

# TUCSON BIKE SHARE

## Business Model and Financial Analysis

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## I. BUSINESS MODEL ANALYSIS

One of the key decisions of this study is to select a business model for the program. In general, the following functions are required to mobilize and operate a bike share system:

- Obtain political, public, and other support.
- Raise funds for initial capital and early operating costs.
- Procure the equipment vendor and the operator.
- Administer contracts with the equipment vendor and the operator.
- Own and maintain the system and its assets.
- Evaluate and expand the system.

These functions could be undertaken by one or more organizations. Existing U.S. bike share programs operate under different business models depending on the jurisdiction's funding environment, institutional capacity, and local transportation needs. The relationship between system owners and system operators in U.S. bike share systems is shown on **Figure 1**. The most common models are those owned by cities and operated by a private contractor, non-profit owned and operated, and privately owned and operated.

The role of the city, non-profit, and private sectors in owning and operating a potential bike share program in Tucson is evaluated in **Table 1** in terms of key operating criteria (such as funding and implementation) and local priorities identified by regional stakeholders. The evaluation criteria included:

- Who will own the system and be responsible for fundraising capital funding?
- Who will operate the system and be responsible for fundraising operations funding?
- What potential funding sources are available under this business model?
- What is the organizational capacity and interest for this model?
- Does the model allow for quick and nimble mobilization?
- How does the model meet local priorities including:
  1. Bike share complementing and extending transit services.
  2. Introducing new riders to bicycling and increasing the importance of bicycling to Tucson.
  3. Ensuring the system is accessible and affordable to all individuals, regardless of socio-economic standing.



Figure 1: Relationship between System Owners and System Operators in U.S. Bike Share Systems.

Table 1: Evaluation of Potential Ownership and Operations Models in Tucson

Model	Fundraising Responsibility	Potential Operating Models	Potential Funding Sources	Organizational Interest / Capacity	Speed / Nimbleness	Priority #1: Complement Transit	Priority #2: Promote Bicycling	Priority #3: Affordability and Accessibility	Other	Examples
<b>Non-profit owned</b>	Nonprofit with City support	Nonprofit or private contractor	● City, state, federal, private, foundations, sponsorship.	● Interest or capacity may already exist or could be created with a new non-profit.	● Significant time may be needed to identify or create a new nonprofit.	● Important to the success of the system, but not a primary mission. Wider transit decisions out of the control of the nonprofit.	● Important to success of the system, but not a primary mission. Wider decisions on bicycling out of the control of the nonprofit.	● Pricing structure can be controlled. Social equity is consistent with the community responsibilities of a nonprofit.	Broad community support for nonprofit partnerships.	Salt Lake City GREENbike, Denver Bike Sharing, , Nice Ride Minnesota (Minneapolis).
<b>City owned</b>	City	Private contractor	● City, state, federal, private, sponsorship.	● City has proven interest in similar programs. Would need to add staff. Significant political support.	● No agreements / contracts required.	● Transit services managed by City. Transit decisions could include consideration of bike share.	● City places high priority on bicycling infrastructure. Bicycling policy decisions could include consideration of bike share.	● Fee structure can be controlled. Social equity is consistent with City goals and responsibilities.	Maximizes transparency of financing and decision making.	Chattanooga Bike Transit System, Capital Bikeshare (Washington D.C.); Hubway (Boston), San Antonio B-Cycle

Model	Fundraising Responsibility	Potential Operating Models	Potential Funding Sources	Organizational Interest / Capacity	Speed / Nimbleness	Priority #1: Complement Transit	Priority #2: Promote Bicycling	Priority #3: Affordability and Accessibility	Other	Examples
<b>Privately owned and operated</b>	Private contractor	Private contractor	● Private, sponsorship.	● Interest will depend on financial performance evaluation and fundraising capacity. Staff capacity can be created.	● Procurement will be required to select contractor. Capacity can be determined through this process.	● Important to the success of the system, but not a primary mission. Wider transit decisions out of the control of the contractor.	● Important to success of the system, but not a primary mission. Wider decisions on bicycling out of the control of the contractor.	● Price structure may need to reflect financial performance. Expansion likely to be demand-driven.	Private sector brings established skills and experience.	Phoenix Grid Bike Share; DecoBike (Miami); Citi Bike (NYC)

**Legend:** ○ least favorable for this category    ◐ Somewhat favorable    ◑ Average    ◒ Favorable    ● Most favorable for this category

## Non-Profit Organization

A non-profit organization is a solid candidate to own and manage the bike share program, operate the program, or both. The selection or creation of a non-profit organization specifically charged with managing bike share has been a prevalent means for small- to medium-sized cities to implement bike share programs. Funding for equipment typically comes to the non-profit in the form of public, private and philanthropic sources. The ongoing financial liability for operations and additional equipment falls to the non-profit organization. As a result of the constant fundraising need, significant managerial staff time may be committed to this activity.

While non-profit organizations tend to be nimble and adaptive, the creation of such an entity may require organizational and possibly financial support from a local government agency in its first few years. There are also some issues with organizational capacity as the non-profit will often also be responsible for operations and potential expansion as well as fundraising and sustainability.

Examples of non-profit owned and managed programs include Denver BCycle (Denver, CO) Nice Ride Minnesota (Minneapolis-St. Paul), and Salt Lake City GREENbikes. An example of a non-profit owned and privately operated program is Seattle's Pronto bike share system.

**Advantages:** fundraising diversity, community-oriented mission of the non-profit organization aligns with many of the goals of bike sharing, transfers risk and ongoing financial responsibility away from the City, maintains some level of transparency through board representation and public reporting requirements, profits are reinvested into the system, operations costs can be low because of in-kind donations, non-existent service levels and lower wages and salaries.

**Disadvantages:** significant capacity building required, skills and experience will need to be learned over time, typically no performance standards for operations, longer timeframe for non-profit organization creation and capacity building, no obvious candidate for an existing non-profit in Tucson to be a non-profit owner. It is possible to help with capacity building if a new non-profit is housed in or strongly assisted by a new non-profit or the City.

## City

Another prevalent business model in U.S. bike share systems is for the City to own the program and administer a contract with a private organization to operate the system. Under City ownership, the City is responsible for fundraising and owns the system infrastructure including the stations and bikes. The agency can decide which other functions it takes responsibility for and which it contracts to a third party (e.g., marketing and promotions, operations, etc.).

The City can access and program various sources of federal funding including Surface Transportation Program (STP) funds, Transportation Alternative Program (TAP) funds, FTA funding sources, health related grants (such as the Centers for Disease Control), and possibly in the future will have access to Congestion Mitigation Funds if Tucson falls out of compliance for air quality. Furthermore, with its

existing relationships with local stakeholders, funders, and sponsors the City may be able to access additional private funds.

By directly managing the program, the agency would maintain full control over setting performance and operating standards as well as making decisions on where the program expands. This could also ensure a closer coordination with transit. Staff capacity (more than likely a dedicated full time position) would be required to manage the program.

In hiring a private operator, the private sector brings established skills that would need to be learned in a non-profit operated model. This model has been implemented in all the transit services available in Tucson, including Sun Tran and Sun Link.

Examples of agency owned and privately operated programs include Capital Bikeshare (Washington D.C.) and Hubway (Boston).

**Advantages:** maximizes agency control and transparency, offers fundraising diversity, organizational goals align with promoting greater use of bicycling and transit and supporting broader transportation goals, profits can be reinvested into the system, and makes use of the established skills of private operator.

**Disadvantages:** risk and ongoing financial responsibility are taken on by the City, some difficulty in spanning jurisdictional boundaries (similar to other transit functions performed by the City), private contracting for operations can be more expensive than direct operations.

## Private Sector

The private sector brings established skills and experience to both ownership and operation of a bike share program. Phoenix Grid Bikes launched a completely private program in November 2014 but was more than a year delayed and is not yet up to the projected system size. It is not known whether the same vendor from Phoenix or other vendors may be interested in operating a private system in Tucson.

In a privately owned bike share system, the City would need to be involved in the initial procurement and contracting process and in initial planning and permitting of stations in the public right-of-way. Some cities have also included some sort of profit sharing arrangement. The private company is responsible for all fundraising including for capital and operations as well as for implementing and operating the system. Funding sources are more limited under this arrangement, e.g., grant funding and private foundations may not be eligible funding sources.

However, the private sector brings established skills in fundraising, marketing, and operations that would need to be learned in a city or non-profit operated model. This model will depend entirely on the interest of a private company and the potential financial performance of the system. In many smaller and mid-sized communities, this interest has not materialized.



**Advantages:** removes risk and financial responsibility from the City if the private sector is interested in owning the system, private operator motivated to ensure visible success of the program (i.e. high ridership and profitability), makes use of established skills in the private sector.

**Disadvantages:** minimal agency control and less transparency than other models, traditional funding options may be limited or difficult to obtain for a private company, agency has less control over use of profits, typically oriented to market-driven expansion of the system making it difficult to achieve accessibility goals, many privately funded and operated systems have either not come to fruition (Los Angeles), been delayed, or launched as smaller systems than promised when the expected sponsorship and advertising has not materialized (e.g., Phoenix, Tampa, Orlando, Providence).

## Recommendation

There are advantages and disadvantages to all of the business model types. However, the evaluation included in this study shows that a City owned and managed system with a private operator would best meet the needs of the program and the priorities identified by local stakeholders. This structure models the types of contracts that the City already has for several different transit services, as detailed below.

This model is dependent on organizational interest and capacity within the City. This will require dedicated staff to fund raise, navigate the procurement process, undertake contract negotiations, administer the operating contract, and evaluate and set the direction of the program. If there is not the organizational interest and capacity within the City, a non-profit structure with significant support from the city would also work well. The City could provide fundraising and site planning assistance to the non-profit, and retain seats on the Board of Directors to ensure the non-profit is carrying out the goals of the program.

Following are some details on the City owned and managed system with a private operator.

## Financial Responsibility

In this model, the City is the owner of the assets of the system. It is the City's responsibility to ensure that there are enough funds available for capital and operations for initial launch, expansion and ongoing support. As discussed in more detail in Business Plan, these funds have different sources for different uses, and will be a mix of public and private funding. This means that, on an ongoing basis, the City is responsible for the profit and loss of the system, and for filling any gaps between system revenue and operating expenses. This also includes negotiating the operating contract with a private contractor and managing ongoing costs to ensure the P&L balances.

## Fundraising

The City will undertake fundraising for the system, including procuring federal or state funding for capital and installation (to date, there are no federal sources for operations), procuring sponsorship for the system from private organizations and potentially finding other sources of funding such as philanthropic sources.

## Public Relations

As the system owner, the City will be the public face of the system. City representatives will be the predominant voice for the press. In any model, this is a strong role for the City, as it obtains significant earned media and is effective at keeping marketing costs low. In this role, the City would also be the core contact for community groups, businesses, and other major stakeholders particularly during system launch, although it is expected that the private contractor would provide significant support to the City in any public outreach program. The private contractor will manage social media accounts on behalf of the City, and messages must be coordinated between the City and the contractor.

## Procurement

The City will undertake a procurement process that will fulfill its own Request for Proposals (RFP) requirements and any requirements of its funding. This procurement will be for bike share equipment and operations, and could be issued together or separately. To date, most procurement processes in the US have coupled equipment and operations, although a few have separated out the different functions.

It is our understanding that Tucson can add onto the Phoenix Grid Bike Share contract with no procurement process. If the City decides that the same technology and operations as Phoenix is desired, it should research in detail the flexibility it has in potential business models open to it. In this scenario, the City would bypass the lengthy procurement process, but may lose negotiating leverage on pricing, technology and service levels in a sole-source contract.

## Staffing

Staffing will be required to fundraise, procure and manage the system. It is anticipated that a full-time staff person employed by the City would be required during the launch phase, and that this person's role would only require 50-percent time after the system launches.

## Site Planning

Funding is already secured to support site planning for the first phase of a system. A private contractor will undertake the technical aspects of bike share site planning, including system mapping, fieldwork and design drawings, but will require significant input from the City. The City will help move bike share site permits through the City permitting process, lead public outreach related to station locations, and have final approval over the sites chosen for stations. The private contractor will undertake negotiations and licensing for private property sites with input from the City.

## Insurance Liability

The private contractor will have an insurance plan with coverage of various types, including general liability overall and a per-occurrence limit, umbrella, property insurance for the bike share equipment, workers compensation and auto insurance. The private contractor will indemnify the City, any sponsors and any private property owners on which bike share stations are located from liability should there be any lawsuits against the bike share system. Insurance limits for the system must be balanced so that the insurance is not prohibitively expensive, but leaves little overall risk for the system. The City Attorney's office should be included in establishing these limits, as well as the indemnification language.

## Contract Type

The City already has similar private company operations for its transit services – Sun Tran, Sun Van and Sun Link. In these services, the City owns the assets and has entered into Management Contracts with different service companies to manage the operations of the transit systems. Because of Arizona state regulations about negotiating with unions, the City has used the specific structure of Management Contracts. The private companies have only a few employees who act as senior management of the transit operations. They have set up standalone companies who house all the operations employees. The management companies are responsible for the performance of the systems, and undertake union negotiations, if the employees are unionized. The City manages the policies of the transit systems.

Another option, which has been undertaken by RTA, the Regional Transit Authority, is Operating Contracts. For these contracts, Sun Shuttle and Sun Shuttle Dial-A-Ride, RTA pays operating companies a fee to own and operate the system. RTA does not own the assets in this scenario and does not pay the upfront capital costs, but pays the operator on a regular basis. Although such a contract structure can be an attractive option, and is a mixture of a publicly and privately-owned system, this structure has not been implemented to date in US bike share systems. However, it could be considered in Tucson.

Neither of these contract types is consistent with how bike share systems have been implemented in the US to date, but if it is required by state regulation, the Management Contract structure is recommended. Unions have formed in bike share operations in New York, Boston, Washington D.C. and Chicago, but it is not yet clear whether this is a national trend, or events specific to one operating company.

## Summary

Overall, a City owned and managed system with a private operator would best meet the needs of the program and its priorities. However, as detailed above, it requires strong commitment by the City. The expected shortfall for the first phase is \$270,000 per year. Sponsorships and marketing can help close the funding gap. Many cities have opted to launch bike share recognizing the risk because they believe the benefits of bike share outweigh the risk.

This business model has been successful in many communities around the country, including Washington D.C. and Boston, but has been less prevalent in smaller communities to date. Its biggest disadvantage is that this model is more expensive than the other models (because of the private operator), requiring a higher level of funding to sustain it over the long term. However, the funding risk can be lowered through creating reasonable service levels and a contract structure with the private operator with incentives for creating more efficient operations.

## II. FINANCIAL ANALYSIS

This **section** explores the financial needs and performance of a potential bike share program in Tucson and recommends a plan for pursuing required funds. A financial pro-forma was prepared to understand the capital, installation, and operating costs of the proposed bike share system and to forecast potential revenues. The pro-forma evaluates a five-year initial operating period, which is a typical contract length for bike share in the United States. It also considers the sensitivity of a number of the assumptions used in the financial pro-forma, such as the impact of lower or higher than expected ridership.

The funding plan uses the results of the financial analysis to understand the level of funding that is expected to come from membership and user fees and explores what other funding sources are available to meet capital and operating requirements. This includes a review of possible federal and state funds, local public funding, as well as the role of advertising or sponsorship.

### Financial Pro-Forma

The financial pro-forma includes a five year evaluation of expected program costs and revenues starting from 6 months before system launch, a typical timeline for equipment manufacture and installation. It includes numerous inputs. Where these variables were unknown, information was gathered from membership, ridership and financial data of the peer cities chosen for this study, as shown below in **Table 2**.

### System Size and Phasing Assumptions

A total system size of 80 stations implemented over three phases, as recommended in the *Bike Share Feasibility Study*, was used to develop the financial pro-forma. Ratios of 10 bikes per station and 1.7 docking points for every bicycle were used in this analysis, as this ratio allows for some percentage of the bikes to be in repair, and keep the on-street ratio at approximately 2:1, which is typical of the peer cities. The phasing assumptions used in the business model are shown below in **Table 3**.

**Table 2: Recommended System Size**

Phase	Description	Stations	Bikes	Docks	Installation
1	Downtown, University, and inner neighborhoods	30	300	510	Q1 Year 1
2	Infill and extension into inner neighborhoods	30	300	510	Q1 Year 3
3	Broadway Corridor	20	200	340	Q1 Year 5
<b>TOTAL</b>		<b>80</b>	<b>800</b>	<b>1,360</b>	

### Business Model Assumptions

The financial model assumes that the system is owned by an agency and operated privately. If an agency were to operate the system directly, costs may adjust downward because in-kind donations and/or efficiencies could be found via utilizing internal resources.

The pro-forma includes agency costs, such as the salaries of the contract manager for the bike share program. Funding for these positions will be needed. Operating costs would need to be revised if the model is different than assumed.



Table 3: Characteristics of Comparable Bike Share Systems

	Denver, CO	Minneapolis, MN	Salt Lake City, UT	San Antonio, TX
System Name	Denver Bikesharing	Nice Ride Minnesota	GreenBike SLC	San Antonio B-cycle
Start Date	April 2010	June 2010	April 2013	March 2011
Technology	Smart Dock	Smart Dock	Smart Dock	Smart Dock
<b>SYSTEM STATISTICS</b>				
Number of Bikes	709	1,328	65	450
Number of Stations	82	146	11	53
Bikes per station	8.6	9.1	5.9	8.5
Service Area (sq. mi.)*	12.8	34.0	2.0	13.2
Docking Point:Bike Ratio	1.8	1.9	1.9	1.8
Station Density (stations per sq. mi.)**	6.4	4.3	5.5	4.0
<b>MEMBERSHIP</b>				
Cost of Annual Membership	\$79	\$65	\$75	\$80
Cost of 24-Hour Membership	\$9	\$6	\$5	\$10
Usage Fees	<b>All:</b> First 30 minutes free; \$1 (31-60 minutes); \$4 (per additional 30 minutes)	<b>Annual members:</b> first 60 minutes free; \$3 (60 – 90 minutes); \$6 (additional half hours) <b>Casual users:</b> first 30 minutes free; \$1.50 (30-60 minutes); \$4.50 (60-90 minutes); \$6 (additional half hours) <b>Daily maximum:</b> \$65	<b>Annual members:</b> first 60 minutes free <b>Casual users:</b> first 30 minutes free <b>Usage fees:</b> Additional 60 minute increments: \$3 <b>Daily maximum:</b> \$72	<b>Annual members:</b> first 60 minutes free <b>Casual users:</b> first 30 minutes free <b>Usage fees:</b> Additional 30 minute increments: \$2 <b>Daily maximum:</b> \$35
Casual Members	51,153	54,451	9,689	26,031
Annual Members	4,023	3,500	308	1,824
<b>RIDERSHIP</b>				
Total Annual Trips	263,110	274,047	25,968	65,560
Annual Member Trips	165,897	170,197	n/a	n/a
Annual Casual Trips	97,213	103,850	n/a	n/a
Trips per Bike per Day	1.02	0.92	1.55	0.4

	Denver, CO	Minneapolis, MN	Salt Lake City, UT	San Antonio, TX
<b>FINANCIAL</b>				
Capital Funding	Grant from Democratic National Convention, Federal grant	Federal grant and sponsorship	Federal and state grants	Federal and state grants
Operating Funding	System revenues and sponsorship	System revenues and sponsorship	System revenues and sponsorship	System revenues and sponsorship
Operating Cost per Dock per Month	\$90.05	\$124.55	\$209.28	\$92.38
Farebox Recovery	64%	54%	33%	48%
<b>BUSINESS MODEL</b>				
Equipment Owner	Non-Profit	Non-Profit	Non-Profit	Agency Owned
Operator	Non-Profit	Non-Profit	Non-Profit	Non-Profit
Impetus Driven By	City	Non-Profit	City	City staff
City Role	Represented on Board; staff support	Mayor serves as a Board member; funding partner	Founding partner; Mayor serves as a Board member, funding partner	Office of Sustainability oversees the operating contract and seeks capital funding
Role of Others	Variety of public / private Board members representing different sectors and skill sets	Variety of public / private Board members representing different sectors and skill sets	System operated by Downtown Alliance; Other Board members include Chamber of Commerce, Tour of Utah, Visit Salt Lake, transit agency, and others	Non-profit Board consists of mainly private sector, but has a variety of skill sets.

### Capital, Installation and Pre-Launch Costs

This analysis includes capital and installation costs for both smart bike and smart dock technologies. Please see the *Bike Share Feasibility Study* for further explanation and analysis of the advantages and disadvantages of each type.

Based on an average of recent prices for the major bike share smart dock equipment vendors in the United States, a 10 bike / 17 dock station represents a total cost of \$42,000 per station that includes the base equipment plus shipping and other fees, spare parts, system keys, stickers and a system map. For smart bike, an assumption of \$2,600 per bike was included (which includes \$100 per bike for shipping). This price can vary widely depending on how many walk-up kiosks and specially designed bike racks are included. For a pure smart bike system with no kiosks and specialized racks, the price will be less expensive. The assumption for this model is that there are the same number of kiosks as in the smart dock system, and that the ratio of specialized racks to bicycles is 1.7:1.

In both cases, the pro-forma includes \$1,000 per station for installation, which includes travel for the equipment vendor, and any extra labor and equipment not provided by the equipment vendor. It also includes \$2,000 per station if site planning and permitting is contracted to a third party. These costs are based on rates quoted in other cities.

The financial model includes a series of system startup costs totaling \$230,000 during the pre-launch period. These costs include:

- Six months' salary for the operator's senior management and administration staff.
- Administrative costs such as insurance, legal, and accounting.
- Marketing costs such as hiring an agency to establish the name and brand of the system, website development, and marketing materials (brochures, collateral, etc.) and event staff.
- Direct operational costs such as real estate acquisition for this period, vehicle costs, purchase of uniforms and equipment and employee training.
- Staff costs for a full-time agency employee for one year of work, who will undertake system procurement, site planning, public outreach and funding.

**Tables 4 and 5** show the capital and installation costs for both a smart dock and smart bike system.

**Table 4: Capital, Installation and System Startup for a Smart Dock System**

Capital Costs – Smart Dock						
	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Capital Purchase and Installation	\$1,350,000	-	\$1,430,000	-	\$1,015,000	\$3,795,000
System Startup	\$230,000	-	-	-	-	\$230,000
Agency Administrative Costs, Pre-Launch	\$85,000	-	-	-	-	\$85,000
<b>Total Capital Cost – Smart Dock</b>	<b>\$1,665,000</b>	<b>-</b>	<b>\$1,432,000</b>	<b>-</b>	<b>\$1,015,000</b>	<b>\$4,110,000</b>

**Table 5: Capital, Installation and System Startup for a Smart Bike System**

Capital Costs – Smart Bike						
	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Capital Purchase and Installation	\$780,000	-	\$830,000	-	\$585,000	\$2,195,000
System Startup	\$230,000	-	-	-	-	\$230,000
Agency Administrative Costs, Pre-Launch	\$85,000	-	-	-	-	\$85,000
<b>Total Capital Cost – Smart Bike</b>	<b>\$1,095,000</b>	<b>-</b>	<b>\$830,000</b>	<b>-</b>	<b>\$585,000</b>	<b>\$2,510,000</b>

### Operational Costs

The pro-forma includes operational costs after the “go-live” date that represent everything needed to keep the system operational, including rebalancing, bike maintenance, station maintenance, customer service, software support, reporting, insurance and all other day-to-day operations. The cost of marketing the system is included in the pro-forma. The operational cost is presented on a per-dock-per-month basis. This approach is taken for several reasons:

- Docking points are the most accurate representation of a system size, and represent stable infrastructure, as opposed to a bike fleet, which varies on a daily basis due to repairs, rebalancing and seasonality.
- Data is available for this metric from several system contracts around the country.
- It is easily scalable as the system expands.

The pro-forma assumes a per-dock-per-month general operating cost of \$96 in the first year. Systems operate anywhere between \$38 and \$120 per dock per month. The operating cost will ultimately be determined by (1) the wages and salaries offered by the operator; (2) the level of service and intensity of system rebalancing required; and (3) operational efficiencies that can result in cost reductions (e.g., in-kind donations, use of City-owned property for operating space, etc.). A certain amount of spare parts replacement will be covered by warranty and/or equipment insurance and therefore is not included in the financial model. However, some annual spare parts and bike replacement has been included for theft, vandalism and regular wear and tear.

Using these per-dock-per-month operating costs, annual operating costs average approximately \$620,000 per year for Phase 1 (not including agency administrative costs) and total approximately \$3.1 million over the first 5 years of the program for Phase 1. These costs grow as the system grows to Phases 2 and 3, to \$1.2 million per year for Phases 1 and 2; and \$1.8 million per year for the full system.

Agency administrative costs - \$85,000 for a full-time City staff person during the one year pre-launch and \$42,500 per year for a half-time commitment after the system is launched – are not included in the operating cost. Funding for this position may come from a different source to the operating fund.



## System Revenue

There are three basic drivers of system revenue: annual membership, casual membership, and usage fees. For revenue forecasting, the pro-forma assumes the rate structure shown in **Table 6** that is based on similar pricing structures in other bike share systems. The model of a membership fee, free-ride period, and usage fees for longer rides, has some shortcomings – such as being a potential barrier to entry for lower socio-economic populations. Some communities, such as Philadelphia, are exploring different pricing structures such as a monthly fee with a certain amount of free “minutes” (similar to a cell phone plan) or a “per ride” trip fee (similar to how transit is priced). Regardless, for this analysis, the traditional pricing structure has been assumed as there is significant data to support related membership and ridership assumptions using this structure.

**Table 6: Suggested Fee Schedule for Tucson Bike Share**

Access Fee		Usage Fees	
		0-30 mins	Additional Half Hours
Annual	\$75	\$0.00	\$4.00
24-hour	\$8		

Revenue drivers and their related model inputs are summarized in **Table 7** and are based on trends observed in peer cities.

**Table 7: Performance Metrics for Case Study Bike Share System and Tucson Model Inputs**

	Denver Bikesharing	Minneapolis Nice Ride	Salt Lake City	San Antonio	Model Input	Comments
Annual members / bike / 100,000 population	0.9	0.6	0.4	0.3	0.5	Average
Casual members / station	623	373	1077	491	641	Average
Trips per casual member	1.8	1.9	1.9	n/a	1.9	Average
Trips per annual member	41	49	44	n/a	45	Average

n/a = Data not available

### Annual Membership Revenues:

- Annual membership fee: the model assumes a \$75 fee to become an annual member. This amount is in the range of current fees in the U.S.
- Annual members per bike per person: the model assumes that the system will have 0.5 persons / bike / 100,000 residents (based on city population) purchasing annual membership and growing 10% annually. This does not include any special membership promotions or group sales to increase membership.

### Casual Membership Revenues:

- Casual membership fee: the model assumes an \$8 daily fee to become a 24-hour member. This amount is in the range of current fees in the U.S.
- Casual members per station per year: casual members typically find out about a bike sharing system by seeing a station. Therefore, the pro-forma uses the metric of casual members per station to estimate casual membership. The model assumes that Tucson will annually attract 641 casual members per station.

### Usage Fees:

Available data from other U.S. systems was used to estimate revenues coming from the system including:

- Rides per member: data shows approximately 45 rides per year per annual member amongst peer cities. For casual members, data show approximately 1.9 rides per member. These have been used to calculate ridership for Tucson.
- Percent of rides incurring usage fees: data show that approximately 30% of casual trips and 2% of member trips incur usage fees. These numbers are consistent across the systems for which data is public.
- Average usage fee incurred: the average usage fee incurred for annual members ranges from \$4 to \$6 for annual members and \$6 to \$10 for casual members. The pro-forma assumes an average usage fee of \$5 for annual members and \$9 for casual members.

### Forecast Results

Using the inputs above, the pro-forma was prepared to forecast membership, ridership, capital and installation costs, annual operating costs and system revenues. The output was checked against metrics from peer cities (see **Table 8**) to ensure consistency with actual results and then analyzed to understand the funding needs for capital and operations.

**Table 8: Performance Measures for Case Study Bike Share Systems and Tucson Model Results**

	Denver Bikesharing	Minneapolis Nice Ride	Salt Lake City	San Antonio	Peer System Averages	Model Output
<b>Trips per Bike per Day</b>	1.0	0.9	1.6	0.4	<b>1.0</b>	<b>0.7</b>
<b>Annual / Casual Ridership Split</b>	63%/37%	62%/38%	NA	NA	<b>62.5%/37.5%</b>	<b>52%/48%</b>
<b>Farebox Recovery<sup>1</sup></b>	64%	54%	33%	47%	<b>49%</b>	<b>53%</b>

<sup>1</sup> Farebox recovery is the amount of operating cost recouped by membership and usage charges.

The forecast results are summarized in **Table 8** including the following metrics:

#### **Membership and Ridership Metrics:**

- Trips / bike / day: used globally to measure system usage. The pro-forma predicts an average ridership of approximately 0.7 trips per bike per day over five years. This is slightly less than the 1.0 trips per bike per day which is the average of the peer systems.
- Percentage of casual and annual member rides: the forecast output predicts a split of approximately 48% of rides made by casual members and 52% by annual users.

#### **Financial Metrics:**

- Farebox recovery: this factor is important in understanding the financial needs of the system. The pro-forma shows that approximately 53% of operating expenses will be recouped through membership and usage fees. This is similar to the peer cities.
- User revenue split: user revenues are expected to be split approximately 23% from annual membership sales / 46% from casual membership sales / 31% from usage fees. Data for this metric is not released by all cities, however, in many cities this split is approximately 33% / 33% / 33%. The forecasted split in Tucson is weighted more towards visitors, but is reasonable because of the significant visitor population.

A summary of the five year funding need for implementation of the phased bike share system in Tucson includes:

- Capital and Installation Costs: \$1.1 million for smart bike or \$1.7 million for smart dock to implement Phase 1, which includes capital, installation and system startup. This would be \$2.5 and \$4.1 million respectively to implement the full system.
- Operating Costs: \$620,000 per year for Phase 1, which includes operating costs and system upkeep, for a total of \$3.1 million during the first five years of operation for Phase 1, and \$5.5 million for 5 years for the full system.
- Agency Administrative Costs: \$85,000 for a full-time employee during the one year pre-launch (included in the system start-up cost above) and \$42,500 per year for half-time commitment after system operations for a total of \$225,000 for five years.
- Revenue: \$320,000 per year earned in membership sales and trip fees for the Phase 1 system, for a total of \$1.7 million during the first five years of operation of Phase 1, and \$2.9 million over 5 years of the full system.
- Fundraising Need:
  - Phase 1 Capital: for smart bike, \$1.1 million for smart bike or \$1.7 million for smart dock.
  - Phase 1 Annual Operations: netting out the system revenue, \$1.4 million over five years for the Phase 1 system, or approximately \$280,000 per year, or \$933 per bike per year.
  - Phase 1 Agency Administrative Costs: an additional \$225,000 over five years will be needed to fund a half-time City staff person to administer the program.

Table 9: Forecast Membership, Ridership, and Financial Performance of the Tucson Bike Share Program

	Year 1	Year 2	Year 3	Year 4	Year 5	5-Year Total
<b>Stations</b>	30	30	60	60	80	80
<b>Bikes</b>	300	300	600	600	800	800
<b>Docks</b>	510	510	1,020	1,020	1,360	1,360
<b>Membership and Ridership</b>						
<b>Annual Members</b>	788	866	1,906	2,096	3,075	
<b>Casual Members</b>	19,230	19,230	38,460	38,460	51,280	
<b>Annual Member Rides</b>	22,503	37,688	68,685	91,204	122,289	342,369
<b>Casual Member Rides</b>	36,537	36,537	73,074	73,074	97,432	316,654
<b>Total Rides</b>	59,040	74,225	141,759	164,278	219,721	659,023
<b>Trips per Bike per Day</b>	0.72	0.68	0.65	0.75	0.75	0.69
<b>Operations</b>						
<b>Bike Share Operating and Agency Administrative Costs</b>	\$626,972	\$645,782	\$1,285,222	\$1,323,778	\$1,802,044	\$5,683,799
<b>Revenues</b>						
<b>Bike Share Revenue</b>	\$313,803	\$321,227	\$654,780	\$671,325	\$916,131	\$2,877,265
<b>User Fee Recovery</b>	54%	53%	53%	53%	52%	53%
<b>Operations Fundraising Need (does not include Agency Administrative Costs)</b>						
<b>Total Operating Fundraising Need</b>	\$(270,670)	\$(280,779)	\$(585,354)	\$(606,013)	\$(838,079)	\$(2,580,895)
<b>Per Bike Per Year</b>	\$(902)	\$(936)	\$(976)	\$(1,010)	\$(1,048)	\$(993)



Credit: Bike Chattanooga



## Sensitivity Analyses

The financial model shows that there is a funding shortfall, which is normal for bike share systems in similarly sized cities. Capital and installation costs, which are one-time costs, lend themselves to one-time funding sources such as grants and/or private donations. Nevertheless the choice of vendor or type of equipment (i.e., smart dock versus smart bike) may change the capital funding need.

Ongoing operating costs are more difficult to fund and typically rely on user-generated revenues and sponsorship. Therefore, reducing operating costs or increasing revenues will reduce the amount of funding required. While certain assumptions on pricing schemes were selected for the pre-forma to estimate cost, the bike share operator and City of Tucson decision-makers will select the pricing scheme that is best for Tucson prior to implementation.

A sensitivity test was conducted on the effect of varying assumptions in the financial model and the resulting impact on the second year operating fundraising need. For example, varying the annual membership price from \$60 to \$90 and the casual membership price from \$4 to \$12 yields a range of the second year operating funding need from \$190,000 to \$370,000 (between 33-percent and 60-percent of the base operating cost). Varying the uptake of annual membership from 0.3 to 0.7 annual members / bike / 100,000 population and casual members per station per year from 400 to 800 yields a range of the second year operating funding need from \$190,000 to \$403,000 (between 33-percent and 67-percent of the base operating cost). Finally, varying the operations cost per dock per month from \$76 to \$116 yields a range of the second year operating funding need from \$154,000 to \$407,000 (between 25-percent and 67-percent of base operating cost). The full sensitivity tables are shown in **Appendix A**.

The tests show that the factors that most influence operational funding need are:

- The operating cost per dock per month.
- The attraction of casual members (i.e., the number of casual members per station).
- The uptake and price of annual membership. This assumes no offset in demand from raising the price.

## Funding Plan

Beyond membership and usage fees, bike share systems in the U.S. have generally used three other types of funding: public, private, and advertising/sponsorship. While most programs use a combination of funding sources, generally, public funds and private foundation grants are used towards capital costs whereas membership and usage fees and advertising/sponsorship revenues are used towards on-going operating costs.

## Public Funding

Public funding sources include federal, state, and local funds. Federal funding opportunities include transportation, health, and sustainability programs from agencies such as Federal Highways Administration (FHWA), Federal Transit Administration (FTA), Centers for Disease Control (CDC), Department of Health and Human Services (HHS), and the Department of Energy. There are often additional requirements to the use of these funds such as use only for fixed equipment, “Buy-America”

provisions, NEPA requirements, etc. These funds are often less flexible in terms of timing. Approximately two-thirds of current bike share systems in the U.S. have used federal funding for capital costs.

The Federal Highway Administration has established a web page for addressing the U.S. Department of Transportation (USDOT) position on federal funding and bike share.<sup>2</sup> Bike share program capital costs are eligible under several federal-aid highway program categories. The following table reflects FHWA guidance that was updated June 13, 2013, to incorporate programs authorized under the Moving Ahead for Progress in the 21<sup>st</sup> Century Act (MAP-21).

**Table 10: Bike Share Eligibility by Federal Program (Capital and Equipment Costs; Operations not Eligible)**

Program	Fund	Applicability
FTA	Federal Transit Administration Capital Funds	YES
ATI	Associated Transit Improvement	YES
CMAQ	Congestion Mitigation and Air Quality Improvement Program	YES
HSIP	Highway Safety Improvement Program	NO
NHPP	NHPP/NHS: National Highway Performance Program (National Highway System)	YES
STP	Surface Transportation Program	YES
TAP	TAP/TE: Transportation Alternatives Program / Transportation Enhancement Activities	YES
RTP	Recreational Trails Program	NO
SRTS	Safe Routes to School Program	NO
PLAN	Statewide or Metropolitan Planning	NO
402	State and Community Traffic Safety Program	NO
FLH	Federal Lands Highway Program (Federal Lands Access Program, Federal Lands Transportation Program, Tribal Transportation Program)	YES
BYW	National Scenic Byways Program	NO
TCSP	Transportation, Community, and System Preservation Program	YES

Local public funding could also be considered. The City of Columbus used 100% local funds to cover the \$2.2 million capital and first year operating cost of their 30 station / 300 bike share system that launched in July, 2013. They did consider state and federal funding through the CMAQ program, but would not have been able to receive funds until 2016 and elected to use local funds to expedite the system launch.

### Private Funding

Private funding sources are various and include grants from private foundations, private gifts and donations from individuals, and private sector investment. These sources are used in many U.S. cities, e.g., private funding makes up approximately 5% - 10% of funding in Boulder and Denver.

Some other ways the private sector could get involved is through large membership commitments and programs offered by employers, universities, and the City. This could include:

<sup>2</sup> Frequently asked Questions and Answers concerning Bike Sharing Relative to the United States Department of Transportation  
[http://www.fhwa.dot.gov/environment/bicycle\\_pedestrian/funding/faq\\_bikeshare.cfm](http://www.fhwa.dot.gov/environment/bicycle_pedestrian/funding/faq_bikeshare.cfm)

- Bike share membership tied to existing transit pass programs, e.g., discounted memberships could be offered to university students through an increase to the student fee.
- Bike share membership could be added to the offerings available to city employees.
- Corporate membership programs can be used to build enrollment by offering reduced membership rates and the opportunity for employers to sponsor all or a portion of membership costs for their employees.
- Developer incentives and parking offsets could be used to create a mechanism for a development to contribute to capital funding for bike share (e.g., an amenity included as part of downtown residential redevelopment).
- Crowdsourcing through individuals donating or making contributions online. Kansas City B-Cycle recently raised \$400,000 to help expand their system.<sup>3</sup>

### Sponsorship / Advertising

Sponsorship and/or advertising are an important element of most U.S. bike share systems. It will be no exception in Tucson to help fund operations. There are several levels of sponsorship that other cities have been able to achieve. Examples for each of the different levels are shown on **Figure 2** and include:

- Title sponsorship: includes branding of all elements of the system including name, color, and representation on all sponsorship elements including at the station, on the bikes, on electronic media, and all other components. Title sponsorship has only been achieved in a few systems around the world – New York (Citi Bike) and London (Barclay’s Cycle Hire), which garner values upwards of \$1,000 per bike per year in those markets. Philadelphia recently signed a 5-year sponsorship for \$2,500 per bike per year for a title sponsorship.
- Presenting sponsorship: in these systems, branding is already developed, e.g., the bright colored bicycles and the name Nice Ride Minnesota in Minneapolis. A single sponsor (such as in Minneapolis or Boston) or multiple sponsors (such as in Montreal) purchase the right for system-wide logo placement, typically on all bicycle fenders or at all stations, and may negotiate for other sponsorship elements. In Minneapolis, Blue Cross Blue Shield has their logo and colors on every bike fender as well as placement on the program website and other media. However, other sponsorship opportunities are available to other organizations and bike and station sponsors can augment larger presenting sponsors. Presenting sponsorship garners in the order of \$400 to \$600 per bike per year.
- Individual sponsorship offerings: in this model sponsorship offerings are broken into individual elements and sold off to many smaller sponsors. This is often the model followed in the interim prior to presenting sponsorship (such as in San Antonio), but may also suit markets with smaller capacity or a desire for broader community support (such as in Boulder).

Overall, sponsorship will be required to support the bike share system in Tucson. The amount that will be able to be generated will depend on the specific assets offered (e.g., whether or not it can include an advertising panel). Based on the business pro-forma, Tucson requires \$280,000 per year in sponsorship

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<sup>3</sup> Neighbor.ly Helps Communities Build Better Towns. Accessed on May 16, 2014 at: <http://www.crowdsourcing.org/article/neighborly-helps-communities-build-better-towns-/21377>

to support the 300 bike system. This equates to approximately \$930 per bike per year. Local companies may be interested in sponsoring stations and larger sponsors (perhaps wanting to get exposure in the student market) may be interested in larger title or presenting sponsorships.

### Possible Funding Plan

The 30 station / 300 bike potential bike share system in Tucson will require approximately \$1.1 to \$1.7 million in capital funds (depending on smart dock or smart bike) and ongoing operating funds of approximately \$280,000 per year over five years. The following chapter recommends a potential funding plan for the system and the potential commitments from local agencies, sponsors and major stakeholders.

### Capital Funding

Grant funding should be sought to fund the initial capital for the system. In Arizona, the local match for STP or TAP funding is 5.7%. Therefore, an application should be submitted for \$1,600,000. Aiming for the higher number, the system could be smart dock, and if a smart bike system is chosen, it could be larger than originally planned. A local match of \$100,000 would be required. This local match could come from city, sponsorship or private funding.

Capital funding should also be opportunistic. There may be smaller, more nimble health or social equity focused grants that become available and could be used to fund stations, particularly where there are no obvious funding partners. Similarly, as development or redevelopment occurs, providing a bike share station should become a part of a developer's transportation demand management options. This may require policy changes or incentives to encourage this activity.


















	Station	Bike	Bike Detail	Website / App	Membership Key
<b>Title Sponsor</b> Examples: New York City					
<b>Presenting Sponsor</b> Examples: Minneapolis					
<b>Individual Sponsorship</b> Examples: Denver Madison Miami Beach San Antonio					

Figure 2: Sponsorship Examples.

Sources: Citibike, Nice Ride Minnesota, San Antonio B-Cycle, Denver Bike Sharing.

## Operations Funding

Funding sources for operations are more limited primarily because federal funding can typically be allocated to capital projects and not ongoing operations and maintenance. Fundraising for operations should consider all available sources including private, philanthropic, sponsorship, and public funding:

- Sponsorship will be an important source of operating funds. Realistically, based on rates obtained in other cities, sponsorship could be expected to generate up to \$600 to \$1,000 per bike per year for title or presenting sponsorship. Exact valuation should be determined at the time of sponsorship acquisition, potentially by a marketing and media company familiar with the Tucson market.
- Some stations could be funded through direct contributions from private foundations, large employers, business districts, large campuses (e.g., University of Arizona), developers and interested businesses. Likely, these deals will need to be incentivized with group or discounted membership for students and employees of these organizations, or providing sponsorship presence on the stations and bikes that they have purchased.
- Private partners could be sought, such as large employers, business districts, large campuses, developers and interested businesses to take part in group or discounted memberships and sponsorship opportunities. Such sponsorship could bring in \$10,000 per station per year. Assuming the low end of the rate (\$5,000 per station per year) and a 50% uptake rate, station sponsorship could generate \$150,000 per year.
- Reconsidering the pricing structure to better monetize the system and increase system revenues. Several systems in the US, the largest being Philadelphia, have launched new pricing structures, and Tucson should monitor success of such structures to evaluate its own structure prior to launch.
- Local public funding through the City or other sources may also be required to fill any operational funding gap.

## Other Strategies

There are several ways to reduce the funding commitment. Capital costs can be reduced through consideration of different vendors and different technologies. It has been found to date that capital funding is easier to identify than operational funding.

Most impactful, operating costs can be reduced (as shown by the very low operating costs of Nice Ride Minnesota and some other non-profit systems). The operating costs shown in the business model can be reduced if a non-profit model is chosen. The privately operated system can provide quicker implementation and a high service level through the contracting process. However, this type of operation can be more expensive because a company has some amount of profit margin.

## Implementation Timeline

Following is a potential implementation timeline for a bike share system for Tucson, showing a total timeline to launch of approximately 18 months:

**Table 11: Potential Implementation Timeline**

Critical Path Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Decision on governance structure and funding plan																		
Identify funds for system installation, equipment and operations																		
Develop procurement documents																		
Issue Request for Proposals for equipment and/or operations																		
Award and sign contract for equipment and/or operations																		
Site planning and community outreach																		
System manufacture, preparation for operations, installation and launch																		

The most difficult and unpredictable step of this process is identifying and securing the funds for capital and operations. Whether this process is undertaken in series or in parallel with the procurement process will be at the discretion of the organization that owns the system.



## **APPENDIX A**

### **Sensitivity Tables**

## Year 2 Operating Shortfall

### if the Casual Membership Price is...

		\$4	\$6	\$8	\$10	\$12
and the	\$ 60	\$(370,693)	\$(332,233)	\$(293,773)	\$(255,313)	\$(216,853)
Annual	\$ 70	\$(362,030)	\$(323,570)	\$(285,110)	\$(246,650)	\$(208,190)
Membership	\$ 75	\$(357,699)	\$(319,239)	<b>\$(280,779)</b>	\$(242,319)	\$(203,859)
Price	\$ 80	\$(353,368)	\$(314,908)	\$(276,448)	\$(237,988)	\$(199,528)
is...	\$ 90	\$(344,705)	\$(306,245)	\$(267,785)	\$(229,325)	\$(190,865)

### if the Annual Members per Population is...

		0.0003%	0.0004%	0.0005%	0.0006%	0.0007%
and the	400	\$(403,204)	\$(389,457)	\$(375,709)	\$(361,962)	\$(348,214)
Casual	500	\$(363,814)	\$(350,067)	\$(336,319)	\$(322,572)	\$(308,824)
Members	641	\$(308,274)	\$(294,527)	<b>\$(280,779)</b>	\$(267,032)	\$(253,284)
per Station	700	\$(285,034)	\$(271,287)	\$(257,539)	\$(243,792)	\$(230,044)
is...	800	\$(245,644)	\$(231,897)	\$(218,149)	\$(204,402)	\$(190,654)

### if the Operations Cost per Dock per Month is...

		\$ 76	\$ 86	\$ 96	\$ 106	\$ 116
and the	400	\$(249,637)	\$(312,673)	\$(375,709)	\$(438,745)	\$(501,781)
Casual	500	\$(210,247)	\$(273,283)	\$(336,319)	\$(399,355)	\$(462,391)
Members	641	\$(154,707)	\$(217,743)	<b>\$(280,779)</b>	\$(343,815)	\$(406,851)
per Station	700	\$(131,467)	\$(194,503)	\$(257,539)	\$(320,575)	\$(383,611)
is...	800	\$(92,077)	\$(155,113)	\$(218,149)	\$(281,185)	\$(344,221)