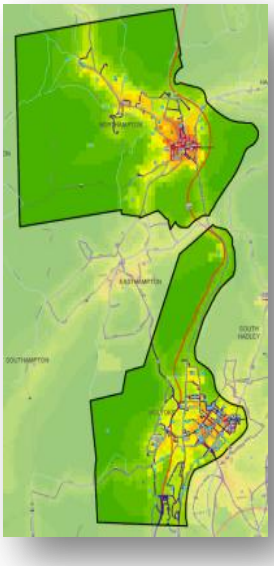
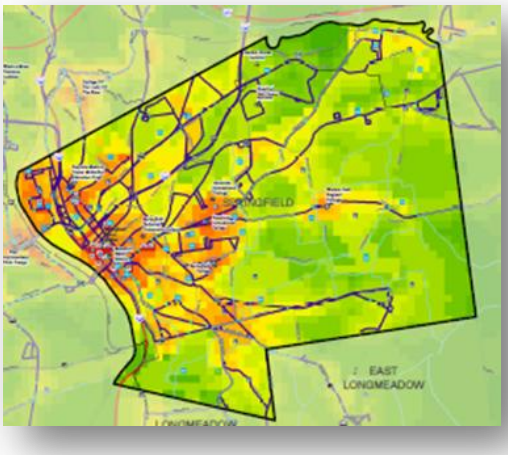
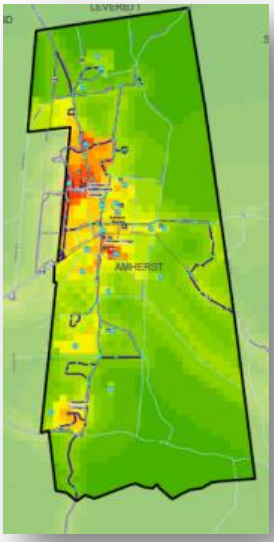
Regional Bike Share in the Pioneer Valley

Feasibility Study







Catalyst for Regional Progress
PVPC
Timothy W. Brennan, Executive Director

Produced by the Pioneer Valley Planning Commission
in collaboration with the Bike Share Feasibility Study Advisory Committee
and municipalities of Northampton, Amherst, Holyoke and Springfield

March 2015

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Acknowledgements

The Pioneer Valley Planning Commission would like to thank the following members of the Bike Share Feasibility Study Advisory Committee, whose participation and input was critical to the development of this report. Funding for this plan was provided by the Commonwealth of Massachusetts Department of Housing and Community Development 2014 District Local Technical Assistance Program and the Pioneer Valley Planning Commission.

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Section 1: Introduction and Purpose of Study

Background

The Pioneer Valley region and its member communities are committed to creating more livable communities and downtowns, as well as reducing single occupancy vehicle trips and the resulting air pollution and greenhouse gas emissions. The region is working to increase alternative modes of transportation, including expanding infrastructure for biking, walking, bus and rail service. The region is also seeking to establish commuter rail service along the north-south Amtrak rail line serving Springfield, Holyoke and Northampton, and a bike share program could provide a complementary "last mile" component to this service.

Funding Source and Study Participants

This project was made possible under a District Local Technical Assistance (DLTA) grant from the Massachusetts Department of Housing and Economic Development. This project was initiated based on a joint DLTA request from Northampton, Springfield, Holyoke, and Amherst. Additional study participants and partners included the University of Massachusetts - Amherst, Mt. Holyoke College, Hampshire College, Smith College, Springfield College, and other colleges. The communities expressed interest to participate in a feasibility analysis of implementing a bike sharing system. The chief elected officials of these communities submitted a letter of interest and signed off on a letter of commitment to participate in the project. By committing to the project, each municipality affirmed commitment to help with implementing the work performed and to provide an in-kind match equivalent to 5 percent of the total budget for the project.

Advisory Committee

In support of a collaborative approach to ensure the success of this project, the PVPC assembled an Advisory Committee that included representatives identified in the chart on the next page.

The Advisory Committee meetings were held once a month, beginning from April 2014 and ending December 2014. Guest speakers with experience on components of a bike share program and systems were invited to speak, including: Ted Bronstein, Director of Business Development and Sales at Zagster; Scott Kubly, President of Alta Bicycle Sharing; and Nicole Freedman, Director of Bicycle Programs at the City of Boston.

Bike Share Feasibility Study Advisory Committee Members

Entity	Name	Title
Holyoke	- Claire Ricker - Matt Sokop - Matt Lustig	- Senior Planner - City Engineer -Mass in Motion Coordinator
Springfield	- Scott Hanson	- Senior Planner
Amherst	- Stephanie Ciccarello - Chris Brestrup	- Sustainability Coordinator - Senior Planner
Northampton	- Wayne Feiden	- Planning Director
UMass - Amherst	- Ezra Small	- Sustainability Manager
Hampshire College	- Steve Roof	- Professor of Earth and Environmental Science
Smith College	- Emma Kerr	- Sustainability Coordinator
Springfield College	-Jill Russell	
Springfield Technical Community College	- Mike Suzor	- Assistant to the President
Mt. Holyoke College	- Nancy Apple	- Director of Environmental Health, Safety, and Sustainability
Pioneer Valley Planning Commission	-Chris Curtis -Joshua Garcia -Josiah Neiderbach -Andrew Loew	- Staff
Mass Bike	-Jimmy Pereira	-Design Coordinator

Goals and Objectives

The Regional Bike Share Advisory Committee has established the following goals for this project:

Goals of Project
1. To use bicycles to enhance and extend the range of the transit and rail services
2. To promote healthy, active living and support recreational use of bikes
3. To build demand for bicycle infrastructure, including bike lanes and bike parking
4. To provide visitors and local residents with an effective means of moving around the region, that is equitable and inclusive of elderly, lower income and other traditionally underserved populations
5. To promote economic development including jobs and schools
6. To promote green transportation and reduce greenhouse gas emissions
7. To create a bike share system that is financially sustainable
8. To create a bike share system that functions regionally
9. To make use of local opportunities to support bike sharing, such the prevalence of large health care institutions, the number of higher-learning campuses and large student population, and supportive local businesses.
10. Create more livable communities, and reduce the need for new areas to be developed for additional parking in our urban core and commercial areas.

At the first meeting responsible for kicking-off the project, representatives of the participating entities shared its vision, interests, comments, and priorities they wish to see addressed during the analysis. These ideas are listed in the table below.

Additional Issues Identified by Advisory Committee

Municipality	College/University
• Improve traffic flow in its downtown	• Integrate bike share program with communities Pedestrian and Bicycle Plan
• Integrate the bike share system to connect the colleges and other communities to help reduce traffic	• Existing interest on campuses to initiate a bike share cooperative program, studies are ongoing; how can college integrate with Regional Bike Share system?
• Understanding if the bike share system would be controlled by a public or private entity	• Small scale bike rental program are in affect at UMASS Amherst; how can bike rental system integrate with regional system?
• Physical appearance and attraction of kiosks	• To learn if whether or not there is an actual demand from its college for such a program
• Connecting the bike share system with other ongoing development projects in the downtowns (i.e. canal walks and bike paths, rail depots, bus transit centers, etc.)	
• Integrate bike share program with the communities Pedestrian and Bicycle Plan	
• Addressing potential issues of users taking more trips down hill, leading to imbalance in the number of bicycles throughout the system	
• Subsidies for low-income population and making the system as equitable as possible	
• Potentially building bike stations near CVS's and Walgreens such as that of the Red Box	

History of Biking in Springfield

Springfield has a long history with biking. In 1881, the Springfield Bicycle Club was started with 9 members. This grew quickly, and in 1883, the club had 5000 people attend a biking event held on the Springfield riverfront, the “Bicycle Camp Exhibition and Tournament." Today, the Springfield Bicycle Club no longer exists, but the Cyclonauts Bicycle Club, based in Springfield continues the tradition, offering group rides and biking events.

Source: Library of Congress

Section 2: What Is Bike Sharing ?

Overview of Bike Sharing

Bike sharing is a cost-effective mobility option for trips too far to walk, but not long enough to take transit or drive. A bike share system consists of a network of stations placed throughout a city, from which a bike can be taken and returned to any other station. Bike sharing is a relatively inexpensive and quick implementation extension to a city's public transit offerings.

Over the past several years, bike sharing programs have been increasingly popular in American cities and around the world. As of April 2013, there were around 535 bike-sharing programs around the world, made of an estimated fleet of 517,000 bicycles, doubling the number bike share programs globally in two years.

Bike sharing programs have been transformative for a number of cities. It provides an option for urban transportation that opens up downtowns to a new form of exploration that is non-polluting, active, healthy, and engaging.

Existing and proposed bike share programs in the United States. Source: MetroBike

Benefits of Bike Sharing

Financial Benefits

Bike sharing is a relatively inexpensive and readily implemented option for expanding urban transportation. The cost of one bike share station with ten bicycles is typically between $29,500 and $55,000 (based on an analysis completed by the Mineta Transportation Institute), compared to the cost of $321,000 - $375,000 for one transit bus, or the $10 - $20 million cost for one lane-mile of urban highway.

Many bike share programs have been able to cover all or a portion of their operating costs by utilizing a combination of sponsorship, advertising and use revenues. This reduces the public funding needs for these programs.

Bike share systems create "green" jobs for managing and operating the system. They are also an affordable transportation alternative for low-income families. For most families, transportation costs are the second highest cost, after housing, as a percentage of household expenditure. The cost to access a bike share program can be as low as the annual membership fee of $70 - $100, which is subsidized for low-income users in some cities. Bike sharing may reduce the need for a second vehicle in some households.

Bike share systems can help businesses to attract additional customers, and to provide their employees with an inexpensive option for commuting to work or making short trips during the day. Businesses can also benefit from sponsoring or advertising at bike share stations.

Finally, bike share systems can be an attractive, high-profile addition to a city that draws tourists and visitors.

Environmental Benefits

Bike sharing is nearly carbon neutral. Most bike share stations are solar-powered, and 25 percent of bike share trips replace vehicle trips, thus reducing carbon emissions. The only carbon emissions typically are produced by the vehicles used for bike re-balancing.

Bike sharing reduces dependence on the private automobile, with commensurate benefits in air quality. This is an important factor in the Pioneer Valley - Springfield has had ozone and carbon monoxide levels above the Massachusetts mean for most years between 2000 and 2010, and its overall air quality index has been less healthy than the state mean.

Health Benefits

Bicycling is an accessible low-impact form of physical activity, with well-recognized health benefits to reduce obesity, heart diseases and other sedentary lifestyle diseases. With rising numbers of people affected by these health issues, bike sharing can benefit overall community health.

The Pioneer Valley region has an increasing number of residents with obesity or unhealthy weight. The table below shows the increase between 2000 and 2010 in the percentage of Pioneer Valley residents who have a Body Mass Index over 30 percent:

Table 2-1: Obesity in the Pioneer Valley (Hampshire, Hampden, and Franklin County)

	2000	2010
Percent of Population Over 30 BMI	17.0%	25.5%

Body Mass Index (BMI) is a number calculated from a person's weight and height. BMI provides a reliable indicator of body fatness for most people and is used to screen for weight categories that may lead to health problems. A BMI of 30 or more is currently defined as “obese,” according to the Centers for Disease Control and Prevention.

Mobility and Safety Benefits

For residents and visitors alike, bike sharing provides an added mobility option to fill the gap for trips too long to walk, but not long enough to justify a cab or car rental.

Bike sharing can be very effective in filling the “last mile” need between destinations and transit stops, to extend the reach of the transit system at very low cost. It can also be effective at introducing more people to cycling and encouraging more biking. Surveys of bike share users in several cities indicate that they bicycle more since subscribing to bike share, including 66 percent of users in Minneapolis and 82 percent of users in Washington.

Bike sharing systems have a strong safety track record to date. After 23 million rides, there have been no recorded fatal accidents attributed to bike share systems in the United States, and few serious injuries. This record can probably be attributed in part to “safety in numbers” effect and increasing driver awareness of cyclists, as well as the safe design of the bicycles, which are built very durably with wide tires, a very low center of gravity, and drum brakes that are effective even in wet weather.

Elements of Bike Share Systems

Bicycles

Bike sharing bicycles feature unique designs that increase visibility and differentiate them from traditional bicycles. They are designed to be durable, low-maintenance and easily adjustable for a wide range of users. They are typically heavier and more stable than traditional bikes, with wider tires and a low center of gravity, as noted above. They typically have one to three speeds and coaster-style drum brakes. These bikes comfortably accommodate short, transportation-oriented in-town trips, but are less suited for longer road or touring trips.

Typical station-based bike from New York City's Citibike program.

Stations-based and Station-less "Smart Bike" Systems

In general, there are two bike sharing system types currently operative in the United States:

- Station-based systems
- Station-less or "smart bike" systems

Station-based systems include automatic docks that lock the bikes in place and an electronic payment kiosk. Bike sharing stations incorporate unmanned kiosks with electronic user interfaces that allow users to check bikes in and out with an electronic identification or payment method, most commonly recognized as a credit or debit card, or radio-frequency identification key (RFID). Many stations are solar powered, and consequently can be easily picked up and moved to other locations. Stations typically accommodate ten to twenty docks, but are customizable in modules of one to three docks.

Station-based bike share system.

Smart bikes are similar to station-based bikes, but typically have a bike mounted U-lock which can be used to lock up the bike in any location. Bicycles are reserved via a smart phone app, and the U-lock is unlocked with an access code provided. All of the technology is mounted on the bike, instead of at a station. Billing is done via a smart phone or computer. Bikes typically are somewhat lighter than station based bikes. Smart bike systems have the advantage of having lower initial capital costs, given that no purchase of expensive technology-based docking stations is necessary. Smart bikes can be ridden to any location and locked up, but are returned at the end of a trip to a common location or "pod" or "hub" locking area. Bikes are reserved and paid for via a smart phone app.

Typical smart bike with tracking system mounted on rear. Source: Zagster Bike Share

Smart Bike Pod Area. Source: Yale University

Smart bike systems are often tailored to smaller applications, such as university and college based systems, businesses, large multi-family residential buildings, or hotels. Notable examples of bike share at colleges include Yale, Buffalo and Duke Universities. Businesses that utilize a system include Hyatt, General Motors, Amtrak Downeaster, and Quicken Loans. They are also being established in cities including: Grid in Phoenix-Tempe-Mesa, Arizona; Orlando, Florida; Hamilton, California; Tampa, Florida; Hailey, Idaho and Providence, Rhode Island. Examples of smart bike vendors/operators are Zagster and Social Bicycles.

Operations

Several operations components are needed to run a bike share system. These components are:

- Control center, where the central management of a bike share system is housed
- Depot, where bikes are held while being serviced or stored
- Mobile maintenance unit, which can respond to requests for repairs

Rebalancing

Most bike share systems rebalance the location of the bicycles one or more times daily, in order to return bikes to stations where the need is the greatest. Redistribution is critical to the viability of the system from the customer's perspective, and is one of greatest challenges of operating a bike share system, accounting for as much as 30 percent of operating costs. An IT system is needed to monitor the locations of bikes, and determine where rebalancing is needed. Redistribution vehicles, which are often flatbed trucks or trailers carried behind vans, are a significant investment. It also may be possible to re-balance bike share systems through user incentives to return bikes in an unpopular direction.

Maintenance

Maintenance is also a major operational cost. Maintenance is needed for both stations and bikes, including preventative and repair maintenance. Bike repairs include fixing tire puncture, broken chains, or faulty brakes. Annual maintenance costs can run $800 - $1,000 per bike. Bicycle maintenance and repair are critical to the reliability and image of a bike share system.

Marketing and Customer Service

It is important to have a customer service center, where customers can call with questions, problems or emergencies. Some systems try for nearly full automation of this service with a website or social media, while others have fully staffed centers.

Another important operational cost is promotional materials and marketing the system. This can range from simple printed materials to elaborate campaigns across various media. This component is particularly important during the first six months of implementation. Marketing can also include an interactive website, social media, a blog for users, and other elements.

Insurance

To reduce liability risks for the owner/operator of the system, bike share systems will need a carefully crafted conditions-of-use document to be included in contracting for the system. It is also necessary to have accident insurance and anti-theft insurance, and coverage for vandalism.

Other Considerations

Subsidized Memberships

Subsidized memberships can be an effective way to encourage memberships from low income residents, and promote equity. Boston, Boulder, Denver and Washington D.C. offer reduced rate or subsidized memberships to low income individuals.

Hubway recently began subsidizing memberships for those making less than $20,000 per year. In addition, they launched Prescribe-A-Bike which offers low income residents a reduced $5 annual Hubway membership if a doctor recommends riding for health reasons. Nearly 2,000 people have since signed up. Nicole Freedman, Director of Bicycle Programs, City of Boston noted, “It was really important to make sure we reached residents with low incomes, they’re the ones most impacted by transportation costs."

Montgomery County’s Department of Transportation is offering financial assistance to make it easier for people of low income to use Capital Bikeshare. A limited amount of funding is available through the Job Access Reverse Commute (JARC) program to improve travel options for low income commuters living or working in the County or enrolled in job training or educational programs. Those who qualify for the program based on income requirements will receive free services, including: free membership for up to one year ($75 value), free bicycle education and safety training and a free bike helmet.

However, the percentage of low-income riders is still extraordinarily small. The average bike-share user, according to Transportation Alternatives, is young, male and high income, one-half of one percent of Citi Bike users are low income, and percentages are similar in other cities.

Helmets

Helmets have been a difficult problem to solve for most bike sharing programs. In the United States, cities are struggling to overcome the significant practical problems of melding helmet use with bike-sharing programs — such as providing sanitized helmet dispensers at bike docking stations. Most cities, however, have no organized helmet programs associated with their bike share systems.

The need for helmets is a heavily debated question. Statistics on bicycle helmets indicate that helmets save lives and prevent head injuries. Between 1994 and 2010, at least 70 percent of the cyclists killed in the U.S. each year weren't wearing helmets, and in many of those years, the proportion was more than 90 percent, according to the Insurance Institute for Highway Safety. In 1989, a study in the New England Journal of Medicine concluded that helmets reduced a bike rider's risk of head injury by 85 percent and the chance of brain injury by 88 percent (Source: Washington Post). The United States National Highway Traffic Safety Administration recommends that “all cyclists wear helmets, no matter where they ride."

However, many European health experts have taken the opposing view that injurious falls off bikes are rare - exceedingly so in mature urban cycling systems. Many researchers argue that pressure to wear helmets will discourage people to ride bicycles. The safest biking cities are places like Amsterdam and Copenhagen, where middle-aged commuters are mainstay riders and the fraction of adults in helmets is minuscule.

Cities across the U.S. are taking various approaches to this problem:

- Seattle makes helmets available alongside bikes for a rental price of $2. Seattle law requires all cyclists, regardless of age, to wear helmets.

- The Boston area bike share program, Hubway provides helmets in some locations.

- Seattle and Boston have both installed helmet vending machines that are available by swiping a credit card. Riders return the helmets to collection bins, where they are picked up each day, taken to a warehouse, cleaned and inspected before they can be used again.

- In New York, Mayor Michael R. Bloomberg rejected calls for a mandatory helmet law when New York's 10,000-cycle bike-share program rolled out, for fear it would keep people from riding. Still, the mayor noted helmets are a "good idea," and the city promotes helmet use through education and with giveaway programs.

- In Washington D.C. and Minneapolis, like most other cities, there are no plans to add helmets. Bill Dossett, executive director of Nice Ride Minnesota, noted that riding the slow, heavy, well-lighted urban bikes "is a fundamentally safe thing to do." In four years, there have been no reports of a major injury to a Nice Ride Minnesota cyclist, and no head injuries at all. Much the same is true for Washington's Capital Bikeshare program, which has had fewer than 100 reported crashes since 2010, despite 6.8 million bike trips.

The biggest obstacles to providing helmets are hygiene, cost and liability. Instead, most bike share programs in the U.S. encourage riders to use their own helmets, partnering with sponsors to offer big discounts or even give them away. But that means carrying the bulky headgear around, at least until better technology is developed (Source: Washington Post).

Targeting a Large Student Population

The Pioneer Valley region has over 20 colleges and a large student population, which may be a potential boon for a bike share program. However, questions remain about the potential uptake of bike sharing by college students. For Boston's Hubway, students, particularly undergraduates, have not signed up in the numbers anticipated. Hubway's director, Nicole Freedman, indicated several possible reasons for this:

- Students are quite frugal and lack money and $85 seems expensive to them, especially since the system is shut in the winter and they are not here in the summer
- Hubway has not done a great job marketing directly to students
- Students are more likely to have their own bicycles
- Students often live on campus and the distances between origin/destination on campus are too short to bike. Perhaps commuting students would be more inclined to use bike share?

However, Ms. Freedman also noted it is possible Hubway's overall estimates were just too high - they estimated a 2 percent student uptake versus 1 percent for the general populations.

Regional Bike Share Programs

Many of the bike share programs established in the U.S. are city-based programs, with ownership of the equipment by a city. However, there are some operating examples of regional bike share programs.

In 2007, Boston Mayor Thomas M. Menino and Director of Bicycle Programs, Nicole Freedman, decided to bring bike sharing to the Boston area. However, they knew that in order for it to truly transform the way people travel and experience the city, it would have to span municipal boundaries. The Metropolitan Area Planning Council, the regional planning agency for the metro-Boston region of 101 cities and towns, joined the effort to operate a bike share in the Boston region. Along the way Brookline, Cambridge, and Somerville committed to bring this initiative to their communities as well. In 2011, the metropolitan area of Boston launched its 60-station, 600-bike Hubway system, sponsored by the shoe manufacturer New Balance and funded in part by a $3 million grant from the Federal Transit Administration, the contract to operate was awarded to Alta Bicycle Share. Bicycle-sharing arrived in Boston with a mix of excitement and skepticism, but was an immediate success, recording 100,000 station-to-station rides in its first two and a half months. After recording 140,000 trips in four months, Boston's European-style bicycle-sharing system expanded outside of city limits, planting stations across Cambridge, Somerville, and Brookline. Hubway now has over 100 stations throughout the Greater Boston area.

In 2010, the District of Columbia launched Capital Bikeshare, which was the largest bike share program in the United States until May 2013, with over 200 stations and annual ridership of more than two million. The system has expanded into the inner suburbs of Arlington and Alexandria in Virginia, with planned expansion into the Maryland suburbs.

In August 2013 the Bay Area Bike Share system began operating in the San Francisco Bay Area, California. The system allocated half of its 700 bicycle fleet in San Francisco, and the rest along the Caltrain corridor in Redwood City, Palo Alto, Mountain View and San Jose (Source: Wikipedia).

Section 3: Existing Bike Share Programs and Alternatives for the Region

Business Models

North American bike share systems operate under many different business models. In fact, each existing system has identified a governance and organizational structure that fits their needs and their funding environment. This section provides examples of the different business models available including our recommendation on which business model would be most effective. Moreover, this section provides funding examples to consider that may support implementing a bike share system within the region.

There are three main types of business models for bike share systems that have been employed in the United States.

- Publically Owned / Privately Operated
- Administrative Non-Profit
- Privately owned and operated

The type of business model that is selected will determine the funding sources, day-to-day operations, and system equipment that are used. Hybrids between these three business models are also possible.

Publically Owned / Privately Operated

Under this business model, a government entity - either a municipality, group of municipalities and colleges/universities, or regional transit authority - pays the initial capital costs for the bike share program and owns the bicycles and station infrastructure. Usually the government entity will contract with a private vendor to address customer service, marketing, redistribution of bicycles, and system maintenance. Financial responsibility for the system is accepted by the government entity, though the contractor provides liability insurance for user accidents.

Through a variation of this business model, the government entity owns the equipment but shares the capital and operating costs with a private contractor. The contractor then handles selling advertising and sponsorships, the revenues from which are shared between the two parties.

The bulk of financing in this model comes from a mix of Federal, State, and local grants, as well as private sponsorships from local non-profit institutions or businesses. Congestion Mitigation and Air Quality Improvement (CMAQ) funding is one major source for funding capital costs of the system. Larger systems can also raise significant money from advertising and membership fees.

Government ownership provides for greater control over permitting and locations of stations. However, the financial liability of the system is a risk that some local governments may be hesitant to take on. Additionally, the public funding that this business model relies upon may take longer.

This model requires a dedicated staff position to administer the system as well as an interest from the agency to take on this responsibility. It offers a good compromise between maintaining transparency of

operations while making use of private sector expertise. A decision on whether there is sufficient agency interest (and funding for the staff position required) should be made before issuing an RFP.

Administrative Non-Profit

Using this model, an existing or newly-created non-profit organization receives funding to administer and own the bike share system, but contract operations to the private sector. The non-profit may apply for Federal grants on its own or a local government entity can apply for Federal grants and pass these on to the non-profit. This business model places financial liability on the non-profit organization rather than the local government and relies heavily on local business sponsorships and private funding from foundations. While non-profits are better suited for fundraising than a government entity, the non-profit may have to spend considerable effort and resources to seeking sponsorships and donations.

Using a non-profit provides fundraising flexibility and a generally positive public image associated with the sole mission of providing bike share services. Public agencies maintain some level of control in this model through representation on the non-profit board or as technical advisors.

Privately Owned and Operated

Bike share programs can also be owned and operated by a for-profit company. Under this model, the government does not own or operate any aspect of the program, and thus has no financial liability. However, this model is entirely dependent on the interest of the private sector, which bases the system on the ability to raise the necessary funds and to maintain financial sustainability. A privately owned and operated system makes it difficult to ensure that the system meets public accessibility and equity needs.

Table 3-1: Key Characteristics of Different Bike Share Business Models

Government Owned and Operated	Non-Profit Owned and Operated	For-Profit Owned and Operated
• Jurisdiction pays capital costs, owns infrastructure	• Reduced financial liability for jurisdiction	• Service provided with minimal government involvement
• Private contractor handles membership, customer service, bicycle redistribution, maintenance	• Jurisdiction may provide some initial capital while nonprofit charged with providing additional funding	• Only operates where there is a potential profit from stations, limiting expansion
• Government entities can have additional red-tape that non-profits do not need to worry about	• Operating costs assumed by non-profit	• Jurisdiction receives percentage of profits in return for public space and permitting costs
• Government can apply for grant funding and channel to a non-profit entity	• Non-profit provides a centralized entity for control of an inter-municipal system	• Not eligible for federal, state, and local grants
• Model most frequently used by larger systems	• Model used most frequently by small and mid-size systems	

The chart below provides a summary of existing North American bike share business models:

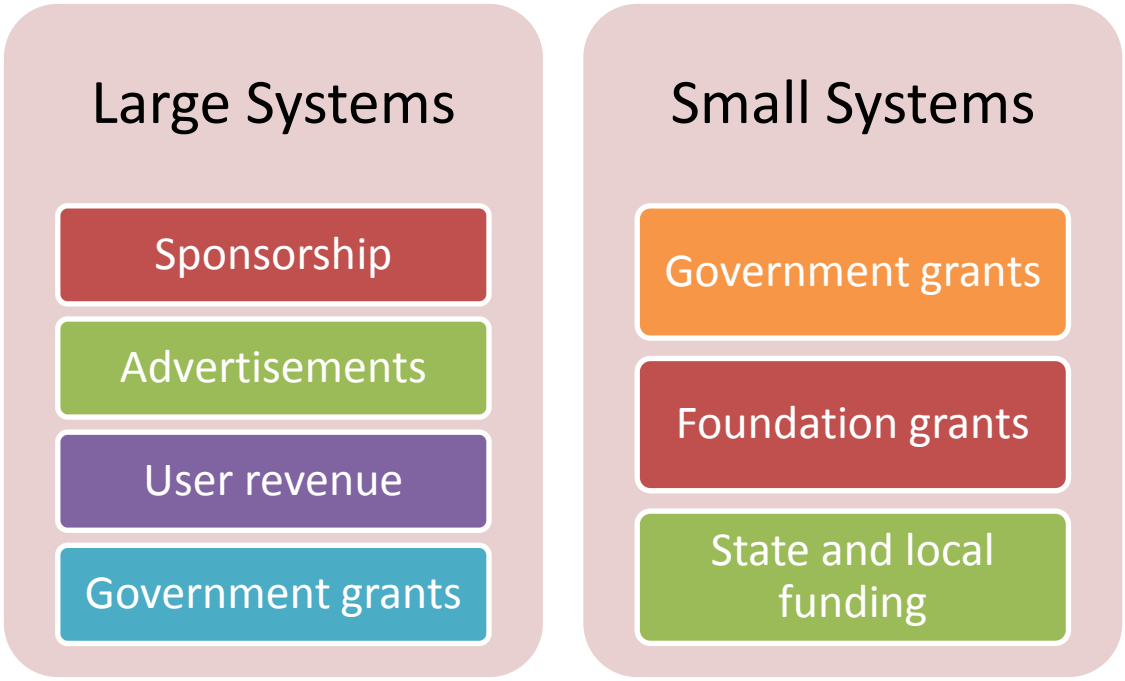
Table 3-2: Existing Bike Share Business Models

Name	Stations/Bikes	Operations	Ownership of Capital Infrastructure
Boston New Balance Hubway	61/610	Public - private partnership; operator direct contract with the City of Boston, other municipalities to contract directly with operator (RFP issued by regional planning agency).	City of Boston (government agency)
Capital Bikeshare	179/1,560	Operator direct contract with both Washington DC and Arlington County	DDOT and Arlington County (government agencies)
Capital Bixi (Ottawa/Gatineau)	10/100	NCC funding of $785,000 for equipment and launch. Operated by PBSC.	National Capital Commission (government agency)
Chattanooga Bikeshare	30/300	Public - private partnership; operator direct contract with local transit agency (which received federal funding).	Outdoor Chattanooga (government agency)
Chicago B-Cycle	6/100	Completely private system, privately owned and operated, concession agreement only.	Bike N Roll (private company)
Denver B-Cycle	50/500	Non-profit setup by City	Denver Bike Sharing (non-profit)
Des Moines B-Cycle	4/18	Already existing local non-profit (Des Moines Bicycle Collective)	Des Moines Bicycle Collective (non-profit)
Ecobici, Mexico City	85/1,000	Private advertising-funded system	Clear Channel Communications (private company)
Miami Beach DecoBike	100/1,000	Completely private system, privately owned and operated, concession agreement only.	DecoBike (private company)
Montreal	405/5,050	Owned and operated by Public Bike System Company (PBSC), a non-profit organization.	PBSC (non-profit)
New York City Bike Share	600/10,000	Completely private system; privately owned and operated	Alta Bicycle Share (private company)
Nice Ride Minnesota	116/1,200	Non-profit setup by City	Nice Ride Minnesota (non-profit)
San Antonio B-Cycle	14/140	Governed by non-profit setup by City - operated by bike rental company through tender.	San Antonio B-Cycle (non-profit)
Toronto Bixi	80/1,000	Program owned and operated by PBSC. City of Toronto provided a $4.8 million loan guarantee.	PBSC (non-profit)

Funding Sources

Four types of funding sources exist for bike share systems: public funding, private funding, customer fees, and advertising and sponsorship sales. Systems usually employ some combination of all of these funding sources, though capital costs are usually funded through public monies and private foundation grants, while on-going operational costs are supported through membership/usage fees, and advertising/sponsorships.

Figure 3-3: Funding Sources for Different Sizes of Bike Share Systems



Public Funding

Public funding is the largest source of funding for U.S. bike share systems, and it comes from Federal, State, and local sources. Federal funding, particularly through transportation funds and health and sustainability grants, is the primary type of public funding available. While Federal grants are the largest funding source available to bike share programs nationwide, there are a range of restrictions and challenges that may be attached to them:

- "Buy-America" provisions, requiring “a domestic manufacturing process for any steel or iron products (including protective coatings) that are permanently incorporated in any project; alternate bid provisions; minimal usage criteria for non-domestic products; and a waiver process based on public interest or the availability of domestic products." This may limit the private vendors from which equipment can be purchased.

- Requirement to complete an environmental assessment.

- Ensuring that implementation of the system considers providing access to people with disabilities, minorities, and low income communities.

- Delays in funding availability that can stall the roll-out of the bike share system.

- Lack of applicability of certain programs to non-government entities, such as non-profit owner and operators.

- Money only available for capital costs rather than operations.

Private Funding

Private funding comes from two sources: private donations and grants from businesses and non-profits. Organizations that support health-related missions, such as insurance companies or hospitals, are the largest element of this funding stream. Private funding composes a relatively small portion of the budget for larger bike share systems, because of their higher expenses. However, for a smaller system, a private grant from a local hospital or business can be a major source of funding for capital and operating costs. Private funding sources are most often associated with a non-profit ownership and operation business model.

Customer Fees

Revenue from customers are obtained through memberships and usage fees. Current bike share systems have a variety of membership types, including annual, monthly, weekly, or daily. While prices vary, ranges are between $40 to $85 for annual memberships; $15 to $60 for a monthly pass; $15 to $30 for a three-day or weekly pass, and $5 to $8 for daily memberships. Annual and monthly memberships are usually targeted towards residents and shorter-term memberships are intended for tourists or visitors.

In addition to membership costs, bike share systems can charge a separate user fee for each time a bicycle is rented. Most larger systems are designed for short rental periods, in order to promote bicycle turnover and availability, and this is promoted through their price structure. For example, the first 30 or 60 minutes of every ride will be free, after which time an incremental fee is charged for every additional half hour. Smaller systems, which have fewer stations and may be less convenient for users to dock their bicycles, generally have longer rental periods of up to three or four hours.

Figure 3-4: Membership and Usage Fees for Madison B-Cycle

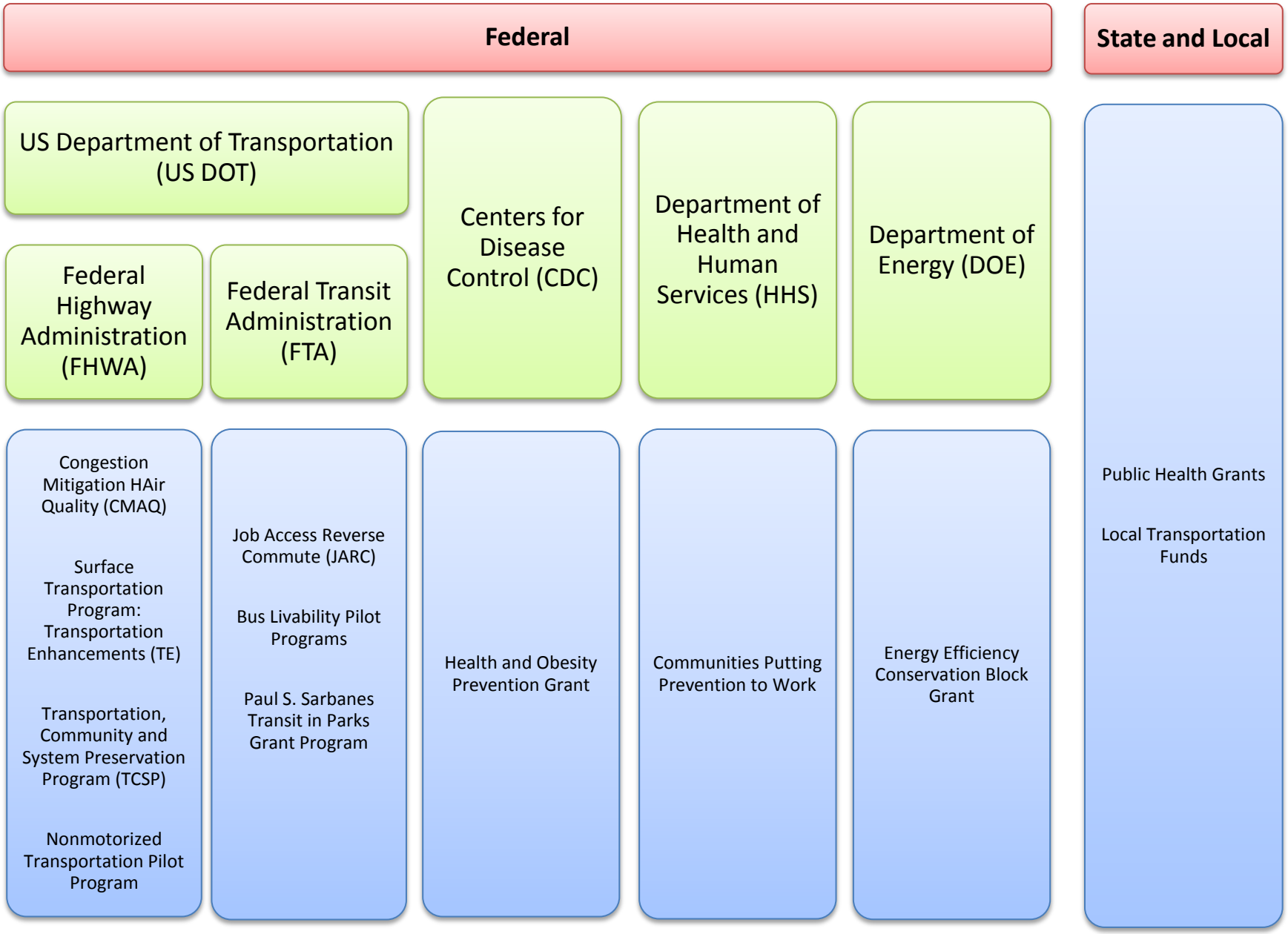
Advertising and Sponsorship Sales

Selling advertising space, either on bicycle fenders or on information panels located on station kiosks, can generate revenue that supplements other funding sources. Advertising revenue is dependent on the number of people who will see the advertisement, and for this reason denser, larger cities will realize the most revenue. Sales of ad space can be managed by a government owner and manager, a non-profit owner and manager, or private contractor.

The selling of ad space is significantly affected by local ordinances that regulate signage and advertising. Northampton, Amherst, and Holyoke all have zoning that prevents the installation of any new non-accessory signs anywhere in the community, and Springfield has limits on the total number of non-accessory signs that are permitted at any one time in the city. Because of these regulations, the potential for using advertising revenue to support a bike share program is reduced, though the current zoning could be amended to except advertisements displayed on bike share stations.

Sponsorships are another strategy for raising funds from businesses, who often see sponsorship as a great opportunity for public recognition. For example, the New Balance shoe company entered a partnership with the City of Boston to sponsor the entire system for its first three years, a contract which has since been renewed. Businesses can also sponsor individual, nearby stations in order to encourage people to visit their store.

Figure 3-5: Public Funding Sources for Bike Share Programs



Existing Bike Share System Case Studies

In order to understand the context and system characteristics that would be suitable for a Pioneer Valley Bike Share system, seven different existing bike share programs were identified and studied from throughout the country. The case studies have been selected based on their different contexts, including both cold and warm climate, small and large size, different financing and business models, and different equipment and technology.

Boulder, Colorado: B-Cycle

Boulder's B-Cycle system, started in 2011, began with 150 bicycles at 22 stations, and has grown to 250 bicycles located at 37 stations. Stations are primarily located in the central business district and near the campus of the University of Colorado at Boulder. In 2013, the program sold 807 annual memberships, 259 week-long passes, and 8,698 daily passes. The large quantity of daily passes is indicative of a large number of tourists using the program. The system was open during all four seasons during 2013, with over 1,300 trips taken during January.

Boulder B-Cycle's annual memberships are $70, three-month long memberships are $45, weekly memberships are $20, and daily memberships are $8. In addition, there are discounted student memberships available for $25 a semester or $40 for a year. The system is designed to be used for very short trips, with no usage fee for trips up to 30 minutes and $3 per every additional 30 minutes.

In 2013, B-Cycle's revenue came from public funding (38 percent), memberships (26 percent), sponsorships (19 percent), memberships (26 percent), and usage fees (13 percent). During 2011 and 2012, B-Cycle contracted with a local Trek store for re-balancing and maintaining of bicycles. In 2013, a bike mechanic was hired to handle these tasks in-house.

A year after opening, the City of Boulder applied for and received a Transportation, Community, and System Preservation (TCSP) grant for $550,000 with a $110,000 required local match. The grant was awarded to add 15 additional stations and 100 bicycles to the system, the installation of which was completed in 2014.

Boston, Massachusetts: Hubway

Planning for Hubway began in 2007 under the leadership of City of Boston Mayor Thomas M. Menino and Director of Bicycle Programs Nicole Freedman. In order to expand the project to the neighboring municipalities of Cambridge, Somerville, and Brookline, the City engaged with the Metropolitan Area Planning Council, which is the regional planning agency for the metro-Boston region. Through MAPC's open bidding process, Alta Bicycle Share was selected as a private company to manage and operate the bike share system. The system, initially launched in 2011 with 600 bicycles at 60 stations, now has expanded to 1300 bicycles at 140 stations. Stations were installed in 2012 in Brookline, Cambridge, and Somerville, with each community signing an agreement with Boston and Alta.

Hubway's pricing structure promotes short-term use, with no usage fee for trips under 30 minutes, and hour-long trips of $2 for non-annual members and $1.50 for annual members. Costs increase significantly after an hour, to $14 for non-annual members for a 2 hour rental. Annual memberships are $85, monthly memberships are $20, 3-day passes are $12, and daily passes are $6. The system also prioritizes equity, offering subsidized annual memberships and a free helmet for $5 to low-income residents.

Hubway currently has almost 10,000 annual members, and more than 79,000 24-hour passes, 9,000 72-hour passes, and 2,000 monthly passes were sold in 2013. The system operates 24 hours a day and is owned by the municipalities participating in the program. Solar-powered kiosks are used for payment and docking of bicycles, which are removed during the winter and stored at a warehouse facility owned by Alta.

New Balance shoe company has been a sponsor of the program since it began and individual stations also sponsor particular stations. Initial public funding for Hubway involved grants totaling $4.5 million, including $3 million from the Federal Transit Administration (FTA), $450,000 from the Boston Public Health Commission (BPHC) and $250,000 from the Boston Metropolitan Planning Organization's Congestion Mitigation and Air Quality (CMAQ) grant program. It is estimated that the cost of installing each station in the system is between $47,500 and $55,000, plus $450,000 to initially begin operation.

Hubway operates one of the largest systems in the United States, with over 1300 bicycles at 140 stations. Source: PVPC

University of California - Irvine: ZotWheels

The University's ZotWheels bike share system was implemented by the University's Transportation and Distribution Services and is for use by students, faculty, and staff. The system's four stations and 28 bicycles are all located directly on campus and are operated and owned by the school. The system's equipment was designed as a partnership between Central Specialties Co., which manufactures commercial stroller vending systems, and Collegiate Bicycle Company, a bicycle design and consulting company. Local bike shops repair the bicycles on an as-needed basis.

The program was unable to utilize a private advertising option because it is part of the University of California system, and so operational revenue comes from parking fees and citations issued by school police. Membership to use the program is $40 annually and there is no usage fee, though students are encouraged to return their bicycles within three hours and there is a $200 charge for damaged or lost bicycles. Expansion of the small system is planned and will include other areas of the campus, off-campus student housing, and local shopping and business areas. The estimated cost of each station, including bicycles, is $50,000. The program has approximately 100 members.

Spartanburg, South Carolina: B-Cycle

Spartanburg B-Cycle began in 2011 with 14 bicycles at two stations, and now has 20 bicycles located at four stations. Stations are both solar-powered and hard-wired. The system, which was the first bike share system in the Southeast, has stations located at Wofford College, Converse College, in the Spartanburg central business district, and at the nearby Pride Rail Trail. Owing to the small number of stations and the population of Spartanburg, the system promotes itself for running errands, recreation, and exercise, rather than as a last-mile transit solution.

The program is owned and operated by local non-profit called Partners for Active Living, with grant support from the City of Spartanburg, the Mary Black Foundation, and JM Smith Foundation Management. Revenue is also generated from membership and usage fees. The pricing structure promotes short-term trips but is not as expensive as larger bike share systems, with no usage fee during the first hour, and $1 for each additional 30 minutes. Annual membership is $30, monthly membership is $30, and daily membership is $5. There were approximately 127 annual members and 828 other types of memberships purchased in 2013. The program markets itself towards local college students, with students able to purchase a $20 annual membership that includes two-hour rentals free of charge. The estimated cost per each station in the system, including bicycling, is $37,500.

Chattanooga, Tennessee: Bike Chattanooga

The City of Chattanooga owns the Bike Chattanooga program, which consists of 33 stations and 300 bicycles. Stations are installed in the Chattanooga central business district and provide access to key attractions such as the Chattanooga Choo-Choo Hotel, the Convention Center, the Tennessee Aquarium and the campus of the University of Tennessee at Chattanooga. Stations are hard-wired and permanently installed, with equipment currently provided by 8D technologies.

The City contracts with Alta Bike Share to operate the system, and employs a profit-sharing model for advertising that splits generated revenue between the City and Alta. The estimated cost for each station in the system, including bicycles, is $30,000, with funding coming from the Tennessee DOT, the Lyndhurst Foundation, and Federal Congestion Mitigation and Air Quality (CMAQ) funds. There are approximately 1,200 users of Bike Chattanooga, with an annual membership price of $75 and a daily membership $6. There is no user fee for rides up to an hour, with $5 charged for every additional hour.

A Bike Chattanooga station. Source: Times Free Press

Madison, Wisconsin: B-Cycle

The Madison B-Cycle program is owned by the City of Madison and operated by B-Cycle. The system has 35 stations and 350 bicycles, which were donated by the Wisconsin-based Trek Bicycle Company. Stations are primarily located in downtown and on the campus of the University of Wisconsin, with a few stations also located at the shopping corridor to the west of the school on University Avenue, near the Hilldale Shopping Center and off-campus student housing. The estimated initial cost for each station, including bicycles, was $30,000 to $60,000. Funding was provided by the Federal Transportation Authority, the University of Wisconsin Health System, Trek Bicycle, and the City of Madison.

The program has approximately 1,800 annual members and over 15,000 people buying short-term passes in 2013. Annual memberships are $65, monthly memberships are $8, and daily passes are $5.

Trips under 30 minutes are free, with $2 charged for trips up to an hour, and $5 for every additional half hour after that. The program offers $20 annual memberships for students, faculty, and staff of the University of Wisconsin.

New Haven, Connecticut: Yale University Bike Share

Yale's bike share system is operated by Zagster, a private bike sharing company that services primarily universities and private companies. There are 50 bicycles stored at 10 locations for students to check bicycles in and out. Unlike the other case studies examined, Yale's system does not utilize docking stations. Instead, users check out a bicycle by making a reservation using their phone and obtaining a pin number that unlocks a key lock box located on the bicycle itself. Zagster owns all equipment, and also operates and manages the system. The cost to implement the bike share system was significantly less than station-based systems, at $110 per bike per month, or approximately $66,000 per year. Funding was supplied through a donation from Yale alumni and the University's Transportation Options Department.

There are approximately 650 members of Yale's bike share program. Annual membership costs $30, with a $20 discount provided for students taking a bicycle safety class on campus. The first four hours of system use is free, with $3 charged for every additional hour up to a maximum day charge of $24.

Table 3-6: Summary of Existing Bike Share Programs in the United States

System	Boulder B-Cycle	Hubway	ZotWheels	Spartanburg B-Cycle	Bike Chattanooga	Madison B-Cycle	Yale Bike Share
Location	Boulder, CO	Boston, MA Cambridge, MA Brookline, MA Somerville, MA	University of California – Irvine Irvine, CA	Spartanburg, SC	Chattanooga, TN	Madison, WI	Yale University New Haven, CT
Population	101,808 (Boulder)	878,786 (4 municipalities)	38,684 (students, faculty, staff)	37,401 (Spartanburg)	171,279 (Chattanooga)	240,323 (Madison)	17,000 (students, faculty, staff)
Seasons Open	4	3 4 in Cambridge	4	4	4	4	3
Annual Members	1,400	9,700	100	127	300	1,843	650
Casual Users	5,083	Subscription sales in 2013: 24-hour: 79,000 72-hour: 9,000 30-day: 2,000	-	828	1,200	15,367	-
Hours of Operation	24 hours	24 hours	Sunrise to sunset	5am – 10pm	24 hours	5am - midnight	Return by midnight or pay $30 late fee
Equipment Ownership	Non-profit owned	Jurisdiction owned	UC - Irvine (local bike shops provide maintenance)	Non-profit owned	Jurisdiction owned	Jurisdiction owned	Zagster
Operator	Boulder B-Cycle	Alta Bicycle Share	UC - Irvine, Transportation and Distribution Services	Partners for Active Living	Alta Bicycle Share	Madison B-Cycle	Zagster

System	Boulder B-Cycle	Hubway	ZotWheels	Spartanburg B-Cycle	Bike Chattanooga	Madison B-Cycle	Yale Bike Share
Equipment Provider	B-Cycle	TBD (formerly Bixi)	Collegiate Bicycle Company, Central Specialties	B-Cycle	8D Technologies (formerly Bixi)	B-Cycle (kiosks) Trek (bikes)	Zagster
Business Model	Non-profit owned and operated	Advertising and sponsorship concession with profit-sharing	University owned and managed	Non-profit owned and managed	Profit-sharing (Alta, City of Chattanooga)	Public-private (Trek Bicycle, City of Madison)	Operated / leased from vendor
Number of Stations	37	140	4	4	33	35	10
Number of Bicycles	250	1,300	14	28	300	350	50
Kiosks / Type	Yes / Solar & Wired	Yes / Solar	Yes, Wired	Yes / Solar & Wired	Yes, Wired	Yes / Solar	No
Price Structure	Short-term	Short-term	Medium-term	Short-term	Short-term	Short-term	Medium-term
Membership Fee	Daily – $8 Weekly – $20 Semester – $45 Yearly – $70	Daily – $6 3 Days – $12 Monthly – $20 Yearly – $85	Yearly – $40	Daily – $5 Monthly – $15 Yearly – $30	Daily – $6 Yearly – $75	Daily – $5 Monthly – $8 Yearly - $65	Yearly – $30
Pricing 0 to 30 min	$0	$0	$0	$0	$0	$0	$0
Pricing 30 to 60 min	$3	$2 (non-annual members) / $1.50 (annual members)	$0	$0	$0	$2	$0
Pricing Beyond 60 min	3 every half hour	60 – 90 min $6 / $4.50 90 – 120 min: $14 / $10.50	$0 (up to 3 hours)	$1 every half hour	$5 every hour	$5 every half hour	$0 (up to 4 hours) $3 every additional hour

System	Boulder B-Cycle	Hubway	ZotWheels	Spartanburg B-Cycle	Bike Chattanooga	Madison B-Cycle	Yale Bike Share
Other pricing options	Student Discounts of $40 for annual membership and $25 for semester membership	Subsidized memberships for low-income residents, those receiving public assistance, or in low income housing. Annual cost of membership: $5, with first hour free, comes with helmet	None	Annual student rate of $20 offers first 2 hours of rental free	None	Discounts for students, seniors, and active duty military	Annual fee reimbursed for students who take university-sponsored bicycle safety class
Funding Sources	Kaiser Permanente Health, Transportation, Community, and System Preservation (TCSP) grant program	New Balance FTA CMAQ Boston Public Health Commission	University Transportation and Distribution Services Parking Fees	City of Spartanburg, Mary Black Foundation, JM Smith Foundation Management	Lyndhurst Foundation, CMAQ funds, Tennessee DOT	FTA, University of Wisconsin Health, Trek Bicycle, City of Madison	Pilot program funded through Yale alumni donation and Transportation Options Department
Initial Cost per Station (including bicycles)	$45,000	$47,500 – $55,000 + $450,000 initial costs	$50,000	$37,500	$30,000	$30,000 - $60,000	$110 per bike per month ($66,000 / yr)

Key Lessons from Case Studies

The seven case studies above provide many lessons for how to own and operate a successful bike share program. These lessons are as follows:

1. **Bike share programs can be successful in communities of all sizes.** While generally the largest systems in the country, such as Hubway, receive the most publicity, many smaller systems have also been successful. The smallest case studies examined, at UC-Irvine and downtown Spartanburg, each serve 37,000 people, a population that is relatively similar to that of Amherst, Holyoke, and Northampton. Similarly, the range in system sizes and annual ridership statistics indicates that bike share systems can be small (100 members at UC-Irvine) to very large (9,700 annual users for Hubway).

2. **Programs can be successful in cold climates and can run year round.** Cold and snowy weather does not prevent people from using a bike share program, as shown by the four-season popularity of the systems in Boulder and Madison. Boston has also experimented with maintaining a few stations open during the winter. One challenge identified by Hubway for maintaining winter operations is ensuring that the stations do not interfere with normal snow removal.

3. **Stations must form a network and be started up simultaneously.** For a bike share system to work, users must be able to check bicycles in and out of different locations, and have the system serve several destinations. Because of this, initial implementation must include a sufficient number of bike share station locations to serve as a network.

4. **Phasing is important.** Starting with a relatively small number of stations is important, as it requires less financial resources and allows for system operation to be tested on a manageable scale.Three of the case studies (Boulder, Boston, and Madison) have seen steady annual growth and are annually adding new stations and bicycles. Boston's Hubway began with 61 stations and 600 bicycles in 2011, and as of 2014 has grown to 140 stations and 1,300 bicycles.

5. **System should serve as an extension of public transit.** Most of the systems discussed above are located in central business districts that are served by good public transit service. In larger systems, particularly Hubway, the bike share functions as a "last-mile solution," to get public transit users to their destination after disembarking from their bus or train.

6. **Small systems can stay small.** Two of the bike share systems examined only have four stations (ZotWheels and Spartanburg). While there are plans to modestly expand these systems, they are likely to stay under ten stations each to accommodate their small population bases. However, these systems are still successful and serve their communities.

7. **Casual riders are important.** For both large and small systems, a major component of overall ridership is composed of daily, weekly, and monthly users. Many of these users are tourists, meaning that it is important to include stations near major tourism destinations.

8. **Hours of system operation vary.** The bike share systems identified were open 24 hours, during daylight hours only, or close in late evening. The potential weakness of a 24-hour system is increased risk of vandalism or theft. However, keeping the system open during off-peak hours can provide a useful alternative for times when there is limited public transit service.

9. **All systems favor short-term rentals, though smaller systems allow longer rental times.** Larger systems promote the shortest rental times, charging no additional fee for trips less than 30 minutes. These systems have dense station networks that allow users many places to dock within a 30-minute period. Smaller systems in Spartanburg and Chattanooga allow up to an hour at no charge, with UC-Irvine allowing no-fee rentals of up to three hours. These systems have many fewer stations, meaning users are more likely to need the bike for a longer period in between docking.

10. **Non-profit ownership and operation is a common model for smaller systems.** Systems that are operated by a non-profit generally also own the equipment. Jurisdiction-owned systems generally employ a private vendor to operate the system, and use a profit sharing model to distribute revenues between the public and private partner. This is because smaller systems require fewer resources to operate. In the case of UC-Irvine, the existing department of Transportation and Distribution Services initiated and operates the system.

11. **Operator oversight is important for minimizing cost and ensuring the system runs smoothly.** When hiring a private company to operate the system, it is important to clearly specify through written contract what the operator's responsibilities will be. Including performance metrics and penalties for poor performance can increase accountability of the private contractor and ensure that they meet expectations.

12. **Solar-powered kiosks are most common in larger systems.** While more expensive, these offer more flexibility since they can be moved at a later time. Many smaller systems tend to use wired kiosks as they are less expensive. However, they cannot be removed during the winter months and might present a challenge for snow removal.

13. **Non-kiosk systems are being explored.** While six of the seven case studies examined are kiosk-based, non-kiosk systems are slowly gaining popularity. While non-kiosk systems have mostly been company or university-based to this point, these have been successful and are worth considering because of their significantly lower costs.

14. **Securing a range of funding sources is essential.** All systems have utilized a combination of federal grants, municipal funding, and private sponsorships. Smaller systems rely more heavily on private donations from local institutions, municipal funding, and grants. Larger systems rely more heavily on membership and usage fees, as well as advertising revenue. Depending on the operating model, some funding options may or may not be available. A public-private or public-non-profit collaboration can assist in obtaining funding from a wider range of sources.

15. **Kiosk-based systems generally have an upfront capital cost of approximately $45,000 to $50,000 per station**. This figure includes bicycles docked at the station. The significant exception to this cost range is Zagster, which operates systems without kiosks at a cost approximately seven times less than kiosk-based systems.

Recommendations for a Pioneer Valley System Based on Case Studies

Based on the case studies above, recommendations for a bike share program in the Pioneer Valley are as follows:

- **Operate three seasons of the year.** Use of a small system is likely to be minimal during the winter in the Pioneer Valley. Systems that do have four-season operation tend to either be in warm weather climates or in somewhat larger communities, where the system is used largely for commuting. Operating only three seasons of the year will also reduce any conflict with snow removal. Removal of stations during the off-season will require storage space to be identified, which is generally rented and managed by a private contractor if applicable. The Pioneer Valley Transit Authority's warehouse facility is another possible location for storage.

- **Implement a pricing structure that allows for multi-hour rentals.** Smaller systems tend to have longer rental periods, since there are fewer stations and bike share users may not be able to dock their bicycle at their destination. These systems also tend to rely more on recreational and exercise use, both of which often last longer than one hour. Because of this, a rental period of up to 4 hours, such as that found in the ZotWheels and Yale Bike Share systems, would be more suitable for the Pioneer Valley.

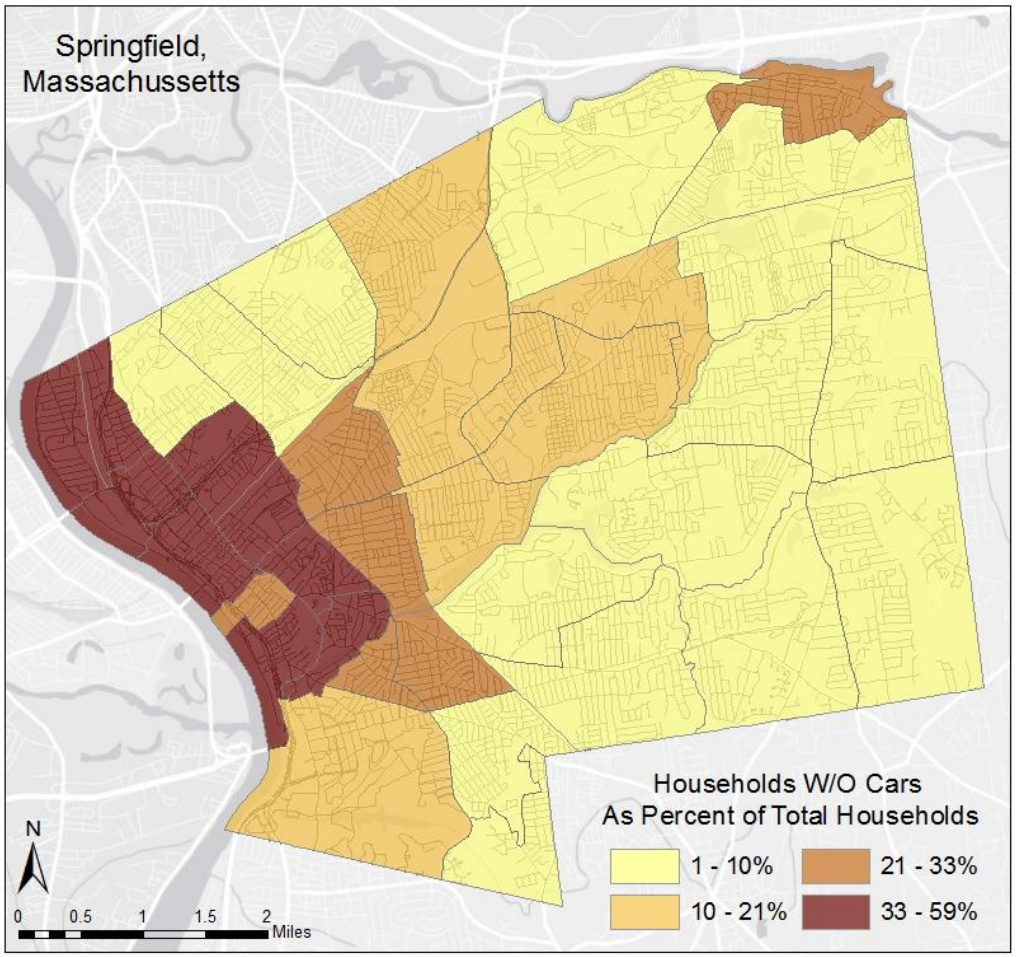
- **Monitor the success of emerging smart dock systems.** A non-kiosk based system would greatly reduce the upfront and maintenance costs of a bike share system and make financing much more practical. Public non-kiosk systems, such as the pending Phoenix, Arizona bike share program, should be examined to determine whether such a system would be practical for the region.

- **Provide discounted student memberships.** Most of the bike share systems examined in this chapter, particularly those located near large student populations, offer discounted student memberships. Targeting the large student population for use of the bike share system will help increase its overall use.

Strategies for Ensuring Equity

As a form of public transit, it is important that the Pioneer Valley's bike share program serve all residents of the region equally, regardless of their age, race, income, or ethnicity. In many ways, low-income residents have the most to benefit from a bike share program, since it offers an inexpensive transportation alternative that complements existing public transit. This is particularly important for the 6.1 percent of households in Holyoke and 8.5 percent of households in Springfield that do not own a car and are heavily reliant on the PVTA every day.

Figure 3-7: Percent of Springfield Households that Do Not Own a Car



Source: American Community Survey, 2008-2013

However, throughout the country, bike share systems have had low participation from minority and low-income residents. For example, 90 percent of B-Cycle riders in Denver are white, whereas only 52 percent of Denver's total population is white. Of the 31 percent of Denver residents who are Hispanic, only 5.4 percent of them are using the city's bike share system. Despite significant efforts to increase participation, several aspects of bike share programs often present a challenge to creating an equitable system:

- **Credit card requirement** - Several bike share systems, such as Capital Bikeshare in Washington D.C., requires users to swipe a credit card or debit card to protect against damage or theft of the bicycle. Many bike share systems also place hold on a user's credit or debit card account while they are using a bicycle, in order to protect against theft. This hold can present a major barrier to residents who have little money in their checking accounts.

- **High user fees** - The average cost for daily and annual memberships for systems throughout the country is $8 and $63, respectively. This expense can present a significant barrier to participation among low-income residents.

- **Stations not in close proximity** - Bike share stations are located most densely in downtown areas, and not necessarily in low-income communities. When stations are located in low-income communities, the overall density of stations is usually lower, making the system less convenient.

Given these challenges, the following strategies should be incorporated into the Pioneer Valley bike share program to ensure that the system is as equitable as possible:

- **Find alternatives to credit card requirements -** Allowing debit cards to be used in addition to credit cards can open the bike share program up to those who have a bank account but limited credit. Additionally, for residents that do not currently have a bank account, the bike share program can partner with local banks to provide discounted memberships to residents who sign up for either a debit card or credit card. Capital Bikeshare has implemented this initiative, which serves to both increase low-income participation and also offers an easy way for residents to obtain a bank account or credit card account. Removing temporary holds against a user's credit or debit limit eliminates another financial barrier.

- **Partner with other organizations** - Partnerships with community-based organizations can help promote access and equity. As an example, Capital Bikeshare has partnered with the non-profit Back on My Feet to provide better transportation access for low-income and homeless individuals. As part of the partnership, memberships were offered to homeless individuals who attended weekly fitness and job-training programs. Another example of a non-profit partnership is Denver's B-cycle, which partnered with the Goodwill to recruit employees for the bike share program from low-income communities. In Montreal's Bixi Bike Share, a youth-service program provided the labor for maintenance of the bicycles. The existing bicycle re-use program in Holyoke, in which local youth repair old bicycles, could be incorporated into the Pioneer Valley bike share program. Because bike share provides a healthy, low-cost form of exercise, public health initiatives are also good potential collaborators. As an example, Boston's Hubway system is administered and funded by an obesity prevention public health program. In the Pioneer Valley, LiveWell Springfield, a community-based movement around healthy eating and active living, could be a partner in the bike share program.

- **Locate stations where they primarily serve low-income communities** - The placement of stations in the Pioneer Valley bike share system should include locations that will benefit low-income residents. Good locations include neighborhoods with affordable housing and areas that have disproportionately low rates of bicycling. An example of placing stations in low-income communities is NiceRide Minnesota, which has located 30 stations in places identified during the program's community outreach process as important for promoting equity. For Springfield and Holyoke, several proposed locations for bike share stations are located within or near low-income neighborhoods. A related policy would be to allow longer free trips from bike share stations in low-income areas, particularly if these stations do not have high station density and require a longer time to travel to other stations in the system.

- **Conduct community-specific marketing and outreach** - reaching out to low-income residents can help raise awareness about the bike share program and its benefits. Outreach can involve speaking at neighborhood association meetings and ensuring that marketing materials are translated into multiple languages. For example, Boston's Hubway representatives have spent significant time at local social service agencies to raise awareness about the low cost of subsidized bike share memberships.

- **Provide financial assistance** - For existing bike share programs throughout the country, the most common method for promoting equity is to provide financial assistance for membership fees. Most bike share programs offer a discounted membership fee to alleviate this financial hardship. For example, Boston's Hubway has annual memberships available for $5 year, instead of the regular $85, for low-income residents who receive public assistance.

- **Consider integration of fare payment system with PVTA** - Incorporating the bike share payment system with the PVTA's payment system through a joint farecard would increase the convenience of using both systems for regular public transit users. Due to hardware issues, existing bike share systems have generally not yet been successful at integration of fare systems. However, San Francisco is currently soliciting requests for proposal to integrate the Bay Area regional bike share program with the region's Clipper Card.

- **Ensure equitable access to bicycle infrastructure** - Bike lanes, sharrows, and cycle tracks make bicycling easier and safer for residents. Pursuing funding for bicycle infrastructure in low-income and minority neighborhoods will encourage participation in the bike share program. Potential funding opportunities are the Pioneer Valley Metropolitan Planning Organization, Safe Routes to School, and the Complete Streets funding that is part of the most recent Massachusetts Transportation Bond Bill.

- **Provide bicycle education and advocacy** - Many residents have limited experience bicycling, which can create a significant barrier to their participation in a bike share program. This can be overcome through bicycle safety education courses, like those run by MassBike. Mass in Motion's promotion of bicycling can also encourage residents to participate. Additionally, ensuring that advocacy and encouragement programs in the Pioneer Valley, such as the annual Bay State Bike Week, include an outreach component to low-income and minority neighborhoods will also increase use. Boston's Hubway has offered bicycling safety classes, and also offers reduced-cost helmets near some stations to encourage helmet use.

Section 4: Regional Characteristics That Support Bike Share

The previous section of this report identified the characteristics a region must have in order to successfully implement a bike share system. The Pioneer Valley has many of these characteristics, including:

- Regional rail and bus service
- Bicycle infrastructure that includes an ever-expanding network of bike lanes and off-road paths
- Compact urban centers that have major destinations, including universities, businesses, museums, entertainment districts, and local services

This section describes how each of these factors would influence the use of a bike share system in the region.

Rail Service

Passenger rail service in the Pioneer Valley is currently being upgraded. Starting in early 2015, Amtrak's Vermonter line will be rerouted to serve the Pioneer Valley and include stops at newly-constructed stations in downtown Holyoke and Northampton. Additionally, Springfield's Union Station is currently in the process of a $75 million renovation. When completed in 2016, the station will be a multi-modal transportation hub for the city's bus and rail service, which will greatly increase its use. At this time there is only one planned train per day each way along the Vermonter line, but the Pioneer Valley Planning Commission is working towards a commuter rail approach that would allow for more trips in the future.

Rail improvements in Connecticut, also to be completed in 2015, will allow for faster trains between Springfield and New Haven. Travelers on this corridor will be able to board trains every 30 minutes during peak morning and evening rush hour periods, and hourly during the rest of the day. An increase in the number of trains running during peak morning and evening rush hours is also planned between these two destinations. These track and schedule upgrades will make rail travel between Springfield, Hartford, and New York City more convenient in the coming years.

Amtrak commuters at the train stations in Springfield, Holyoke, and Northampton are major potential users of a bike share system. Bicycling would be particularly useful for traveling distances that are just beyond a ten-minute walk from the station. These trips are short enough to be an easy ride, but long enough for bicycling to save significant time over walking. The table below shows the distances from the Springfield, Holyoke, and Northampton train stations to nearby destinations, and the estimated time that would be saved by bicycling instead of walking to them.

Table 4-1: Trip Distances and Times from Train Stations in Northampton, Holyoke, and Springfield

Train Station	Destination	Distance (miles)	Walking Time (minutes)	Bicycling Time (minutes)	Time Saved	Feet of Climb
Springfield	Baystate Medical Center	1.3	25	8	17	-
Springfield	MassMutual Center	0.5	10	3	7	-
Springfield	Basketball Hall of Fame	1.1	23	7	16	-
Springfield	Mercy Medical Center	0.8	18	6	12	-
Holyoke	Holyoke Hospital	1.8	40	14	26	167
Northampton	Smith College	0.6	13	6	7	46
Northampton	Look Park	3.6	72	23	49	-
Northampton	Cooley Dickinson Hospital	1.8	36	13	23	105

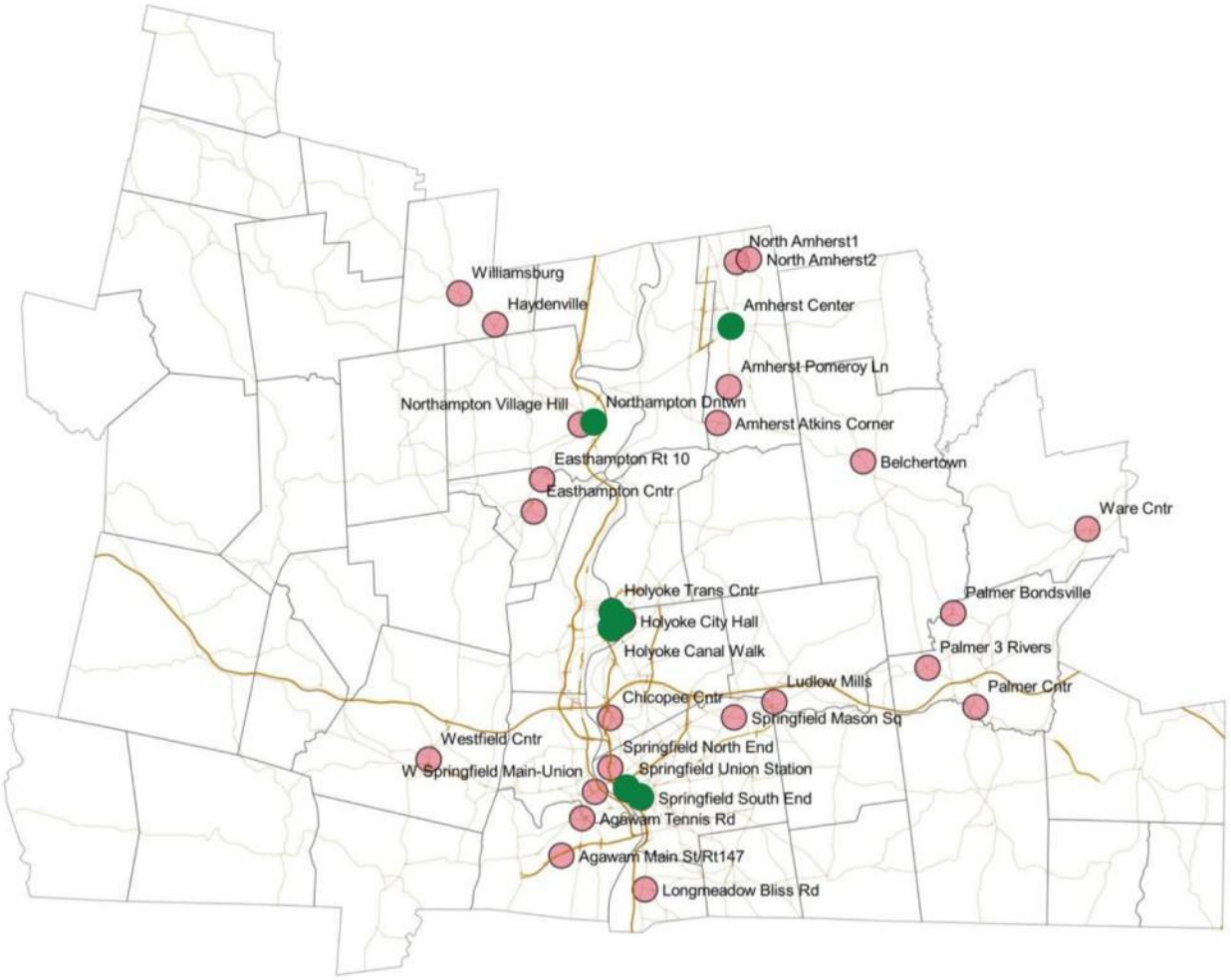
While rail improvements will also increase in the number of people making multi-day trips, these riders will be less likely to use the bike share system than daily commuters, because they likely have luggage that cannot be transported via bicycle.

In 2014, Hartford completed a feasibility study for a regional bike share system and is currently determining next steps for implementation. Strategies for linking bike share programs in Hartford and the Pioneer Valley should be considered by stakeholders in both regions, with particular attention to how to utilize the improved rail service.

The Pioneer Valley's *Our Next Future Plan* (2014) identified locations in the Pioneer Valley that are best suited for transit-oriented development (TOD). Transit-oriented development is generally mixed-use, dense, and walkable, in order to maximize the use of transit. The map below shows all locations that were examined in the Pioneer Valley for potential TOD, shown in pink. After assessing the potential of these 30 sites based on their current walkability, density, and public transit availability, they were ranked and prioritized. Of the top ten locations in this prioritized list, most are located in Amherst, Holyoke, Springfield, and Northampton and are shown in green on the map below.

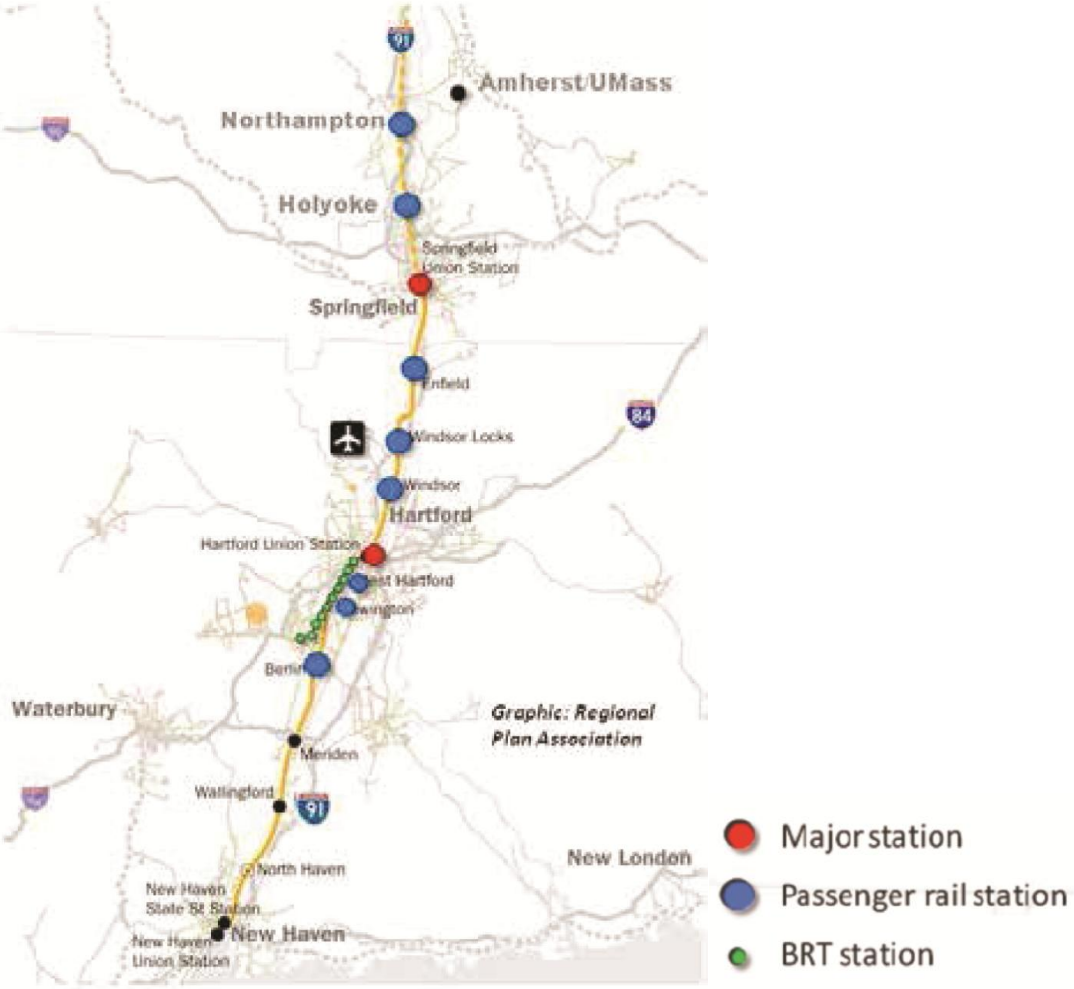
The locations are: Main Street in Springfield, the Holyoke Transportation Center, Holyoke City Hall area, downtown Northampton, the Holyoke Canal Walk, Springfield on State Street around Mason Square, Springfield's South End neighborhood, and Amherst Center. Incorporating bike share stations at these locations would encourage transit-oriented development and be well suited for integrating the bike share system with transit service.

Figure 4-2: Locations Best Suited for Transit Oriented Development in Amherst, Springfield, Holyoke, and Northampton



Locations (shown in green) in Amherst, Springfield, Holyoke, and Northampton were identified in PVPC's *Our Next Future* plan as most suitable for transit-oriented development, which are walkable areas built around transit use. These areas would be well-suited for bike share stations. Pink areas are areas in other communities identified as potential TOD sites. Source: PVPC

Figure 4-3: Locations for Passenger Rail Stations with Potential for TOD in Connecticut and Massachusetts



The improvements to rail service in Connecticut and Massachusetts will mean renovations to Springfield's Union Station, new stations in Holyoke, and Northampton, and more frequent train service between Springfield and New Haven. Source: Regional Plan Association

Bus Service

The Pioneer Valley Transit Authority provides bus service to 24 municipalities in western Massachusetts, including Amherst, Holyoke, Springfield, and Northampton. The system's 46 scheduled bus routes mostly radiate from four service hubs, or "pulse" points: the Springfield Bus Terminal (to be relocated to Union Station in 2016), the Holyoke Transportation Center, downtown Northampton, and the UMass Amherst / downtown Amherst corridor. Several routes that serve the Five College area (Northampton, Hadley, South Hadley, and Amherst) either have suspended or reduced service when classes are not in session. In 2013, the PVTA's annual ridership was just over 11 million and the system has approximately 15,000 to 20,000 regular riders. The Springfield Bus Terminal has approximately 7,500 PVTA customers traveling on approximately 550 buses each weekday.

Surveys conducted by the PVTA have found that riders primarily use the system for commuting to work and school. Most residents have low incomes and are dependent on the bus for transportation, with almost 75 percent of riders make less than $20,000 per year, 60 percent of riders not owning a car, and 80 percent indicating they have no other way to make their trip other than using PVTA.

One of the primary goals of bike share programs across the country is to integrate bike share systems with public transit. Benefits of doing so include:

- Solving the "last-mile problem" by expanding the distance people can easily travel in order to get to the nearest bus route.
- Providing a convenient alternative for trips that are too far to walk but not far enough to justify waiting for a bus.
- Offering a back-up option to bicycling in case of inclement weather or if there is too much to carry on the return trip.

Holyoke Transportation Center. Source: PVPC

While almost all PVTA buses currently have external bike racks that allow for transport of personal bicycles, the weight and size of bike share program bicycles would likely preclude them from being used in this way. Instead, residents would bicycle to their bus stop, dock the bicycle, ride the bus, and pick up another bicycle at their destination if needed.

Residents of the Pioneer Valley understand the importance of integrating a bike share system with transit. As part of a public survey (see Section 6) residents indicated that bus stops are one of the most important destinations at which they would like to see stations located.

Similar to most existing bike share programs, the PVTA provides 1-day, 7-day, and 30-day fare passes. Integrating bus passes with the bike share fare system would increase the ease of renting a bicycle. Many existing bike share systems in the world are currently trying to combine their fare systems with public transit, though so far only one city (Avignon, France) has successfully done so.

The region also has several private bus services, including Greyhound and Peter Pan. These companies provide regional service to Amherst, Holyoke, Springfield, and Northampton with multiple buses a day. Approximately 150 commercial buses depart the Springfield Bus Terminal every day and 12-15 per day from the Northampton Bus Terminal. Riders of the region's private bus lines are unlikely to significantly utilize a bike share program, because most are making multiple-day trips that necessitate luggage that cannot be carried by bicycle.

Bicycle Infrastructure

The Pioneer Valley has a network of on-road and off-road bike paths that connects different destinations and communities. Planning bike share stations around this infrastructure will increase the convenience of using the program.

There are three primary off-road bicycle paths in Amherst, Northampton, Holyoke, and Springfield:

- The Norwottuck Rail Trail connects downtown Northampton, downtown Amherst, the commercial district along Route 9 in Hadley, and Amherst College. The trail is approximately 10 miles long. In addition, the UMass Connector Bikeway provides a two-mile path between the trail and campus.

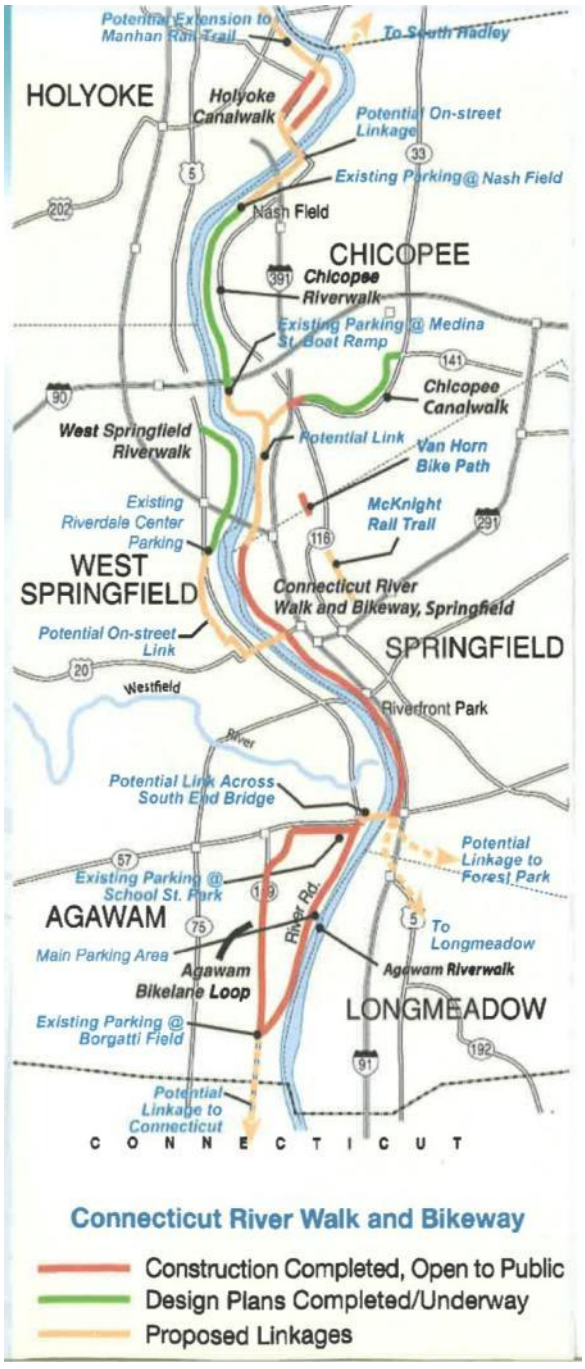
- The Manhan Rail Trail is 6 miles long and connects downtown Northampton to Easthampton. It also runs near the Northampton section of the Norwottuck Rail Trail. There is also a spur of the Manhan off of Route 66.

- The Connecticut River Walk currently has two main sections – a 3.7 mile stretch in Springfield and 1.7 miles in Agawam. Several major destinations are in close proximity to the Springfield River Walk, including downtown Springfield, Bay State Medical Center, the Pioneer Valley Riverfront Club, and the Basketball Hall of Fame. A half-mile of the Holyoke Canalwalk and quarter-mile of the Chicopee Canalwalk are also completed and will be expanded in the upcoming years. Long-term plans envision the River Walk as a continuous network of off-road and on-road paths in Agawam, Springfield, Holyoke, West Springfield, and Chicopee.

In a public survey (see Section 6) residents indicated that recreation and exercise are two primary reasons they would be interested in a bike share system. Off-road paths are generally best for recreational riding, meaning that bike share stations should be located in close proximity to bike path access points.

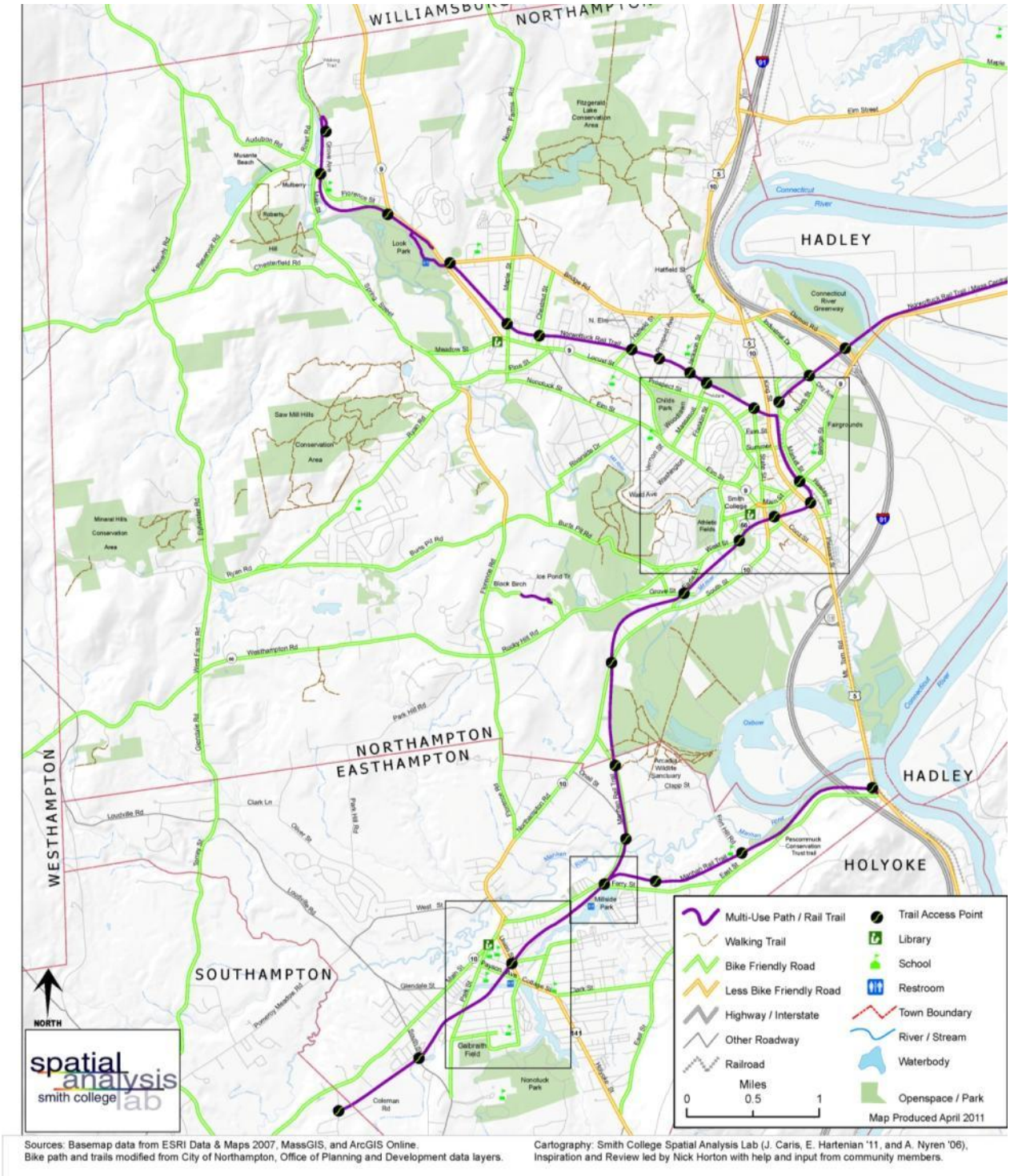
There are also several on-road bike lanes in Amherst, Holyoke, Northampton, and Springfield. In 2013, Springfield installed its first bike lane on Plum Tree Road in the Six Corners neighborhood, and the City plans to consider the installation of bike lanes as part of all future road repaving projects. In Holyoke, there are currently bike lanes on Dwight Street and Hampden Street. Northampton has bike lanes along South Street, Elm Street, Route 66 from Florence Road to Westhampton, Route 9 from Florence to Leeds, and Prospect Street from Elm Street to Jackson Street. Amherst has a quarter-mile of bike lane on South Pleasant Street, near downtown.

Figure 4-4: Existing and Proposed Segments of the Connecticut River Walk and Bikeway



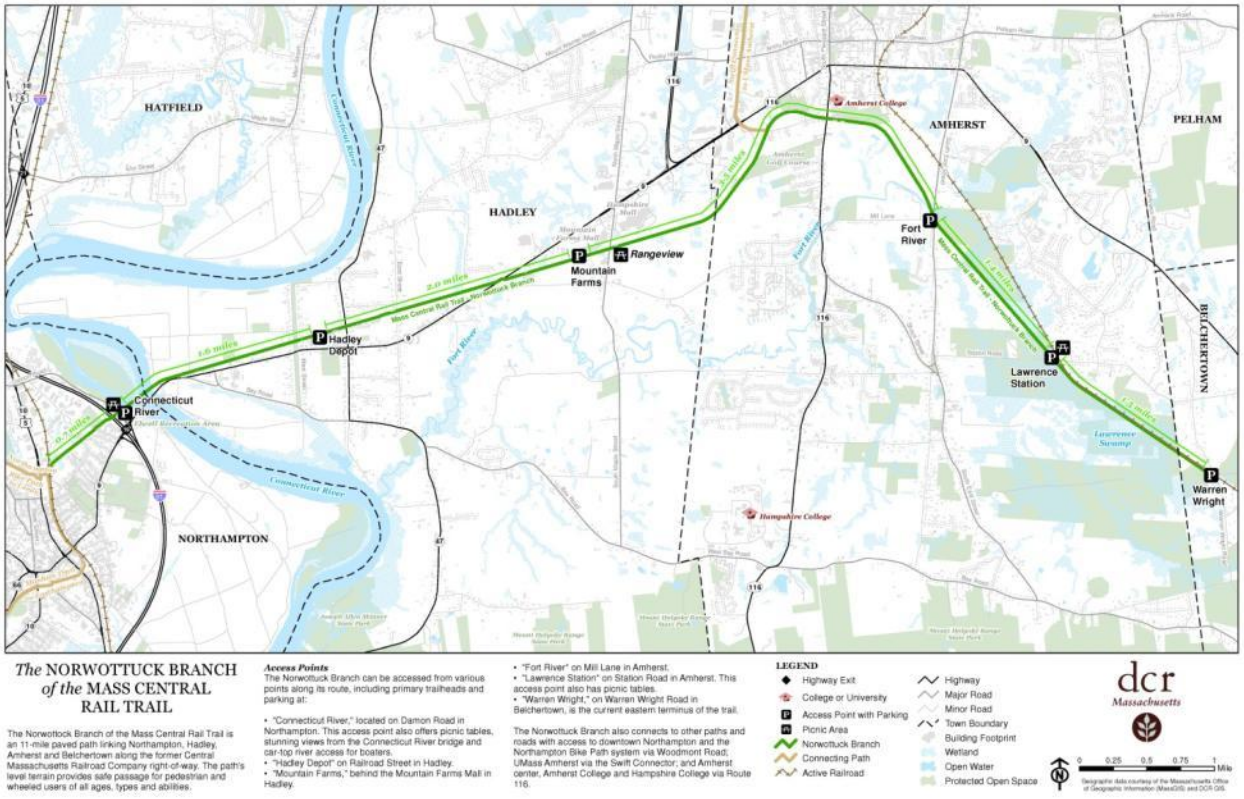
The currently constructed portions of the Connecticut River Walk and Bikeway in Agawam, Springfield, Chicopee, and Holyoke will eventually be extended and connected. Source: PVPC

Figure 4-5: Rail Trails in Easthampton and Northampton



Source: Smith College Spatial Analysis Lab

Figure 4-6: Norwottuck Rail Trail Map



Source: Massachusetts Department of Conservation and Recreation

Existing Bike Share and Bike Rental Programs

There are several existing bike share and rental programs in the Pioneer Valley. While these programs have different cost structures, equipment, and rental times than a public bike share system, they demonstrate that Pioneer Valley residents and visitors are interested in using bicycles without having to make a permanent purchase. The current programs are:

- **Private rental companies** – Two bicycle shops in the Pioneer Valley offer bike rentals. Northampton Bicycle offers rental of town bikes for $25 for 1 day, $50 for 3 days, and $90 for 7 days, and road bike rentals for $35 for 1 day, $70 for 3 days, $130 for 7 days. Hampshire Bicycle Exchange in Amherst offers rentals of $35 for 1 day or $70 for 7 days if the bicycle has a price less than $350. For bicycles that cost greater than $350, the cost is 10 percent of the price per day, or 25 percent of the cost of the bike per week. Because the Hampshire Bicycle Exchange both buys and sells used bicycles, it is possible to "rent" a bicycle for a few months by purchasing and selling it back to the store. Both shops provide a lock and helmet with the cost of the rental.

- **Smith College Bike Kitchen** – the Bike Kitchen, open since 2005, offers Smith students and faculty with maintenance service, bike rentals, and safety education. Rentals are available for $20 per semester and include a lock and helmet. The program's 40 bicycles are in high demand and there is a waitlist to use the program.

- **University of Massachusetts – Amherst** – Since the fall of 2011, UMass has made available a fleet of 25 bikes to students. The program offers free rentals to students of up to 24 hours and provides helmets and locks. The bicycles, stored at the student union, were purchased through a gift from the Class of 2010. The program is currently supported by the Student Government Association and the Sustainable UMass program. The University is currently investigating implementation of a more formal bike share program on campus. Such a system could potentially be integrated with a regional public bike share system.

- **Pioneer Valley Riverfront Club** – The PVRC offers children and adult bicycle rentals for $5 per hour. Because the rentals are on an hourly basis, they are primarily meant for short-term, recreational use on the Connecticut River Walk, which is adjacent to the PVRC. Three-wheeled bicycles are also available for those who cannot ride a bike.

Major Destinations

The Pioneer Valley is home to many destinations that generate trips by car, walking, and bicycling. The region's bike sharing program can ensure maximum usage by having stations near the following types of major destinations.

Colleges and Universities

There are fourteen colleges and universities located in the Pioneer Valley – of these, four are located in Springfield, three in Amherst, one in Northampton, and one in Holyoke. College students are often enthusiastic users of bike sharing programs, with successful campus-based systems established at colleges around the country. Students living on campus could use a bicycle to make trips between their dorms and classes. They could also use bicycles to make short trips to the store, such as UMass students going to Big Y, the Hampshire Mall or downtown Amherst. Faculty and staff could also use the system to go out for lunch or run quick errands. These type of trips mean that college students would most use the system during the day, and for trips of less than one hour.

On-campus students are most likely to use the system, since off-campus commuter students are more likely to own a bicycle or car. However, similar to faculty, off-campus students might utilize the system for short trips while on campus.

Table 4-7: On-Campus Student Populations for Amherst, Holyoke, Northampton, and Springfield

College	Community	Students Living On-Campus
American International College	Springfield	926
Amherst College	Amherst	1,750
Holyoke Community College	Holyoke	0
Hampshire College	Amherst	1,188
Smith College	Northampton	2,401
Springfield College	Springfield	1,995
Springfield Technical Community College	Springfield	0
University of Massachusetts - Amherst	Amherst	12,012
Western New England College	Springfield	2,035
Total		**22,307**

Major Employers

The region's major employers, such as MassMutual or UMass – Amherst, generate many hundreds of trips each day. Employees could use the bike sharing program during the day to attend nearby meetings, go to lunch, or for convenient exercise. As discussed under "Rail Service," employees could also use the bike share program as a last-mile solution for transit, such as riding from the Springfield train station to offices in downtown Springfield. Trips would likely be under 30 minutes for these uses. Employers could also potentially fund the bicycle sharing program in conjunction with an employee health and wellness program.

Tourist and Cultural Destinations

Visitors to the region's tourist and cultural centers, such as the Basketball Hall of Fame, could ride bicycles between different destinations or take a ride on a nearby bike path. Visitors would be interested in short term passes to use the system. Rides would most likely be to explore the area rather than make short, direct trips for errands, meaning the length of the average rental would probably be longer than one hour. A list of major tourist and cultural destinations can be found in the table on the next page.

Entertainment Districts

Downtown Amherst, Northampton, Holyoke, and Springfield all have shops, bars, and restaurants that are major trip generators. Not having to worry about parking could make bicycling to these destinations a convenient alternative to driving. Most of the entertainment districts in the region are close to major employers and tourist attractions, meaning that one bike share station could provide access to multiple destinations. Entertainment districts are most likely to be visited at night, which would complement the system's use during the day by college students, major employers, and tourists.

Table 4-8: Major Destinations in the Pioneer Valley for a Regional Bike Sharing Program

	Amherst	Holyoke	Northampton	Springfield
Colleges	Amherst College UMass – Amherst Hampshire College	Holyoke Community College	Smith College	American International College Springfield College Western New England University Springfield Technical Community College
Major Employers	Amherst College UMass – Amherst Hampshire College	Holyoke Hospital	Smith College Cooley Dickinson Hospital L-3 Keo	Mercy Medical Center MassMutual Baystate Health
Tourist and Cultural Destinations	Mullins Center Emily Dickinson Museum	Volleyball Hall of Fame Holyoke Children's Museum	Smith College Museum of Art Academy of Music Theater Calvin Theater New Century Theater Iron Horse Theater	Mass Mutual Center Basketball Hall of Fame Museum Quadrangle CityStage Symphony Hall
Entertainment Districts	Downtown Amherst	Main Street	Downtown Northampton	Hall of Fame Complex
Other key destinations	Town Common	Holyoke Heritage State Park	Look Park	Pioneer Valley Riverfront Club Forest Park

Conclusion

As discussed in Section 4, bike share systems can vary in their size, equipment, rental fee structure, and operations. For a bike share system to be successful, it must be designed around local context and take into consideration density, public transit, and potential destinations. The following characteristics of the Pioneer Valley support a bike share system:

- **Different types of users.** There are several groups that could utilize a bike share system, including students, daily commuters, and tourists. Bike share stations could accommodate the needs of multiple groups, helping to ensure that the system is used at different times of the day and week, as well as for different trip purposes.

- **Local areas of density.** Northampton, Amherst, Springfield, and Holyoke all have dense downtown centers that are served by good public transit and have been identified as areas to promote transit-oriented development. Each of these communities has cultural and tourist destinations that would generate trips. There is also off-road and on-road bicycle infrastructure that promotes bicycle riding.

- **Interest in bicycling.** There is a strong bicycle culture in the Pioneer Valley, and 80 percent of respondents in the public survey conducted for this report indicated they would be interested in using a bike share system.

The region also has features that could present some concerns to implementing a bike share system.

- **Lack of regional density**. While there are small pockets of density in Amherst, Northampton, Holyoke, and Springfield, the region as a whole lacks the density found in most bike share systems. The region's size could also lead to limited trips between these four communities, and create challenges in maintaining and servicing bikes and stations.

- **Easy access to personal bicycles**. While residents of large cities may use a bike share system because they do not have space for their own bicycle or are concerned about theft, these issues are not generally as significant in the Pioneer Valley and do not discourage people from buying their own bicycles. There are many bike shops at which to purchase bicycles as well.

- **Relatively few visitors.** Many bike share systems rely on tourists to purchase short-term memberships for a major portion of their operating revenue. Compared to larger cities that have bike share systems, there are relatively few visitors to the region, limiting the potential of this revenue stream.

- **Limited public transit**. The region's public transit is not as extensive as in larger cities, where bike share systems are used for daily commuting. The percentage of people commuting by public transit in the Pioneer Valley is significantly less than in Boston or New York.

The recommendations in the final chapter of this report take these concerns into account and propose a bike share system that is sensitive to local context.

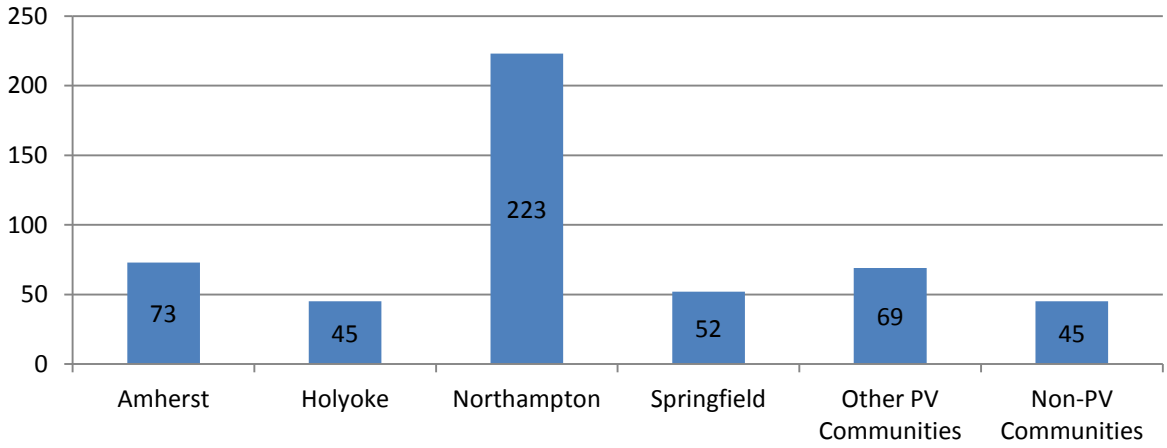
Section 5: Demand Analysis and Proposed Service Area

Public Survey

During the months of June and early July, as part of the larger feasibility study, the PVPC in conjunction with the Advisory Committee developed a survey to assess the interest among its residents of Amherst, Northampton, Holyoke and Springfield, as well as faculty, staff and students at the University of Massachusetts Amherst, Mount Holyoke College, Hampshire College, Amherst College, Smith College, Springfield College, and Springfield Technical Community College. Various outreach methods were used by the participating entities of the study to make the survey available to the public including: a press release to news media outlets; distribution through several e-mail listserve networks; accessibility of surveys on municipal websites and at offices; and distribution through several social networking websites including Facebook and Twitter.

In total, there were 507 responses to the survey. Northampton had the largest number of responses at 223 (44 percent) of the 507 respondents.

Figure 5-1: Number of Responses by Community



Other Pioneer Valley communities that were recorded responding to the survey included:

- Agawam - 6 responses
- Belchertown - 13 responses
- Easthampton - 14 responses
- Hadley - 7 responses
- Longmeadow - 6 responses
- South Hadley - 6 responses

Other non-Pioneer Valley communities that responded to the survey included:

- Andover - 6 responses
- Gill - 3 responses
- Greenfield - 6 responses
- Sunderland - 4 responses

The majority of respondents (408 of the 507 respondents, or 80 percent) indicated that they would use a bike share program in the Pioneer Valley. The same percentage of respondents also said they would be willing to walk up to ten minutes to the nearest bike share station to use the system, which is approximately a distance of one-half mile.

Figure 5-2: Interest in Bike Share Program by Community

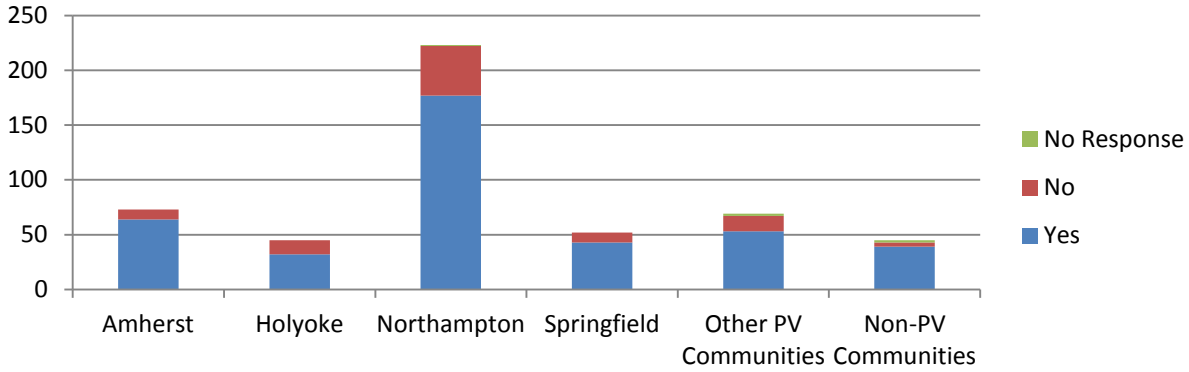
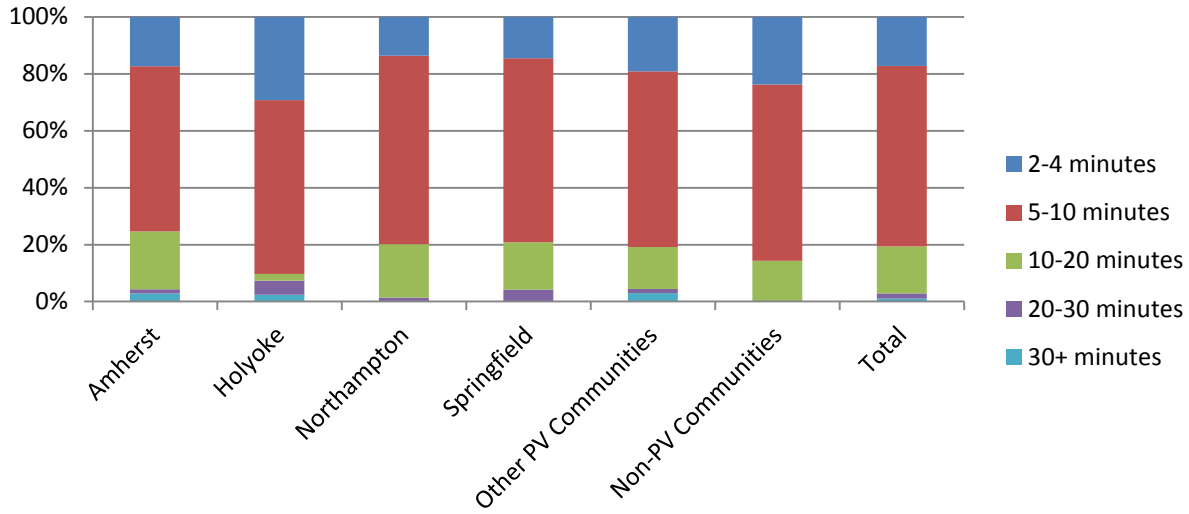


Figure 5-3: Willingness to Walk to Bike Share Station by Community



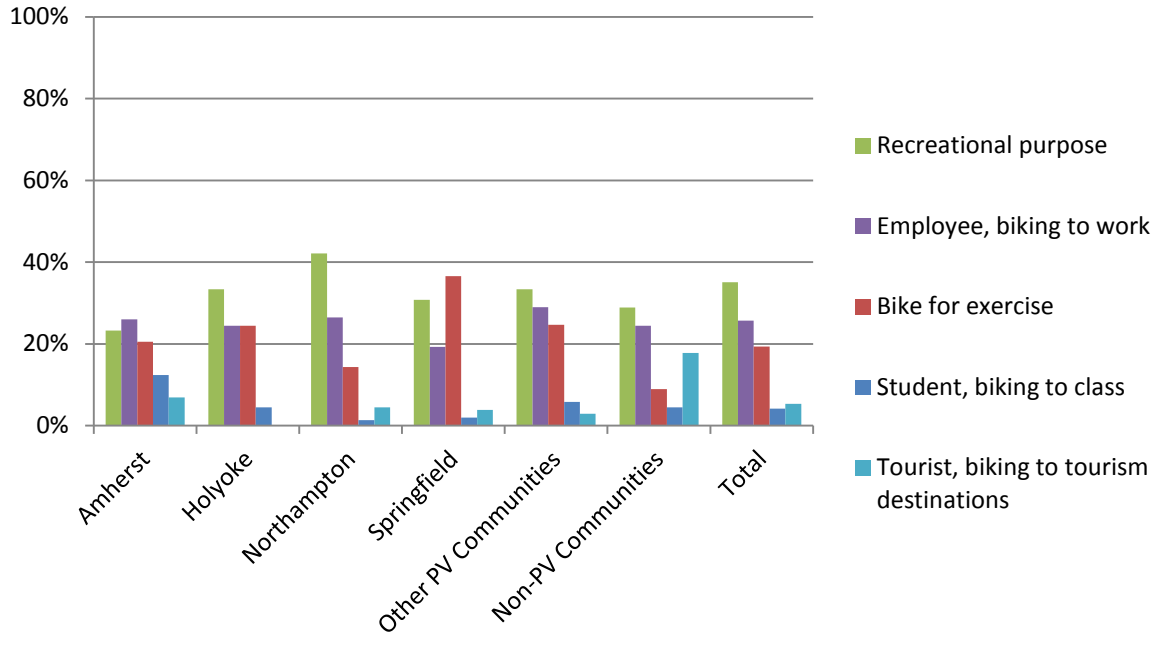
The most popular destinations cited by 79 percent of the respondents were city and town centers. The second and third most popular responses were bus stops (59 percent) and college campuses (59 percent). In Springfield and Holyoke, more people chose municipal parks as a destination. These results confirm the identified regional characteristics that support bike share outlined in Section 4.

Comments received by the respondents about other potential destination included:

- Bike paths and rail trails - 34 responses
- Libraries - 6 responses
- Low-income neighborhoods - 6 responses
- Grocery store - 6 responses
- Parking lots/garages - 4 responses

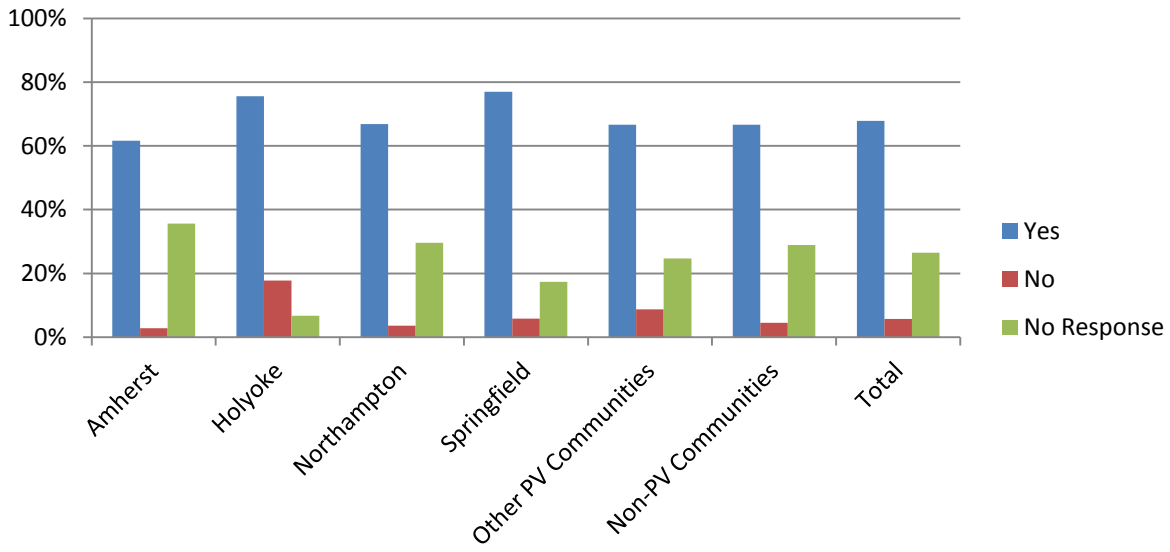
Recreation was the most common overall response for interest in a bike share program (35 percent). Approximately 37 percent of the responders in Springfield alone said that their interest in bike share is for exercising purposes. Several respondents indicated they would use the system either as tourists themselves or guests who visit the area (16 responses). Other reasons included reducing car use and for environmental purposes (6 responses). Students biking to class was a very low response, however surveys were distributed during summer break when students are not on campus which indicates that students were underrepresented in the survey results.

Figure 5-4: Reason for Interest in Bike Share Program By Community



It is important to consider a self-selection bias when members of the public chose to complete the survey. In other words, those who were interested in completing a survey about bike share would be more likely to want to use the system which can explain the overwhelming majority support reflected in the assessment. Moreover, 68 percent of the respondents who do not currently own a bicycle said they would be willing to try using the program. On the other hand, comments varied amongst those who already own a bicycle. 21 respondents said they would not use the system because they have a bicycle already. 15 respondents indicated they would use the bike share system in situations where they did not have ready access to their own bicycle, or to make one-way trips in conjunction with public transit.

Figure 5-5: Willingness to Try Program for Residents without a Bicycle



Other common concerns identified from respondents regarding a bike share system in the Pioneer Valley included:

- Need for better bicycle infrastructure, in the form of bike lanes, cycle tracks, and sharrows - 17 responses
- Lack of density necessary for a successful system - 10 responses
- Need for better safety through both bicyclists and motorists following the rules of the road - 9 responses
- Concern that program would be a waste of resources that should be better spent on general transportation infrastructure, bicycle infrastructure, education, crime, etc. - 8 responses
- Theft and vandalism, especially in Holyoke and Springfield - 7 responses
- Accommodation to elderly, children, and different user heights - 5 responses
- Availability of helmets and locks for the bikes - 3 responses

Demand Analysis

The potential for a bike share system can be recognizable after looking through and analyzing:

- Regional characteristics highlighted in Section 4
- Results of the community interest survey pinpointing the most popular destinations listed at the beginning of this section
- User demand realized through the Heat Map (discussed further in this section)

User forecasts can also be determined by using the Massachusetts Travel Survey (MTS) created by the Massachusetts Department of Transportation (MassDOT) in 2012. The MTS is a comprehensive study of the demographic and travel behavior characteristics of residents throughout the state. It assists planners and decision makers to understand needs and trends for all modes of transportation, including bike share.

Pioneer Valley - Massachusetts Travel Survey (MTS)

Focusing in the Pioneer Valley specifically, the 2012 MTS data reports that there are 236,337 households within the Hampden and Hampshire County region, totaling a population of 607,263 residents.

The majority of households (83.5 percent or 197,326 households) reported they do not use transit on a regular basis. On the other hand, 38,743 households (or 16.4 percent) use transit regularly.

Table 5-6: Transit Used on Regular Basis (Weighted)

Transit Used on Regular Basis	Count	Percent
Yes	38,743	16.4%
No	197,326	83.5%
Don't Know	268	0.1%
Total	236,337	100%

Just over half of all households within the Pioneer Valley (59.8 percent) reported having at least one household bicycle. Of those, 19.2 percent reported having two bicycles available to the household, and 16.9 percent reported having one bicycle while a comparative 16.4 percent, or 95,131 households, reported not having a household bicycle.

Table 5-7: Household Bicycles (Weighted)

Household Bicycles	Count	Percent
0	95,131	16.4%
1	40,011	16.9%
2	45,279	19.2%
3	23,129	9.8%
4	17,851	7.6%
5	8,318	3.5%
6	4,114	1.7%
7	950	0.4%
8	1,431	0.6%
Don't Know	123	0.1%
Total	236,337	100%

Regarding the number of vehicles available to the household, 35.7 percent of households reported having two vehicles available, 36.3 percent reported having one vehicle available, while 12.9 percent (or 30,459 households) reported having no vehicles.

Table 5-8: Household Number of Vehicles (Weighted)

Household Vehicles	Count	Percent
0	30,459	12.9%
1	85,891	36.3%
2	84,407	35.7%
3	22,615	9.6%
4	8,796	3.7%
5	2,750	1.2%
6	913	0.4%
7	412	0.2%
8 or more	93	0.0%
Total	236,337	100%

Regarding household income distribution, 10.4 percent reported making $15,000-$34,999 annually. Slightly over 19 percent reported making $50,000-$74,999 annually, while 12.9 percent report making $75,000-$99-999 annually. Approximately 5.7 percent of households fall within the highest income category ($150,000 or more) while a much larger percent (16.3 percent) fall within the lowest income category (less than $15,000).

Table 5-9: Household Income (Weighted)

Household Income	Count	Percent
Less than $15,000	38,505	16.3%
$15,000-$24,999	24,499	10.4%
$25,000-$34,999	20,766	8.8%
$35,000-$49,999	34,485	14.6%
$50,000-$74,999	45,036	19.1%
$75,000-$99,999	30,522	12.9%
$100,000-$149,999	18,515	7.8%
$150,000 or more	13,407	5.7%
Don't Know/Refused	10,602	4.5%
Total	236,337	100%

As shown below, on their travel day, 29.4 percent of households made 6 to 10 trips, while another 31.8 percent made fewer trips (1 to 5). 15.7 percent made 11 to 15 trips, 9.2 percent made 16 to 20 trips, and another 18.1 percent of households made at least 21 trips on their travel day. 5 percent of households reported making no trips.

Table 5-10: Trips Made by Household on Travel Day (Weighted)

Trips Made by Household on Travel day	Count	Percent
None	11,824	5%
1 to 5	75,176	31.8%
6 to 10	69,556	29.4%
11 to 15	37,080	15.7%
16 to 20	21,830	9.2%
21 to 30	16,482	7%
31 to 50	4,253	1.8%
50+	135	0.1%
Total	236,337	100%

Overall, the majority of respondents (63.7 percent or 269,834 respondents) have not used a bicycle for recreational purposes during the week prior to their travel day. Of those who had biked recreationally, the table below shows that 5.9 percent (24,927 people) did so on one day only, 5.5 percent (23,185) did so on two days, and 3.3 percent (14,037 people) did so on three days of the week.

Table 5-11: Days Used Bike for Recreation in Past Week (Weighted)

Days Used Bike for Recreation in Past Week	Count	Percent
0	268,834	63.7%
1	24,927	5.9%
2	23,185	5.5%
3	14,037	3.3%
4	6,626	1.6%
5	5,112	1.2%
6	1,171	0.3%
7	3,723	0.9%
Don't Know	45,255	10.7%
Total	423,385	100%

Similar to recreational biking, the majority of respondents (74.1 percent) reported not using a bicycle for transportation in the week prior to their travel day. Of those who did, 1.8 percent (7,618 people) used a bicycle for transportation for one day only, while 2 percent (8,609 people) used a bicycle on two days. See the table below for more information on bicycle use for transportation.

Table 5-12: Days Used Bike for Transportation (Weighted)

Days Used Bike for Transportation in Past Week	Count	Percent
0	313,918	74.1%
1	7,617	1.8%
2	8,609	2%
3	3,400	0.8%
4	4,208	1%
5	3,875	0.9%
6	1,708	0.4%
7	1,968	0.5%
Don't Know	-	-
Total	423,385	100%

As summarized in the table below, the majority of households reported having two licensed drivers in the household (45.2 percent), while another 34.7 percent reported having one licensed driver. 8.6 percent of households which is translated to 20,293 households in the Pioneer Valley have no licensed drivers.

Table 5-13: Licensed Drives in Household (Weighted)

Licensed Drives in Household	Count	Percent
0	20,293	8.6%
1	82,103	34.7
2	106,720	45.2%
3	21,253	9%
4	4,937	2.1%
5	847	0.4%
6	185	0.1%
Total	236,337	100%

The data available in the MTS provides valuable information relating to the demographic and travel behavior characteristics of the Pioneer Valley. The following section examines data for the four participating communities in this bike share study, to obtain more detailed information about the bike share study area.

Population Density

Most of the successful bike share programs that exist in North America are typically very high in population and density. The combined population of Holyoke, Springfield, Amherst, and Northampton is similar to that of several U.S. cities operating bike share systems, but the combined density of these communities is significantly lower. Nevertheless, there are existing bike share programs that serve communities as small as Pendleton, Oregon. As shown in the table on the next page, Springfield has a population and density comparable to Chattanooga, Tennessee. While a Pioneer Valley bike share system may not involve much travel between the four communities involved, the experiences of other bike share programs in the country indicate that there are opportunities to build a successful system within each of these communities.

Table 5-14: Population and Density of Pioneer Valley Municipalities

Municipality	Population	Land Area (sq./mi.)	Density (sq./ mi.)
Holyoke	40,135	22.8 sq./mi.	1,872 sq./mi.
Springfield	153,703	33.2 sq./mi.	4,768 sq./mi.
Amherst	34,874	27.8 sq./mi.	1,365 sq./mi.
Northampton	28,592	35.8 sq./mi.	800 sq./mi.
Total Population	257,304		

Table 5-15: Population and Density of U.S. Cities with Existing Bike Share Systems

Municipality	Population	Land Area (sq./mi.)	Density (sq./mi.)
Boston, MA	645,966	48.42 sq./mi.	13,340 sq./mi.
Washington DC	646,449	68.3 sq./mi.	10,528 sq./mi.
Pendleton, Oregon	16,935	10.52 sq./mi.	1,579 sq./mi.
Minneapolis, MN	400,070	58.4 sq./mi.	7,287 sq./mi.
Denver, CO	649,495	155 sq./mi.	4,044 sq./mi.
Cincinnati, Ohio	297,517	79.54 sq./mi.	3,809 sq./mi.
Chattanooga, TN	173,366	143.2 sq./mi.	1,222 sq./mi.

Age and Income

Cities with successful bike share systems have found that the average user (or the highest represented group of the systems) is young, urban professionals typically between the ages of 25 and 34 with a household income of over $100,000. This may be a result of the fact that these populations are over-represented in areas where bike share systems exist. However, there are opportunities within the Pioneer Valley to tap into these demographics and build a successful bike share program.

Educational Enrollment

Marketing to young and urban populations is relatively easy and inexpensive, since they often respond strongly to social media and word-of-mouth outreach. Bike share can connect students to nearby downtowns and other popular destinations such as shopping and entertainment districts.

Table 5-16: Student Populations for Colleges/Universities in Amherst, Holyoke, Northampton, and Springfield

College	Community	Students Living On-Campus	Enrollment
American International College	Springfield	926	1,723
Amherst College	Amherst	1,750	28,518
Holyoke Community College	Holyoke	0	9,000
Smith College	Northampton	2,401	3,033
Springfield College	Springfield	1,995	3,621
Springfield Technical Community College	Springfield	0	8,899
University of Massachusetts - Amherst	Amherst	12,012	28,518
Western New England University	Springfield	2,035	2,520
Total		21,119	85,832

Major Employers

Marketing to major employers for bike share can also be relatively easy . There are a total of 15 large employers in the Pioneer Valley, with nine of these located within Holyoke, Springfield, Amherst or Northampton.

Table 5-17: Major Employers in Amherst, Holyoke, Springfield, and Northampton

Company Name	Location	Employment	Industry
Baystate Health System	Springfield	6,565	Hospitals
UMass - Amherst	Amherst	4,766	Educational Services
MassMutual Financial Group	Springfield	4,366	Insurance Carriers & Related Activities
Big Y Foods, Inc.	Springfield	3,337	Food and Beverage Stores
U.S. Postal Service	Springfield	2,520	Postal Service
Sisters of Providence Health System	Springfield	2,253	Hospitals
Cooley Dickinson Hospital	Northampton	1,683	Hospitals
Holyoke Hospital	Holyoke	1,404	Hospitals
Smith College	Northampton	1,296	Educational Services
Total		26,855	

Employment at Colleges

Three of the top 15 employers in the Pioneer Valley region are educational institutions. Overall, there are 13 public and private colleges and universities located within the region, and 9 of these are located in Northampton, Amherst, Holyoke, or Springfield. Together, these educational institutions employ 12,304 people in two distinct geographic clusters. In the northern half of the region, the well-known Five College area is home to the University of Massachusetts Amherst, Smith College, Mount Holyoke College, Hampshire College, and Amherst College. These five institutions together graduate approximately 6,000 to 7,000 students a year and employ approximately 8,382 people. The University of Massachusetts employs approximately 4,800 people, making it the largest educational institution in the region and the third largest single employer within the Pioneer Valley.

Table 5-18: Five College Area # of Employees (Northern Half of Region)

College/University	Location	Employment
UMASS Amherst	Amherst	4,776
Smith College	Northampton	1,296
Mount Holyoke College	South Hadley	1,000
Hampshire College	Amherst	470
Amherst College	Amherst	840
Total		8,382

In the southern half of the region, the Cooperating Colleges of Greater Springfield encompass the remaining eight colleges within the Pioneer Valley region. These eight colleges - American International College, Bay Path College, Elms College, Holyoke Community College, Springfield College, Springfield Technical Community College, Western New England College, and Westfield State University - employs approximately 3,922 people and graduate nearly 7,000 students a year. Together, the 13 colleges and universities afford residents of the Pioneer Valley region a multitude of educational opportunities and provide employers with an annual pool of skilled talent. This broad higher education sector provides the region with a strong employment base and a superior foundation from which to launch many of the region's economic development initiatives.

Table 5-19: Remaining Colleges 8 # of Employees (Southern Half of Region)

College/University	Location	Employment
American International College	Springfield	428
Bay Path College	Longmeadow	165
Elms College	Chicopee	140
Holyoke Community College	Holyoke	940
Springfield College	Springfield	650
Springfield Technical Community College	Springfield	460
Western New England University	Springfield	589
Westfield State University	Westfield	550
Total		3,922

Employment at Hospitals

Employing even more workers than the region's colleges and universities are the Pioneer Valley's 12 hospitals, which employ a total of 12,461 workers. The majority of the hospitals are located within Holyoke, Springfield, and Northampton. Baystate Medical Center in Springfield is the region's largest hospital and employer with 4,737 full-time employees on its payroll. Cooley Dickinson Hospital in Northampton is the second largest with over 1,600 employees. In addition, Holyoke Hospital and Mercy Medical Center in Springfield also boast substantial employment for the region and their host communities, with over 1,400 and 900 employees respectively. Overall, the health care industry is growing in the region and provides a source of well-paying jobs with good benefits which is a potential market for a bike share program.

Table 5-20: Hospital Employees within Holyoke, Northampton, Springfield, and Amherst

Company Name	Location	Employment
Baystate Medical Center	Springfield	4,737
Cooley Dickinson Hospital	Northampton	1,683
Holyoke Hospital	Holyoke	1,404
Mercy Medical Center	Springfield	977
U.S. Veteran's Medical Center	Northampton	640
Soldiers Home in Holyoke	Holyoke	391
Providence Behavioral Health Hospital	Holyoke	284
Shriner's Hospital	Springfield	251
Total		10,367

Paper Manufacturing Employment

Paper manufacturing is one of the oldest and most enduring industries in the Pioneer Valley. Because of the region's large stands of timber and ample water power from large, swift rivers, the Pioneer Valley became one of the first areas in America to produce paper and paper products on a massive scale. The City of Holyoke, bearing the nickname "Paper City," was once home to over 30 independent paper mills. Although many of these mills have now closed, the region retains a vibrant paper manufacturing industry with a particular emphasis on the manufacture of high-value specialty papers and coated papers. Even now, there are 15 paper manufacturers operating in the Pioneer Valley region and of which 6 are located within Holyoke and Springfield. See chart on next page.

Table 5-21: Paper Manufacturing Employment with Holyoke Springfield, Northampton, and Amherst

Company Name	Location	Employment
Hazen Paper Co.	Holyoke	185
Sonoco Products Co.	Holyoke	160
Hampden papers, Inc.	Holyoke	155
Packaging Corp. of America	Northampton	120
Mead Westvaco Envelope Products	Springfield	120
Smurfit-Stone Container Corp.	Springfield	120
Total		860

Metal and Machinery Manufacturing Employees

Over the past four decades, many of the region's metal and machinery firms have found it increasingly difficult to compete against low-cost foreign and domestic rivals. Nevertheless, a vibrant metal and machinery industry remains with an increasing focus on niche and specialty products. Four of the seven manufacturing companies in the region are located within Springfield, Northampton or Holyoke. Springfield is home to Smith and Wesson, one of the leading manufacturers of firearms and firearm accessories in the nation. Kollmorgen Electro-Optical is located in Northampton and employs 330 people. U.S. Tsubaki Roller Chain Division operates a factory in Holyoke producing machinery for the auto industry and employing 200 people.

Table 5-22: Metal and Machinery Manufacturing Employment in Springfield, Holyoke, and Northampton

Company Name	Location	Employment
Smith and Wesson	Springfeld	587
Kollmorgen Electro-Optical	Northampton	330
U.S. Tsubaki, Inc.	Holyoke	200
Total		1,117

Municipal Employment

Municipal employers are among the largest employers in the region. For example, the City of Springfield and the Springfield Public Schools have a combined 5,721 employees, almost as many as Baystate Health System, the region's largest employer.

Table 5-23: Municipal Employment within Holyoke, Springfield, Northampton, and Amherst

Name of School	Location	Employees
Springfield Public Schools	Springfield	4,422
City of Springfield	Springfield	1,299
Holyoke Public Schools	Holyoke	1,101
City of Holyoke	Holyoke	650
Amherst Public Schools	Amherst	680
Town of Amherst	Amherst	350
Northampton Public Schools	Northampton	450
City of Northampton	Northampton	397
Total		9,349

Summary of Demand Analysis

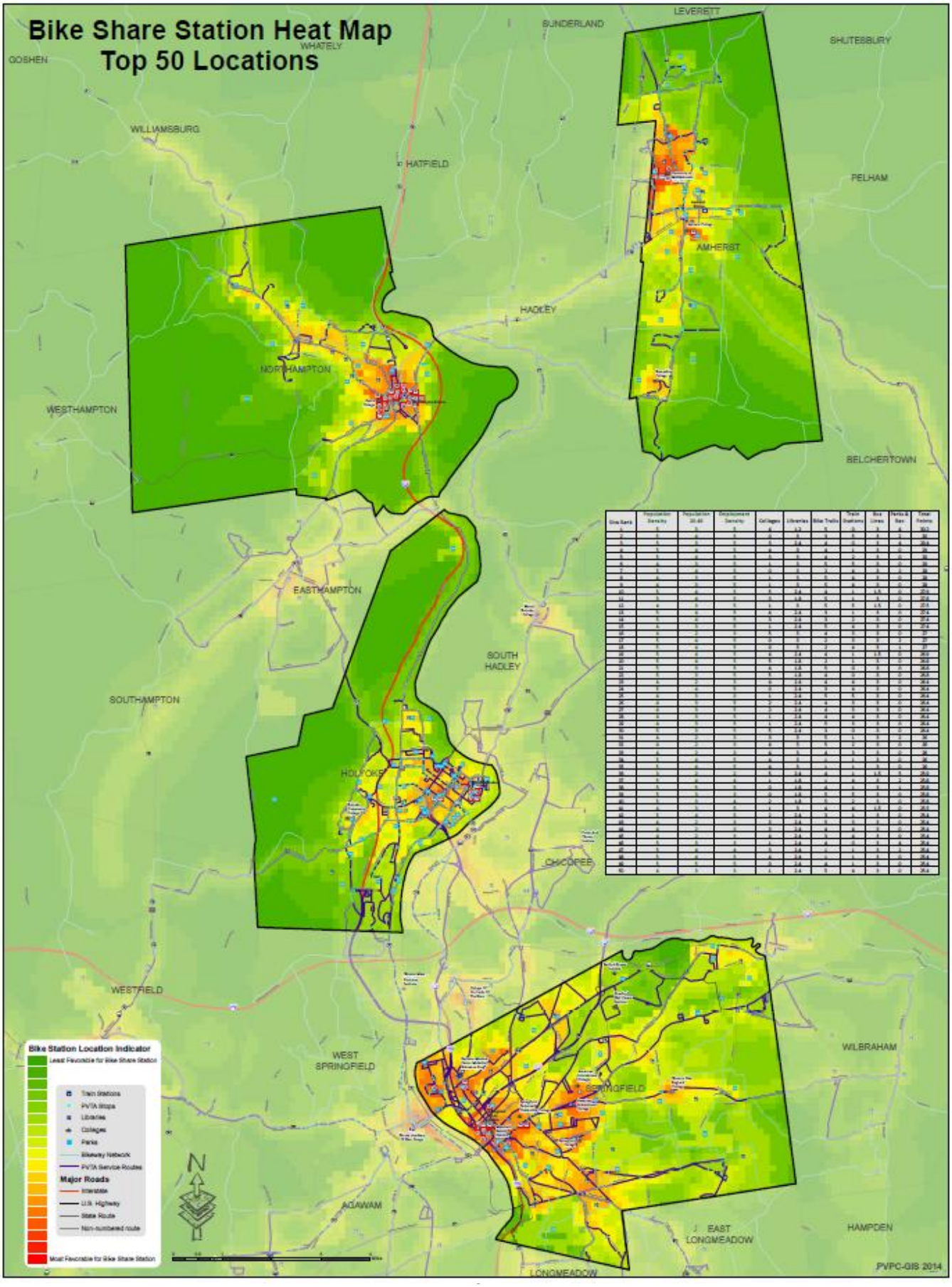
The fact that Holyoke, Springfield, Amherst, and Northampton are not contiguous and relatively spread out from one another represents a challenge to determining a clearly-defined bike share system with a geographic center of demand. On the other hand, the large number of colleges and universities, active downtowns, and large employers offers a potentially unique condition where demand for intra-city travel and "last mile" transit connections could be assisted through a bike share system.

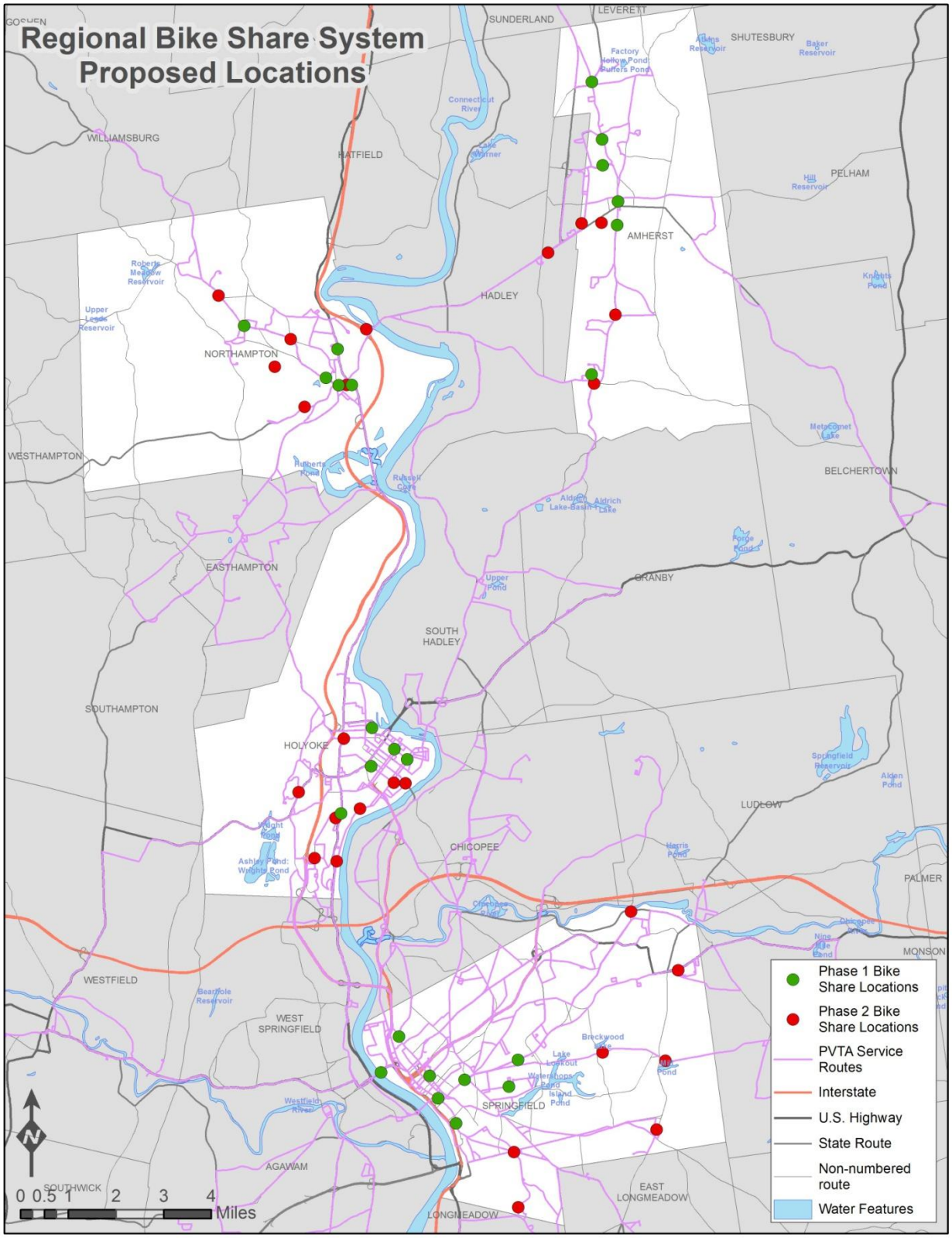
When developing the bike share system, it is important to address the specific needs of users and market segments prior to and after deployment. Through the public survey conducted as part of this study, the overwhelming response to bring bike share to the region was noted and community input for potential bike share locations recognized. Popular noted destinations identified by residents include city and town centers, bus stops and train stations, bike paths, college campuses, and municipal parks Tailoring components of the system to these locations will encourage use by casual users, which will be imperative for a system's long-term economic viability.

Data from other bike sharing systems shows that average users are younger, Caucasian, wealthier, and have attained higher education. These demographics exist within Holyoke, Springfield, Northampton, and Amherst and represent a large portion of the users for a Pioneer Valley bike share system. At the same time, it is important that the bike share program accommodate low-income residents and minorities and the system must meet the needs of disadvantaged communities.

Heat Map Analysis

Areas with high potential demand for bike share were identified through a heat mapping exercise that allocated "points" to where people live, work, shop, play, and take transit. Launching the system initially in the highest demand areas will accelerate visible success and will maximize the chance of the system being successful. The heat map shown on the next page confirms that the downtown areas have the highest demand potential and therefore would make the most logical first phase. Other notable areas that scored well on the heat map include college/university campuses, large hospital campuses, and several mixed-use areas. These locations can be included in the initial phase of implementation or may be logical expansion areas to the system for a second phase. The decision to expand the system further will depend on its initial success.


Bike Share Station Heat Map
Top 50 Locations
GOSHEN
WHATELY
SUNDERLAND
LEVERETT
SHUTESBURY
WILLIAMSBURG
HATFIELD
PELHAM
AMHERST
HADLEY
NORTHAMPTON
WESTHAMPTON
BELCHERTOWN
EASTHAMPTON
SOUTH HADLEY
SOUTHAMPTON
HOLYOKE
CHICOPEE
WESTFIELD
WEST SPRINGFIELD
SPRINGFIELD
WILBRAHAM
AGAWAM
EAST LONGMEADOW
LONGMEADOW
HAMPDEN
Bike Station Location Indicator
Least Favorable for Bike Share Station
Most Favorable for Bike Share Station
Train Stations
PVTA Stops
Libraries
Colleges
Parks
Bikeway Network
PVTA Service Routes
Major Roads
Interstate
U.S. Highway
State Route
Non-numbered route
N
PVPC-GIS 2014


Regional Bike Share System
Proposed Locations
SUNDERLAND
LEVERETT
SHUTESBURY
WILLIAMSBURG
HATFIELD
PELHAM
AMHERST
HADLEY
NORTHAMPTON
WESTHAMPTON
BELCHERTOWN
EASTHAMPTON
GRANBY
SOUTH HADLEY
SOUTHAMPTON
HOLYOKE
CHICOPEE
LUDLOW
PALMER
MONSON
WESTFIELD
WEST SPRINGFIELD
SPRINGFIELD
AGAWAM
SOUTHWICK
EAST LONGMEADOW
LONGMEADOW
Connecticut River
Phase 1 Bike Share Locations
Phase 2 Bike Share Locations
PVTA Service Routes
Interstate
U.S. Highway
State Route
Non-numbered route
Water Features
0 0.5 1 2 3 4 Miles

Proposed Service Area and Station Locations

The service area proposed in this section considers the extent, size, and phasing of a potential bike share system within each of the participating municipalities and defines parameters for the system such as the spacing of stations and the number of bikes per station. The locations identified for stations are based on data collected from the public survey, heat map analysis, PVPC staff, and the Bike Share Advisory Committee. These sources identified the following locations for bike share stations:

- Tourist attractions, landmarks, civic facilities
- Higher density housing and employment centers
- Key transit stops
- Neighborhood and commercial centers
- Colleges and hospital campuses

Station Density

The size of the system is a function of the coverage area and typically outlines the desired spacing of stations. Operators of U.S. bike share programs generally have found that bike sharing kiosks need to be located as close to public transit as possible - preferably adjacent to a bus stop or rail entrance. Additionally, data on North American bike share systems suggests that stations should be spaced approximately one-quarter to one-half mile apart. This range provides access to a bike within a short walk of anywhere in the service area and provides a nearby alternative to return a bike if the destination station is full.

However, larger geographic areas like the Pioneer Valley may not fit this approach, meaning stations must be placed further apart in order to serve key destinations throughout the region. Examples include Forest Park, Indian Orchard, and Sixteen Acres in Springfield; Holyoke Community College, the Holyoke Mall, and areas around North Holyoke along route 5 in Holyoke; Hampshire Mall in Hadley; Hampshire College and the North Amherst area in Amherst. With this lower level of density, a system of approximately 15 stations would be sufficient to serve an area that is 7 square miles.

Minimum System Size

A system that is too small limits its effectiveness. A system of ten stations is considered the absolute minimum to provide an effective mix of trip origins and destinations and to justify the cost of operations. The following are key ideas to note for implementation of the bike share system:

- The coverage area at which bicycling becomes a more attractive option than walking. On average, the median walking trip is approximately five minutes, in which time a person can walk approximately ¼ of a mile, but can cycle approximately ¾ of a mile. 80 percent of the respondents that have completed our survey said they would be willing to walk no more than ten minutes to the nearest bike share station which is approximately one-half mile.

- The system must provide a variety of trip origins and destinations or there is no reason to use the bikes.

- The system should provide reasonable station spacing so that users can easily access a station. If stations are too far apart and users have to walk too far to access a bike, users will consider not making the trip or will take a different mode.

- The system needs to be a reasonable size to justify the cost to operate the system. There are some economies of scale in terms of operating the system.

Proposed Station Locations

The following charts display the proposed station locations for Holyoke, Northampton, Springfield, and Amherst. The left-hand column of each chart lists locations proposed for the first phase of implementation, taking into consideration the downtown areas of each community, transit stations, and mixed-use districts. The right-hand column of each chart lists locations proposed for a second phase of bike share stations and includes high-demand locations in surrounding areas.

Table 5-24: Springfield Proposed Bike Share Station Locations

Initial Phase	Second Phase
Union Station	Indian Orchard, Main Street
Downtown Springfield / Mass Mutual Center, Court Square	Forest Park
North End / Baystate Medical Center - Staff Parking and Hospital locations	The X
State Street / Mass Mutual Financial Group Office Building	Western New England University*
South End / Basketball Hall of Fame	Eastfield Mall
Connecticut River Walk / Riverfront Park	Big Y on Cooley Street
State Street / Springfield Technical Community College (STCC)*	Fresh Acres Market (Wilbraham Road in Sixteen Acres)
Springfield College*	

*Additional stations at colleges could potentially be purchased by the colleges, and businesses could also sponsor stations

The station locations in Springfield provide opportunity for bike share in and around key nodes with a high density of people. The spacing between each of the stations within the initial phase for Springfield is no more than one mile apart and no less than one-half mile apart. Station location areas listed within the second phase are much more geographically dispersed. The proposed station locations in this phase are no more than two miles apart from each other.

Table 5-25: Holyoke Proposed Bike Share Station Locations

Initial Phase	Second Phase
Depot Square Rail Station	Holyoke Community College*
Downtown Holyoke / Transit Center on Maple St.	West Side/Dwight Street or Park at Route 5
Churchill Neighborhood	Holyoke Mall
North Holyoke / Holyoke Heights Plaza	River Access Center
Route 5 at Whiting Farms Road	K-Mart Plaza
	Carlos Vega Plaza (South Holyoke)
	Springdale Park
	Cabot Street and Canal Street at Route 116 Bridge

*Additional stations at colleges could potentially be purchased by the colleges, and businesses could also sponsor stations

The station locations within the initial phase in Holyoke are no more than one-half mile apart. This allows users to walk no more than ten minutes to the nearest bike share station. The station spacing in the second phase is between one and two miles.

Table 5-26: Northampton Proposed Bike Share Station Locations

Initial Phase	Second Phase
Downtown Northampton / Pleasant St., Amtrak Rail Station	Links to: Easthampton Center, Hadley Center at Gateway areas
Downtown Northampton / Pulaski Park, PVTA pulse point	Look Park
Smith College*	Cooley Dickinson Hospital*
Bike Path North / King St. Shopping District	Norwottuck Rail Trail at Damon Rd.*
Florence Center	Northampton Parking Garage
	Bay State Village
	Village Hill

*Additional stations at colleges could potentially be purchased by the colleges, and businesses could also sponsor stations

The proposed bike share station locations in Northampton are no less than one-quarter mile apart and no more than one-half mile apart from one another.

Table 5-27: Amherst Proposed Bike Share Station Locations

Initial Phase	Second Phase
Downtown Amherst	Norwotuck Trail at Amherst Center
UMass - south*	Atkins Farm
UMass - north*	Hampshire Mall in Hadley*
S. Amherst / Hampshire College*	Big Y, Stop & Shop stores
Amherst College*	South Amherst Center at Pomeroy Lane
North Amherst at Library	

*Additional stations at colleges could potentially be purchased by the colleges, and businesses could also sponsor stations

In Amherst, the majority of the proposed bike station locations are no less than one-quarter mile apart and no more than one mile apart, with the exception of the station located in Hadley by the Hampshire Mall, as well as station locations areas in North and South Amherst.

Section 6: Funding Sources and Financing Options

Overview

Bike share systems likely have a lower per person cost than any other public transportation option. But like all public transportation, bike share most likely needs public subsidy to operate.

Bike share systems will need funding for both capital and operating costs. Funding sources to be considered in this process include grants, municipal revenues, corporate sponsorship, advertising and user revenues, membership fees, and tax revenues.

According to analysis of U.S. systems, while subscription and user fees provide a stable revenue source, rarely do they provide enough revenue to ensure that the system is financially self-sustaining. (Source: Institute for Transportation and Development Policy). Boston achieves 88 percent recovery of costs from farebox, and Toronto achieves about 60 percent farebox recovery.

Many transit systems, like bus and train operations, generate less than half of their revenue from user fees, according to Susan Shaheen, an adjunct professor and co-director of the University of California at Berkeley's Transportation Sustainability Research Center. It's not unheard of for bike-rental programs in large cities to fund themselves. Citi Bike in New York City and DecoBike Miami Beach are self-funded, and cities including Tampa, Orlando, Atlanta and San Diego plan to launch self-funded systems. But small cities like Des Moines don't have the density to support bike-rental systems on user fees alone. With the current products and pricing structures, having a self-funding system is not possible in many lower-density cities and, in such cities, public subsidies should be expected.

Grant Sources

Grants, particularly from federal agencies, have been a key revenue source for bike share programs, including paying for initial capital purchases. Options for funding sources are detailed in Table 6-2, and may include:

- Federal sources: such as Federal Highway Administration programs including Congestion Mitigation Air Quality, TIGER, MAP-21 Transportation Alternatives, and Surface Transportation Program, and other agencies such as Center for Disease Control;
- State sources: such Community Innovation Challenge grants;
- Municipal sources: such as funds from municipal departments of parks and recreation or public works;
- Private sources (BIDs, health providers, colleges, corporations, sale of naming rights)
- Private foundations

Corporate Sponsorship

Corporate or business sponsorship can be an important revenue source. This has been particularly effective in larger cities, where “naming rights” for bike share systems have been sold to generate revenues.

In New York, Citigroup owns and operates the Citibike system. Citigroup provided $41 million over 6 years for the NYC Citibike. In Chicago, Blue Cross Blue Shield provided the Divvy system with $12 million in private funding.

Private entities, such as colleges or developers, may also be willing to pay for the costs of a bike share station on or near their premises, and possibly also pay operating costs.

In Boston, the Hubway system has at least 18 corporate sponsors that each paid $50,000 to sponsor a station, which entitles them to advertise their logos on the system's website, on ten bikes and on one station kiosk.

In the Capital Bikeshare system, Arlington, Virginia has already added station sponsorship to the zoning process. Developers can negotiate with county officials to include full or partial station funding as part of a transit-related improvements project.

Municipal Sources

Some cities have used local public funding for the initial deployment of bike sharing. For example, Des Moines received funds from the municipal parks and recreation department, as well as the regional transit authority and the tourism board. The Arlington County government funds 36% of the operations of the Arlington portion of Capital Bikeshare, including $200,000 annually from local vehicle registration fees. These funds are most likely to be directed towards capital costs or a specific annual amount for operations.

Agencies are less likely to want the responsibility (and uncertainty) of funding annual operating costs. Ongoing public funding could potentially come from local "steady stream" sources such as parking revenues, bus bike rack advertising, special taxes, distribution of license plate fees, etc.

Station purchase could also be funded through Traffic Impact Fees (TIFs) or Traffic Mitigation Fees, or form part of a developer's travel demand management strategy. Bike share could potentially follow the example of recent streetcar systems in the US, which have often used federal funding for initial capital expenses, and then used local funding for operations with expenses shared by multiple governments and transit agencies.

Private Foundations

Private foundations are becoming an increasingly important source of funds for bicycle transportation projects, and grants in support of bike share systems are part of this trend. Many corporations or wealthy business families have related foundations that support social causes and the health and environmental benefits of bicycle share are attracting public attention. In Minneapolis, Nice Ride Minnesota received funding from the Central Corridor Funders Collaborative (http://www.funderscollaborative.org), a coalition of local and national private foundations interested in supporting activities synergistic with the local light rail line.

Advertising Revenues

Advertising is frequently sold on bike share stations, kiosks, or bikes, or related infrastructure, generating an additional source of revenue.

Advertising revenue directly subsidizes bike share programs without directly touching municipal revenue sources.

User Revenues

There are two types of user fees in most bike share systems:

- Membership or subscription fees, which allow unlimited access for a certain time period (a year, month, week, day)
- Usage fees, charged during the time the bike is in use.

Most programs offer the first time increment of bike share rental for free, normally 30 to 45 minutes. After that, usage fees are charged, and scaled to encourage shorter trips and encourage a high rate of bike turnover. Usage fees typically generate the most revenue. In an analysis of U.S. systems, data showed that while annual members took a majority of the trips, casual members provide roughly 2/3 of the revenue for the system.

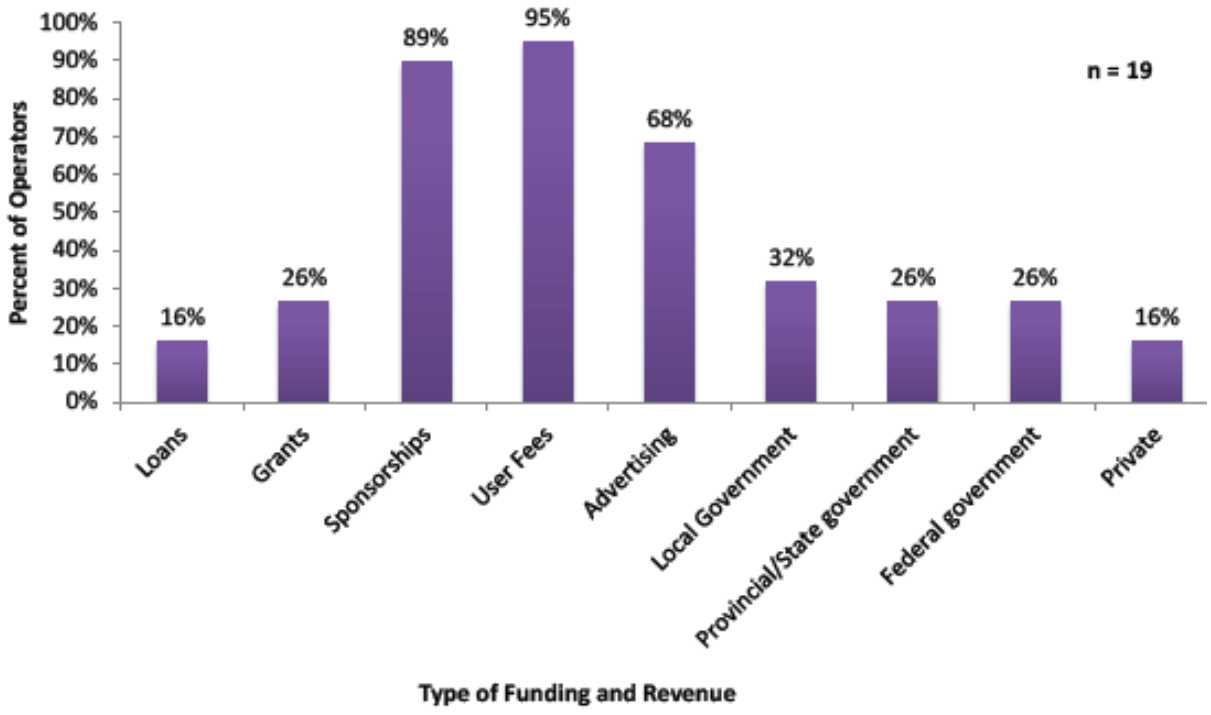
Setting usage fees requires careful consideration of likely users and routes, as well as ability to pay. New York and many cities have tried to keep fees lower than transit costs to attract users.

When initially setting fees, it is important to consider the service-fee structure carefully, as changes to the price structure after the program is launched may cause a public backlash.

Overall Revenue Streams

The following data for North American cities is from a report published by the Mineta Transportation Institute: “Public Bikesharing in North America: Early Operator and User Understanding.” The chart below provides an overview of the types of funding and revenue received. The top three funding and revenue sources were user fees (collected by 95% of all operators), sponsorships (collected by 89% of operators), and advertising (collected by 68% of operators).

Figure 6-1: Types of Funding and Revenue Uses for Bike Share Programs in North America



Examples from Across the United States

Table 6-2 provides an array of small and large bike share system examples, their capital and operating costs, and how they derive the funding for each.

Table 6-2: Funding Examples for Bike Share Programs

Program Name	Size	Capital Costs	Funding Sources for Capital Costs	Annual Operating Costs	Funding Sources for Operating Costs
Minneapolis, Nice Ride	116 stations 1200 bikes	$5.3 million $44,496 per station; $4,892 per bike	• $2.75m federal Non-motorized Transportation Pilot Program (NTP) grant, Bike Walk Twin Cities • $3.7m Blue Cross Blue Shield tobacco settlement funds • $250,000 Minneapolis Convention Center Fund • $250,000 Central Corridor Light Rail Funders Collaborative • $200,000 ARRA US Department of Health and Human Services • $150,000 University of Minnesota • $30,000 Macalester College	$300,000 $10,788 per station; $1,250 per bike	36% from sponsors; 55% from rider
Des Moines, B-Cycle	5 stations 22 bikes	$120,000	• Business sponsorship of individual hubs • Small contributions (<$20k) from Nationwide, Wellmark, Principal Financial Group, Des Moines Regional Transit Authority, Des Moines Park and Recreation Dept, Greater Des Moines Convention and Visitors Bureau, Polk County Health Department, others	$36,678 in 2012, of which $15,761 were paid for by user revenues	User revenues, grants, business sponsors
Spartanburg, B-Cycle	4 stations 28 bikes		• $35,000 Mary Black Foundation • JM Smith Foundation • City of Spartanburg	n.a.	n.a.

Program Name	Size	Capital Costs	Funding Sources for Capital Costs	Annual Operating Costs	Funding Sources for Operating Costs
Denver, B-Cycle	52 stations 732 bikes	$1.5 million $40,740 per station; $4,074 per bike	• $210,000 USDOE Energy Efficiency & Conservation Block Grant (EECBG) • $1.3 million from Democratic National Convention and Kaiser Permanente contributions, several foundations, multiple station sponsors • Transportation Community Preservation Program • Colorado vehicle registration tax	$26,447 per station; $2,645 per bike	49% from sponsors; 46% from riders
Boulder, B-Cycle	15 stations 110 bikes	$525,000 $35,000 per station; $4,773 per bike	• $250,000 USDOE Energy Efficiency & Conservation Block Grant (EECBG) • City of Boulder funds • $178,000 Gifts from individuals and businesses	n.a.	64% from sponsorships; 36% from memberships and usage fees
Chattanooga	300 bikes, 28 stations	$2 million	• $2 m CMAQ grant from FTA	n.a.	City, Park and Rec, Blue Cross/ Blue Shield, others
Washington DC, Capital Bikeshare	1670 bikes, 170 stations	$8 million $32,993 per station; $2,248 per bike	• $5 million CMAQ from FTA • $200,000 state grants • $650,000 from local BID sponsorship, system revenues • Additional funds from Virginia Dept. of Rail and Public Trans., Arlington County, Crystal City BID, Potomac Yard TMA	$15,683 per station; $2,248 per bike	5% from sponsors; 56% from riders
San Antonio	140 bikes/ 14 stations	$840,000	• $840,000 USDOE Energy Efficiency & Conservation Block Grant (EECBG)	n.a.	n.a.
Fort Lauderdale	200 bikes/ 20 stations	$1.1 million	• $300,000 Florida DOT funds, other • $800,000 corporate sponsorship, advertising	n.a.	n.a.

Program Name	Size	Capital Costs	Funding Sources for Capital Costs	Annual Operating Costs	Funding Sources for Operating Costs
Boston, Hubway	610 bikes/ 61 stations	$4 million	• $3 million from CDC Communities Putting Prevention to Work, CMAQ, FTA Bus Livability Initiative Program, state grants • $1 million from multiple local sponsors, and a naming sponsor	n.a.	n.a.

Funding Programs for Bike Share

Table 6-3 provides details on array of funding programs and options for bike share programs, from federal and state grants to private foundations to contributions from municipal and regional organizations. These funding programs are primarily targeted toward paying for the initial capital costs of bike share programs.

Table 6-3. Funding Programs for Bike Share

Program Name	Funding Source	Funding Levels	Eligible Activities	Examples
FEDERAL PROGRAMS:				
Congestion Mitigation Air Quality	Federal Highway Administration and MassDOT	$76m for Massachusetts in FY13; Each MPO receives an annual CMAQ target, and there is also a state target	Improve transportation systems management and operations that mitigate congestion and improve air quality. CMAQ funds have been used to fund initial capital expenses of many US bike share systems.	Boston, Chattanooga
Transportation Alternatives Program (MAP-21)	Federal Highway Administration and MassDOT	Each MPO receives an annual CMAQ target, and there is also a state target, $809m nationally	Construction, planning, and design of on-road and off-road trail facilities for pedestrians, bicyclists and other non-motorized forms of transportation (including sidewalks, bicycle infrastructure).	

Program Name	Funding Source	Funding Levels	Eligible Activities	Examples
TIGER	USDOT	$600m nationally in FY14, grants from $400k to $25m	Build and repair critical pieces of our freight and passenger transportation networks.	
Bus Livability Program	USDOT Federal Transit Administration	$125m nationally in FY12	Finance capital projects to replace, rehabilitate, and purchase buses and related equipment and to construct bus-related facilities. Can't be used to purchase bikes.	Boston
CDC Communities Putting Prevention to Work grant s or CDC Community Transformation grants	Center for Disease Control	$372m nationally. Boston received $12.5m $70-100m annually on national basis	Addresses obesity and tobacco use through environmental change at the local level . Community level effort to reduce chronic diseases such as heart disease, cancer, stroke, diabetes.	Boston, San Antonio
Surface Transportation Program	Federal Highway Administration	$10b nationally	Flexible funds, may be used on any road or bike/ped facilities.	
STATE PROGRAMS:				
Community Innovation Challenge Grants	Executive Office of Administration and Finance	Grant amounts up to $500,000	One-time costs, transitional costs, or seed money for regionalization and other efficiency initiatives. Funds may be used to cover costs such as: Small capital purchases or improvements that are integral to the implementation of a functional program such as equipment or software.	

Program Name	Funding Source	Funding Levels	Eligible Activities	Examples
OTHER SOURCES:				
Health Organizations	Examples: Blue Cross Blue Shield, Kaiser Permanente, etc.	various	Sponsorship funds for capital or operating costs.	Minneapolis, Chattanooga
Universities	Examples: Harvard, Northeastern, UMass Boston,	various	Sponsorship funds for capital or operating costs.	Boston, Minneapolis
Corporations	Examples: Citigroup, Google, Gates Foundation, Biogen, New Balance, State Street Corp, Trek	various	Sponsorship funds for capital or operating costs. Citigroup provided $41m over 6 years for the NYC Citibike program. Boston offers methods for corporations to subsidize individual memberships.	New York, Washington DC, Boston, Madison
Non-profit Organizations	Examples: League of American Bicyclists	various	Sponsorship funds for capital or operating costs.	Washington DC
Local Business Improvement Districts	BIDs	various	Sponsorship funds for capital or operating costs.	Washington DC, Spartanburg
Regional Transit Authorities		various	Sponsorship funds for capital or operating costs.	Des Moines
Tourism Boards		various	Sponsorship funds for capital or operating costs.	Des Moines
Municipal Park and Recreation Departments		various	Sponsorship funds for capital or operating costs.	Des Moines, Chattanooga

Program Name	Funding Source	Funding Levels	Eligible Activities	Examples
Municipal revenues	Parking revenues, bus bike rack advertising, special taxes, license plate fees, Traffic Impact Fees (TIFs)	various	various	
Private Foundation grants	Example: Central Corridor Funders Collaborative, MN	various	various	Spartanburg, Denver, Minneapolis
Crowdfunding		various	Kansas City B-cycle has raised about $420,000 through a crowdfunding campaign.	Kansas City

Financing Options for a Pioneer Valley Bike Share Program

It is a goal of this study to identify most appropriate combination of user-generated revenues, government funds, corporate sponsorship and street advertising contracts, and other sources that could capitalize and sustain the operation of a program serving the Pioneer Valley region.

Our region has a number of opportunities and challenges which will influence the funding the capital costs and operating costs for a bike share program.

Opportunities include:

- the presence of many colleges and universities within the target area that are willing participants and possible sponsors for bike share;
- possible corporate sponsors for the program among the region's major employers, particularly health care companies;
- a very active and socially conscious population, possibly making crowdfunding an option;

Challenges include:

- constrained municipal budgets;
- constrained availability of federal transportation funds due to competing projects;
- the lack of large private foundations or donors;
- user revenues may be less than bigger cities, due to lack of high density population or employment centers, lack of a strong tourism market,

The recommended financing options for a Pioneer Valley Bike Share Program would include:

Table 6-4. Recommended Financing Options for Pioneer Valley Bike Share Program

Type of Funding Need	Recommended Funding Source Types	Specific Regional Sources	Notes
Capital Costs	FHWA/MassDOT, Congestion Mitigation Air Quality grant	Regional or state target	Best available option. Significant funds targeted for current projects, such as Union Station
	FHWA/MassDOT, Transportation Alternatives Program grant	Regional or state target	
	Other FHWA funding: TIGER, Bus Livability, Surface Transportation Program		Highly competitive
	CDC Communities Putting Prevention to Work grant s or CDC Community Transformation grants		
	Colleges and Universities	• University of Massachusetts • Smith College • Hampshire College • Amherst College • Springfield area colleges	
	Center for Disease Control	Communities Putting Prevention to Work or Community Transformation grants	
	MA Community Innovation Challenge grant		Program not funded in 2015
	Crowdfunding grant		

Type of Funding Need	Recommended Funding Source Types	Specific Regional Sources	Notes
Capital Costs	Private Foundation grants	• Community Foundation of Western Mass • Frank Stanley Beveridge Foundation	
Operating Costs	Corporate sponsorships	• Health New England • Baystate Health System • Mass Mutual Financial Group • Big Y Foods • Area hospitals (Cooley Dickinson, Holyoke, et. al.) • MGM (casino) • Peter Pan Bus Lines	
	User revenues	• Membership fees • Usage fees	
	Advertising	• Station-based advertising • Bike-based and other advertising • Corporate naming rights	
	Municipal revenues	• General funds • Parking Authority funds	
	Other Sources	• Develop Springfield • Mass Development • Community Development Block Grant funds	

Section 7: Financial Analysis

This section provides estimates for the expected capital costs, operating costs, and operating revenues based on the system recommendations outlined in the previous chapters. The analysis is based on costs and revenues from existing bike share systems, with adjustments made to take into account local projections for the cost to purchase bicycles and stations, ridership rates, expected advertising revenues, and storage facility costs.

Three different cost scenarios are considered, based on different equipment and ownership models used by existing bike share systems:

- Station-based system, in which equipment is owned. This model is used by many bike share providers throughout the country, including Alta and B-Cycle.

- Station-less, smart bike system, in which equipment is owned. The bicycles are rented out and returned from designated locations, and approximately one-third of these locations have payment kiosks and orientation maps, similar to a full station-based system. This is a model used by Social Bicycle.

- Station-less, smart bike system, in which equipment is leased and there is minimal equipment associated with the location at which bicycles are rented (no payment kiosk, orientation map, etc.)

Capital Costs

The capital costs involved in a bike share program are:

- Bicycles, docks, and payment kiosks
- Warehouse to store equipment during the winter
- Maintenance and repair of equipment
- Vehicle fleet for redistributing bicycles and docks

Details for each of these items is provided below.

Bicycles, Docks, and Kiosks

The largest capital cost involves the purchasing of the bicycles, docks, and kiosks, which together compose individual stations. This cost varies between vendors and depends on system features and the overall system size. Based on a study conducted by the Mineta Transportation Institute that examined existing station-based bike share systems around the United States, the cost for individual stations (including bicycles, docks, and installation) ranges between $29,500 and $50,000, with a median of slightly under $48,000. The mean of $48,000 is used for this analysis.

For station-less bike share systems, there are two possible cost scenarios. Under the first scenario, it is assumed that all equipment will be purchased and owned, and bicycles will be rented out and returned

from designated locations, at which there are parking racks, a payment kiosk, and an orientation map for users. Based on information from station-less equipment vendors, the approximate cost for these items at each location is approximately $18,200. This assumes that one-third of the stations have a payment kiosk and orientation map. Without this equipment, the cost per location (including 9 bicycles) is $13,950, and with this equipment, the cost is $26,700.

Under the second scenario, the equipment is leased from an operating vendor on an annual basis. This model, used by Zagster, does not include payment kiosks or maps. This means that there is minimal capital cost associated with each station. The upfront capital costs are approximately $3,000 per station under this scenario.

Based on these estimates, the following tables provide the cost for stations in the proposed bike share system.

Table 7-1: Amherst Capital Costs

	Equipment			Acquisition Cost		
	Phase I	**Phase II**	**Total**	**Phase I**	**Phase II**	**Total**
Dock-Based						
Stations	6	5	11	$288,000	$240,000	$528,000
Docks	96	80	176			
Bikes	54	45	99			
Smart Bike - Owned						
Locations	6	5	11	$109,200	$91,000	$200,200
Bikes	54	45	99			
Smart Bike - Leased						
Locations	6	5	11	$18,000	$15,000	$33,000
Bikes	54	45	99			

Table 7-2: Holyoke Capital Costs

	Equipment			Acquisition Cost		
	Phase I	**Phase II**	**Total**	**Phase I**	**Phase II**	**Total**
Dock-Based						
Stations	5	8	13	$240,000	$384,000	$624,000
Docks	80	128	208			
Bikes	45	72	117			
Smart Bike - Owned						
Locations	5	8	13	$91,000	$145,600	$236,600
Bikes	45	72	117			
Smart Bike - Leased						
Locations	5	8	13	$15,000	$24,000	$39,000
Bikes	45	72	117			

Table 7-3: Northampton Capital Costs

	Equipment			Acquisition Cost		
	Phase I	**Phase II**	**Total**	**Phase I**	**Phase II**	**Total**
Dock-Based						
Stations	5	7	12	$240,000	$336,000	$576,000
Docks	80	112	192			
Bikes	45	63	108			
Smart Bike - Owned						
Locations	5	7	12	$91,000	$127,400	$218,400
Bikes	45	63	108			
Smart Bike - Leased						
Locations	5	7	12	$15,000	$21,000	$36,000
Bikes	45	63	108			

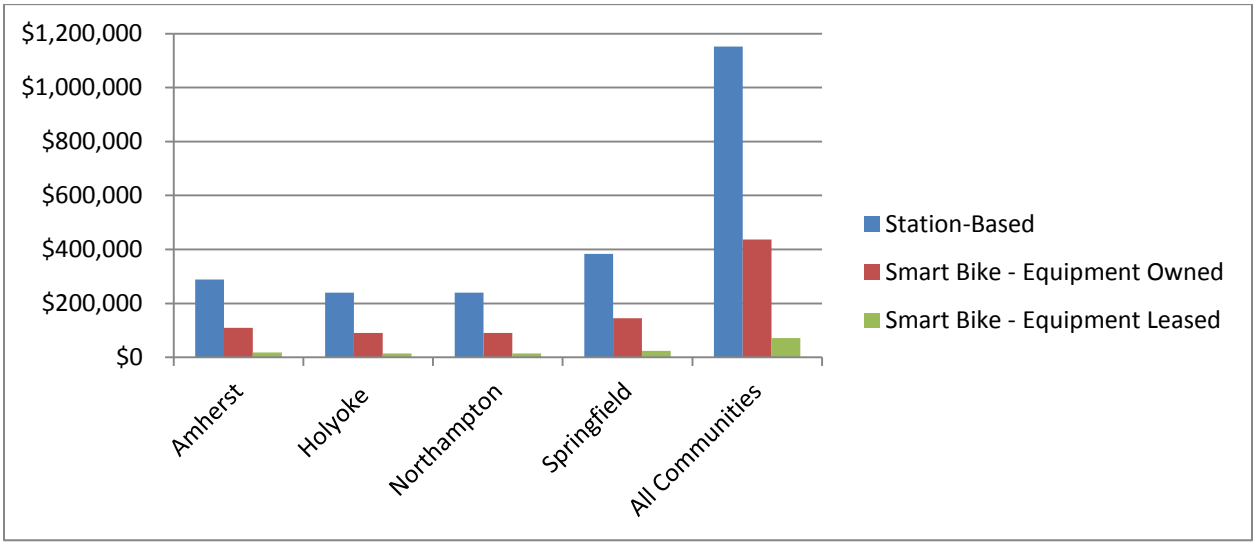
Table 7-4: Springfield Capital Costs

	Equipment			Acquisition Cost		
	Phase I	**Phase II**	**Total**	**Phase I**	**Phase II**	**Total**
Dock-Based						
Stations	8	7	15	$384,000	$336,000	$720,000
Docks	128	112	240			
Bikes	72	63	135			
Smart Bike - Owned						
Locations	8	7	15	$145,600	$127,400	$273,000
Bikes	72	63	135			
Smart Bike - Leased						
Locations	8	7	15	$24,000	$21,000	$45,000
Bikes	72	63	135			

Table 7-5: Total System Capital Costs

	Equipment			Acquisition Cost		
	Phase I	**Phase II**	**Total**	**Phase I**	**Phase II**	**Total**
Dock-Based						
Stations	24	27	51	$1,152,000	$1,296,000	$2,448,000
Docks	384	432	816			
Bikes	216	243	459			
Smart Bike - Owned						
Locations	24	27	51	$436,800	$491,400	$928,200
Bikes	216	243	459			
Smart Bike - Leased						
Locations	24	27	51	$72,000	$81,000	$153,000
Bikes	216	243	459			

Figure 7-6: Total System Costs for Phase I



System Expansion

Each expansion phase of the system will have additional capital costs associated with purchasing more bicycles and expanding to more locations. Future phases may see a slight cost savings due to existing agreements with a bike share equipment provider, though for the purposes of this financial analysis, station/location costs for the second phase are expected to stay consistent.

Bikes and Docks per Station/Location

Based on data from the Mineta Transportation Institute, on average in the United States there are 9 bicycles per bike share station and 16 docks per station. This figure provides an estimate as to the expected number of bicycles and users that each station will be able to accommodate. The number of bicycles per location is assumed to be the same for smart bike and dock-based systems.

Maintenance Facility and Equipment

In order to store equipment during the non-operational winter months, as well as to conduct regular maintenance on bicycles, a maintenance facility must be either purchased or rented. Based on a review of warehouse facilities in the Pioneer Valley, the cost of a 50,000 square foot warehouse facility will be $300,000 ($6 per square foot). This analysis assumes the facility will be purchased upfront, prior to the first year that operations commence. However, renting the facility could spread this cost over several years.

A fleet of vehicles will also need to be purchased, in order to redistribute bicycles between stations, as well as haul bicycles and docks to the warehouse facility for storage during the winter months and maintenance. It is estimated that four total vehicles will be purchased for this purpose (one for each community) at a cost of $75,000 each.

Bike repair equipment will need to be purchased, which is estimated to cost a total of $10,000. Finally, specialized computer software and hardware, which tracks bicycle usage and provides reporting information about the system, will need to be purchased to run the program. This cost is estimated to be $10,000. All of the costs above will be split equally among all four communities in the bike share program and total $150,000 per community.

A smart bike system for which the equipment is owned will operate similar to a dock-based system, and so it is assumed that the maintenance facility and equipment costs will also be similar. When considering the cost of a smart bike system that uses leased equipment, it is assumed that the costs of the maintenance facility and equipment are included in the leasing cost and there is no capital cost involved.

Year-By-Year Capital Budget Projections

Based on the above estimates, capital cost projections are shown on the following pages for the first ten years of system operation. The projections begin in Year 0 (the year prior to operation), which is when it is expected the warehouse facility and maintenance equipment will be acquired. Phase II expansion is projected to occur gradually starting in the program's fifth year, with one or two stations added per year to reduce the financial impact incurred.

Operating Costs

Operating costs are required to operate and maintain the system. For the purposes of this analysis, operating costs are split into the following categories:

- **Stationary Equipment Re-Location** - cost to transport and install the equipment at each station or bike share location at the beginning of the operating season, and to transport the equipment back to the warehouse facility at the end of each operating season. Based on data from a report by the Mineta Transportation Institute, bike share systems pay between $600 and $12,000 per kiosk per year for this expense. Costs vary significantly depending on whether local technicians are trained to remove and re-install kiosks locally versus using trained contracted labor. For this analysis, an average figure of $6,000 per kiosk per year is used for dock-based systems. For smart bike systems in which the equipment is owned, the cost is assumed to be $3,000 per location, since the equipment is not as extensive, but the payment kiosk, bike parking, and orientation map will still need to be transported. For smart bike systems in which the equipment is leased, this cost is assumed to be part of the leasing fee of $1,600 per bicycle per month.

- **Bicycle Re-Balancing and Maintenance -** Staff engaged in rebalancing bicycles are generally also responsible for regular inspection, basic maintenance, and removing litter and graffiti. While most bike share systems do not keep track of this operating cost as a separate expense, data collected from a few systems by the Mineta Transportation Institute has found that this cost ranges between $500 and $833 per kiosk per month. To be conservative, this analysis estimates the cost to be $700 per location per month, with a seven-month operating year. This expense is expected to be the same for dock-based systems and smart bike systems in which the equipment is owned. For smart bike systems in which the equipment is leased, this cost is assumed to be part of the leasing fee of $1,600 per bicycle per month.

- **Customer Service -** a customer service representative must be available to answer user questions and provide basic troubleshooting. It is anticipated that customer service will be handled by the private vendor contracted to run the system, and will use their existing customer service representatives to handle this staffing requirement. It is assumed that this cost will be approximately 1 staff person being paid $25 per hour (with overhead), 10 hours a week, for seven months of the year. Based on these assumptions, customer service will cost $7,500. This amount is split between all four communities. This expense is expected to be the same for dock-based systems and smart bike systems in which the equipment is owned. For smart bike systems in which the equipment is leased, this cost is assumed to be part of the leasing fee of $1,600 per bicycle per month.

- **Administration** - overseeing of private contractor charged with operating the system, and staff responsible for fundraising. For this analysis, staffing needs for administration are 1.5 full-time equivalents, with a director at $100,000 per year and a clerical staff person at $60,000 per year, estimates which include overhead costs. This amount is split between all four communities. This expense is expected to be the same for dock-based systems, smart bike systems in which the equipment is owned, and smart bike systems in which the equipment is leased.

- **Marketing -** advertising the program and conducting outreach /engagement with the public and other stakeholders, in order to raise awareness of the program and increase ridership. This cost is based on the Hartford bike share estimate of $80,000 per year, and assumes a regional system that includes the full number of stations proposed in both phases. This expense is expected to be the same for dock-based systems, smart bike systems in which the equipment is owned, and smart bike systems in which the equipment is leased at a rate of $1,600 per bicycle per month.

- **Utilities** - while most stations are expected to be solar powered, a few may require a connection to the electrical grid. In addition, vendors generally charge a fee to maintain the rental and payment software at each station. This cost is estimated to be $70 per station/location per month. This expense is expected to be the same for dock-based systems and smart bike systems in which the equipment is owned. For smart bike systems in which the equipment is leased, this cost is assumed to be part of the leasing fee of $1,600 per bicycle per month.

- **Insurance -** the cost of insurance covers any injuries to bike share system users and is generally 5 percent of other operating costs, based on a study of bike share systems in the United States conducted by the Mineta Transportation Institute. This expense is expected to be the same for dock-based systems and smart bike systems in which the equipment is owned. For smart bike systems in which the equipment is leased, this cost is assumed to be part of the leasing fee of $1,600 per bicycle per month.

- **Bicycle Replacement -** an estimated 5 percent of bicycles will need to be replaced annually due to normal wear and tear, theft, or vandalism. In addition, bicycles are expected to have a five-year lifespan and will need to be replaced after this time. Because most bike share systems are still very new, there is limited data to develop this lifespan estimate. However, the five-year figure is used in other bike share feasibility studies such as those conducted for Hartford and Philadelphia. Based on analysis completed by the Philadelphia bike share study, the cost to replace individual bicycles is estimated to be $1,200. In order to reduce the impact that this replacement has on operating costs, bicycle replacement is planned over a two-year period. This expense is expected to be less for dock-based systems than smart bike systems, due to the additional equipment located on a smart bike. The cost for replacement of a smart bike is estimated to be $1,500. For smart bike systems in which the equipment is leased, this cost is assumed to be part of the leasing fee.

- **Dock Replacement** - docks are estimated to have a ten-year lifespan and need replacement after this time. Smart bike systems in which the equipment is owned also have a replacement cost. Smart bike systems in which the equipment is leased do not have this cost.

Based on the estimated costs above, the following graphs provide an estimate of the cost for the proposed regional bike share system under three scenarios: station-based, station-less smart bike system in which the equipment is owned, and a station-less smart bike system in which the equipment is leased.

Figure 7-7: Amherst Operating Costs

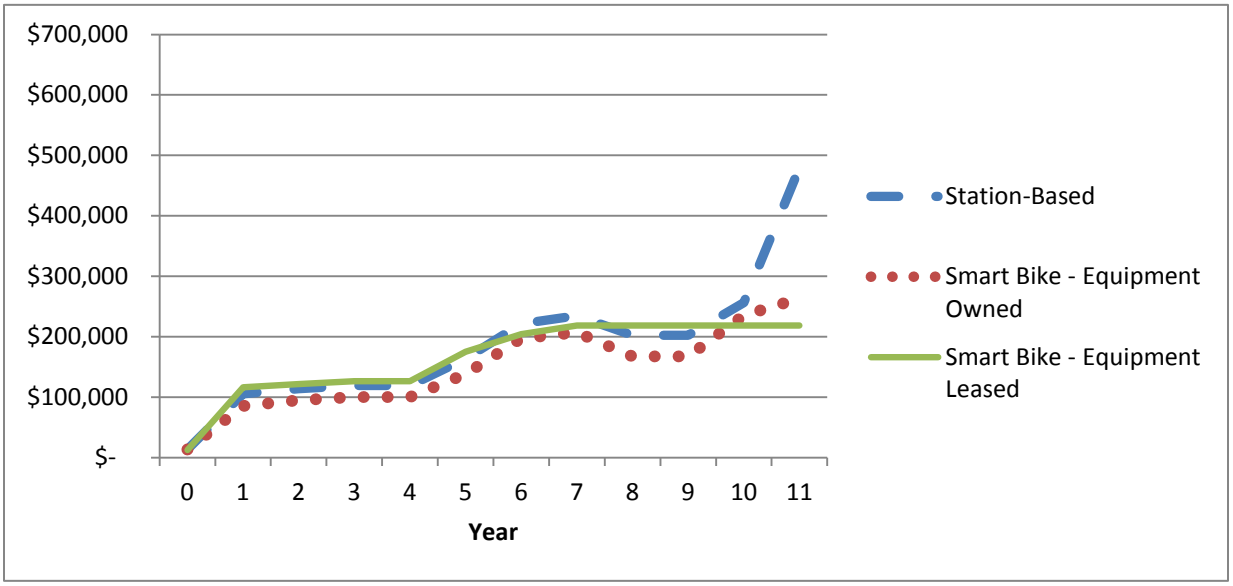


Figure 7-8: Holyoke Operating Costs

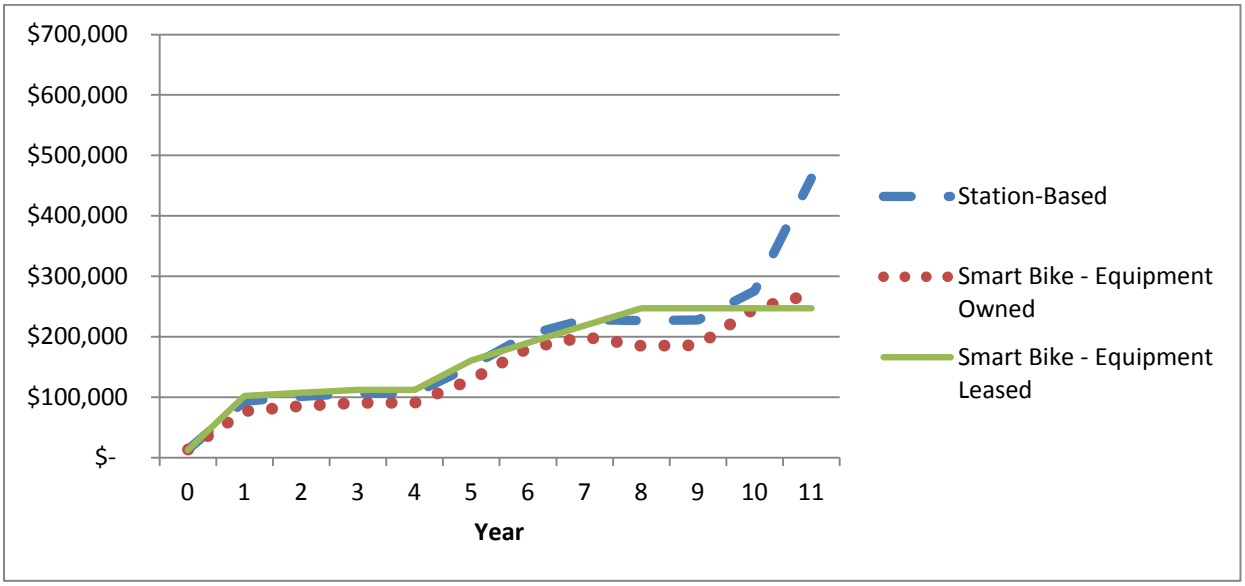


Figure 7-9: Northampton Operating Costs

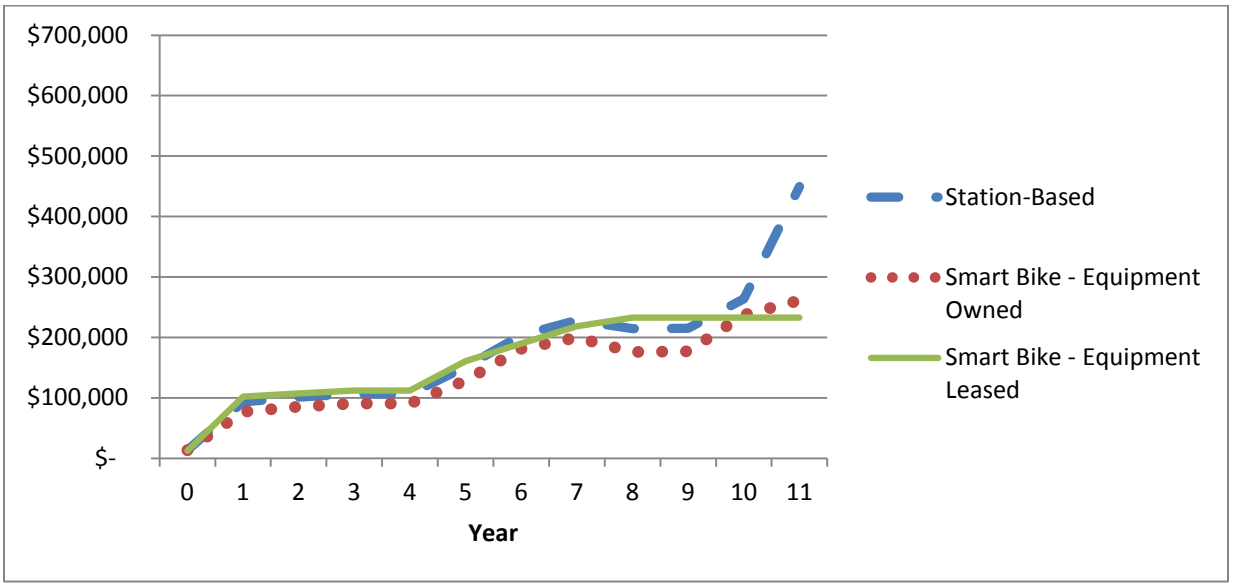


Figure 7-10: Springfield Operating Costs

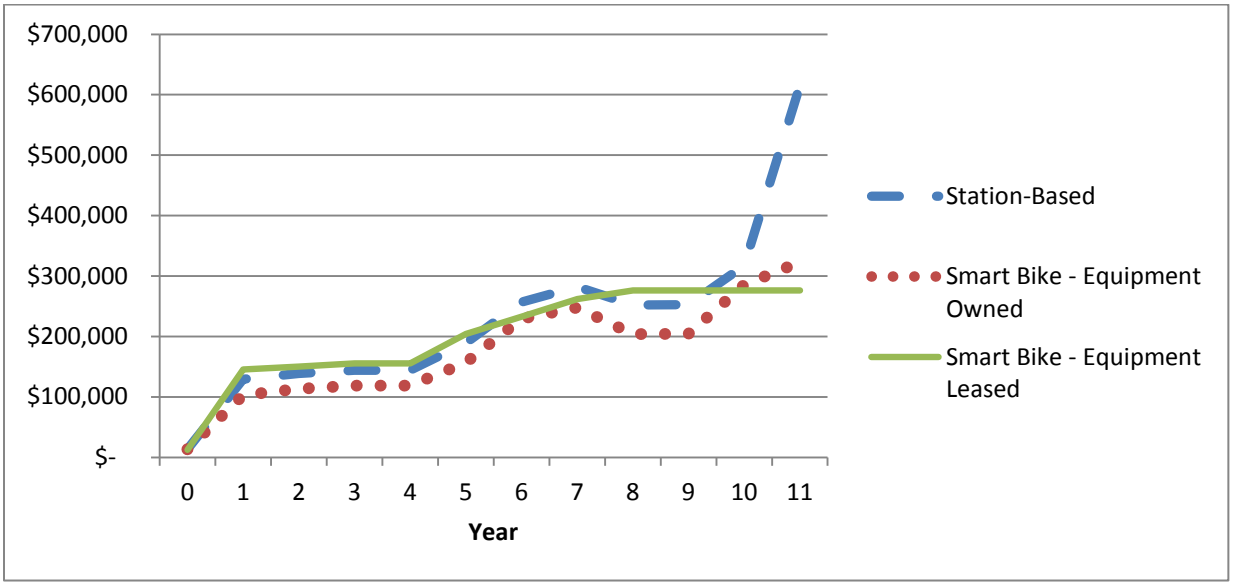


Figure 7-11: Total System Operating Costs

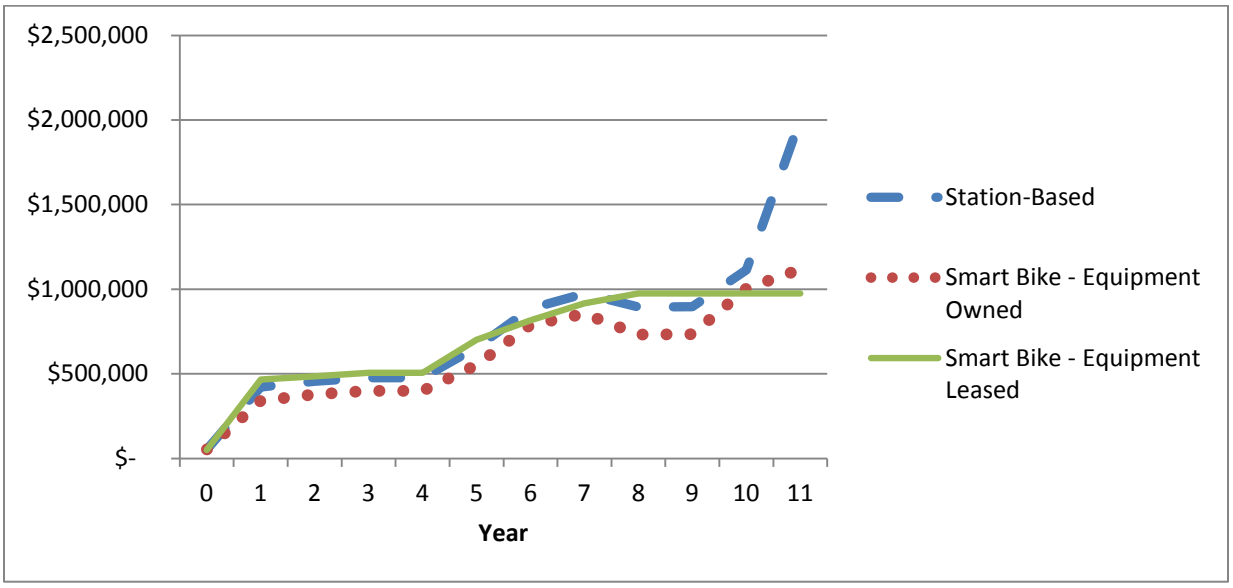


Table 7-12: Operating Costs for First 5 Years

Community	Station-Based	Smart Bike - Equipment Owned	Smart Bike - Equipment Leased
Northampton	$ 571,925	$ 484,864	$ 606,300
Amherst	$ 633,883	$ 714,833	$ 971,800
Springfield	$757,798	$ 838,703	$ 1,159,000
Holyoke	$571,925	$ 652,898	$899,800
Total	$ 2,535,531	$ 2,691,296	$ 3,636,900

Ridership Estimates

Revenues for the bike share system will be derived from user fees and advertising. Both of these sources will be critical supplements to the corporate sponsorships and grant funding necessary to implement and operate the bike share system. Unless otherwise noted, all data on bike share programs nationwide is based on a report produced by the Mineta Transportation Institute. For the purposes of this analysis, it is assumed that station-based and smart bike systems will have the same ridership and revenue.

Overall, ridership is based on the general trend that the average number of riders that use a bike share program can be correlated to the number of total bicycles in the system. This trend is based on national data on existing bike share programs, collected by Mineta. Based on national averages, it is estimated

that there will be 44.1 casual users per bicycle per year, and 2.78 annual members per bicycle each year. These figures are consistent with the demand analysis and assessment of regional characteristics that promote a bike share program which were conducted as part of this report.

Ridership estimates are further refined based on an assessment of how many annual and short-term members can be expected to use the system in each community. This is similar to the methodology used for the Hartford bike share study, in which projected ridership for different parts of the system was weighted based on local density and context.

The bike share system is projected to be utilized the most in Northampton and Amherst, with less usage in Springfield and Holyoke. Additionally, it is expected that there will be more casual users than annual members using the system in all four communities. This is because smaller-sized bike share systems tend to be used less for daily commuting and supplementing of public transit trips that would justify the purchase of an annual membership, and instead are used more by residents on an occasional basis or by tourists and visitors to the area. Based on these assumptions, Amherst and Northampton receive weights of 1.0 for casual members and 0.75 for annual members, whereas Holyoke and Springfield receive weights of 0.75 for casual members and 0.5 for annual members. These estimates are consistent with ridership data from smaller, existing bike share systems throughout the country.

Table 7-13: Estimated Number of Users for Bike Share Program

Community	Membership Type	Weight	First Phase	Second Phase
Amherst	Annual	0.75	113	208
	Casual	1	2,376	4,356
Holyoke	Annual	0.5	63	164
	Casual	0.75	1,485	3,861
Northampton	Annual	0.75	95	227
	Casual	1	1,980	4,752
Springfield	Annual	0.5	101	189
	Casual	0.75	2,376	4,455
Total	Annual	-	372	788
	Casual	-	8,217	17,424

Operating Revenues

There are three anticipated forms of operating revenues that will be derived from the bike share system: advertising revenue, user fee revenue, and station sponsorships.

For the purposes of this analysis, it is assumed that station-based and smart bike systems will have the same revenues.

Advertising Revenue

Advertising revenue is estimated to be $1,000 per station per year. This figure is consistent with estimates developed for Hartford's bike share study. This is a conservative estimate that is lower than systems in larger cities, based on the fact that the Pioneer Valley stations does not have the same density or number of people that will see a given advertisement. Using this estimate, advertising revenues for the system will be $24,000 during the first phase of the system, and $51,000 during the second phase.

Station Sponsorship Revenue

It is anticipated that at least one local business or non-profit in each community will choose to sponsor a nearby station. This sponsorship will cover the estimated cost of operations for an individual station, which is estimated to be approximately $15,000 per year. For more information on potential sponsorship organizations, see Section 8: Recommended Business Model, Operating Structure, and Financing.

User Fee Revenue

Revenue from user fees is calculated based on the three types of payment from riders: annual memberships, casual memberships, and casual usage fees. For the purposes of this analysis, the following estimates and assumptions are used:

- The proposed cost of an annual bike share system membership is $63, which is the average annual membership fee for bike share programs nationwide. It is assumed that annual members will use the system for short trips and not generate any additional fees based on renting a bicycle for an extended period of time.

- The cost of casual memberships is based on the national average for a one-day casual membership of $8.

- An estimated nine bicycles will be included for every station in the system.

- A fee of $2.50 is estimated to be incurred by riders who use the bicycle for an extended period of time. This is based on the national average fee incurred of $2.74.

- The number of casual rides per bicycle is estimated to be 0.75 per day in Northampton, 0.5 per day in Amherst, and 0.25 in Holyoke and Springfield, which is consistent with estimates developed for the Hartford bike study based on the density and local context of each community.

- The system will operate 213 days per year, based on a seven-month season.

- Based on national averages, it is assumed that 80 percent of total bike share rides will be casual membership riders.

Using these assumptions, revenue figures were estimated for each community during the first and second phases of the program. The following table provides an example of how these ridership assumptions are used to estimate revenue in Amherst.

Table 7-14: Estimated User Revenues in Amherst	
Number of bikes in first phase (6 stations at 9 bikes per station)	54
Annual members (2.8 members per each bike, with a ridership weighting factor of 0.75)	113
Casual members (44.1 members per each bike, with a ridership weighting factor of 1)	2,381
Annual membership revenue (number of annual members and fee of $63/year)	$7,119
Casual membership revenue (number of casual members and fee of $8/day)	$19,048
Annual casual usage fees (0.5 rides per bike per day, with 213 days a year and 80% of total rides being casual rides, and $2.50 collected per ride)	$11,502
Total user revenue (annual memberships, casual memberships, and casual usage fees)	$37,669

Figure 7-15: Amherst Total Revenues

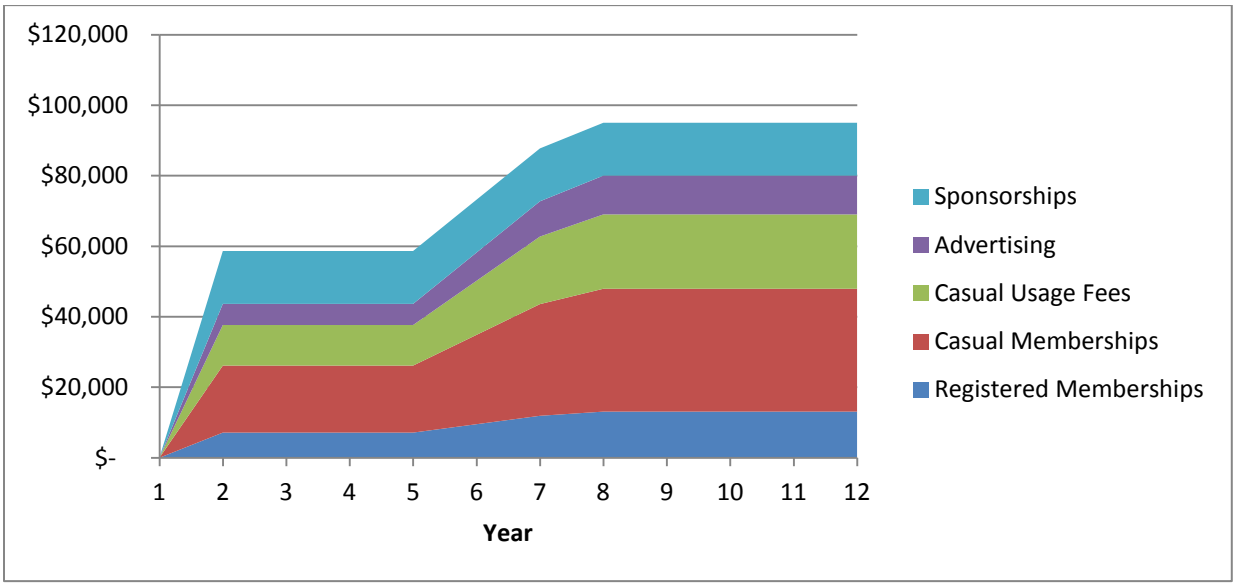


Figure 7-16: Holyoke Total Revenues

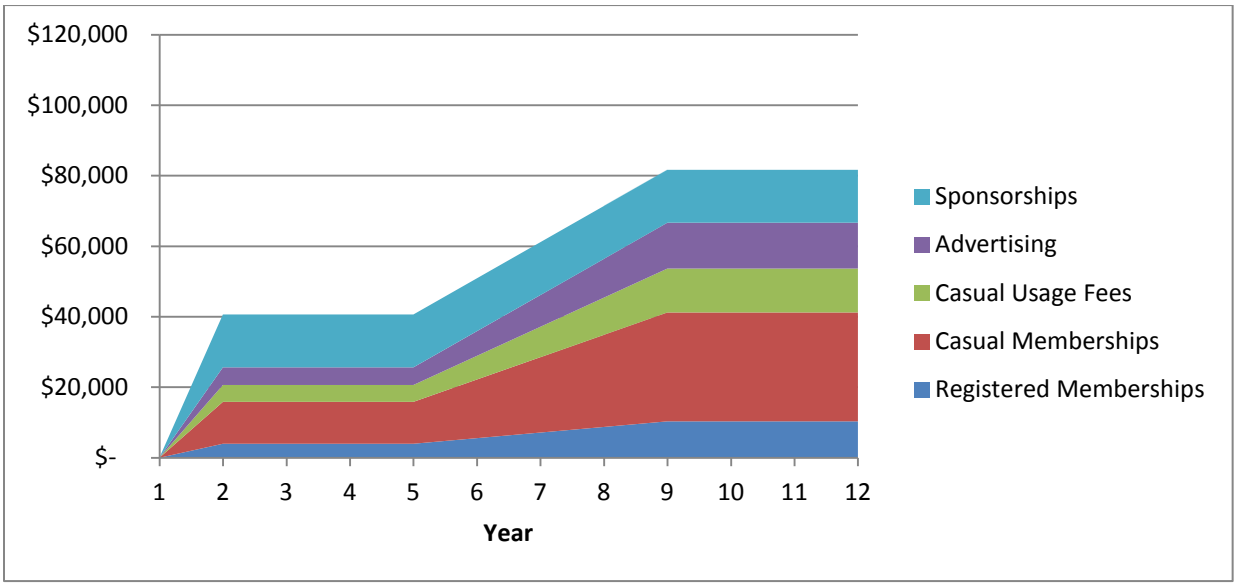


Figure 7-17: Northampton Total Revenues

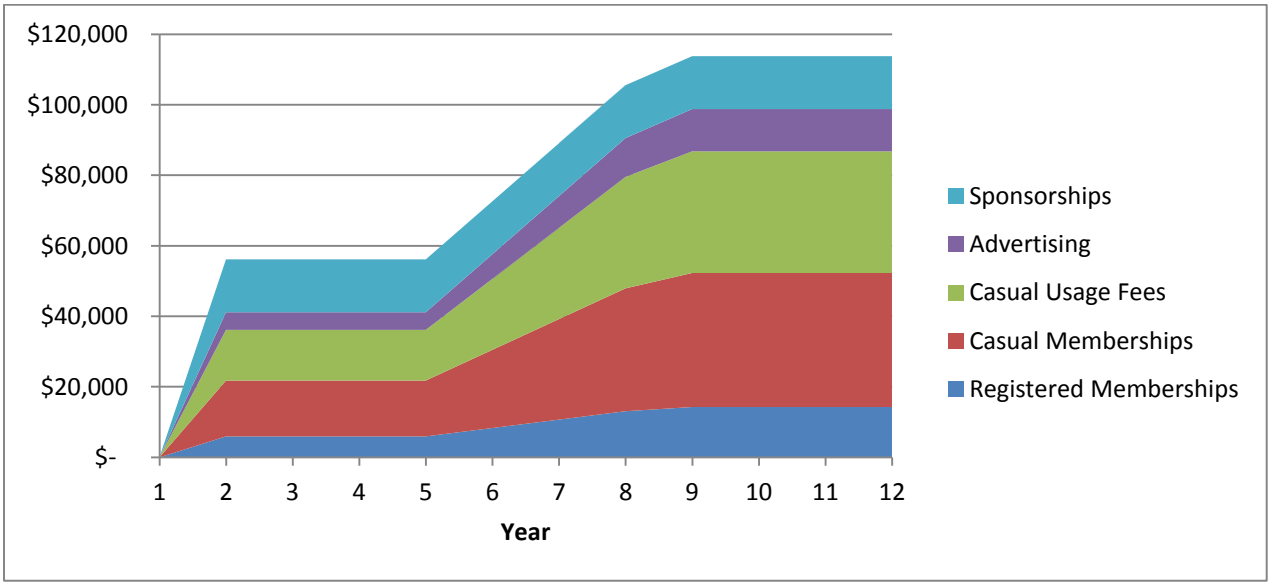
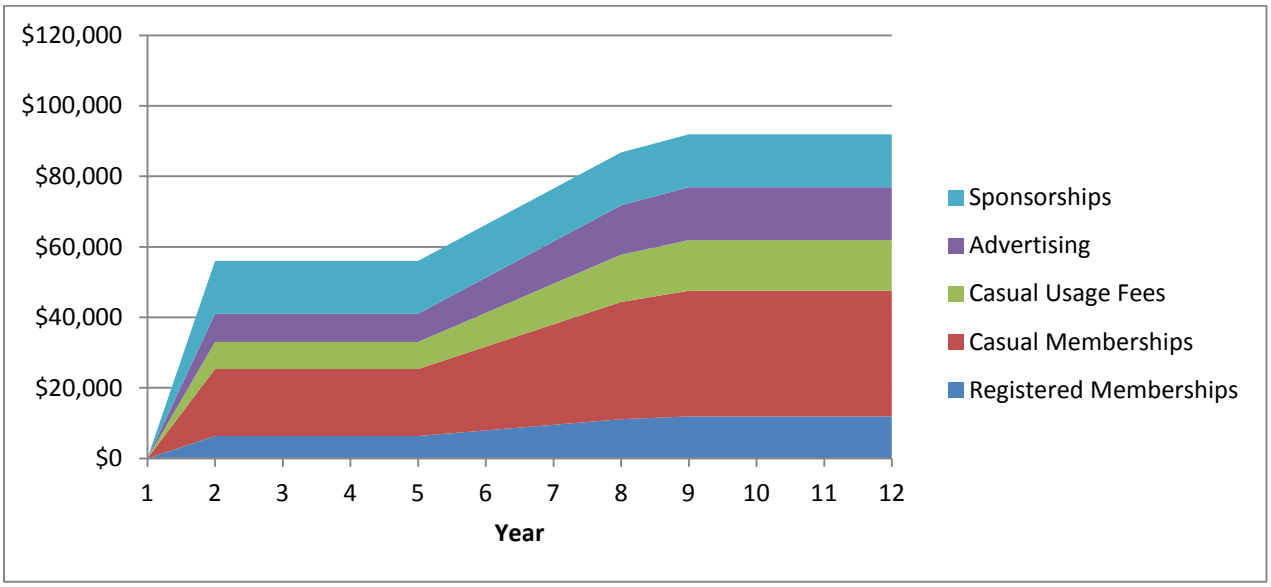


Figure 7-18: Springfield Total Revenues



Summary of Findings

Key findings from the financial analysis are as follows:

Capital Costs

For a dock-based system or a smart bike system in which the equipment is owned, the total capital costs incurred by all 4 communities will be $600,000 prior to starting the program. This amount will be split evenly, for a cost of $150,000 per community. This expense will cover the purchasing of vehicle equipment, warehouse space, computer software to run the system, and bicycle maintenance equipment. For the first year of operation of a dock-based system, the capital costs for all 4 communities will be $1,152,000. This amount is for the purchasing of 216 bicycles and 24 stations. By community, the cost for Phase I of the proposed system will be: $384,000 for Springfield (8 stations), $240,000 for Northampton (5 stations), $288,000 for Amherst (6 stations), and $240,000 for Holyoke (5 stations). To complete the Phase II expansion of the system, the total capital costs for all 4 communities will be $1,296,000. This amount is for the purchasing of 243 bicycles and 27 stations. By community, the cost for Phase II will be: $336,000 for Springfield (7 stations), $336,000 for Northampton (7 stations), $384,000 for Holyoke (8 stations), and $240,000 for Amherst (5 stations).

For the first year of operation of a smart bike system in which the equipment is purchased, the capital costs for all 4 communities will be $436,800, or approximately 38 percent of the cost of a station-based system. This amount is for the purchasing of 216 bicycles and 8 sets of equipment (payment kiosk and maps). By community, the cost for Phase I of this proposed system will be: $145,600 for Springfield (8 stations), $91,000 for Northampton (5 stations), $109,200 for Amherst (6 stations), and $91,000 for Holyoke. To complete the Phase II expansion of the system, the total capital costs for all 4 communities

will be $491,400. This amount is for the purchasing of 243 bicycles and 27 stations. By community, the cost for Phase II will be: $127,400 for Springfield (7 stations), $127,400 for Northampton (7 stations), $145,600 for Holyoke (8 stations), and $91,000 for Amherst (5 stations).

For a bike share system that uses smart bikes and is leased, the upfront capital costs are much smaller than for a smart bike system in which the equipment is owned or a station-based system. The total capital cost for this system would be $72,000, roughly 16 percent of the smart bike system in which the equipment is purchased and 6 percent of the cost of a station-based system. The smaller cost is largely a result of the minimal equipment included at each bike share location - the system does not have any maps or payment kiosks involved. While this greatly reduces the price, it also minimizes the accessibility of the system, especially for new users.

There are several funding sources, such as Congestion Mitigation and Air Quality grants, that could potentially pay for some or all of these capital costs.

Operating Costs

For all three types of systems (station-based, smart bikes in which the equipment is owned, and smart bikes in which the equipment is leased), the total operating costs for Phase I of the bike share system are estimated to be between $400,000 and $500,000 per year. This cost is split relatively evenly amongst all 4 communities ($100,000 to $125,000 per year), though it varies slightly based on the exact number of stations in each community. This cost includes replacement of a small number of bicycles each year, administrative costs, marketing, rebalancing of bicycles, installation and removal of kiosks at the beginning and end of the operating year, utilities, and insurance.

In Year 5, operating costs begin to increase, both due to replacing the original equipment and the expansion of the system. With these additional costs, the annual operating costs for the various types of systems increases to between $750,000 to $1,000,000 for all four communities once Phase II is completed and the system expanded.

The major difference in operating costs between the three systems occurs in approximately year 10, when equipment associated with different bike share locations (payment kiosks, docks, etc.) must be replaced for station-based systems and smart bike systems in which the equipment is owned. The cost to do this for a station-based system raises the annual operating cost to $2,006,000 for the total system, and raises the operating cost for a smart bike system in which the equipment is owned to approximately $1,117,000. For cases in which the equipment is leased, this spike in operating costs does not occur since the leasing agreement includes routine replacement of all equipment.

Replacement of equipment is considered an operating cost that is not eligible for Congestion Mitigation and Air Quality funding, meaning that other funding sources will need to be pursued.

Total Costs

Combining the operating and capital costs for the system provides an idea of the overall cost effectiveness of the three different system types (station-based, smart bike with equipment owned, and smart bike with equipment leased). Overall, the cost of a station-based system is much higher than either of the two smart bike systems, due to the high-cost of station equipment at the beginning of the program and in year 10 when this equipment needs to be replaced. The cost of a system in which the equipment is owned is slightly larger than when a system in which the equipment is leased, which is again a result of having to initially purchase more equipment and replace this equipment after 10 years.

However, it is important to note that there are significantly more public funding opportunities available for capital costs than operating costs, making lower operating costs more of a priority than capital costs for implementation of the program. For this reason, the total costs of the system may not be the best approach to choosing which system type is used for the Pioneer Valley system.

Figure 7-19: Capital and Operational Costs for Each Bike Share Type

	Station-Based*			**Smart Bike - Owned****			**Smart Bike - Leased*****		
	Per Bike	*Per Station*	*Total System*	*Per Bike*	*Per Station*	*Total System*	*Per Bike*	*Per Station*	*Total System*
Capital	$5,333	$48,000	$1,152,000	$2,022	$18,200	$436,800	$333	$3,000	$72,000
Operational	$2,115	$19,036	$456,873	$1,757	$15,813	$379,515	$2,271	$20,442	$490,600

*Assumes all locations include a map and payment kiosk
**Assumes one-third of locations include a map and payment kiosk
***Assumes that there are no locations that include a map and payment kiosk

Figure 7-20: Amherst Total Costs (Operating and Capital)

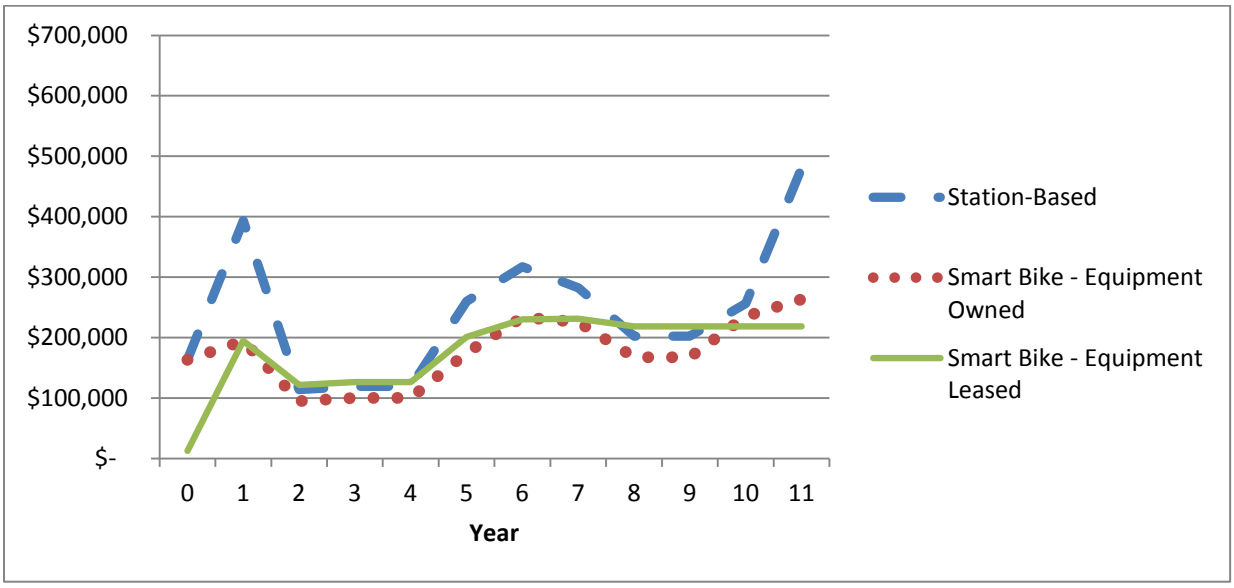


Figure 7-21: Holyoke Total Costs (Operating and Capital)

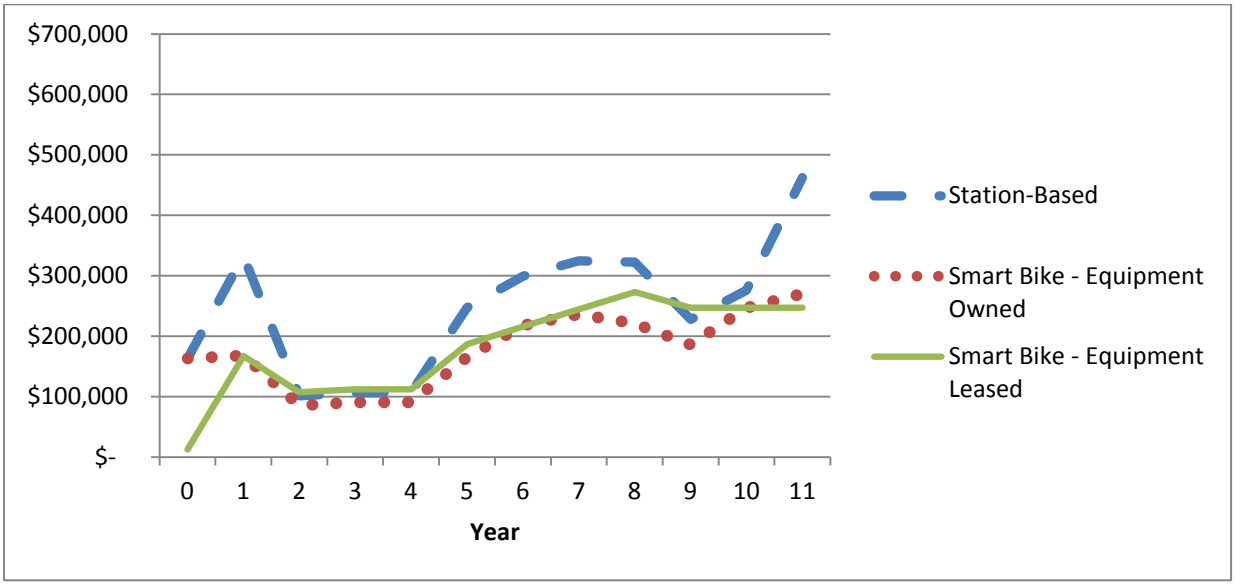


Figure 7-22: Northampton Total Costs (Operating and Capital)

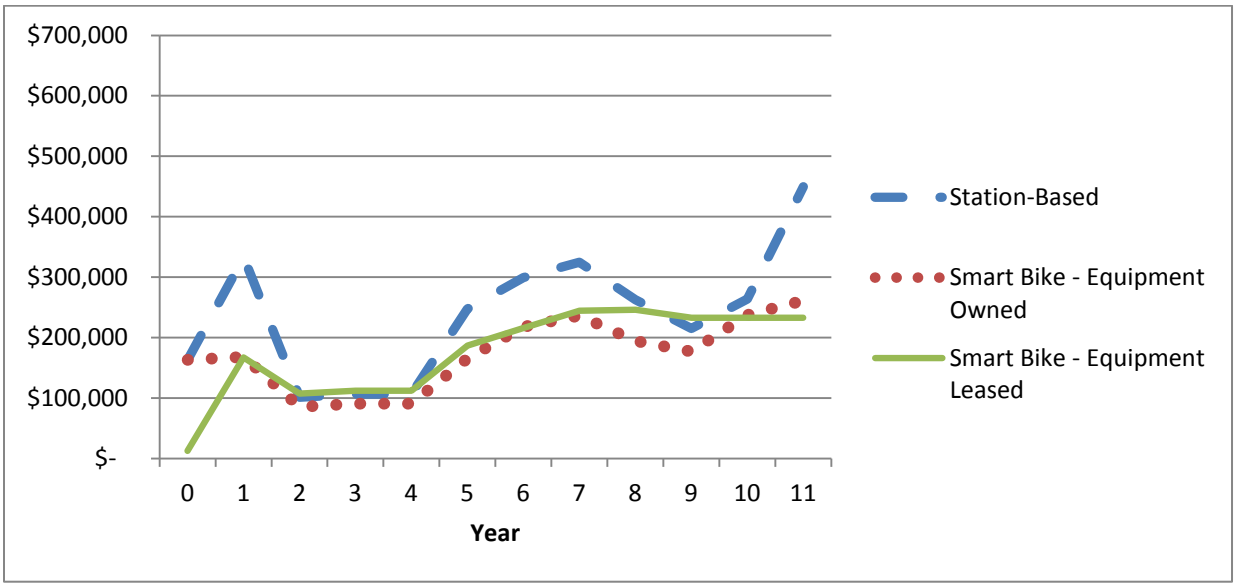


Figure 7-23: Springfield Total Costs (Operating and Capital)

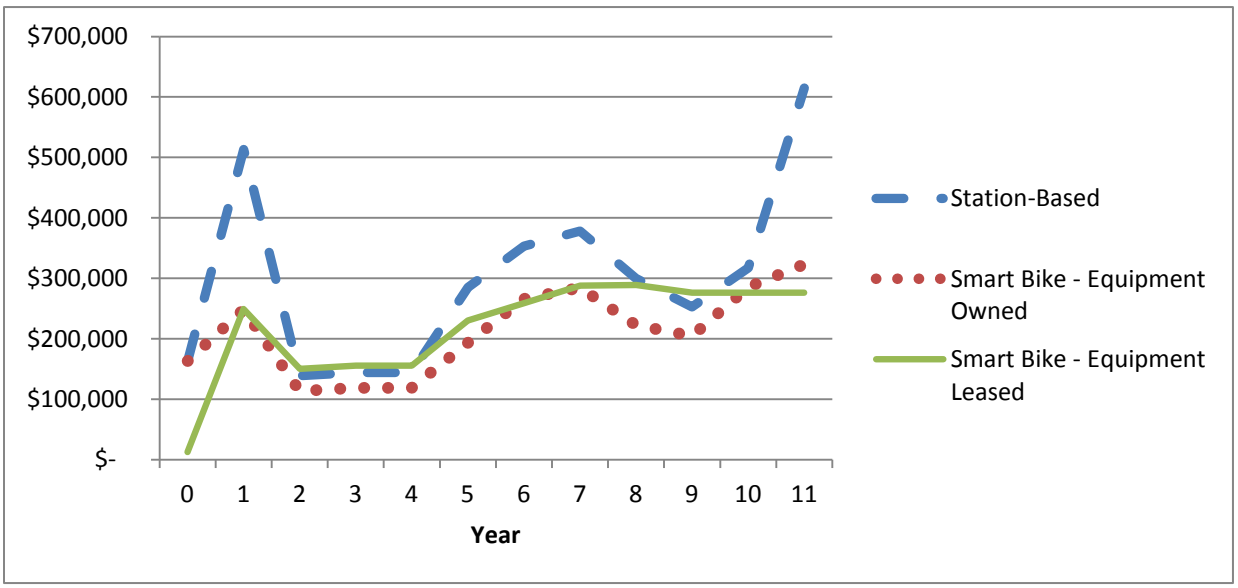
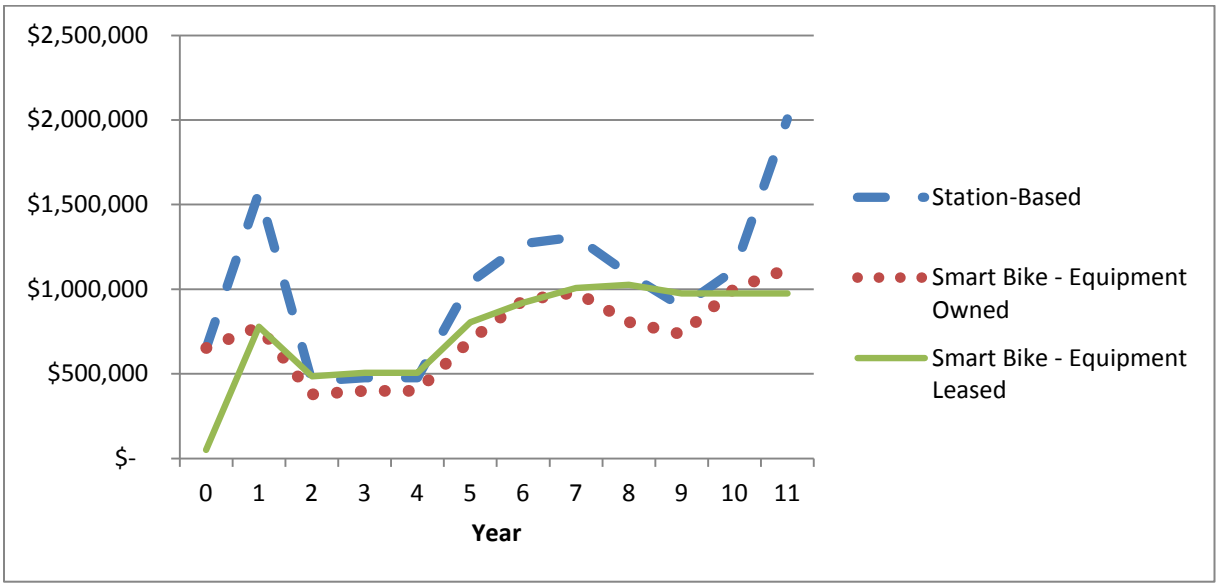


Figure 7-24: All Communities Total Costs (Operating and Capital)



Revenue and Cost Recovery Rate

Based on approximately 372 riders with annual memberships and 8,217 casual riders during the first phase of the program in all 4 communities, it is expected that the annual ridership revenue will be approximately $128,000. If each station generates $1,000 in advertising revenue per year, the advertising revenue for the first phase of the system will be $24,000 per year. If each community has one station sponsor that pays for one station's approximate annual operating cost of $15,000, there will be a total of $60,000 in revenue from sponsorships. This results in $211,000 of total revenue for the first phase of the system. The revenue estimate is expected to be the same regardless of the type of equipment used for the system.

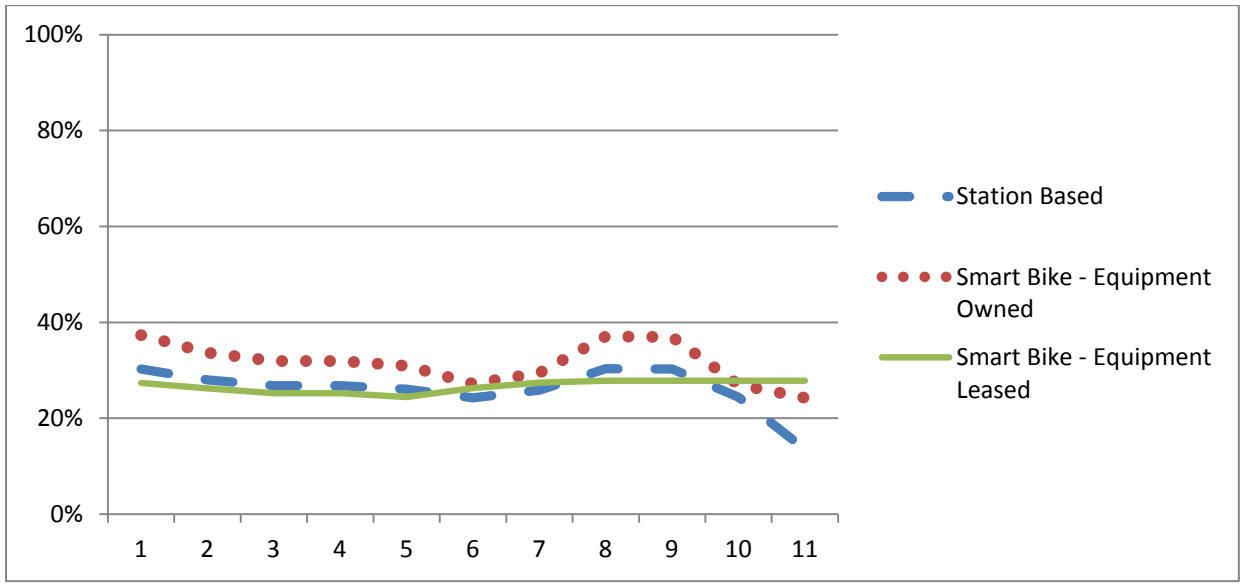
After completion of Phase II, the system will have approximately 788 annual memberships and 17,424 casual riders in all four communities. This will generate an approximate revenue of $271,000 per year. If each station generates $1,000 in advertising revenue per year, the overall advertising revenue after completion of Phase II will be $51,000 per year. Similar to the first phase, if each community has one station sponsor that pays for one station's approximate annual operating cost of $15,000, this will continue to generate revenue of approximately $60,000. This results in $382,000 in total revenue after completion of Phase II.

Revenue estimates for each municipality vary as a result of the different ridership estimates projected for each community, as well as the number of riders and operating costs associated with the specific number of stations planned for each community. As mentioned earlier in this section, the bike share program is expected to be used most in Northampton and Amherst, with less participation from Holyoke and Springfield.

A standard measure for determining the performance of transit systems is the farebox cost recovery rate, calculated as taking ridership revenue as a percentage of operating costs. The recovery rate for the proposed Pioneer Valley bike share system ranges, depending on the operating costs and revenues each

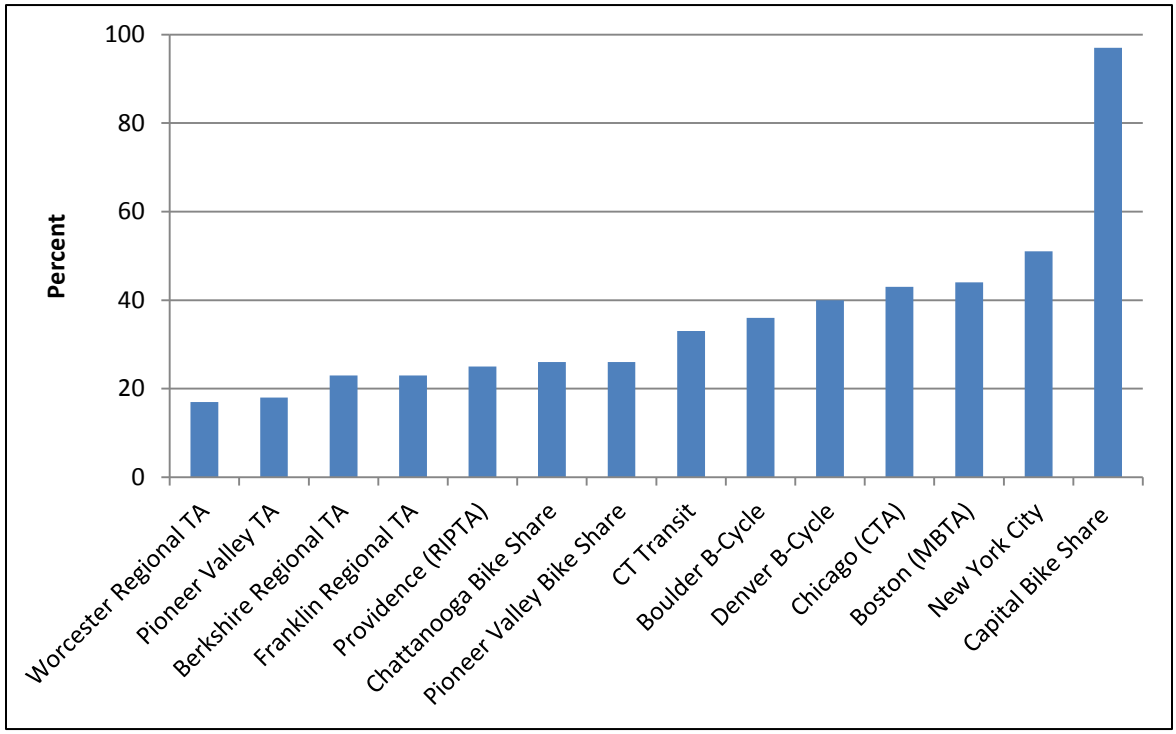
year. However, it is relatively similar for all three systems, ranging between 20 and 40 percent in almost all years.

Figure 7-25: Farebox Recovery Rate for Different Pioneer Valley Bike Share Scenarios



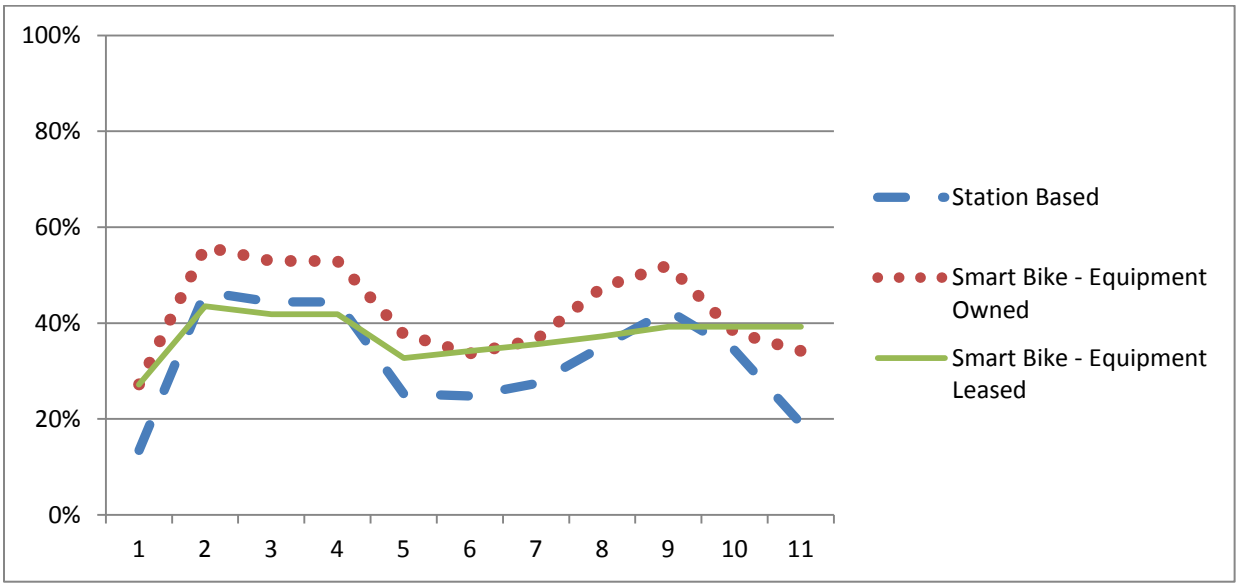
Data to compare this recovery rate to that of other bike share programs is sparse. Capital Bikeshare is able to reach a 100 percent recovery rate, with all operating costs paid for through user revenues. However, the rate is often much lower. A small sample of four operators analyzed by the Mineta Transportation Institute found one bike share program had a recovery rate of 46 percent. The recovery rate of the proposed Pioneer Valley bike share system is also comparable to nearby mass transit systems. As shown in the following table, farebox recovery rates for mass transit generally range between 20 percent and 50 percent. Based on a study completed by MassDOT in 2010, the Pioneer Valley Transit Authority, Worcester Regional Transportation Authority, Berkshire Regional Transit Authority, and Franklin Regional Transit Authority all have a fare recovery rate at or near 20 percent.

Figure 7-26: Farebox Recovery Rates for Selected Bus, Rail, and Bike Share Systems



Another metric to gauge system performance is the overall cost recovery rate, calculated as the total revenue as a percentage of operating and capital costs. Over the first 11 years of operation (including replacement of equipment in Years 5, 6, 10, and 11), the overall cost recovery rate is 30 percent in Amherst, 23 percent in Holyoke, 33 percent in Northampton, and 31 percent in Springfield. The average cost recovery rate for all four communities is 27 percent. The variation in recovery rates is based on the different projected ridership estimates for each community, as well as the number of stations proposed for each community.

Figure 7-27: Total Cost Recovery Rate for Different Pioneer Valley Bike Share Scenarios



Projected system revenues, capital costs, and operating costs are based on many assumptions about how the system will operate, how many people will use it, and how large the system will be. Revenue from advertising, as well as local station sponsorships, could also vary based on the interest of local businesses. Because of this, the revenue and cost estimates will vary greatly based on actual user behavior when the system is implemented. However, it is certain that the revenue from station sponsorships, advertising, and user fees will only provide a portion of the funds necessary to implement the system. Additional funds for capital and operating funds are discussed in the next chapter.

Section 8: Recommended Business Model, Operating Structure, and Financing

Recommended Business Model

A regional bike share program for the Pioneer Valley will need to select a business model well suited to the region's unique needs, which include: a system serving four distinct cities/towns; possible participation from colleges and universities; modest size, projected participation and budget; and no clear choices for corporate sponsorship.

There are 3 primary options for business models, summarized below:

Table 8-1. Business Model Options

Model	Ownership	Operations	Examples
City-Managed	City	Contractor	Capital Bikeshare (DC), Hubway (Boston)
Non-profit/ Authority	Non-profit/ Authority	Non-profit/ Authority	Nice Ride Minnesota, Denver Bikeshare, Des Moines
Privately Owned and Operated	Contractor	Contractor	DecoBike (Miami), Citibike (NYC)

We recommend that the regional bike share system for the Pioneer Valley be publicly owned by the cities, and operated by a private contractor. Similar to Capital Bike Share in Washington D.C. and Hubway in Boston, this model can allow multiple municipalities to contract individually or collectively with a single operator, and allows for expansion to serve additional communities.

The overarching umbrella of a regional planning organization such as the Pioneer Valley Planning Commission can help to coordinate the establishment of a regional compact and committee to guide the regional program, establishment of regional guidelines, assistance finding funding for capital costs, as well as completion of advanced feasibility analysis and contractor selection.

An intergovernmental compact (Memorandum of Agreement) should be prepared to guide the bike share system establishment and operation. Each community and also possibly interested colleges and universities will be asked to make a commitment to the program, and sign on to the MOA. The compact (MOA) should establish an Advisory Committee to help oversee the regional bike share program.

Under this model, one municipality will be identified as the "lead" community and will be responsible for procuring and managing vendor services to operate the system and for marketing, and overall financial

management. The lead community would be responsible for the administrative aspects of running the system, but not the operational aspects, which would be handled by a private contractor.

Equipment for the system could be procured regionally to save costs, but owned locally by each participating community. Each jurisdiction would act as a separate client to the operator and can have a different source of funding and different revenue sharing arrangements with the operator. In this model, the jurisdiction(s) will assume(s) responsibility for initial and ongoing funding for the system.

Boston's Hubway: A Regional Approach to Bike Share

(Description from the Hubway website)

Soon after the Boston Bikes program was founded in 2007, Boston Mayor Thomas M. Menino and Director of Bicycle Programs, Nicole Freedman, decided to bring bike sharing to the Boston area. However, they knew that in order for it to truly transform the way people travel and experience the city, it would have to span municipal boundaries. The Metropolitan Area Planning Council, the regional planning agency for the metro-Boston region of 101 cities and towns, joined the effort, and led the open bidding process that led to the selection of Alta Bicycle Share as the preferred company to operate bike share in the Boston region. Along the way Brookline, Cambridge, and Somerville committed to bring this exciting new initiative to their communities as well.

The Hubway system launched July 28, 2011 with 600 bicycles and 60 stations throughout Boston. Following launch Hubway immediately surpassed expectations. Within 10 weeks Hubway bikes had logged more than 100,000 rides, and by the end November had more than 3,600 annual members. During its first season a strong community of users formed that took an active part in the success of the system. Users reported damage, returned lost keys, docked loose bikes and even delivered engagement rings for each other (true story).

Hubway closed for the winter on December 1, 2011, but the excitement did not fade. While the system was closed, membership continued to grow in anticipation of the bikes' return, and Brookline, Cambridge, and Somerville each signed their own contracts with Alta Bicycle Share. In addition, Alta and the four municipalities signed a collective regional agreement, laying out how they would continue to work together to create a unified regional system, making Hubway the first truly regional bike sharing system in the US.

Start-up Strategy

First, the participating municipalities should identify a "lead" community to coordinate agreements and manage services. The lead municipality should have significant infrastructure and experience in different types of public and private funding, and will be willing and flexible enough to undertake the procurement process and contract management required for this high-profile project. Once a community has been identified as the lead, the other participating municipalities should enter into an intergovernmental compact with the lead community regarding management and oversight. All funding

for the bike share project: city, state, federal, private or foundation - shall be funneled through the lead municipality.

Contract Management and Oversight

Once agreements are signed, the lead, with guidance of the Advisory Committee, made up of members of each of the participating municipalities, will write and issue a Request for Proposals (RFP) to identify and select a vendor that will operate the system. The selected vendor will create its own contract with each of the communities.

Other Roles to be Defined

Within the writing of the RFP, particular operational roles should be decided upon. Roles that the lead will not play should be identified in the RFP as roles for the operator/vendor. Specific roles to be defined are:

- Sponsorship acquisition
- Site planning and permitting
- Public Relations
- Naming and branding
- Pre-launch marketing (website design, events, special membership)
- System setup and launch
- Ongoing operations
- Ongoing marketing

These items above can be split and could be performed by the lead itself and/or the contractor. The exact staffing needed will be determined by what roles it chooses to undertake both for launch and ongoing operations.

Anticipated Staffing Needs - Public and Private

The bike share program will require dedicated staff to manage, operate, and administer the new system. Understanding the limitations within municipal government, our recommend model proposes that the bike share system be privately operated with a vendor that will have staff that will perform operational functions of the program such as bicycle rebalancing, bicycle and station maintenance, station site planning, and handle customer service.

The lead municipality, as the public owners of the system, will be responsible for overseeing the vendor's implementation and operations of the system. Other responsibilities of the lead community in collaboration with the operator, may include but is not limited to:

- overall management
- financial planning and reporting
- initial station planning
- performance analysis
- expansion into the region

These functions can be overseen by a specific municipal department of the lead municipality, i.e. Department of Public Works, Public Health Department, Planning and Economic Development Department, etc. At the start of the implementation of the bike share system, at least three positions will be required to staff the program. These positions are: a General Manager, a Financial and Grants manager, and a System Planning Specialist. After the launch, the operator will assume all station planning responsibilities. The table below highlights the roles and responsibilities envisioned for these positions:

Position	Responsibilities
General Manager	Overall system management and public relations. Serves as the public spokesperson for the system. Works with the entity governing the system's operation, produces press releases, and presents on the bike share system to interested audiences and at public outreach events. Works with the bike share vendor and Financial and Grants Manager to ensure the system's financial stability. Responsible for the maintenance and reporting of all system performance data. Leads the development of the Annual Report and other analytical and reporting activities as needed. Financial and Grants Manager and the System Planner report directly to and work collaboratively with the General Manager. Oversees the work of any contractors.
Financial and Grants Manager	Maintains financial records for the system, including the development of annual budgets. Works with vendor and other stakeholders to identify potential sponsors and maintain sponsor relationships. Identifies and applies for federal, state, and local grants that may fund the bike share system, and completes all reporting requirements related to grants. Responsible for the reporting and analysis of financial information for the bike share system, including monthly data on the financial performance of the system and assisting with the development of the Annual Report.
System Planning Specialist	Plans initial station locations and obtains permits and other necessary approvals for installation of stations in coordination with the bike share operator. Works with the public through a variety of public outreach activities to identify specific station locations. After the first system launch, the operator would assume all station planning responsibilities.

In addition to these core staff positions, there will be a need to fund public outreach associated with the planning and launch of the bike share system. Public outreach can be done by a third party contractor, or directly by the lead municipality, and/or the participating municipalities pending on staff capacity and other sources available.

Potential Funding Sources

Potential funding sources for initial capital costs and operational costs for the bike share system are described in detail in Section 6. The most promising source of funding for initial capital costs for the system is federal Congestion Mitigation Air Quality (CMAQ) funding. The participating communities should work closely with the Pioneer Valley Planning Commission to identify, apply for, and administer grants to support the bike share program.

An Intergovernmental Compact and Business Model for Hubway

Boston's Hubway is a viable role model for a regional approach to bike sharing in the Pioneer Valley region, featuring an intergovernmental compact linking multiple participating communities to a single program and operator. Key provisions of the Hubway MOU are noted here.

While Hubway provides a seamless, regional service to users, each municipality owns its own equipment and each municipality contracts directly with the operations vendor. The four currently participating municipalities have signed a Memorandum of Understanding ("MOU") to ensure the system functions smoothly as a regional system. The MOU codifies the regional features of the system, determines a cost/revenue attribution and provides for a decision making process to determine system wide features. The MOU discusses front and back end elements that are to be consistent across the system including the pricing structure, user waiver, system name, website, marketing, payment collection, reporting, etc.

Each participating municipality has appointed a Project Manager ("PM"). The four PM's, known as the Hubway Advisory Committee ("HAC"), meet bimonthly with the vendor's general manager to oversee system operations.

Additionally, MAPC helps facilitate numerous aspects of the bike share program including data analysis as well as interactions among existing bike share municipalities, the operations vendor, and interested future municipalities. MAPC also helps to raise funds for the system from public and foundation sources, and may from time to time administer some of these funds. MAPC is a signatory on the regional MOU, facilitates the regular HAC meetings, and advises participating municipalities on issues of importance to the regional system. MAPC is a regional planning agency serving the people who live and work in the 101 cities and towns of Metro-Boston, including all of the participating municipalities. MAPC's mission is to promote smart growth and regional collaboration.

Currently all four municipalities have contracted with a single vendor, Alta Bicycle Share, Inc. Alta has performed all operations service since the system's inception except helmet operations. MAPC believes having a single operations vendor is simplest and strongly preferred. However, municipalities are not required to contract with the selected vendor in the regional RFP process. For Hubway, it is expected that each of the following operations elements will be the sole responsibility of one vendor:

- Website Maintenance, including member agreements;
- Customer Service;
- Payment Gateway/ Revenue Collection, including bank account management, financial reporting and revenue distribution among the municipalities;
- IT Management/ System Backend, including the ability to make all backend changes such as inputting prices and membership types.

Section 9: Next Steps and Recommended Implementation Framework

Overview

This report has described the feasibility of a establishing a regional bike share program in the Pioneer Valley, with an initial focus on Northampton, Amherst, Springfield, Holyoke and the Five College system.

The next steps toward establishing and operating a Pioneer Valley Bike Share program include:

- Agreement to Move Forward with Bike Share Program
- Advanced Feasibility Analysis
- Secure Funding
- Select Vendor
- Negotiations and Procurement
- Launch Initial Program Phase
- Build Out Bike Infrastructure

Details on these steps are described below. This report proposes that these steps be taken over the next year, to maintain momentum toward implementation. The following are recommendations for an implementation framework for a pilot phase bike share system, including needed steps to start up.

Agreement to Move Forward with Bike Share Program

- **Commitment from Stakeholder Municipalities/Colleges/PVTA**: Involve city government, PVTA and colleges in the process early on, including goals setting – as they will be likely owners.
- **Intergovernmental Compact**: Develop a regional Memorandum of Agreement (MOA) to establish the commitment of all engage parties and the roles they will play in implementation.
- **Determine Lead Agency/Agencies**: Which entity will oversee the overall system including vendor procurement and oversight.
- **Establish Core Team**: Develop a core implementation team including chief elected officials, DPW, Parks, Engineering, Permitting staff. They will oversee system implementation, including managing the detailed system design, procurement and contracting, and the launch of the system.
- **Community Connections:** Reach out to church leaders, neighborhood groups, youth groups to enlist their engagement in, and promotion of, bike share.
- **Public Outreach**: Strengthen public involvement in the bike share program development process, build up interest toward a program launch.

Advanced Feasibility Analysis

- **Engage Large Employers and Potential Sponsors**: Seek a major corporate sponsor for the program, and considering sale of naming rights. Seek connections with corporations via Mayors, and their personal contacts.
- **Select Business and Governance Model:** The business model defines the asset ownership and revenue flow between the government and the operator. It will include the organizational structure: who will be the implementing agency; the operator; who will own the assets; contracting for hardware, software, operations, advertising and marketing. There are three basic business models: publicly owned and operated; publicly owned and private operated; privately owned and operated.
- **Select Model for Equipment:** A key decision on equipment options will be choosing a station-based (smart dock) system or smart bike system. Smart docks have the payment kiosks and tracking systems located at station. Smart bikes have these items mounted on the bikes themselves.
- **Identify Necessary Agreements and Permits:** Permits will be needed for station locations and kiosks, where they are located on public property (i.e. roads and sidewalks). Agreements with private property owners will be needed for stations on private land.
- **Strategies for Phasing Implementation:** Note that the first phase must be large enough to connect meaningful origins and destinations and dense enough to ensure convenience and reliability. Small-scale pilot projects have not worked well.

Secure Funding

- **Grant Applications and /or Programming of Local Funds**: Develop information needed for future grant applications for capital funding.
- **Advertising and Sponsorship:** Secure agreements for advertising and sponsorship. Advertising can be placed on bikes, stations and kiosks. Stations should be strategically located to help promote private sponsorship. As user revenues will not be sufficient to operate most programs, sponsorships or advertising of at least $1,000 per bike per year will be needed to sustain most programs.

Select Vendor

- **Draft RFP for Vendor:** A vendor will be needed to operate the bike share system. The lead agency should prepare a Request for Proposals to seek a vendor/operator. In a vendor-operated model, the vendor provides the following services: maintenance; re-balancing and demand monitoring; equipment installation; customer service and support; payment platform; IT systems and website. Some cities hire separate vendors for marketing.
- **Vendor Procurement Process:** Complete the evaluation of vendor proposals and selection of a vendor.
- **Refine Site Selection (if station-based model):** Identify detailed station locations, including property ownership and space availability on-site. Station locations can include businesses or

institutions, on sidewalks, in public parks or plazas, on the street. Key parameters include locating stations for uniform coverage, identifying locations near mass transit, near bike lanes or infrastructure, on corners, in safe locations and near high-use destinations. Access to sunlight for solar powered stations will be an important consideration.

Negotiations and Procurement

- **Finalize Contract, Agreements/Permits:** Negotiate and secure approvals for all vendor contracts. Complete needed agreements and permits for station locations.
- **Confirm Sponsorships:** Work with potential corporate sponsors to negotiate and secure formal financial agreements in exchange for naming rights or advertising rights.
- **Procure Equipment and Prepare Station Designs:** Complete the procurement process for all needed bikes, docking stations, computer equipment and software. Prepare detailed site plans and designs for all docking stations.
- **Pre-launch Marketing:** Marketing can range from printed materials to elaborate advertising campaigns. It can include an interactive website, social media sites, a blog for users, and other technological element to engage users.
- **Naming, Branding:** Develop a unique name for the region's bike share program (Valley Bikeshare?) and undertake activities to make this brand identifiable to the region's residents.

Launch Initial Program Phase

- **Install Stations and Begin Operations**
- **Monitor Station Demand and Finance**
- **Assess Program for Continuance, Expansion**

Other Needs

- **Bike Infrastructure**: Build out bike lanes and infrastructure linking key destinations, which are very important to the successful operation of a bike share program.

Options for Funding the Advanced Feasibility Analysis

There are a number of potential options for funding these next steps. These include:

- PVPC has applied for a MA Clean Energy Center grant, which can support consultant services for the Phase II program
- A second phase of District Local Technical Assistance funding could be sought by participating communities
- Municipal matching contributions could help support the two above options

Recommended Next Steps

There are several key next steps that should be taken by participants, including:

1) **Secure Funding for Advanced Feasibility Analysis**: Seek funding through the District Local Technical Assistance program, along with municipal matching funds, and funds from a MA Clean Energy Center grant.

2) **Designate a Lead Community**: The Committee should identify a lead community or lead communities to act on their behalf in advancing the project and grant applications. Meetings and detailed presentations may be needed to sell this concept.

3) **Community and College Commitments to Proceed:** Communities that are ready to proceed with a Bike Share program should seek formal commitments from chief elected officials to agree to be responsible for ownership and maintenance of the bike share equipment. Formal commitments should also be solicited from potential college and university participants in the program.

4) **Apply for CMAQ Funding**: CMAQ appears to be the most viable funding option for the cost of initial capital costs for a regional Bike Share program. The Pioneer Valley region has a CMAQ target of approximately $2 million, which is sufficient to meet expected capital needs, and funding could also come from the statewide target. Funding would be most readily available in the FY17 or FY18 sections of the region's Transportation Improvement Plan (TIP). A request letter should be submitted to PVPC in time for the February, 2015 funding round. A MassDOT Project Need Form and Project Initiation Form must be prepared and submitted.

5) **Explore Sponsorship Options**: Actively seek to engage and secure one or more large corporate sponsors for the program.

6) **Develop an Intergovernmental Compact:** PVPC and the participating communities should develop and approve an intergovernmental compact (Memorandum of Agreement) that clearly lays out the roles of each participant, including the roles of individual municipal departments.