit metrics imply that a system in Hudson County could be well adopted by the local population. However, unknown tourist metrics make it difficult to determine how well the system will be adopted by casual users. The lack of bicycle infrastructure could be a barrier to high utilization.

⁹ U.S. Census, American Community Survey five year estimate, 2011.



RIDERSHIP FORECAST

Data from the comparison cities were used to forecast ridership using a ridership model developed by Toole Design Group. The ridership model takes into account the many aspects of a bike share system that drive different types of usage. Key model assumptions include:

- Phase I with a population of 313,000 people, 102 stations and 800 bikes as per the updates of BNR proposal.
- The total built-out of the system includes 186 stations and 1,808 bikes. The expansion of the system in the identified second and third phases is based on the recommended system density that is described further in Chapter 5.

Timing of the phases is as follows:

- Phase I starts in spring of Year 1, with 102 stations and 800 bikes. The Phase I boundaries were roughly based on the BNR proposal, but also confirmed and modified somewhat based on the GIS analysis performed as part of this study, as described in Chapter 3.
- Phase II starts in spring of Year 3, with an additional 70 stations and 840 bikes. The number of stations is based on the identified service area of Phase II (see Figure 3.1) and the recommended station density of 10 stations per square mile (see Chapter 5).
- Phase III starts in the spring of Year 4, with an additional 14 stations and 168 bikes. The number of stations is based on the identified service area of Phase II (see Figure 3.1) and the recommended station density of 5 stations per square mile (see Chapter 5).
- Annual members per bike starting in year 1 at 9.5 (average of comparison cities) and growing at 4% per year thereafter (this growth rate has been selected on the basis of the average growth rate of the comparable cities and expert knowledge of the project team members).
- Annual member ridership of 61 rides per year (average of comparison cities).
- Casual membership of 841 casual members per station per year (average of comparison cities).
- Casual member ridership of 2.2 rides per casual membership (average of comparison cities)

As listed above, the model uses the number of bikes and stations, annual and casual members (based on comparable cities), and projected rides per membership (also based on comparable cities) to predict the annual ridership for the first 10 years of operations. The model outputs are shown in Table 4.2.



Table 4.2. Ten-Year Membership and Ridership Projection for Phase I of Proposed Hudson County Bike Share System

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Stations	102	102	155	183	186	186	186	186	186	186
Bikes	800	800	1,430	1,766	1,808	1,808	1,808	1,808	1,808	1,808
Membership And Ridership										
Live Annual Members	6,840	7,904	15,988	19,141	20,093	20,897	21,733	22,602	23,507	24,447
Members Per Bike	8.6	9.9	11.2	10.8	11.1	11.6	12.0	12.5	13.0	13.5
Member Rides	253,821	475,607	782,891	1,114,512	1,209,085	1,274,731	1,325,720	1,378,749	1,433,899	1,491,255
Casual Rides	169,848	188,720	305,283	341,547	344,137	352,741	361,559	370,598	379,863	389,360
Total Rides	423,669	664,328	1,088,174	1,456,059	1,553,222	1,627,472	1,687,279	1,749,347	1,813,762	1,880,615
Casual Members	77,204	85,782	138,765	155,249	156,426	161,119	165,952	170,931	176,059	181,341
Trips / Bike / Day	2.1	2.5	2.3	2.5	2.6	2.7	2.8	2.9	3.1	3.2
% Rides Casual	40.1%	28.4%	28.1%	23.5%	22.2%	21.7%	21.4%	21.2%	20.9%	20.7%
% Rides Annual	59.9%	71.6%	71.9%	76.5%	77.8%	78.3%	78.6%	78.8%	79.1%	79.3%
% Population With Annual Membership	2.2%	2.5%	3.6%	4.3%	4.5%	4.7%	4.9%	5.1%	5.3%	5.5%



These forecasts show that the proposed system could achieve almost one million rides after two years, and then one million rides per year in the third year growing to almost 1.8 million rides per year in later years. Early on, each bike is ridden approximately two times per day. Later, each bike gets ridden approximately three times per day, similar to Boston and Washington DC. In the early years, the model predicts that approximately 2.2% of the system population has an annual membership, increasing to over 5% in the later years.

As shown above, the model relies on many assumptions. Table 4.3 includes a sensitivity test for Year 2 ridership (first full year of operations after Phase I is built) with a range of assumptions of annual members per bike and casual members per station per year.

Table 4.3. Sensitivity Test for Year 2 Ridership Varying Annual and Casual Membership Rates

		Casual Members Per Station in Year 1		
		400	800	1200
Annual Members Per Bike in Year 1	4.0	290,016	379,776	469,536
	8.0	490,271	580,031	669,791
	12.0	690,527	780,287	870,047

The sensitivity analysis shows a wide range of potential ridership with the low-end similar to the Minneapolis system, of 290,000 rides per year, and the high end similar to the New York system, of 870,000 rides per year. The ridership for the Hudson County system will depend on the operator's ability to penetrate both the local and the visitor markets.



EQUITY STRATEGIES

A major topic of discussion at the first TAC meeting was creating a system for Hudson County that provides access to a wide cross section of the community. Bike sharing represents a great opportunity for an affordable transportation option for lower income and minority communities that historically have been marked by low automobile ownership rates and high transit dependency. While bike share systems have typically launched in high demand and revenue generating areas of existing cities, geographic and social equity have become important considerations. The following section identifies strategies for achieving social and geographic equity of a bike share program in Hudson County.

Barriers to Success in Bike Share in Low Income Communities

The uptake of bike share in both minority and low-income communities has not been significant to date. Bike share programs continue to face challenges reaching these populations, despite a number of innovative approaches. There are several reasons for this:

Location of Bike Share Infrastructure: In most systems in the U.S., bike share stations have been located in high demand and revenue generating locations such as downtown and in more affluent neighborhoods. Low-income neighborhoods, typically located on the outskirts of the system, have only experienced the installation of very few and sparsely situated stations. The stations tend to be located far away from other stations and in areas that do not include good bike infrastructure. Therefore, potential trips from these stations do not have convenient origins or destinations and the trip is not necessarily a pleasant one. It will be important for Hudson County to strongly consider how the planning of the system will affect the location and density of stations in low income and minority communities.

Digital Divide: To date, much of the marketing for bike share programs is done online due to limited marketing budgets. This represents a challenge for the jurisdictions that find it difficult to reach communities that are not regularly online.



System Access and Verification: Third generation bike share is possible because of the accountability created by the credit card system. However, many people in lower-income communities do not possess credit cards. Potential strategies for access depend on the nextbike system and its technological capabilities, as well as local partner organizations' willingness to take on financial risk. This is discussed in more detail below.

Cultural Issues: Bike share is becoming the mark for sustainable, technology-inspired cities, and is now familiar to well-traveled middle- to upper-class communities. There continue to be many communities within bike share cities that have not yet adopted bicycling as part of their everyday lives, do not know what bike share is, or do not understand it. In many low-income communities, cars are seen as a sign of success, and bicycles may be viewed as signs of poverty. Education and outreach campaigns should be considered to help overcome this obstacle.

Cost Barrier to Entry and Communication: Most bike share systems have an annual one-time fee paid at the beginning of the year. Although it is an extremely affordable way to get around the city, the one-time fee can represent the largest barrier to using the system for a low-income person. Hudson County should therefore focus on offering alternative payment plans such as a monthly payment option that amortizes the cost of an annual membership into easy access lower monthly payments.

Financial Sustainability and Incentives: The financial incentives for the operator have traditionally not been focused on reaching out to low-income or minority communities. Because they typically have access only to low budgets or must be financially self-sustaining (as the proposed Jersey City, Hoboken and Weehawken system is), they tend to focus their outreach resources on early-adopter, downtown and tourist markets that must generate enough revenue to cover the costs of implementation and operation. Outreach programs to low-income and minority communities have typically been high demand and high resource consuming programs which can take a big toll in the total marketing expenditures. The County should consider how the proper alignment of equity goals with the incentives offered to a potential operator could help with the marketing and promotion of the system throughout these communities.



Examples from Other Cities

The case study cities include a number of equity strategies; these include:

Discounted Memberships: Many cities offer some sort of discount for low-income populations. They may be subsidized (in Boston, by the Centers for Disease Control, and as low as \$5), or not subsidized. Residents of the New York City Housing Authority and various Community Development Credit Unions receive approximately 30% off, or \$65 memberships.

Station Locations: Many cities have located stations targeted in low-income neighborhoods. Typically, these stations have not seen impressive ridership due to lack of nearby stations, lack of bicycle infrastructure, lack of targeted marketing and other unknown reasons.

Access for Residents Without Credit Cards: Credit cards (or debit cards with a credit card symbol) are required by bike share systems to become members and check out a bicycle. These cards create the fundamental accountability that makes bike share possible. However, a few bikeshare systems have now eliminated the credit card requirement to increase system access by low-income communities, such as Nice Ride Minnesota, Kansas City B-cycle, Capital Bikeshare (DC), and Spartanburg B-cycle (South Carolina). Customers of Nice Ride Minnesota and Kansas City B-cycle use different kinds of prepaid cards to access the bike share system. The Bank on DC / Capital Bikeshare partnership gets unbanked people into the banking system, and then offers them a credit / debit card and a discounted bike share membership¹⁰. Capital Bikeshare allows residents of Arlington County to pay for annual memberships in cash¹¹. In South Carolina, Spartanburg B-cycle is developing a program to allow access to the system without a credit or debit card¹⁰.

¹⁰ Shaheen, S. A., Martin, E. W., Chan, N. D., Cohen, A. P., & Pogodzinski, M. (2014). Public Bikesharing In North America During a Period of Rapid Expansion: Understanding Business Models, Industry Trends and User Impacts. San Jose: Mineta Transportation Institute.

¹¹ <http://newsroom.arlingtonva.us/release/capital-bikeshare-annual-cash-membership-now-available-for-arlington-residents/>



Recommendations for Hudson County

To achieve the goal of an equitable bike share system for the Hudson County, some existing strategies should be employed, and some new ones implemented.

System Area And Station Locations: As described in Chapter 3, the recommended system area was determined through a process that included equity measures. In addition, recommended station locations (shown in Figure 5.1 and described in Chapter 4 in detail below), were determined in part based on the locations of public/subsidized housing. Because there is no public investment being provided for the BNR system, it is important that the cities ensure that this goal is being met during system planning.

Discounted Memberships: Hudson County should work with the system operator to offer a certain number of discounted memberships for the system. Such a program was included in BNR's proposal. The County should be aware, though, that too many low-priced memberships can be detrimental to a privately owned system, as there will not be enough revenue to support operations. Therefore, the County may need to consider subsidizing such memberships for a robust program.

Credit Card Access: The issue of credit card access is limited or enabled by the background technology. For example, some bike share systems technically require a credit card to create an account. Others require it by policy only. The County must work with nextbike to understand whether an account can be created in the system without a credit card. If this is possible, then partner organizations and a small amount of funding can be set up to allow access to people without credit cards with proper identification verification and escrow funding for financial accountability. There have been no projects with such a setup to date, but Philadelphia's project may include such characteristics.

Pricing: Most systems include an annual membership fee of \$50 to \$100 to be paid once a year. This cost can be a significant barrier to entry to lower-income populations. It is recommended that Hudson County consider strategies to lower this barrier to entry by introducing pricing structures such as annual membership paid in monthly installments, similar to a cell phone plan, and a pay-per-ride option of \$1 to \$3 per ride.



Marketing and Outreach: Although many systems have made some efforts towards creating an equitable system, few have earmarked specific funding for significant marketing and outreach for low-income communities. Non-digital marketing can be more expensive than the typical online approach using websites, earned media and social media. A key aspect of successful marketing and outreach is budget dedicated funding for this effort. Marketing materials also must be produced in languages spoken in the service area communities, which may not be English. In addition, two other important characteristics are as follows:

Local Champions: It will be important to the success of the outreach strategy to identify individuals within targeted communities to champion bike share and spread the word using various communications strategies, media, events and venues available in their communities. These trusted advocates could be political figures, community organizers, or even committed individuals with a proven means to influence their local communities. They can also advise the operator on the best messaging and means to communicate to their communities.

Community Organizations: Experience from existing programs has found that it is not difficult to find community organizations that want to partner with bike share systems. However, there should be a limited number of important and effective partners that are brought on early in the system establishment to maximize the impact of the partnership.



Dedicated Funding: It is important that Hudson County and the municipalities interested in bike share identify separate and dedicated funding to achieve the equity goal. Most systems around the country have not procured specific funding for outreach and low-cost memberships. This lack of funding has likely suppressed success of these programs. It is recommended that even with the privately funded BNR/nextbike system, the County fund these programs separately if a truly equitable system is desired.

Finally, it is recommended that Hudson County follow updates on equity programs around the country. It is anticipated that several cities in the next few years, most notably Philadelphia, will be dedicating significant funding to many of the above-recommended strategies to increase equity in bike share systems.



BIKE SHARE STATION DENSITY AND SITING

Bike Share Station Density

Bike Share Station Siting

Review Of BNR Station Density And Placement



BIKE SHARE STATION DENSITY

The recommended station density for Phases II and III of the Hudson County bike share system (see Figure 3.1 for system area) is 10 stations per square mile and five stations per square mile, respectively. The recommended station density for Phase III is lower than for Phase II, as this area was projected to have a lower bike share demand than Phase II, as described in Chapter 3. (While a station density recommendation is not provided here for Phase I, as station density for this area will be determined by planners of the BNR system, a review of the proposed BNR station density and placement is provided below.)

Bike share station density is determined based on the following factors:

- Bike share demand (as described in Chapter 3)
- Available funding; systems with greater financial resources can support a greater density than those with more limited resources
- The need to ensure that stations are sufficiently dense in order to (a) be reasonably convenient to a user's likely origin and destination and (b) minimize the distance to the next closest station if a user finds a station to be empty or full

According to common literature, stations should generally be placed at a density that would result in, at most, a 10-minute walk to a station for users originating within the bike share system area, and the station densities recommended here largely conform to this. (Transportation planners, as a rule, consider 10 minutes to be the maximum most users of public transportation are willing to walk to a transit origin point, such as a bus stop, rail station, or, in this case, a bike share station.)

With 29,770 persons per square mile¹² in the combined Phase I, II, and III system area, the population density is comparable to many jurisdictions that have 20 to 35 bike share stations per square mile. This level of station density is considered ideal by many bike share system planners in order to maximize market penetration and bicycle use. However, such systems are typically publically subsidized in order to support the higher density. Thus the recommendation of five to 10 stations per square mile (Phase III and II respectively) is based on a privately funded model, such as the planned BNR system, with stations still sufficiently dense to support a viable system.

¹² U.S. Census, American Community Survey five year estimate, 2011.



BIKE SHARE STATION SITING

Based on the density model described above, bike share stations were sited for the Phase II and III system area, as shown in Figure 30 below. (Phase I siting is contained in the BNR proposal.)

Stations were sited based on the locations of the following origins and destinations, with gaps filled in as needed. These origins and destinations are displayed above in Chapter 3, with the corresponding figure number indicated below.

- Colleges and universities (Figure 3.6)
- Tourist destinations (Figure 3.7)
- Hotels (Figure 3.8)
- Rail stations and bus routes (Figure 3.9)
- Retail corridors (Figure 3.10)
- Parks and open space (Figure 3.11)
- Public/subsidized housing (Figure 3.13)

In addition, stations were placed based on suggestions provided via the project website and the February 4, 2014, public meeting, each of which was incorporated into the online WikiMap (Figure 2.2).

Stations were placed without consideration of existing and potential bike routes because in Phase II and III, these routes are only found in Jersey City, where their development is ongoing and subject to change.

To serve residents west of West Side Avenue in Jersey City, stations were located on the western edge of Phase II.

Figure 5.1 includes 84 bike share stations, with 65 in Phase II and nine and 10 located in the northern and southern portions of Phase III respectively.



Figure 5.1. Recommended Bike Share Locations, Phases II and III



Source: Sam Schwartz Engineering and Toole Design Group, 2014



REVIEW OF BNR STATION DENSITY AND PLACEMENT

As described previously, during the course of this study, the cities of Jersey City, Hoboken, and Weehawken issued a RFP to implement and operate a bike share system for these three urban municipalities. The RFP defined 4.8-square-mile system area including Hoboken, Weehawken, and an area of Jersey City extending south from Hoboken to the north side of Liberty State Park and generally west to Journal Square. The selected BNR proposal indicates that 45 stations would be located within the system area, resulting in a station density of 9.4 stations per square mile. This density is consistent with that recommended above for Phases II and III. However, station density as proposed is not consistent across the RFP system area, and stations are generally limited to the area within ½-mile of the Hudson River waterfront. In addition, the three stations proposed for Jersey City west of Interstate 78 may be of limited value given their considerable distance from other stations. (Recommended service area boundaries are described in Chapter 3. Phase I boundaries are roughly based on the BNR proposal, but also were modified somewhat based on the GIS analysis performed as part of this study,)

Based on the goals and objectives developed in consultation with public and the TAC (as described in Chapter 2), it is recommended that there be a more uniform distribution of stations across the RFP service area and less concentration on the waterfront.

However, as noted previously, at the time of this study, the number of BNR-proposed stations was also revised from 45 to 102, with station placement and potential revisions to the RFP's system area unknown. Thus there is insufficient information to further evaluate the proposed station placement and density.



CONCLUSION: REGIONAL CONNECTIONS, IMPLEMENTATION, AND NEXT STEPS

Promoting Regional Equity

Improving Access To Opportunities

Addressing Regional Issues In Coordinated Way

Supporting Multiple RPSD Planning Topics



This study is a part of Together North Jersey’s Regional Plan for Sustainable Development (RPSD). The study strongly supports RPSD’s central idea of promoting regional equity in the 13 counties of northern New Jersey. It also supports the planning goals of improving access to opportunities (housing, jobs, educational, cultural and recreational facilities) and addressing regional issues in a coordinated way. The recommendations generated through this study are most associated with the RPSD topics of Transportation, Energy and Climate, Asset-Based Infrastructure Development, Health and Safety, and Business Environment and Entrepreneurial Support.



PROMOTING REGIONAL EQUITY

Serving and engaging users of all communities, including minority and low-income communities, has been identified as an important objective of any bike share system established in Hudson County. A bike share system can provide an affordable transportation option to lower income and minority communities, historically marked by lower automobile ownership rates and higher rates of transit dependency. A bike share system in the county should be not only financially affordable but also geographically accessible to the under privileged. The development of this objective was inspired by discussions during the beginning of the stakeholder outreach efforts. It also mirrors the fact that geographic and social equity has increasingly become an important consideration for implementation and operation of bike share systems in the U.S.

After reviewing barriers to success and examples from other cities, the following equity strategies are recommended for a Hudson County bike share system (refer to equity strategies discussion in Chapter 4 for additional details):

- **System Area and Station Locations:** Equity must be taken into account when identifying bike share system area and station locations—as is done in this study—through metrics such as the location of public/subsidized housing, median household income, and carless households.
- **Discounted Memberships:** Work with the system operator to offer a certain number of discounted memberships for the system.
- **Credit card access:** To the extent that the technology allows it, create programs for those without credit cards (mostly people of lower income and minority communities) to access the system.
- **Pricing:** Lower the barrier to entry by introducing low-cost pricing structures such as:
 - Annual membership paid in monthly installments, similar to a cell phone plan
 - Pay-per-ride option of \$1-3 per ride
- **Marketing and outreach:** Dedicate marketing and outreach efforts to low-income markets and include local champions and community organizations. Identify funding sources for this purpose, such as funds through the Centers for Disease Control or other public health focused sources.
- **Dedicated funding:** Identify separate and dedicated funding to achieve the equity goal.



It is also recommended that Hudson County follow updates on equity programs around the country. It is anticipated that several cities, most notably Philadelphia, will be dedicating significant funding for many of the above-recommended strategies in the next few years to increase equity in bike share systems.

Notably, specific efforts were undertaken throughout the study process to include, engage, and consider traditionally under-represented communities and data about these communities:

- Distribution of Spanish-language invitations to the public meeting, translation of the public presentation into Spanish (available at the meeting and online), and availability of a Spanish translator at the meeting
- Focused discussion of equity issues at TAC meetings and via online input, leading to specific equity-related goals, objectives, and performance measures and inclusion of equity-related bike share demand metrics to determine the recommended bike share system area
- Expansion of the initial Phase II system area to include a larger area of traditionally under-represented communities, based on public feedback



IMPROVING ACCESS TO OPPORTUNITIES

The study identified a goal to “increase accessibility to jobs, recreation and other locations” and an objective to “provide station locations not only in downtown CBD areas but also in neighboring residential areas; eventually expand the geographic coverage across Hudson County.” The goal and objective reflect the view that it is indeed possible to further promote and improve access to opportunities through a bike share system in Hudson County. The TAC and general public especially supported use of bike share system to improve access to transit stations. Hudson County has an extensive public transit network, and improving access to public transit stations will improve people’s access to other opportunities such as jobs, educational, cultural, and recreational facilities.

The study also promotes improved access to opportunities by strategically selecting the geographic boundaries of the service area and station locations for the bike share program. The service area has been demarcated on the basis of the density of opportunities—such as the density of residences, businesses, and tourist locations—located within the county. The bike share station locations were also suggested considering the location of opportunities. For instance, every rail and ferry stop within the service area has a bike share station. One bike share station has been located near to each major educational institution within the county, such as New Jersey City University , Hudson County Community College, and Saint Peter’s University. Bike share stations have also been suggested near parks and open spaces such as Liberty State Park, Lincoln Park, Bayonne Park, and Washington Park.



ADDRESSING REGIONAL ISSUES IN COORDINATED WAY

Following the planning process of Together North Jersey, the goals, objectives, performance measures, service area, station locations, and recommendations of this study were determined with the help of stakeholders from different levels of the government, non-governmental organizations, and the general public. The stakeholders were primarily engaged through the TAC, and the opinion of the general public was gathered through the online survey, WikiMap, and public meeting. The outcomes of this study were significantly improved due to these opinions and feedback.

The study recommends formation of a Hudson County Bike Share Task Force for successful implementation of a bike sharing in the county. The task force would be a modified version of the existing TAC and should include Hudson County, NJTPA, Hudson TMA, the counties' municipalities, and the New Jersey Department of Transportation (NJDOT) (such as via the NJDOT Bicycle and Pedestrian Resource Center). The task force should work closely with the BNR team on the planning and implementation of Phase I of the bike share system and also guide the expansion of bike share in the county, post-Phase I.

The task force should work with the cities to help ensure that the bike share system best meets the identified goals and objectives for a system in Hudson County, as described in this report and determined in consultation with the TAC and the public. The task force should also help ensure that the performance measures proposed in this report are used by the three urban municipalities to evaluate success of the BNR system.



SUPPORTING MULTIPLE RPSD PLANNING TOPICS

The recommendations are primarily associated with the Transportation and Energy and Climate topics of the RPSD and, to a lesser extent, the Health and Safety, Asset-Based Infrastructure Development and Business Environment and Entrepreneurial Support topics. Table 6.1 provides a listing of the recommendations by RPSD topics:

Table 6.1. Recommendations and RPSD Topics

Recommendation	RPSD Topic
The Hudson County Division of Planning should take the lead on forming a Hudson County Bike Share Task Force to advance bike sharing in the county.	<ul style="list-style-type: none"> • Transportation • Energy and Climate • Health and Safety
The task force should ensure that the Hudson County bike share system best meets the identified goals and objectives for a system in Hudson County, as described in this report and determined in consultation with the TAC and the public.	<ul style="list-style-type: none"> • Transportation • Business Environment and Entrepreneurial Support
The task force will help ensure that the performance measures proposed in this report are used by the three urban municipalities to evaluate success of the BNR system.	<ul style="list-style-type: none"> • Transportation • Business Environment and Entrepreneurial Support
The task force should encourage and support the municipalities as well as identify potential public-private partnerships to implement equity strategies to support low/no-cost bike share memberships.	<ul style="list-style-type: none"> • Health and Safety
The task force should encourage the adoption of Complete Streets policies by the county's municipalities, create a county-wide bicycle master plan, and install robust bikeways designed to attract a diverse range of potential bicyclists and bike share users.	<ul style="list-style-type: none"> • Transportation • Asset-Based Infrastructure Development • Energy and Climate • Health and Safety

The methodologies, findings, and recommendations of this study are applicable throughout northern New Jersey region and are particularly suited to the multi-jurisdictional planning environment in urban and suburban settings. The results of the survey can be used to understand characteristics and preferences of potential users of a bike share system in New Jersey. The ridership and membership forecasts can also be used by other jurisdictions to plan a successful system.