

Pioneer Valley Regional Bike Share System Pilot

DRAFT Technical Memorandum #1: Business Model Assessment and Equipment Alternatives



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1. Introduction

The purpose of this Technical Memorandum is to build upon the recommended Business Model, Operational Structure and Financing strategy outlined in the Pioneer Valley Regional Planning Commission's (PVPC) March 2015 Feasibility Study for Regional Bike Share in the Pioneer Valley. Also covered here is an analysis of the potential equipment options for bike share along with an evaluation that narrows down the options to two. In particular, this Technical Memorandum provides the following:

- **Business Models**
 - An overview of relevant business models
 - A matrix that provides a description of the operational, administrative and financial differences between the business models
 - A pros/cons matrix for both ownership and operations that details the benefits and tradeoffs of the different models
 - Proposed Business Model Recommendation for the Pioneer Valley
- **Five Year Pro-Forma**
 - A table that provides cost estimates that include expenses and revenues over the first five years of the system under two different equipment scenarios
- **Equipment Alternatives**
 - An overview of the main types of equipment considered in this study
 - A pros/cons matrix to evaluate several prominent bike share equipment providers (*to be developed in conjunction with the Steering Committee*)

Each of these topics will be assessed in light of the unique characteristics and needs of the Pioneer Valley, and special consideration was given to observations and recommendations in the March 2015 Regional Bike Share in the Pioneer Valley Feasibility Study.

2. Business Models

2.1 Overview

One of the key early decisions for a city or region exploring bike share is to determine a governance structure for the program. Who will own the assets? Who will administer the program? Who will be responsible for day-to-day operations?

There are generally five bike share business models in the United States. Each business model varies depending on the characteristics of the local market. Some contextual differences include, for example, municipal and regional procurement capabilities, capacity and interest of local partners, and the funding environment.

Variations aside, the business models considered in this memo are:

1. **Publicly Owned and Operated:** a government agency takes on the financial risk of purchasing, owning and operating the bike share program.
2. **Publicly Owned / Privately Operated:** a government agency takes on the financial risk of purchasing and owning the system and contracts operations to a private company that takes on liability for the system (note: certain operating tasks, such as marketing, may be taken on by the jurisdiction).
3. **Non-Profit Owned and Operated:** an existing or a newly formed non-profit takes on the responsibility of one or more of the roles of ownership, administration, and operation. Financial risk is taken on by the non-profit, although government agencies may provide start-up funds or act as a fiscal agent for the pass-through of federal, state, or local funding.
4. **Non-Profit Owned / Privately Operated:** a non-profit takes on the financial risk of purchasing and owning the system and contracts operations to a private company that takes on liability for the system.
5. **For-Profit Owned and Operated:** a private company takes on the responsibility of providing and operating the system. The private sector takes on all risk and fundraising responsibility and retains all profits



Model 2: Boston Hubway



Model 3: Denver B-cycle



Model 5. Miami Beach DecoBike

(although it is not uncommon for a portion of profits to be paid to the jurisdiction for use of right-of-way, advertising, etc.). This model is highly dependent on the capacity of private sector fundraising.

The key characteristics of the five primary models are summarized in Table 2-1, providing an overview of ownership of assets, operating responsibility, agency role, transparency, share of profit and risk, use of operating expertise, fundraising responsibility, expansion potential, and staff capacity / organizational interest. Table 2-2 and Table 2-3 provide further detail on pros and cons as they specifically relate to ownership and operations.

2.2 Business Model Matrix

Table 2-1: Key Characteristics of Typical Bike Share Governance Models

Model	Ownership	Operations	Municipal Role	Transparency	Risk	Profits	Operating Expertise	Fundraising	Expansion Potential	Staff Capacity / Interest	Examples
Publicly Owned and Operated	Public agency	Public agency	Municipalities are responsible for capital investment; own the infrastructure and equipment, and oversee all aspects of operations.	Strong agency control over equipment, expansion, operations, and service levels.	Financial risk and liability exposure is taken on by the public agency.	Agency retains potential profits, which can be used to fund system improvements and expansion.	Public agency would likely lack start-up and operating expertise, which can affect level of service.	Agency responsible for fundraising. Typically a mix of federal, state, local grants; sponsorships; and user revenues.	Expansion (within the jurisdictions) can be easily permitted.	Requires agency staff capacity for fundraising, oversight of the system and operations and marketing staff management	Boise Bike Share, ID Topeka Metro Bike, KS.
Publicly Owned / Privately Operated	Public agency	Private contractor	Municipalities are responsible for capital investment; own the infrastructure and equipment; administer the contract with private operator; and make decisions and drive program direction.	Strong agency control over program direction and operating contract.	Financial risk is taken on by the public agency. Liability exposure is taken on by the private contractor.	Agency retains (or splits) profits, which can be used to fund system improvements and expansion.	Makes use of private expertise to complement agency skills.	Agency responsible for fundraising. Typically a mix of federal, state, local grants; sponsorships; and user revenues.	Expansion (within the jurisdiction) is contractually simple and depends only on additional funds being raised.	Requires agency staff capacity for fundraising and oversight of the system, but makes use of the private sector experience for operations.	Divvy (Chicago), Hubway (Greater Boston) GoGo (Columbus OH) Gr:d Bike Share (Phoenix)
Non-Profit Owned and Operated	Non-profit	Non-profit	Municipalities can be involved as a financial partner providing start-up funding for the non-profit or acting as a fiscal agent to pass through federal, state, and local funding. Agency may be represented on the non-profit board or as a technical advisor.	Some transparency through representation on non-profit Board or Oversight Committee	Financial and liability risk is shifted to the non-profit organization.	Profits are generally reinvested into improvement and expansion of the system.	Non-profit often lacks start-up and operating expertise, which can affect level of service.	Provides the most diverse fundraising options. Agency or non-profit (or both) can fundraise and private sector is often more willing to sponsor / donate to non-profits. All funding types are in play under this model.	Expansion (within the jurisdiction) is contractually simple and depends only on additional funds being raised.	Staff dedicated specifically to the mission of bike sharing.	Denver B-cycle, Madison B-cycle Kansas City B-cycle Nice Ride (Minneapolis/St. Paul)
Non-Profit Owned / Privately Operated	Non-profit	Private contractor	Municipalities have a less active role and may only be responsible for certain aspects of system planning such as station siting and permitting.	Some transparency through representation on non-profit Board or Oversight Committee	Financial and liability risk is shifted to the non-profit organization and for profit operator	Non-profit retains (or splits) profits, which can be used to fund system improvements and expansion.	Makes use of private expertise to complement non-profit's skills and passion.	Same as above	Expansion (within the jurisdiction) is contractually simple and depends only on additional funds being raised.	Staff dedicated specifically to the mission of bike sharing.	Pronto (Seattle)
For-Profit Owned and Operated	Private	Private	Agency has a less active role and may only be responsible for certain aspects of system planning such as station siting and permitting.	Operator controls decision-making, re-investment / expansion, and operations.	All risk is taken on by the private sector.	Retained by private company.	Makes use of private sector experience.	More restrictive on the type of funds available for use - generally relying on private investment, user revenues, sponsorship and advertising.	Expansion focused towards profitability	Small business with entrepreneurial mentality	Deco Bike (Miami Beach and San Diego)

Operations & Ownership Pros / Cons

Table 2-2: Pros and Cons of Business Model options: OWNERSHIP

Model	PROS	CONS
Public	<ul style="list-style-type: none"> • Highest level of public control and transparency • Profits could be returned to the City or regional entity as revenue, or reinvested into the system for expansion • For a multi-jurisdictional system, a regional agency has greater ability to coordinate among the jurisdictions • May have stronger connections and higher-level experience needed to bring in federal or state funding • Higher likelihood to coordinate a unified bike share and public transit pass • Strong oversight of contract operator 	<ul style="list-style-type: none"> • Agency or cities may not see governing a bike share system as within their mission, unless they typically deal with multi-modal transportation • Concern may exist about potential liability to the city, county, etc. • Requires significant time commitment by staff at participating municipalities • Some corporate or institutional sponsors may feel uncomfortable dealing with and giving money to a government entity
Non-Profit	<ul style="list-style-type: none"> • Transparency can be easily achieved through representation on the Board • High likelihood that staff and board will be committed and passionate about bike share as their sole mission • Easily able to accommodate a regional system • More likely to respond to issues related to system equity and promotion of public health • Corporate or institutional sponsors are accustomed to giving to non-profits • Profits can be reinvested into the system for expansion 	<ul style="list-style-type: none"> • Requires investment of time and funding, likely from government partners, sponsors, and other stakeholders • May not be effective at raising local, state, or federal funding • Board composition is critical to help bring in private sponsors • May take longer than other models to organize an ownership, management and Board structure
For-Profit	<ul style="list-style-type: none"> • All liability issues are borne by the for-profit company • May increase some people's confidence that the private sector is fully providing the service • Private company has the major incentive to ensure well-maintained (and profitable) equipment 	<ul style="list-style-type: none"> • Little transparency in the equipment procurement process • Limited ability for local governments to influence changes to station siting and/or operations issues • There are few companies in the U.S., so interest may be slow to arise

Table 2-3: Pros and Cons of Business Model options: OPERATIONS

Model	PROS	CONS
Public	<ul style="list-style-type: none"> • If the public agency’s primary mission is transportation, they may have some level of relevant experience. • Opportunity to integrate with established transportation/transit practices 	<ul style="list-style-type: none"> • Public agency lacks experience and knowledge of bike share operations • Costs related to staffing and union rules will likely make operations more expensive • Multi-jurisdictional bike share programs require multi-jurisdictional agencies or agreements
Non-Profit	<ul style="list-style-type: none"> • Potentially lower cost • Foundation grants and individual donations more likely • With a small system (<200 bikes), non-profit can team with bike shops and/or advocacy groups to assist with maintenance and rebalancing 	<ul style="list-style-type: none"> • Learning curve • If operations performance is poor, it may be difficult for a non-profit to change course quickly • With a larger system (>200 bikes), non-profit may have difficulty assembling experienced staff • Less likely for bike share to become fully integrated into transportation system
For-Profit	<ul style="list-style-type: none"> • Can handle multi-jurisdictional systems relatively easily • If operations performance is poor for an extended period, a new vendor can be hired for operations • More knowledge and experience with operational issues from other systems • Economies of scale with multiple systems • Can mobilize equipment and staff from other systems if needed 	<ul style="list-style-type: none"> • Need to be profitable may limit ability to prioritize equity and public health issues • Foundation grants and donations less likely

2.3 Proposed Business Model

Recommendation: Publicly Owned / Privately Operated

Per the March 2015, *Regional Bike Share in the Pioneer Valley Feasibility Study*, the recommended business model is a program that is publicly-owned by the municipalities and operated by a private vendor. Based on goals for the bike share program, along with analysis of the Business Model matrix and the Operations and Ownership Pros and Cons described above, this Technical Memorandum supports the viability of the March 2015 study's recommendation. There are a variety of reasons why this is a sound choice:

- Ability of many elected official at the four towns/cities (not just a single mayor) and high level officials at the University of Massachusetts to work with various government agencies and local businesses/corporations to raise money for capital and operations costs.
- With at least four separate municipalities involved, it maximizes the transparency and accountability of decision making.
- The solid establishment of PVPC as the coordinator among the municipalities and the fiscal agent with control over the "Project Fund".
- The strength of the Partnership Agreement Memorandum of Understanding (MOU) and the number of signatories to the agreement (especially when the "Lead Party" emerges).
- A for-profit operator is typically a good fit for a regional bike share program, per the experience of other multi-jurisdictional bike share systems to date, including Hubway and Capital Bike Share in Metro Washington DC.

The recommended business model for the Pioneer Valley is similar to the Hubway bike share program in Greater Boston, whose equipment is owned separately by the cities of Boston, Cambridge, Somerville and the Town of Brookline. These municipalities have a contract with Motivate, Inc. to maintain and operate the program. In principle, there is no "lead" municipality, but the regional planning agency MAPC (Metropolitan Area Planning Commission) set up the original RFP for equipment and operations and acts as the coordinator and arbiter between the four municipalities. With PVPC playing the coordinator/arbiter role, the governance of a bike share program in the Pioneer Valley could function in a similar format as in Greater Boston.

Interim Steps

The most critical need currently is to formally establish the Lead Party and Program Administrator (LPPA). Without one of the communities taking the lead, despite PVPC's strong efforts, there could be delays in moving the program forward, especially with fundraising via grant applications and corporate sponsorships. Also, as stated in the MOU, the LPPA will also be needed to take on the role of contractor on behalf of all parties involved, for the future operations contract. As the lead city, town or institution, the LPPA could also be the primary media contact and the top elected official or administrator can be a *de facto* cheerleader for the effort to bring bike share to the Pioneer Valley. Without high-level leadership driving the program forward, sponsorship dollars may be hard to come by. The lack of

leadership also sends the message to the business community that perhaps bike share is not a high priority for the region.

With a LPPA in place, bike share will also become a more transparent program in the eyes of the public. The procurement of the equipment and the operations vendor RFP process should be done in a highly transparent manner by the LPPA and with significant input by the Steering Committee. In order to oversee the public engagement and the RFP, the LPPA and Steering Committee will need to hire an interim General Manager. Any initial money raised through the sponsorship process should be committed to the hiring of the GM, who can also be tasked with helping to secure further sponsorship dollars. Though securing sponsorship can be a time consuming process, the equipment and operations vendor can be selected and waiting in the wings until the necessary funds are raised to move forward to program launch.

Alternative: Non-profit Owned and Operated (or with Private Operations)

It should be noted that one motivation for cities in the Hubway network is revenue. User fees are distributed to each municipality based on the number of docking points and 24 hour passes sold in each jurisdictions. Based on the level of tourism and density within Greater Boston, revenues are far higher than those likely achieved in the Pioneer Valley. Also, in the Pioneer Valley, each jurisdiction will receive significantly-different levels of revenue, requiring higher percentage levels of sponsorship and/or municipal funding in some communities versus others. This could have an impact on the motivation of each municipality or institution to continue to own and operate bike share in the long term. As such, this memorandum outlines an alternative governance approach: non-profit ownership with operations performed by either the non-profit itself or contracted out to a private bike share operations company.

A non-profit 501c-3--whose Board would be comprised of key political, corporate, institutional, public-agency and community leaders—could potentially be a good fit for bike share program ownership in the Pioneer Valley. This model works well in a number of cities and offers:

- Involvement of numerous stakeholders
- Neutral governance
- Ability to raise sponsorships and donations
- Ability to expand over time
- Ability to reinvest profits in expansion and operational improvements

With a non-profit, the Board of Directors can have a higher level of flexibility related to securing sponsors and ensuring funding is spread out among all of the Pioneer Valley communities that are part of the current Partnership Agreement MOU. Although primarily populated by representatives from local/regional agencies and institutions, the establishment of the Board also gives an opportunity for members of the corporate community—whether committed sponsors or not—to play a role in the evolution of bike share. With the right Board composition, this allows for a stronger link between the non-profit and potential sponsors and those influential in the business community locally. It is important to note that corporations are more accustomed to making donations to non-profits than they are to government agencies or other private companies.

Interim Steps

If a non-profit is desired, there is typically a transition period during which all of the paper work is filed and a Board is established. One scenario is for an existing non-profit to take on bike share as the interim General Manager, or a staff person from a planning agency such as PVPC can help the bike share program through this transition period. During this transitional period, it is critically important that high-level representatives from each Pioneer Valley municipality (ideally from respective Mayor's or First Selectmen's offices) be an active leader. In some locales, the launching of bike share has been delayed due to lack of high-level city or regional leadership. Similar to the recommended public governance model, without high-level leadership driving the program forward, sponsorship dollars may be hard to come by and the lack of leadership risks sending the wrong message to the business community about the importance of bike share.

Beyond the interim GM's role in overseeing the bike share system operations, this person will lead the process of officially applying for non-profit status of the new organization and formalizing the Board of Directors. The latter will help to create a level of transparency that gives community leaders and bike share users a solid stake in the oversight of the program. With a Board comprised of diverse representatives, the opportunities to branch out to neighborhoods beyond the initial launch area will also be highlighted.

Finally, establishment of a non-profit will eliminate the need for one of the Partnership Agreement MOU signatory communities to be designated as "the 'lead' community responsible for procuring and managing vendor services to operate the system and for marketing, and overall financial management" (March 2015 Feasibility Study, page 112). Overseeing the administrative aspects of bike share *could* be a tall order for any of the Pioneer Valley communities and runs the risk of wavering commitments during political transitions and/or changes in mayoral administration.

3. System Costs and Revenues

3.1 Cost Components

There are four major costs that will be associated with a regional bike share program in the Pioneer Valley: start-up costs (broken into **launch** and **capital** costs), **administrative** costs for the equipment owner, and **operating** costs. Costs will range—especially capital costs—depending on whether the equipment selected is more-expensive, electro-magnetic docking stations ("dock-based" system) or one with an integrated lock ("smart lock" system). For either scenario, all cost estimates are based on a first phase launch of 24 stations with approximately 216 bicycles (nine per station, average), as established by the members of the Bike Share Steering Committee.

3.2 Launch Costs

There are a number of general system launch costs associated with establishing a system. These are mostly one-time startup costs, some of which recur during expansion phases. Launch costs include items

such as hiring employees, procuring a storage warehouse, purchasing bike and station assembly tools, website development, communications and IT set-up, and pre-launch marketing. There may be opportunities to reduce some of these costs through partnerships with other organizations or public agencies – for example, by using a city-provided warehouse space instead of renting storage space. For Smart lock systems, launched costs are significantly lower since the much-lighter station equipment does not require a flat-bed crane typically used for installation of dock-based systems.

For the potential system in the Pioneer Valley, one-time launch costs are expected to range from \$172,800 to \$345,600 (or \$800 per bike x 216 SoBi smart lock bikes, to \$1,600 per bike x 216 dock-based bikes).

3.3 Capital Costs

Capital costs are costs associated with purchase of essential bike share equipment. This includes stations, transaction kiosks, map frame panels, bikes, and docks (or bike racks). Equipment costs will vary depending on:

- Selected equipment (“high” cost range for dock-based stations vs. “low” cost range for rack-based stations with ‘smart-lock’ bikes)
- System parameters such as the number of bikes per station or the number of docks per bike
- Additional features such as or equipping bikes with GPS units

Per-station capital costs typically range from \$25,000 (low end at \$2,800/bike, gross) to \$55,000 (high end at roughly \$6,000/bike, gross) per station. Both are based on information from both various vendors, including SoBi, B-cycle and Motivate/PBSC. Some ‘smart lock’ equipment providers such as Zagster offer an even lower-cost option, but the range described above is used within this analysis as a baseline. On the other end, some equipment providers offer dock-based systems with electric-assist bicycles which can be more expensive than the high end.

For the proposed system in the Pioneer Valley, capital costs are expected to range from \$600,000 – \$1,320,000 for the proposed 24 stations and 216 bikes in Phase I (note: does not include potential price changes related to inflation)

3.4 Administrative Costs

There will be costs associated with administering the program by the equipment owners. For each model, a total of \$60,000 has been budgeted for this service as the lead-in to the Phase I launch. The primary administrative cost is, at a minimum, hiring the General Manager to lead the effort during the year prior to the first fully-operational season. The costs also relate to recruiting and securing full- and part-time staff, and to imitating special marketing efforts that are most prevalent during the launch year. Longer-term, the municipal agency(ies), (or potentially, the non-profit) that owns and administers the bike share program will have administrative costs associated with staff positions, marketing, and general expenses. These are included in operating costs as described below.

3.5 Operating Costs

Operating costs include those expenses required to operate and maintain the system for reliable use. This includes staff and equipment related to:

- **Station maintenance**, which includes troubleshooting any technology problems with the kiosk or docking points, cleaning and clearing the station, removing litter and graffiti, etc.
- **Bike maintenance**, including regular inspection and servicing of bikes, maintaining equipment inventory and/or technology problems associated the integrated lock mechanism
- **Rebalancing** processes that entail staff time and equipment associated with moving bikes from full to empty stations and vice versa, a problem typically associated with peak demand at commute periods, a result of special events, or avoidance of riding up hills. Rebalancing costs can be mitigated in a smart-lock system through the use of pricing incentives that encourages riders to return bikes to stations with lower demand.
- **Customer service** that provides a responsive interface for customer inquiries and complaints, as well as a capability to conduct marketing and outreach to new and existing customers.
- **Direct expenses** such as maintaining an operations facility, purchasing tools and spare parts, upkeep of software, communications and IT, and general administrative costs such as insurance and membership database management.

Operational costs will depend on numerous factors, but are most influenced by the Service Level Agreement (SLA) that will need to be reached between the system's operator and the participating Pioneer Valley municipalities. The SLA sets out the operating terms that must be met: how long a station can remain empty, how often bikes are inspected, cleaning policies, and other concerns. The agreed-upon service levels will need to balance operating costs with customer service. Some jurisdictions, however, do not define SLAs for their operators; this depends on the overall structure of the contract and the extent to which the risk is borne by the contractor. If the financial risk is borne by PVPC, and a flat operations fee paid to an operator, then SLAs are appropriate, but if the financial risk is borne by the operator, then SLAs are not typically a part of the contract.

Depending on the service-level expectations, monthly operating costs could range from \$70 per rack (based on SoBi smart lock system experience) up to \$120 per dock (based on Motivate dock-based system experience). This is based on experience with systems that currently exist throughout the U.S. **With expectations for approximate two parking spots for every bike share bicycle (either rack or dock) this equates to an operations cost range of \$362,880 to \$622,080 per year.¹**

¹. Note that while a bike share program in the Pioneer Valley is expected to run between April and November, the range above includes a 12 month multiplier. This is to account for the additional costs associated with packing up, storing and redeploying the equipment on a twice-yearly basis.

3.6 Revenues

One of the goals (born frequently out of necessity) of many bike share systems is to use a diverse range of revenue sources. Potential revenues include: user fees, sponsorship, advertising and public funding (through grants and direct appropriations from the Capital Budget).

User Fees

User fees include the fees bike share patrons pay for annual, monthly or daily memberships, along with any potential overtime fees (i.e. use of a bicycle beyond the proscribed 30-minute or 45-minute free-use period). A key factor to determine revenue through user fees is the “Farebox Recovery” (FR) rate, a term borrowed from public transit planning and operations. The FR rate equates to the percentage of the system’s operating costs expected to be covered by user fees. Of the three typical user-fee sources—annual memberships, 24 hour passes and overtime usage fees—the most lucrative for most bike share programs are the 24 hour passes. While annual members typically pay the \$50-\$100 fee once a year, casual users who purchase a 24 hour pass bring \$6-\$10 into the revenue stream for only a single day of use. In most instances, visitors and tourists are the casual users who purchase the day passes. As such, cities and regions with major destinations and a significant tourist economy have the highest FR rates in the bike share industry. This includes Metro Washington DC and Chicago programs which pay for virtually all of their operations costs through user fees (i.e. a 100% FR rate). Bike share programs in Seattle and Boston have FR rates in the 75% range, while Denver B-cycle pays for roughly half of their operations through user fees.

Smaller cities with few major destinations and modest levels of tourism have significantly lower FR rates that range from 20% to 40%. While the FR rate for each community within the Pioneer Valley will vary, in aggregate, the FR rate is expected to fall within this range. Also impacting the FR rate is the equipment vendor chosen and the estimated operations costs for the equipment. Because operations costs for smart lock equipment is roughly half compared to dock-based systems, the FR rates are projected to be doubled. As shown in Tables 3-1 and 3-2 below, the FR rate for a smart lock system starts at 40% during year 1, while the FR rate starts at 20% for dock based equipment. For either equipment option, a small increase in the FR rate is expected as bike share use (and revenues) increase with each year of operations. However, if/when the program doubles in size in a second phase—shown in Year 3 in the tables—the increased operations costs would be expected to increase at a rate higher than the increase in use (i.e. operations cost would roughly double while ridership will increase more incrementally). Therefore, the estimated FR rate for both smart lock and dock based equipment drops 20% from the first year’s rate in relative terms. After Year 3, the FR rate would then be expected to resume a modest annual increase of a few percent thereafter.

Sponsor Revenue

Sponsorship provides a significant funding opportunity in the Pioneer Valley given the number of large employers and potentially-interested corporate and institutional partners. Experience in other cities has shown that companies are generally interested in sponsorship for its positive impression and “good corporate citizen” benefits, as much as for its media exposure. Sponsorship typically involves a five-year agreement between the sponsor and the owner of the bike share equipment. Company or institutional

decals are typically placed on the bike share infrastructure (bikes and station) and sponsors are also recognized and highlighted on the bike share program web site and other promotional materials.

In many larger cities, bike share sponsorship agreements frequently bring in roughly \$1000 per bike per year. These cities feature much larger populations, higher levels of traffic (both automobile and pedestrian), higher brand visibility and more-intensive media markets than in the Pioneer Valley. As such, for the sake of the revenue projections, the annual sponsorship fee is estimated to be a more conservative figure: \$500 per bike. With an expected system of 24 stations and 216 bicycles, this equates to a sponsorship deal of \$108,000 per year for phase 1 and ultimately doubling to \$216,000 per year in a full build out expected by the third year of operations. However, in sponsorship negotiations, seeking a more-robust \$1000 per bike per year is recommended, and could perhaps be attainable with a sponsor who is exceptionally enthusiastic about bike share.

Table 3-1: Bike Share sponsorship levels

SYSTEM NAME	# of BIKES (STATIONS)	PRIMARY SPONSOR	QUANTITY (TERM)	SPONSOR FUNDS PER BIKE
Hubway, Boston	600 (60 stations at launch in 2011)	New Balance	\$600,000 (3 years)	\$333 / bike / year *
CoGo Bike Share, Columbus OH	300 (30 stations)	Medical Mutual	\$1,250,000 (5 years)	\$833 / bike / year
Pronto, Seattle	500 (50 stations)	Alaska Airlines	\$2,500,000 (5 years)	\$1,000 / bike / year
Healthy Ride, Pittsburgh	500 (50 stations)	Highmark Blue Cross/Blue Shield	\$2,500,000 (5 years)	\$1,000 / bike / year
GREENbike, Salt Lake City	150 (20 stations)	Select Health	\$275,000 (per year)	\$1,834 / bike / year

* - City of Boston acknowledges that they undersold the sponsorship and "left money on the table"

Advertising Revenue

Advertising includes a contract with a company to provide a regularly changing graphic display and message, typically inserted into the map-panel portion of a typical bike share station. The advertiser and/or message may not be associated with bike sharing or bicycling in general, though the local jurisdiction may have specific restrictions on the advertisements related to tobacco products or alcohol. In some cities with bans on outdoor advertising in the public ROW, many bike share programs include Public Service Announcements within the map frame panel as an alternative. At the time of the writing, it is unknown what revenue may be available through advertising at the bike share stations.

Grants and Public Funding

Numerous public funding options are available for bike sharing in the United States but the most common are federal grants issued by agencies such as FHWA, FTA, or CDC, state grants, and local transportation funds.

The FHWA provides a summary of public funding sources in its guide to Bike Sharing in the United States (2012):

http://www.fhwa.dot.gov/environment/bicycle_pedestrian/funding/faq_bikeshare.cfm

There are a number of factors to consider before pursuing federal funds:

- There is a significant amount of competition for federal funds and grants, and a detailed understanding of the application process is often required.
- Going after discretionary federal funding for bike share comes with some level of risk that it could compete with other regional transit, greenway and non-motorized transportation projects
- These sources are generally less flexible than other funding sources, e.g., FTA funding may only be used for bike share docks/racks, equipment, and other capital costs but NOT for purchasing bicycles or for launch and operating costs. FHWA funding such as CMAQ grants, on the other hand, can be used for all equipment including bikes. Note that few grants are available for operations.
- There may be additional requirements such as “Buy America” provisions for steel and iron products, NEPA environmental assessment, etc.
- There are often delays associated with the application, evaluation, and distribution of funds, which can delay deployment. There may also be a timeline within which to use the funds, which can create difficulties in piecing together several grants.

Most cities have limited the use of local public funding to providing local matches to federal grants (such as CMAQ) as well as providing in-kind services such as staff time, right-of-way use, or displacement of on-street parking revenues. Columbus, Ohio is one exception as they committed \$2.3m of local funds from the Capital budget to purchase the equipment. Another is in Washington State, where the Legislature has allocated \$5.5m to expand Seattle’s Pronto system to cities on the east side of Puget Sound. Local funding from cities and towns in the Pioneer Valley would most likely be directed towards capital costs or a specific annual amount for annual operations costs.

Ongoing public funding could potentially come from local “steady stream” sources such as parking revenues, bus bike rack advertising, special taxes, or distribution of license plate fees. Station purchase could also form part of the use of Traffic Impact Fees or form part of a developer’s travel demand management strategy.

3.7 Cost Summary

The Phase I, five-year cost forecast for a bike share program in the Pioneer Valley is shown in the tables below. Table 3-2 presents costs for a lower-cost, smart-lock system, while Table 3-3 includes a higher-cost, dock-based system². For cost-estimating purposes, a potential expansion that could double the size of the system—24 additional stations with 218 additional bicycles—is included during the third full year of operations. This expansion could be smaller or larger than 24 new stations, and will be dependent on the initial success after the first phase launch and availability of additional funds. A significant expansion of a program size in the third year is not unusual for the bike share industry.

² Note that capital, launch, and administrative costs occur in the year *prior* to operations – i.e., these costs occur in Year “0” for a system whose actual operations begin in Year 1

Table 3-2: Five-Year Cost Estimate for Pioneer Valley Bike Share – LOW cost range for equipment (Smart-Lock)

year	0	1	2	3	4	5
# of stations/hubs	24	24	24	48	48	48
# of bikes	216	216	216	432	432	432
# of docks/racks (1.9 per bike)	432	432	432	864	864	864
COSTS						
launch costs	\$172,800	\$0	\$0	\$172,800	\$0	\$0
capital costs (low)	\$600,000	\$0	\$0	\$600,000	\$0	\$0
admin. costs	\$60,000	\$0	\$0	\$0	\$0	\$0
operations costs	\$0	\$362,880	\$362,880	\$725,760	\$725,760	\$725,760
Low Cost sub-total	\$832,800	\$362,880	\$362,880	\$1,498,560	\$725,760	\$725,760
Low Cost Cumulative	\$832,800	\$1,195,680	\$1,558,560	\$3,057,120	\$3,782,880	\$4,508,640
REVENUE PROJECTIONS						
User-fees	\$0	\$145,152	\$159,667	\$232,243	\$261,274	\$290,304
"Farebox Recovery" rate	na	40.0%	44.0%	32.0%	36.0%	40.0%
Sponsorship (\$500/bike)	\$0	\$108,000	\$108,000	\$216,000	\$216,000	\$216,000
Advertising	\$0	\$0	\$0	\$0	\$0	\$0
Public funds/grants	\$0	\$0	\$0	\$0	\$0	\$0
Revenue sub-total	\$0	\$253,152	\$267,667	\$448,243	\$477,274	\$506,304
Revenue Cumulative	\$0	\$253,152	\$520,819	\$969,062	\$1,446,336	\$1,952,640
FINANCIAL GAP						
Annual need	-\$832,800	-\$109,728	-\$95,213	-\$1,050,317	-\$248,486	-\$219,456
Cumulative need	-\$832,800	-\$942,528	-\$1,037,741	-\$2,088,058	-\$2,336,544	-\$2,556,000

Table 3-3: Five-Year Cost Estimate for Pioneer Valley Bike Share – HIGH cost range for equipment (dock-based)

year	0	1	2	3	4	5
# of stations/hubs	24	24	24	48	48	48
# of bikes	216	216	216	432	432	432
# of docks/racks (1.9 per bike)	432	432	432	864	864	864
COSTS						
launch costs	\$345,600	\$0	\$0	\$345,600	\$0	\$0
capital costs (high)	\$1,320,000	\$0	\$0	\$1,320,000	\$0	\$0
admin. costs	\$60,000	\$0	\$0	\$0	\$0	\$0
operations costs	\$0	\$622,080	\$622,080	\$1,244,160	\$1,244,160	\$1,244,160
High Cost sub-total	\$1,725,600	\$622,080	\$622,080	\$2,909,760	\$1,244,160	\$1,244,160
High Cost Cumulative	\$1,725,600	\$2,347,680	\$2,969,760	\$5,879,520	\$7,123,680	\$8,367,840
REVENUE PROJECTIONS						
User-fees	\$0	\$124,416	\$119,000	\$205,000	\$240,000	\$270,000
"Farebox Recovery" rate	na	20.0%	22.0%	16.0%	18.0%	20.0%
Sponsorship (\$500/bike)	\$0	\$108,000	\$108,000	\$216,000	\$216,000	\$216,000
Advertising	\$0	\$0	\$0	\$0	\$0	\$0
Public funds/grants	\$0	\$0	\$0	\$0	\$0	\$0
Revenue sub-total	\$0	\$232,416	\$227,000	\$421,000	\$456,000	\$486,000
Revenue Cumulative	\$0	\$232,416	\$459,416	\$880,416	\$1,336,416	\$1,822,416
FINANCIAL GAP						
Annual need	-\$1,725,600	-\$389,664	-\$395,080	-\$2,488,760	-\$788,160	-\$758,160
Cumulative need	-\$1,725,600	-\$2,115,264	-\$2,510,344	-\$4,999,104	-\$5,787,264	-\$6,545,424

4. Equipment Alternatives

As stated earlier, the cost and revenue estimates in the previous chapter are contingent upon the type of equipment selected. This section examines the two bike share equipment types (dock-based and smart-lock) being considered in the Pioneer Valley, and provides an assessment of the five equipment vendors. A scoring matrix for each vendor is presented to summarize the vendor evaluations by the Bike Share Steering Committee.

4.1 Equipment Technology

Bike share is not a recent phenomenon, and in fact has been around for nearly 25 years in the US. Most of the so-called 1st generation “systems” were volunteer-led and informally organized. In most places, these programs experienced minimal success because of theft, vandalism, inefficient technology and insufficient operational oversight. However, in the past five to ten years, innovations in technology have increased accountability and given rise to a new generation of technology-driven bike share programs. Advancements in credit card transaction capabilities and RFIC (radio-frequency identification chips) have allowed operators to introduce accountability and reduce theft and vandalism.

The most recent bike-share technologies, developed in North America, are modular systems that do not require excavation because they use solar power and wireless communication, as opposed to hardwired installation. With these new changes, stations can be moved, relocated, expanded, or reduced to meet demand. This ability allows systems to be flexible in terms of service coverage and availability and helps reduce capital costs related to construction.

Bike share technology is evolving quickly along with other wireless and digital changes. In just the past three years, systems that do not require docking stations (i.e. “smart lock” systems), have become more popular with launches in several U.S. and Canadian cities. Systems utilizing grid-connected stations featuring electric-assist bicycles are also emerging as a more-viable option due to successes in several European cities. The electric-assist option remains largely untested in the U.S., however. The near future may also bring a unified transit and bike share pass, of which a number of cities are interested in implementing. Finally, operations have evolved from volunteer-led and informal, to sophisticated and formal, with significant investments in aspects from deployment to rebalancing (i.e. moving bikes from full to empty stations), customer service, marketing and maintenance.

Elements of a Contemporary Dock-Based Bike Share System



A software back-end that keeps track of transactions and ridership information and can be linked to real-time website and mobile device applications and user profiles that report the number of trips, distance travelled, or calories burned.

A fleet of bicycles - specially designed for short trips and constructed of customized components to limit their appeal to theft and vandalism.

A network of stations spread across a broad area to provide convenient access to bikes. Each station includes a terminal where transactions are made and docking points where the bicycles are secured when not in use. Recent technologies have introduced modular station platforms that can be relocated, expanded, and have solar power and wireless communications.

Maintenance: staff and programs to rebalance bikes amongst the stations and maintain the system infrastructure.

Elements of a Contemporary "Smart Lock" Bike Share System



Digital screen to receive unlocking code

Key pad to insert unlocking code or other information

Integrated U-Lock intended to be taken with bike when ridden so that bike can be locked anywhere (typically for a higher fee than parking the bike at a station)

Bike Share Bicycle

Docking station with space for custom branding and advertisements. A kiosk can be added at station to process bike rental transaction. Since bikes can be rented via mobile device and online, not all stations require a kiosk.

4.2 Vendor Overview

There are a number of established and emerging vendors that offer variations on the dock based and smart lock technology options described above. Table 4-1 below offers an overview evaluation of ten criteria developed in conjunction with the Bike Share Steering Committee. The evaluation includes the five vendors that have expressed interest in potentially providing bike share equipment in the Pioneer Valley: B-cycle (dock-based), Social Bicycles (smart lock), Zagster (smart lock), Bewegen (dock based) and Motivate (dock based). Note that Motivate is transitioning from PBSC equipment to their own.

Criteria	Vendor Options				
	B-Cycle	Social Bicycles (SoBi)	Zagster	Bewegen	Motivate
Equipment vendor experience	~5,317 bikes at ~610 stations	~1,964 bikes utilizing ~384 hubs	~14 locations in corporate / private settings	Bewegen has systems operating in Portugal and is the selected vendor for Birmingham, AL's electric-assist program	~15,500 bikes at ~1,340 stations
Bicycle/station durability	40 - 42 pound bike, with proprietary components and internal brake and shifting cables to minimize vandalism; puncture-proof tires; built-in lighting; internal gearset	40 - 42 pound bike, with proprietary components to minimize vandalism; puncture-proof tires; built-in lighting; internal gearset; shaft-drive removes need for chain	Standard off-the-shelf bicycle	A quarter of the bicycles planned for Birmingham will feature electric assist, capable of increasing the range a user may travel without requiring excessive exertion	40 - 42 pound bike, with proprietary components and internal brake and shifting cables to minimize vandalism; puncture-proof tires; built-in lighting; internal gearset
Operations costs	High	Medium	Low - Medium	High	High
Equipment costs (gross costs per bike): Low = < \$2,000 Medium = \$2,001 - \$4,000 High = > \$4,000	High	Medium	Low	High	High
Ability to expand reach of transit	Limited due to cost of each station	More flexible options	More flexible options	Limited due to cost of each station	Limited due to cost of each station
Ability to expand mobility for low-income populations	Limited due to cost of each station	More flexible options	More flexible options	Limited due to cost of each station	Limited due to cost of each station
Ease of use	Access requires swipe card for members or kiosk interaction for casual users (can access bicycle from designated dock without code)	Members can use either an RFID swipecard or simply punch in their member code to each bicycle; casual users can punch in their temporary member code on the back of each bike	Members punch in their member code to receive a key from the lockbox	Modern docking system features touch screen display with live, real-time system map and payment hardware	Access requires swipe card for members or kiosk interaction for casual users (need to access bicycle from designated dock using a code)
Site planning challenges	Docking stations require a location clear of utility poles, man hole covers, sewer grates, etc.	Dockless bike share systems with integrated locks are more flexible in regards to site planning challenges because they are able to be locked to any bike rack within the service area, potentially mitigating the need for large station footprints	Dockless bike share systems with integrated locks are more flexible in regards to site planning challenges because they are able to be locked to any bike rack within the service area, potentially mitigating the need for large station footprints	Docking stations require a location clear of utility poles, man hole covers, sewer grates, etc.	Docking stations require a location clear of utility poles, man hole covers, sewer grates, etc.
High visibility and "brandability"	Branding space on: rear fender, front basket and kiosks	Branding space on: fender and front basket. Fewer kiosks limit brandability of the station itself.	Small branding space on front of the front basket limits opportunities	Branding space on: rear fender, front basket and kiosks	Branding space on: rear fender and kiosks
Interoperability with other systems	None within New England (currently)	None within New England (currently)	Yes, with limited locations in New England	None nationally (currently)	Yes, four cities in Greater Boston.

4.3 Equipment Vendor Scoring

Given the responses to the ten evaluation criteria above, vendor score sheets were developed in an effort to more-quantitatively assess the benefits, drawbacks, and tradeoffs of each. While the scores add up to one hundred, each criterion is weighted between 5 and 20 to reflect the relative importance within the overall program, as expressed by the Steering Committee. As such, the maximum score for each criterion is as follows:

Criteria	Max Score
Equipment vendor experience	20
Bicycle/station durability	20
Operations costs	20
Equipment costs (gross costs per bike): Low = < \$2,000 Medium = \$2,001 - \$4,000 High = > \$4,000	10
Ability to expand reach of transit	5
Ability to expand mobility for low-income populations	5
Ease of use	5
Site planning challenges	5
High visibility and "brandability"	5
Interoperability with other systems	5
TOTAL MAX SCORE:	100

Equipment vendor experience, bicycle/station durability and operational costs have been weighted highest due to their potential to “make or break” an initial deployment from a financial and customer-experience standpoint. All of the other criteria have been weighted lower, not necessarily to reflect decreased importance, but instead to highlight that the ability for a vendor to satisfy the other seven criteria would have less impact on the overall success of the program.

The individual equipment-vendor evaluations are presented as placeholders on the following pages. Scores will be populated as the Steering Committee members arrive at scoring conclusions.

B-Cycle										
Criteria	Max Score	Committee Members								AVERAGE:
		PVPC	Springfield	Holyoke	Northampton	Amherst	UMass Amherst			
Equipment vendor experience	20									
Bicycle/station durability	20									
Operations costs	20									
Equipment costs (gross costs per bike)	10									
Ability to expand reach of transit	5									
Ability to expand mobility for low-income populations	5									
Ease of use	5									
Site planning challenges	5									
High visibility and "brandability"	5									
Interoperability with other systems	5									
TOTAL MAX SCORE:	100									

SOBI									
Criteria	Max Score	Committee Members							AVERAGE:
		PVPC	Springfield	Holyoke	Northampton	Amherst	UMass Amherst		
Equipment vendor experience	20								
Bicycle/station durability	20								
Operations costs	20								
Equipment costs (gross costs per bike)	10								
Ability to expand reach of transit	5								
Ability to expand mobility for low-income populations	5								
Ease of use	5								
Site planning challenges	5								
High visibility and "brandability"	5								
Interoperability with other systems	5								
TOTAL MAX SCORE:	100								

Zagster										
Criteria	Max Score	Committee Members								AVERAGE:
		PVPC	Springfield	Holyoke	Northampton	Amherst	UMass Amherst			
Equipment vendor experience	20									
Bicycle/station durability	20									
Operations costs	20									
Equipment costs (gross costs per bike)	10									
Ability to expand reach of transit	5									
Ability to expand mobility for low-income populations	5									
Ease of use	5									
Site planning challenges	5									
High visibility and "brandability"	5									
Interoperability with other systems	5									
TOTAL MAX SCORE:	100									

Motivate									
Criteria	Max Score	Committee Members							AVERAGE:
		PVPC	Springfield	Holyoke	Northampton	Amherst	UMass Amherst		
Equipment vendor experience	20								
Bicycle/station durability	20								
Operations costs	20								
Equipment costs (gross costs per bike)	10								
Ability to expand reach of transit	5								
Ability to expand mobility for low-income populations	5								
Ease of use	5								
Site planning challenges	5								
High visibility and "brandability"	5								
Interoperability with other systems	5								
TOTAL MAX SCORE:	100								

Bewegen										
Criteria	Max Score	Committee Members								AVERAGE:
		PVPC	Springfield	Holyoke	Northampton	Amherst	UMass Amherst			
Equipment vendor experience	20									
Bicycle/station durability	20									
Operations costs	20									
Equipment costs (gross costs per bike)	10									
Ability to expand reach of transit	5									
Ability to expand mobility for low-income populations	5									
Ease of use	5									
Site planning challenges	5									
High visibility and "brandability"	5									
Interoperability with other systems	5									
TOTAL MAX SCORE:	100									

5. Draft Conclusion and Next Steps

This Technical Memorandum outlines an assessment for a business and equipment model for the creation of a bike share program in the Pioneer Valley. It follows up on the Bike Share Feasibility Study written in March 2015 by the Pioneer Valley Planning Commission.

The recommended system will consist of a Phase I launch of up to 24 stations and 216 bikes at key locations in Springfield, Holyoke, Northampton and Amherst. Station sites will include a mixture of sidewalk and on-street sites at transit hubs, train stations, college campuses, business districts and important destinations. The intent is to enhance mobility between those locations, promote active transportation/public health, economic vitality in the service area and to brand the Pioneer Valley as a region promoting livability and sustainability.

A five-year analysis of system costs and revenue for a two-phased approach indicates that the costs of purchasing, launching and operating a program to be \$4.5 million for lower-cost, “smart lock” equipment and \$8.4 million for higher-cost, dock-based equipment. In either scenario, the costs over this five year period will be offset by up to \$2 million in system revenue through user fees. The rest will come from a combination of federal grants, sponsorships, advertising revenue and perhaps, from municipalities’ capital budgets. Based primarily on the potential for a dock-based system to require expenditures from local governments, it is likely that the lower cost “smart lock” equipment is the best fit for the Pioneer Valley. There are now a handful of manufacturers of such equipment (some domestic, some European) that make a durable and quality product. In just the past year, a handful of cities in North America have successfully launched smart lock bike share systems. Some cities, such as Phoenix and Topeka KS have already announced their intent to expand in their second full year of operations. This recommendation will need to be confirmed by the Bike Share Steering Committee who oversees this planning and implementation effort.

Regardless of the equipment model selected, municipal ownership of the equipment with operations by a private vendor is recommended. Each of the four participating cities and towns will own the equipment that sits within their jurisdiction, but must agree to the likelihood that bicycles may on occasion be ridden to neighboring jurisdictions. As a regional system, this will be the reality. Helping to negotiate this and other issues will be a Regional Oversight Committee (ROC) to be chaired by the Pioneer Valley Planning Commission. An important part of the ROC will be the operations vendor who will need to negotiate performance measures and fees with each individual municipality.

Next Steps

There are a number of critical steps that should be taken to ensure an orderly transition from concept to fundraising to equipment selection/purchase to launch. Though some deviation is possible, following the steps outlined below will be an effective means of moving forward with the program in the latter half of 2016 or 2017.

Steps Already Complete:

- Completion of Bike Share Feasibility Study (March 2015)
- Maintaining Bike Share Steering Committee with regular meetings
- Submit application for CMAQ grant for capital funding
- Research equipment options, issue an RFI and invite vendors to demo product to committee
- Equipment demonstrations from multiple bike share vendors

Next Steps (12-24 month timeline, total)

1. Begin search for title or presenting sponsor at \$125,000-250,000/year (using low/high cost equipment estimate range as a placeholder)
 - a. Alta Planning + Design to develop sponsorship handout and Powerpoint presentation extolling the benefits of bike share sponsorship
 - b. Gather names and contact info for high-level decision makers at area corporations and institutions; Alta to work with Bike Share Steering Committee members to facilitate introductions and begin outreach for seven meetings/presentations
 - c. Maintain an on-going database of potential sponsorship contacts
2. Create an organizational structure for bike share program management:
 - a. Recommendation: Finalize the current Partnership Agreement MOU and, most critically, establish the Lead Party and Program Administrator
 - b. Alternative: Form a new non-profit and establish a governing Board of Directors for the nonprofit; seek 501c3 status
3. Schedule a public meeting in each of the four interested communities to discuss preferred equipment options, the bike share service area, and general station placement
4. Lead Party and Program Administrator to select staff lead or hire an Executive Director (part time or full time, depending on available funds that may need to be raised through sponsorship)
5. The municipal agency staff lead to develop an RFP for equipment and operations, either combined or as separate RFPs
6. The municipal agency staff lead or new Executive Director to continue outreach to potential sponsors (both title/presenting and, later, for individual stations)
7. After selection of equipment provider and with capital and operations funding in place:
 - a. Secure insurance through the operator (if a private vendor), or by the non-profit if that alternative governance is selected
 - b. Develop equipment purchase order and lease warehouse
 - c. Maintain ongoing branding and marketing of bike share regionally
 - d. Develop program name, color scheme and logo
 - e. Establish program web site
 - f. Hire full and part-time staff support (2-3 mechanics, 2-3 rebalancing crew, dispatcher, director of marketing/member relations)
 - g. Pre-launch marketing (to build awareness and bring in early adopters as members)
 - h. Assemble and install equipment
 - i. Launch event/celebration

Numerous cities in the United States recognize the health, mobility and economic benefits of bike sharing. Cities and towns in the Pioneer Valley share some of the key characteristics required to make a bike sharing program successful. With on-going commitment from the local jurisdictions and regional leaders, a modest size bike share system will continue to enhance the quality of life in the Pioneer Valley.