Indego 2018 Business Plan Update

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INTEGRATED TRANSPORTATION PLANNING

On Behalf Of:

Indego

City of Philadelphia

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1 Introduction

1.1 Background

The 2018 Indego Business Plan is a five-year strategic plan intended to guide the growth and management of Philadelphia's Indego bike share program. This plan is a follow-up to the 2013 Business Plan, which outlined a vision for bike share that ultimately became the Indego system. Since its launch in 2015, Indego has rapidly grown to 120+ stations serving Center City and adjacent neighborhoods within North, South, and West Philadelphia. The program is recognized as a national leader in the areas of bike share equity and community engagement, and its work with the Better Bike Share Partnership has led to the development of new equity-focused strategies that are being replicated across the country. The system carries more than 2,000 riders on average per day and is increasingly an integrated part of Philadelphia's public transportation network.

The City of Philadelphia's Office of Transportation, Infrastructure, and Sustainability (oTIS), with funding from the William Penn Foundation, commissioned this Business Plan to help navigate changes to the bike share market over the next five years. Some key questions that this business plan addresses, include:

- How should Indego grow and expand over the next five years?
- How is bike share technology changing and what innovations should the program adopt?
- What are the strengths and weaknesses of the existing system and what strategies should be put in place to ensure Indego continues operating effectively?
- How is the competitive landscape for bike share changing and what can Indego do to be best prepared for competition within its service area?
- What are the program's fundraising needs?

Organization of Report

This report is divided into four sections:

1. Strategic Vision: Goals, objectives, and performance measures for the Indego program
2. Existing Conditions: Analysis of Indego's operations with key findings highlighting program strengths and weaknesses
3. Trends Impacting Bike Share: Assessment of the changing technological and competitive landscape for bike share and how these changes impact Indego
4. Recommendations: Recommendations for the Indego system, along with cost estimates for the program based on three future alternatives and two growth scenarios

1.2 2013 Business Plan

The Pennsylvania Environmental Council, in conjunction with the City of Philadelphia, completed the *Philadelphia Bike Share Strategic Business Plan* in 2013. The 2013 business plan laid the groundwork for today's Indego system, envisioning a 180-station bike share program focused in and around Center City and adjacent neighborhoods in North, South, and West Philadelphia. The 2013 business plan called for a system with a greater density of stations than most peer bike share programs. Equity was a major focus from the start, with bike share serving the downtown core as well as nearby historically disadvantaged communities. Unlike many other bike share programs, which receive public subsidy and funding from the local municipal government, the Business Plan also outlined a system that would be operationally self-sustaining by relying exclusively on user fees, sponsorships, and private funding for operations.

Figure 1 | Indego System as of March 2018 (Left) vs. Service Area Proposed in the 2013 Business Plan (Right)

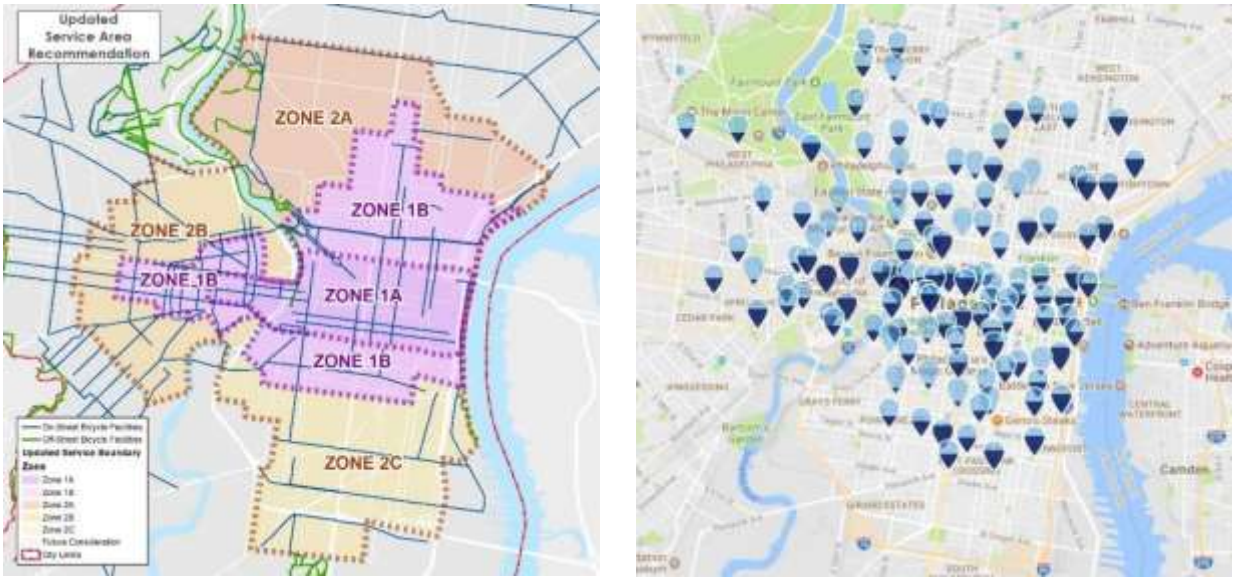


Table 1 | 2013 Business Plan Proposal vs. Current System

	2013 Business Plan	Current System*
Service Area	22.5 square miles	23 square miles
Number of Stations	180	121
Stations per Sq. Mile	8.2	5.4
Population within Service Area	432,000	357,000
Employment within Service Area	400,000	394,000
User Fee Cost Recovery	83% (projection for FY2018)	44% (2017 figure)

* based on January 2018

The present-day system is very similar to the program outlined in the 2013 Business Plan; It covers nearly the same geographic expanse and relies on private funding to operate. The program is a third smaller than that envisioned by the Business Plan, resulting in a lower density of stations within the service area. Funding and right-of-way constraints have limited the pace of expansion.

Indego, while one of the ten most heavily used bike share systems in the country, sees fewer trips, and lower user revenue than projected by the 2013 Business Plan. The smaller system size and lower density of stations all impact ridership and revenue. Moreover, the system has relied extensively on private grants to support reduced-price memberships and promotional initiatives, which reduces the share of funding coming directly from the sale of passes.

None of this should detract from the fact that Indego has been a major success since its launch. Philadelphia has been an innovator in bike share marketing, equity, and pricing strategies and many cities have worked to emulate Indego's successes.

2 Strategic Vision

2.1 Purpose of the Strategic Vision

The strategic vision sets the overall goals for bike sharing in Philadelphia for the next five years and guides the recommendations put forth in this business plan. The vision was developed through input from Indego staff and stakeholders at the City, sponsor stakeholders at Independence Blue Cross (IBX), and Indego's operating vendor, Bicycle Transit Systems (BTS). An additional source of input was customer survey results on the use of the system and attitudes towards Indego.

2.1.1 Vision & Mission

Vision and mission statements are clear declarations of what the city's bike share program is working towards and the purpose of Indego, respectively. These statements guide the development of goals and objectives and are also used for internal and external communication around the purpose and value of the program.

Because Indego is an established bike share operation, the 2018 vision statement is focused on the idealized future Indego can help create for Philadelphia. The 2018 Indego Business Plan Update is a deliverable of the City's CONNECT plan, and shares CONNECT's vision for Philadelphia.

CONNECT Vision Statement:

A transportation system that benefits everyone. It is a system that is safe, affordable, accessible, and reliable at moving Philadelphians, visitors, and commerce so neighborhoods thrive, people are healthy, and the economy grows.

The mission of Indego, or the fundamental purpose of bike share programs in Philadelphia, grounds the day-to-day work being done.

Indego Mission Statement:

To provide bike share as a high quality, reliable, affordable, flexible, and healthy transportation option that gives the user access to the City and our diverse communities."

2.2 Goals, Objectives, and Performance Measures

Clear organizational goals and objectives strengthen operations, focus resource utilization, and establish agreement around intended outcomes. While many of the goals outlined by the 2013 Business Plan remain valid, to the updated goals featured in this business plan better reflect Indego and Philadelphia today. Changes between the 2013 and 2018 plan include aligning the goals to reflect the CONNECT, Philadelphia's strategic transportation plan; adding a goal to track service quality and system reliability; developing an equity value and associated goals; and removing the economic competitiveness and environmental impact goals, which were accomplished following the initial launch of Indego in 2015.

2.2.1 Performance Measures

This Business Plan outlines a set of performance measures to track attainment of goals and objectives. These measures are simplified over those proposed in the 2013 Business Plan to make ongoing monitoring of each measure more feasible. The measures proposed here utilize data already collected by Philadelphia and Indego's operating vendor. These measures target either year-over-year improvement or parity with the service area's underlying demographics.

Table 2 | Goals, Objectives, and Performance Measures

Value	Goals / Objectives	Performance Measure
Opportunity and Access	**1. Increase personal mobility in Philadelphia, providing people with better access to destinations throughout the City**	
	1.1. Maximize the number of destinations accessible through bike share	▪ Population and employment within quarter mile of a bike share station
	1.2. Provide a high quality and reliable service	▪ Meet or exceed contract service level agreement (SLAs) ▪ Average daily downtime (empty or full docks)
	1.3. Integrate bike share as an extension of Philadelphia's public transit network	▪ Percent of bike share stations within a quarter mile of a subway, trolley, high frequency bus line or regional rail station
	1.4. Ensure the system is well-utilized	▪ Average trips per Bicycle per Day
	1.5. Ensure the program is cost competitive for all users	▪ Average cost per trip
Equity	**2. Provide a service that is inclusive, accessible, and affordable to all users**	
	2.1. Improve access for minority and low-income communities to key destinations, such as jobs and recreation	▪ Bike share trips originating or ending in census tracts that are majority minority or have a poverty rate greater than 30 percent (30%)
	2.2. Encourage ridership among all age groups, including seniors and riders under 21	▪ Share of riders under 21 years of age and over 55 years of age
	2.3. Ensure a pricing structure that makes the system financially accessible to low-income communities	▪ Average cost per trip for Indego30 Access Pass members
	2.4. Provide programming and services that reduce non-financial barriers to entry by minority and low-income communities	▪ Percent of users that are minority or low-income (based on Access eligibility) ▪ Percent of users that are limited English proficient (LEP)
Health & Safety	**3. Provide a safe mode of transportation that promotes active and healthy living**	
	3.1. Foster an active lifestyle by diverting a greater share of trips to bicycling	▪ Annual number of miles biked on Indego
	3.2. Support other City health objectives such as improved access to fresh foods and access to green space	▪ Percent of surveyed users utilizing Indego for their health or exercise
	3.3. Promote a culture of safety among bike share system users	▪ Number of crash incidents among 1,000 bike share trips

Value	Goals / Objectives	Performance Measure
Finances & Transparency	**4. Create a system that is financially sustainable, transparently operated, and accountable to the public**	
	4.1. Ensure the program is efficiently operated	▪ Average monthly operating costs per dock and per bike ▪ Maintain appropriate financial oversight for program
	4.2. Plan for and ensure sustainable funding for system growth and operations	▪ Percent of costs recovered through user fees, advertising, and sponsorships
	4.3. Clearly communicate program performance and effectiveness to stakeholders and the public	▪ Provide regular public report on program outcomes and performance

3 Existing Conditions

Philadelphia's Indego bike sharing program is among the ten largest systems in the country by ridership. In 2017, over 750,000 trips were taken by Indego across 121 stations located in 44 neighborhoods. The program is owned and managed by the City of Philadelphia, with day-to-day operations handled by the program's operating vendor, Bicycle Transit Systems (BTS). Indego is supported by a seven-year, $10 million title sponsorship by Independence Blue Cross, along with additional private and public grants from a variety of partners.

Summary Statistics

System Opened:	April 2015
Stations (1/1/18):	121
Docking Points:	2,400
Bikes:	1,117
Ridership (2017):	782,000

The following section examines the performance and organization of the current Indego system, with the goal of identifying program strengths and weaknesses. These findings will help guide the development of study recommendations.

3.1 User Profile

3.1.1 User Demographics

Bike share systems have long recognized a need to achieve greater equity in usage by increasing ridership among low-income people and communities of color. Indego was the first bike share program established with the goal of explicitly addressing racial and economic disparities in bike share. The City of Philadelphia and Bicycle Coalition of Greater Philadelphia are among the founding partners of the Better Bike Share Partnership, a national initiative funded by The JBP Foundation to build equitable and replicable bike share systems. Through this partnership, Indego has become a test-case for a variety of equity-focused initiatives, from reducing financial barriers to use, to implementing innovative community engagement strategies.

Accurately estimating the demographics of bike share riders is challenging. Indego's main source of data comes from user sign-ups. Anytime a person purchases a membership, they are asked basic demographic and income questions. Because this data captures demographics by *membership*, it does not necessarily reflect the demographics of *ridership*. For example, thirty percent (30%) of passholders have an Indego Flex membership, which is a $10 annual membership that allows riders to pay $4 per hour for all trips. Flex users are disproportionately white and high-income. However, Flex members accounted for only 3 percent (3%) of trips in 2017. Additionally, users who purchase a ride at station kiosks are not included in demographic data.

As Table 3 highlights, Indego members are less diverse and have a higher income than the average service area population, defined as all Census Block Groups within a quarter mile of an Indego station. Actual rider demographics fall somewhere between member demographics and service area demographics based on self-reported information from users during the signup process and estimated demographics of casual users.

These figures do not fully capture the progress Indego has made in addressing the equity gap. Indego has a higher share of Black and Latino riders compared to other large-city programs like Washington D.C.'s Capital Bikeshare, Chicago's Divvy, and Boston's Hubway. For example, according to the 2016 annual rider survey, only four percent (4%) of Capital Bike share riders in D.C. identify as Black and under 10 percent (10%) have a household income below $35,000 a year[1]. In Chicago, 83 percent (83%) of regular (full-price) members identify as White and only 1.9 percent (1.9%) as Black and 5.4 percent (5.4%) as Latino according to a 2017 study.[2]

Table 3 | Demographics of Users Compared to Service Area

	Indego Member Demographics	Service Area Demographics
Asian	10%	11%
Black	11%	33%
Hispanic (Any Race)	6%	8%
Other	4%	6%
White	69%	50%
Annual Income < $35k	27%	40%
Annual Income > $65k	55%	42%

Source: Indego 2017 Membership Data and US Census American Community Survey 2012-2016 5-Year Count

3.1.2 Membership Breakdown

Registered and Casual Users

Bike share riders are often grouped into two types of members: casual users and registered members. Casual users are riders who do not utilize a monthly or annual membership. These riders tend to be less price sensitive than registered members and though they form a minority of the user base in most systems, they play a crucial role in generating revenue. On aggregate, they take longer, more recreation or leisure-oriented trips than the average rider. Casual users are disproportionately visitors and tourists; stations near the Art Museum, Zoo, and Independence Mall generate the highest share of casual rides.

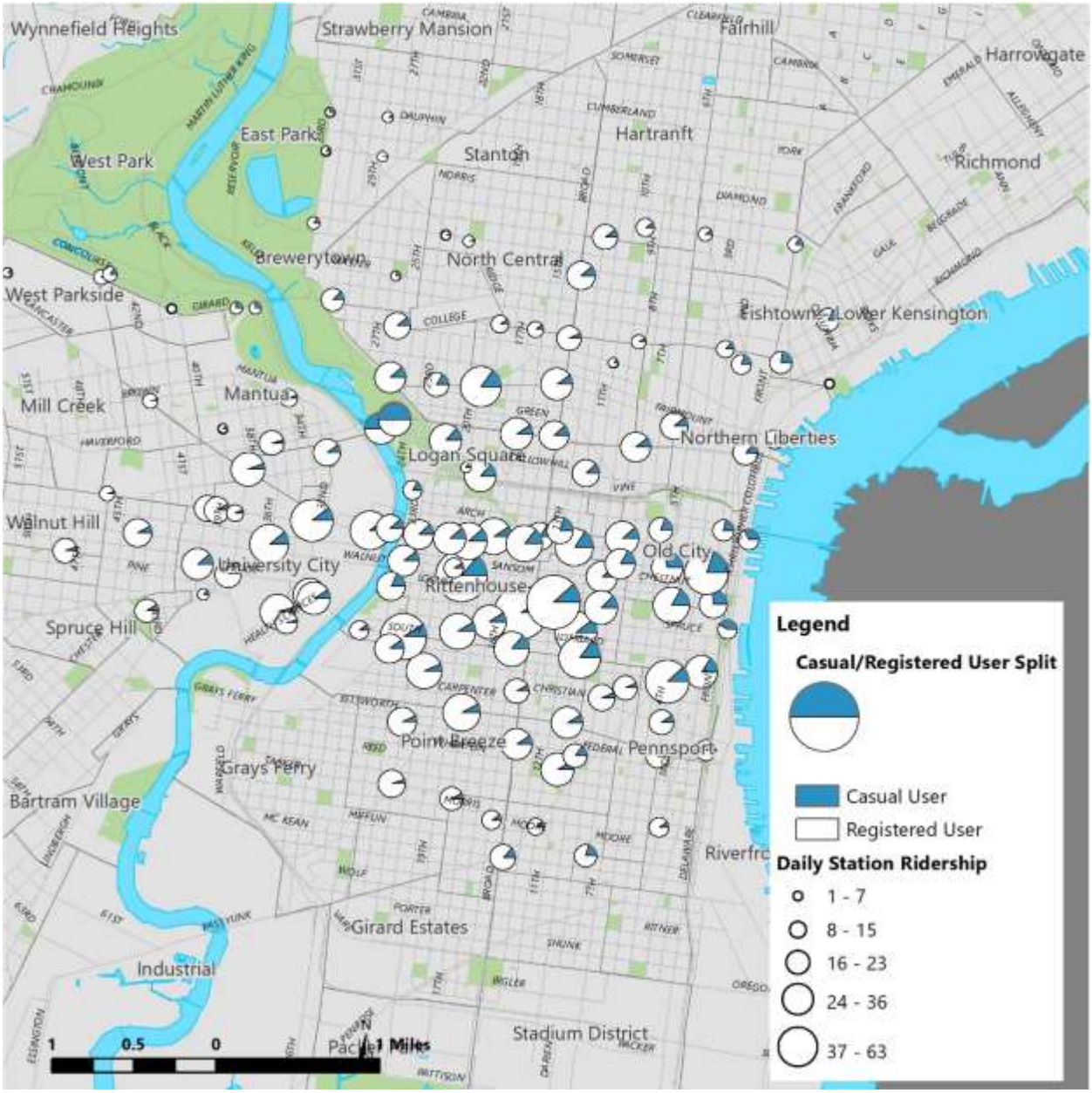
Registered Users are riders who have a monthly or annual membership to the program. They are frequent users who tend to use bike share more for transportation than recreational purposes. Unlike casual users, they are less seasonal in their ridership patterns and provide the main base of riders throughout the year.

[1] *2017 Capital Bike share Members Survey Report:* https://d21xlh2maitm24.cloudfront.net/wdc/Capital-Bike share_2016MemberSurvey_Final-Report.pdf?mtime=20170303165531

[2] "Regular Divvy Members are Still Largely White, But Divvy for Everyone is Diverse" *Streetblog;* https://d21xlh2maitm24.cloudfront.net/wdc/Capital-Bike share_2016MemberSurvey_Final-Report.pdf?mtime=20170303165531; Figures do not include Divvy's low-cost member option. 7% of full-price Indego30 members are Black.

Casual users represented only 14 percent (14%) of trips on Indego in 2017, lower than the approximately 20 percent (20%) share of casual users seen in peer cities like Washington, D.C. and Boston.

Figure 2 | Indego Stations by Pass Type



Source: Indego 2017 Trip Data

Indego's Initial Pricing Structure

Peer bike share programs typically offer an annual pass for registered members and a short-term (one, three, or seven day) pass for casual users. The passes entitle users to unlimited trips of limited duration during their period of validity. User fees are charged for any trips longer than a set amount of time (typically 30 minutes to an hour).

When it first launched, Indego adopted a novel approach to bike share pricing. Casual users could purchase individual trips, either at the kiosk or with an Indego keycard tied to their credit card (Indego Flex). Registered users could pay per month for unlimited trips. This pricing structure was designed to more closely reflect how other transportation modes are priced: people are used to either paying per trip or monthly for transit passes and parking.

Recent Changes to Pricing

In April 2018, after piloting day and annual passes, Indego decided to change its pricing structure to more closely resemble that of its peer systems:

- Eliminate the single-ride option in lieu of a day pass
- Introduce Indego365, an annual membership option
- Continue to offer Indego30 and Flex pass options

Offering single trips instead of a day pass was shown to depress revenue, and not offering an annual pass resulted in members canceling during colder months. The new pass structure is expected to increase both ridership and revenue. Because these changes are very recent, most of the data used in this plan is based largely on the prior pricing structure.

3.1.3 Member Retention

On average in 2017, 15 percent (15%) of Indego30 members did not renew their membership in any given month. This lapse rate is identical to the one in 2016. Overall, the number of new members joining the system has exceeded members leaving, resulting in a 17 percent (17%) increase in memberships purchased in 2017 compared to 2016. The number of memberships that lapse in any given month peaks between September and December, which is likely a result of cold weather. In 2017, for every four lapsed passholders, one former passholder returned to the system.

Table 4 | Statistics on User Retention by Pass Type

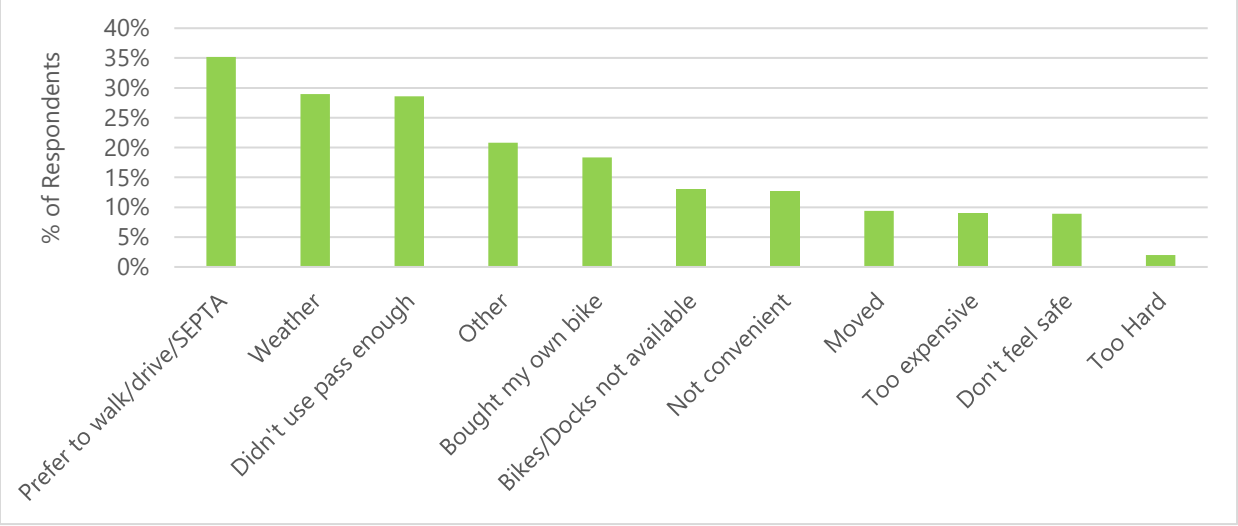
Member Type	Passholder Lapse Rate	Return Rate of Lapsed Passholder
Indego30	15%	28%
Access	24%	24%
Flex	4%	9%
Total Rate	12%	25%

Source: Indego 2017 Membership Data

Users choose to leave Indego for a wide variety of reasons. In Indego's 2017 annual survey, former members stated a preference for another mode, weather, and low pass usage as the main motivating factors behind not renewing their membership. While these reasons are driven by factors outside of Indego's control, several lower ranking reasons relate to the quality of service. Thirteen percent (13%) of users stated that bicycle or docks were not available or that the system was not convenient. Nine percent (9%) of users stated that the system was too expensive or that they did not feel safe riding Indego.

The same survey asked returning members why they rejoined. Weather was the predominant reason, followed by cheaper prices. A declining share of returnees between 2015 and 2017 stated more convenient stations or better availability of bicycles.

Figure 3 | Reasons for Leaving Indego Ranked by Prevalence of Response



*Responses from 2017 survey conducted by Indego.

These retention statistics highlight the following findings:

- A minority of lapsed members return to the Indego system. The program has maintained membership growth by attracting new users at a higher rate than users leaving the program. Improving user retention is crucial to growing ridership for Philadelphia compared to peer cities with greater natural in and out migration.
- Survey responses from returning users suggest that price, more stations, and better bicycle availability are all factors that encourage members to rejoin.
- Indego Flex is the only pass type with continual decline in members. Former Flex passholders are the least likely to return to the program.
- Indego Access passholders see greater month-over-month turnover. Since these users are low-income, price sensitivity (and greater reliance on cash payment instead of automatically debiting credit cards) is likely behind this dynamic. Despite high turnover, Access passholders have steadily increased since 2015.

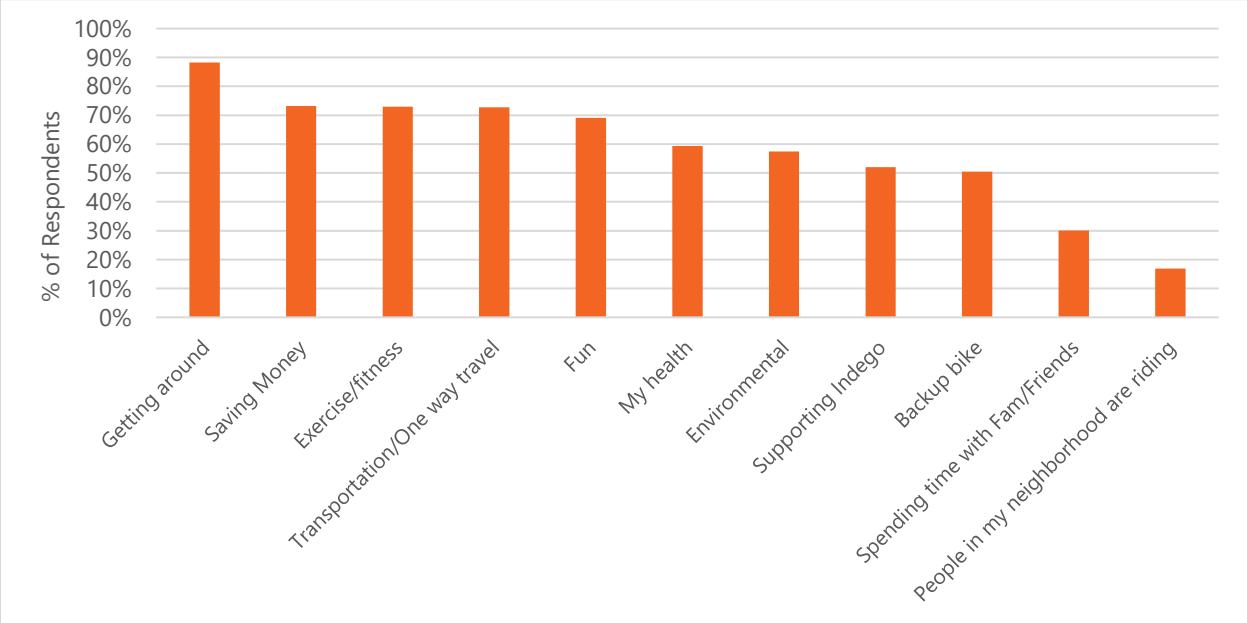
- Top reasons for not utilizing Indego (such as preference for another mode or lack of pass usage), suggest that the program needs to explore strategies for getting members to ride more after they sign-up.
- Quality of service factors play a smaller role in lapsed memberships; the top quality of service factor mentioned by former passholders was a lack of bicycles/docks and the system being "not convenient."

3.1.4 Why Users Choose to Ride

Users stated a wide variety of reasons for using Indego. The most common types of reasons were mobility, value, and health/environmental purposes (Figure 4). Because users could choose multiple reasons in their response, the survey results cannot gauge which factors were primary and which were secondary motivators for utilizing Indego. Overall the survey highlights some key findings:

- Over 73 percent (73%) of riders stated that they utilize Indego to save money, suggesting that riders see the program as a bargain compared to other modes.
- Both health and fitness and mobility ranked highly among respondents, suggesting that Indego is helping address public health and transportation goals.

Figure 4 | Reasons for Using Indego (respondents can choose more than one option)



Source: 2017 Indego Annual Survey

Road safety and lack of adequate bicycle infrastructure are the most common reasons why Philadelphians choose not to ride Indego. Nearly half of non-users surveyed stated they would join the program if there were more on- and off-street bicycle facilities.

3.2 Ridership Characteristics

3.2.1 Trips Per Bicycle Per Day

The most common measurement of bike share system utilization is the number of average daily trips per bicycle (TpB). In 2017, the Indego system saw an average daily TpB of 1.9 which is slightly higher than the national average of 1.7 TpB. Bike share ridership is seasonal, with peak ridership occurring between April and October. During the peak period, the system sees 2.4 average daily trips per bicycle, declining to 1.2 during the off-peak season. The differential between peak and off-peak months is in-line with observed trends among other large bike share programs

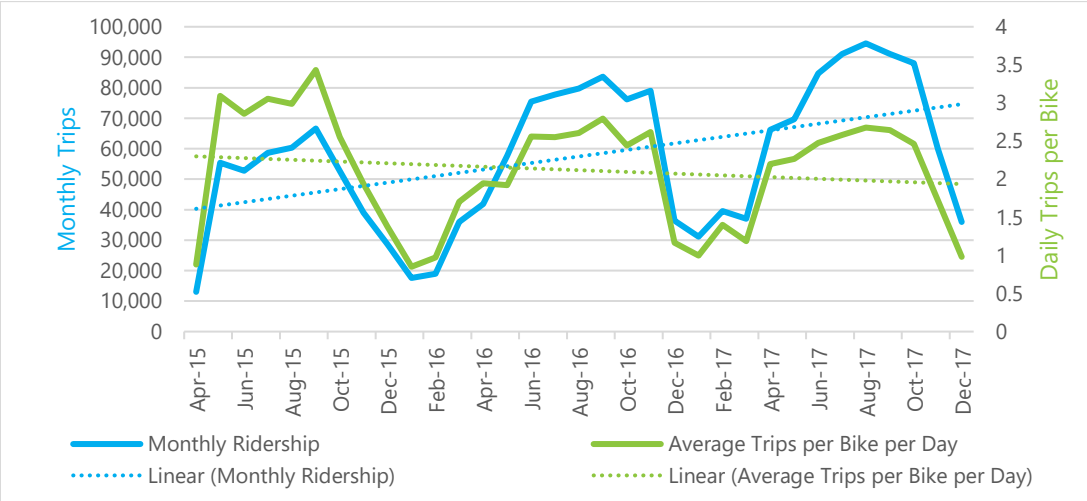
Indego's ridership rate is lower than that of Washington, D.C. but analogous to seasonally adjusted ridership rates in Boston and Chicago, and higher than Portland, OR. Like with any transportation mode, land use and overall density are the best determining factor of ridership demand; considering that Center City's population density alone is over 38,000 people per square mile, there is potential to grow usage of the system within the current service area.

3.2.2 Long-Term Trend in Indego Ridership

Indego has seen annual ridership grow consistently since the program launched in April 2015. This growth has been largely due to system expansion. On a per-bicycle basis, system usage has declined over time. When compared with the first 12 months of the program, trips per bike are down 10% in calendar year 2017. Generally, systems are expected to see an increase in ridership rates as the system grows and more destinations are served; Philadelphia's slight decline in TpB can be explained by a few factors:

- The system's first stations opened in higher-demand neighborhoods like Center City.
- Recent expansion has focused on serving outlying neighborhoods with less overall travel demand.
- The program may have benefited from a bump in ridership at launch due to program publicity and exposure.

Figure 5 | Ridership Trends (April 2015 to December 2017)



Source: Indego Monthly Reports, April 2015-December 2017

3.2.3 Station Ridership Performance

Ridership within the Indego system varies considerably by station. Twenty-nine percent (29%) of all trips originate at only ten percent (10%) of the system's stations. The busiest stations are concentrated in Center City. The stations at Rittenhouse Square and 15th & Spruce are the most used locations. Conversely, 10 percent (10%) of stations account for just one percent (1%) of system ridership. The stations with the lowest ridership are concentrated north of Spring Garden Street and west of Broad Street, in neighborhoods like Mantua, Strawberry Mansion, and West Poplar.

Table 5 | Stations with the Highest and Lowest Ridership

Ten Highest Ridership Stations

Station	Neighbor-hood	2017 Trip Starts
Rittenhouse Square	Rittenhouse	22,948
15th & Spruce	Rittenhouse	22,093
18th & JFK	Logan Square	18,346
13th & Locust	Washington Square West	17,989
University City Station	University City	15,348
23rd & South	Graduate Hospital	15,315
Rodin Museum	Logan Square	15,063
21st & Catharine	Graduate Hospital	14,324
30th Street Station	University City	13,313
11th & South	Washington Square West	12,843

Ten Lowest Ridership Stations

Station	Neighbor-hood	2017 Trip Starts
Cecil B. Moore Library	North Central	495
33rd & Diamond	Strawberry Mansion	521
Mantua Haverford Community Center	Mantua	550
11th & Poplar	West Poplar	614
ParkWest Town Center	West Parkside	665
29th & Dauphin	Strawberry Mansion	670
Philadelphia Zoo	Mantua	752
33rd & Dauphin	Strawberry Mansion	832
27th & Master	Brewerytown	893
29th & Diamond	Strawberry Mansion	938

**Excludes stations that have been active for less than a year. Source: Indego 2017 trip data*

Ridership does not necessarily predict a station's financial performance; station operating costs are largely driven by maintenance and rebalancing needs. A station may have a lot of ridership demand but require constant servicing to ensure it is rarely completely full or empty (i.e., downtime). Similarly, stations on the edge of the service area are costlier to service because they take longer for crews to reach. Station operating revenue is driven as much by the user mix (i.e., more casual users who take longer trips) as by total ridership.

The top 10 percent (10%) of revenue-generating stations account for approximately 26 percent (26%) of system revenue. Philadelphia Art Museum is the highest financially performing station in the system, yet it does not appear within the top 10 stations by ridership. The lowest performing stations not only have low ridership but are largely on the edge of the Indego system service area, adding to the cost of servicing the station. This result is in line with observed ridership in other systems. Outlying stations tend to have lower ridership because they have fewer nearby stations to bike to.

Table 6 | Highest and Lowest Stations by User Cost Recovery

Top 10 Cost Recovery Stations

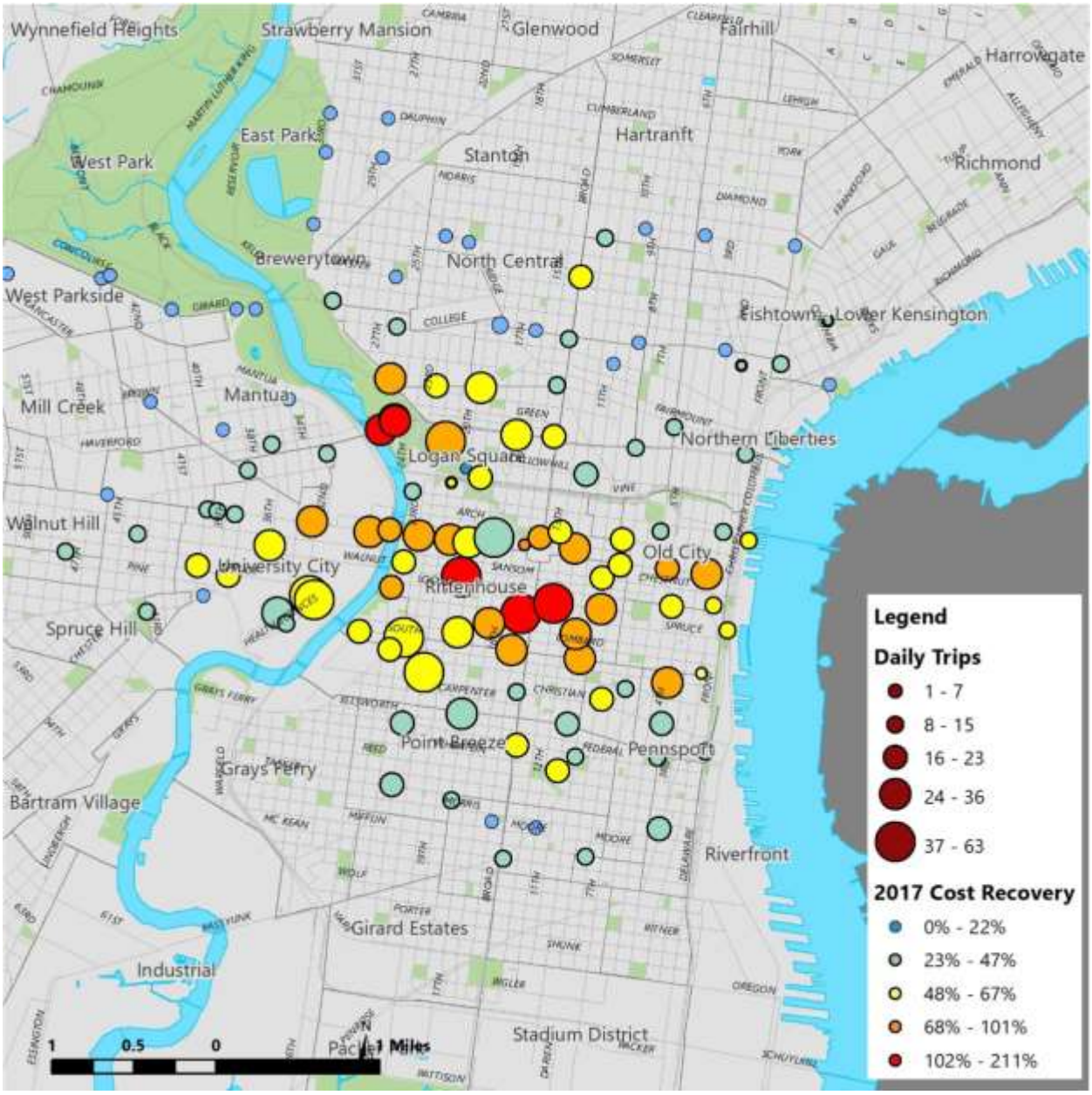
Station	Neighbor-hood	Cost Recovery
Philadelphia Museum of Art	Art Museum	211%
Rittenhouse Square	Rittenhouse	180%
15th & Spruce	Rittenhouse	144%
13th & Locust	Washington Square West	143%
15th & Market	Logan Square	101%
11th & South	Washington Square West	100%
25th & Locust	Rittenhouse	98%
Rodin Museum	Logan Square	95%
12th & Filbert	Center City East	92%
30th Street Station	University City	91%

Bottom 10 Cost Recovery Stations

Station	Neighbor-hood	Cost Recovery
Cecil B. Moore Library	North Central	4%
29th & Dauphin	Strawberry Mansion	5%
33rd & Diamond	Strawberry Mansion	5%
Mantua Haverford Community Center	Mantua	5%
11th & Poplar	West Poplar	6%
Parkside & Girard	West Park	6%
22nd & Cecil B. Moore	North Central	6%
29th & Diamond	Strawberry Mansion	7%
27th & Master	Brewerytown	9%
Philadelphia Zoo	Mantua	9%

The station cost recovery and ridership figures illustrate the importance of investing in stations in high-performing areas. Expanding the system in high-revenue locations helps to fund expansion in the outer portions of the service area.

Figure 6 | Station Cost Recovery



3.2.4 Trip Patterns Between Neighborhoods

Indego usage is highly diffuse, with 1,876 unique neighborhood-to-neighborhood trip pairs in 2017. The 10 busiest neighborhood pairs help highlight the major travel-flow demand in the system. All neighborhood pairs with more than 10 trips a day start or end in University City, Rittenhouse Square, Washington Square West, Logan Square, or Old City.

Ranked Busiest Trip Pairs by Neighborhood (2017)

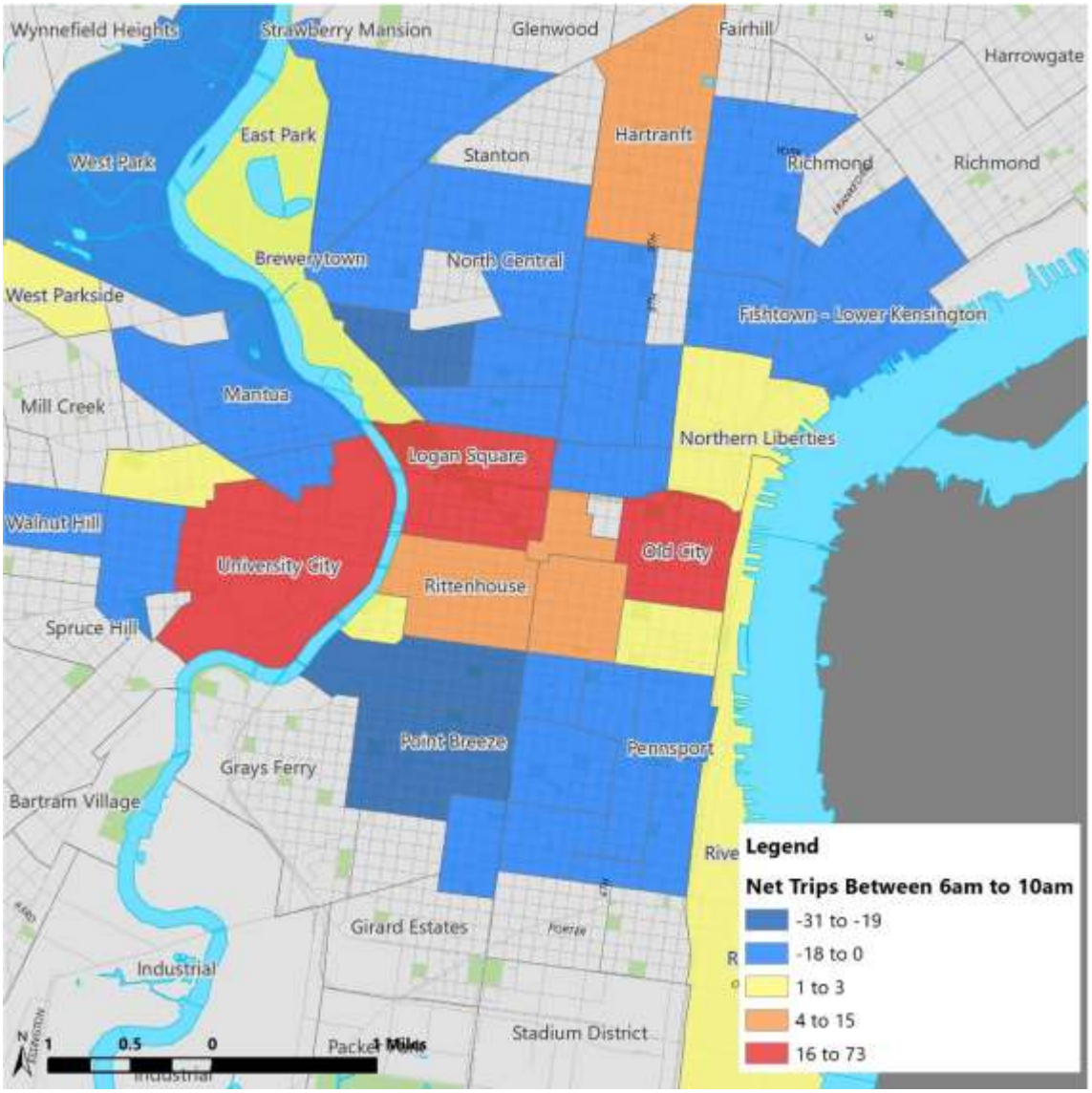
1. Logan Square to Logan Square (*within neighborhood)*)
2. Rittenhouse Square to University City
3. University City to Rittenhouse Square
4. University City to University City (*within neighborhood)*
5. Logan Square to University City
6. Graduate Hospital to University City
7. Washington Square West to Rittenhouse Square
8. Rittenhouse Square to Washington Square West
9. University City to Graduate Hospital
10. University City to Logan Square

3.2.5 Core Neighborhoods

On a typical weekday morning, the Indego system sees more trips toward places like Center City, Temple University, or University City than from these neighborhoods. The reverse is true in the afternoon and evening. As destinations for riders originating all over the service area, these neighborhoods form the Indego system core. Defining Indego's core neighborhoods is important from a capacity planning perspective; as the program grows, the core neighborhoods will need additional stations and docks to meet new demand.

Compared to some other bike share systems, Philadelphia has a low level of one-way trip imbalances during peak usage hours. The City's mixed-use neighborhoods help to generate bi-directional demand. The only neighborhoods with more than a net gain of three trips during the AM peak are: Rittenhouse Square, University City, Washington Square West, Center City East (Market East), Logan Square, Old City, and Hartranft (Temple University). Among these neighborhoods, Logan Square and University City have more net trips in the morning, than the remaining neighborhoods combined. The prevalence of major employment sites such as University City's hospitals and the Market West office district are likely generating this imbalance in trips. These neighborhoods are also home to the bike share stations with the greatest amount of downtime (either full or completely empty).

Figure 7 | Net Trips Between Neighborhoods During the AM Peak (6am to 10am)



3.3 Service Reliability

3.3.1 State of Repair

Indego's capital assets are presently in an excellent state of repair. Because the system is only three years old, it is still likely four or five years away from experiencing significant equipment replacement needs. The operating contract performance requirements for equipment inspection and maintenance generally match industry best practices.

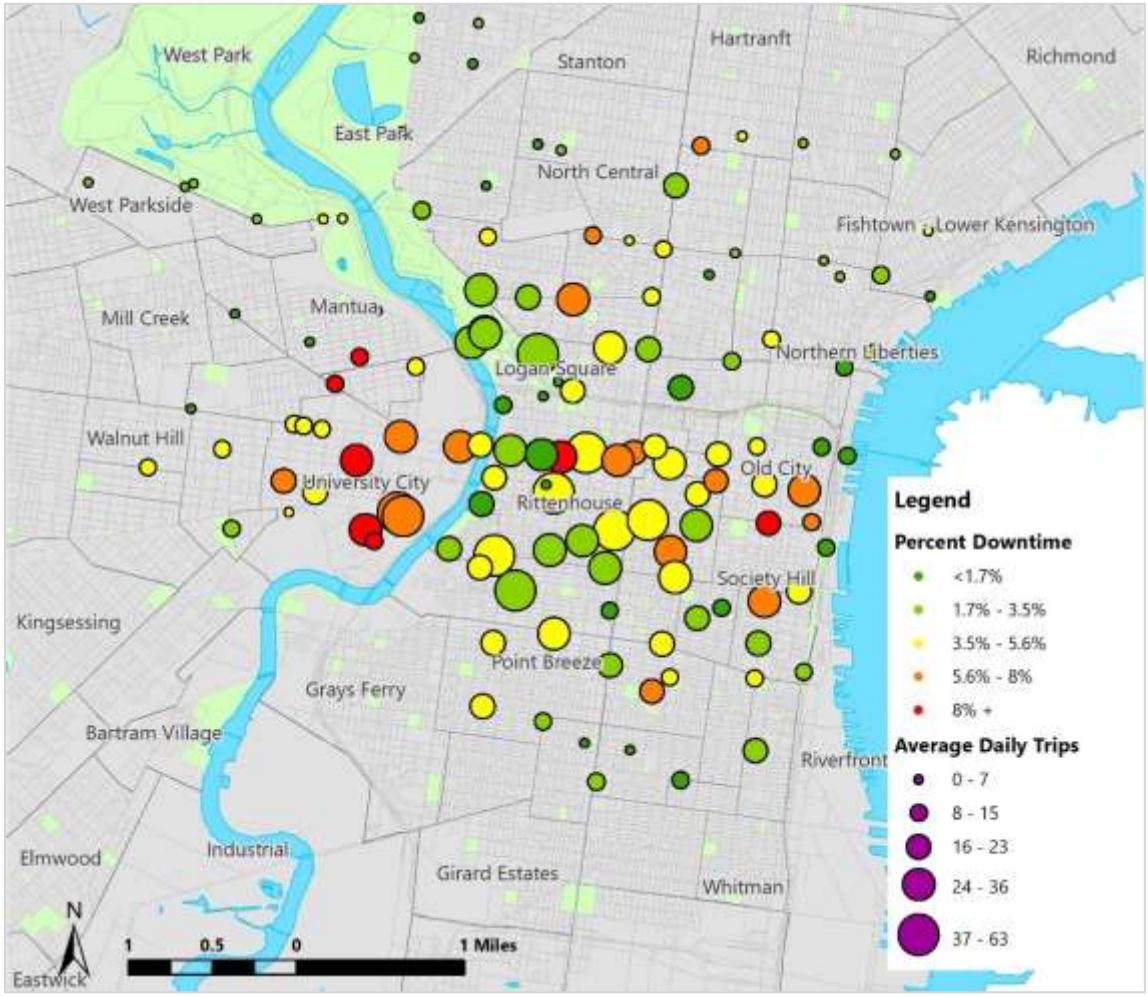
3.3.2 Station Downtime

Downtime refers to the amount of time a station is completely full or empty. This is a crucial measure of service reliability as stations experiencing downtime are failing to adequately meet demand. Bike share systems address downtime by rebalancing bicycles between stations; for Indego, rebalancing is the single largest operating expense. Increasing station size can also address reduce downtime by providing more latent capacity.

In 2017, the average Indego station experienced approximately one hour of daily downtime (4 percent of the day). This rate varies considerably across the system. Three stations had an average downtime rate in 2017 of over 10 percent (10%). Two of the stations were located next to Children's Hospital of Philadelphia and one was across the street from Presbyterian Hospital. The fact that the three stations are adjacent to hospitals is no coincidence. Large employment destinations can be challenging to serve because bicycles are used primarily for commute trips and therefor arrive and depart during shift changes. There appears to be little correlation between ridership and a station's downtime.

Philadelphia has a low rate of downtime compared to other large systems: bike share system assessments in Washington, DC and Boston show that these systems have peak downtime rates almost twice that of Indego. This, along with observations by Indego's operational vendor, Bicycle Transit System, suggest that the system has capacity to serve more stations without increasing the size of the program's rebalancing operations. New stations and docks could help reduce the program's overall operating costs as they will carry a low marginal cost to operate.

Figure 8 | Indego Stations by Daily Downtime and Ridership (2017)



3.4 Key Service Gaps

3.4.1 Overview of Methodology

This plan identified areas which were suitable for bike share, but underserved by the current system. This was accomplished by combining a number of known indicators of success into a single 'propensity score'. Philadelphia. Table 7 outlines the measures used to create the propensity map. Most of these factors relate to high bike share demand, including employment density, population density, concentration of retail activity, existing mode share for bike/walk/transit, availability of bike infrastructure, and proximity to tourist sites. In addition to these factors, the propensity analysis measures aspects that align with the program goals and objectives such as serving low-income populations, providing access to public services, and providing access to transit. Population and employment density are weighted higher than other factors to reflect their relative importance in driving bike share demand.

Table 7: Propensity Map Measures

Measure
Change in Elevation
Employment (Jobs/Acre)
Population Density (People/Square Mile)
Low-Income Density (People/Square Mile) Low-income defined as income under 200% of the poverty level
Retail (Retail Jobs/Acre)
Density of Bike, Transit, and Walking Commuters (People/Square Mile)
Public Facilities (Count of Facilities within 1/4th Mile)
Tourism
SEPTA
University/College Access (University or College within 1/4th Mile)
College Student Enrollment (Students/Square Mile)
Bike Lanes (Feet of Bike Lanes within 1/4th Mile)

It is important to note that propensity mapping is only one data point in determining bike share suitability. The analysis does not consider other factors, such as distance from other stations or availability of property for bike share stations.

3.4.2 Propensity Map Results

Figure 9 shows the bike share propensity score across the current Indego service area. The areas scoring 7.1 and above (yellow, orange, and red) show the greatest promise for bike share. The propensity scores are highest within Center City and decline moving farther away from Center City. Corridors of moderate and high demand closely follow existing rapid transit and major recreational spaces. Propensity results by area are detailed below.

Center City

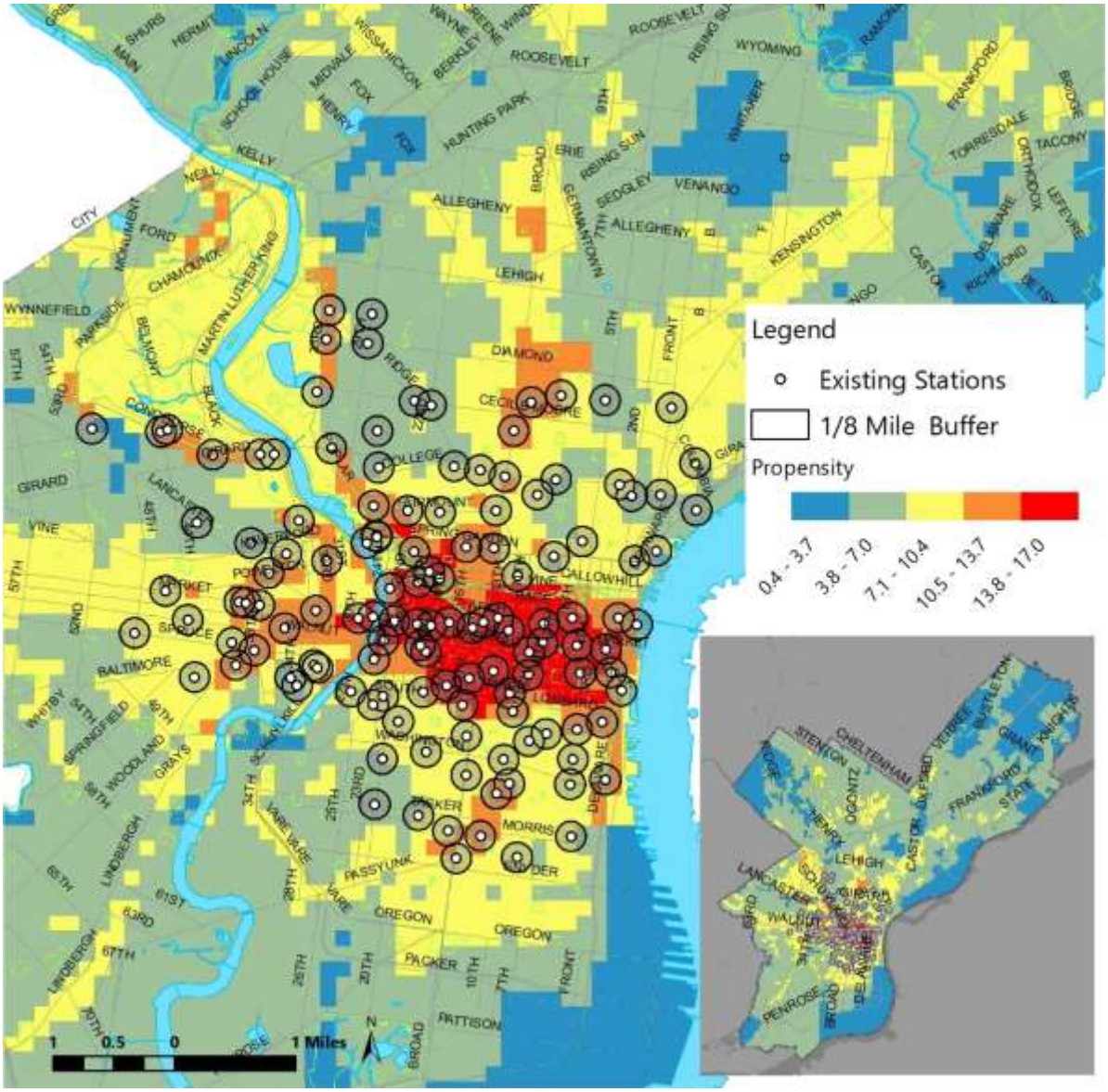
Center City has the highest overall propensity for bike share in the City. The area benefits from a confluence of factors that drive up bike share demand, such as very high population and employment densities, a young population, existing bike lanes, low reliance on private vehicles for transportation, and a high concentration of destinations (notably tourist, retail, and leisure destinations). While Center City has a high density of bike share stations, there are several geographic gaps in station coverage, including:

- Walnut and Locust Street corridor from Rittenhouse Square to Washington Square

- Society Hill
- Chinatown
- Logan Square neighborhood south of Race Street and North of JFK Boulevard

Moreover, several stations within Center City are regularly at capacity, warranting the expansion of existing stations or placement of additional stations to absorb some of the demand.

Figure 9 | Bike Share Propensity Map



South Philadelphia

The analysis shows moderate propensity for bike share in most of South Philadelphia north of Oregon Avenue. Indego stations in South Philadelphia are placed at a lower density than in Center City, creating several gaps in coverage. There are opportunities to expand the system in Graduate Hospital, Point Breeze, and along the lower Passyunk Avenue corridor. The neighborhoods of Girard Estates and Lower Moyamensing currently lack bike share, but could likely support stations.

West Philadelphia

The Indego system in West Philadelphia is concentrated primarily in University City, with few stations west of 40th Street. There are several opportunities to expand bike share in this part of Philadelphia to improve access to both jobs and destinations in University City, as well as better serve residential and neighborhood commercial corridors across West Philadelphia:

- The University of Pennsylvania and Drexel University campuses, notably the area south of Market Street, north of Spruce Street, and east of 36th Street
- Powelton Village
- Baltimore Avenue corridor through Spruce Hill and Cedar Park
- Neighborhoods along the Market-Frankford El, including Cedar Park, Haddington, and Walnut Hill
- West Fairmount Park

Lower North Philadelphia and Riverwards

The existing Indego system is fairly spread out in the neighborhoods north of Center City. There are several key destinations in Lower North Philadelphia and the Riverwards, such as East Fairmount Park, Temple University, and the growing entertainment cluster in Northern Liberties and Fishtown. The propensity map shows the highest demand for stations in the following areas:

- Spring Garden / Fairmount neighborhoods
- North Broad Street corridor from Temple University to Erie Avenue, including the Temple Medical Campus and North Broad Street Station
- Frankford Avenue Corridor, including the neighborhoods of Fishtown, Port Richmond, Kensington, and Frankford

Other Parts of Philadelphia

The Indego system covers only a small fraction of Philadelphia and opportunities exist for expansion beyond the neighborhoods listed above. Several outlying neighborhoods show a moderate propensity for bike share, including Olney, Oak Lane, Mount Airy, Germantown, Manayunk, East Falls, Lawndale and Fox Chase. Due to their distance from the core of the system, these neighborhoods should be a lower priority than those called out in the previous sections. Generally, a contiguous bike share system performs the best, and other cities have struggled to generate suitable ridership from small clusters of stations outside biking distance from one another.

3.5 Organizational Structure

3.5.1 Program Structure

Indego's operating structure is composed of a wide range of organizations in the public, private, and non-profit sector. oTIS leads the Indego program. It provides strategic direction for Indego, collaborates with other City departments on initiatives that interface with it, manages operating and other contracts, and is the program's financial steward. oTIS also leads Indego's grant strategy to identify and secure public grant funding. The remaining partners can be broken into two broad categories: operating partners who share responsibility for running the program, and funding partners and financial brokers who provide financial support to the program.

Program Operations and Management

While Indego is owned by the City of Philadelphia, day to day operations are outsourced to a vendor, Bicycle Transit Systems (BTS). BTS is responsible for maintaining and operating the system, including most customer-facing activities. The model of contracting out operations to private vendors is common among large publicly-owned bike share programs.

Indego receives programmatic support from the Better Bike Share Partnership (BBSP) for outreach activities targeted at low-income communities, those with limited English proficiency, and communities of color. BBSP is a partnership between the City, the Bicycle Coalition of Greater Philadelphia, the National Association of City Transportation Officials (NACTO), and PeopleForBikes (PFB), and is funded by The JPB Foundation. The partnership's mission is to develop and disseminate strategies to increase bike share use among low income and communities of color. Indego's relationship with BBSP is unique in the bike share industry as this nationwide initiative is embedded within oTIS; Indego is a test-case for bike share equity strategies and BBSP has funded expansion into underserved communities, a discounted pass option, in addition to marketing, outreach, education, and community engagement programs.

Program Funding Partners and Financial Brokers

The Mayor's Fund of Philadelphia is a non-profit affiliated with the City. It functions as Indego's fiscal agent - all private grant and sponsorship contributions to Indego pass through the Mayor's Fund. This structure ensures that program funding is transparently managed and exclusively earmarked for bike share.

Independence Blue Cross (IBX) is Indego's largest funding partner. They provide over $2 million a year in support of the program, in exchange for systemwide title sponsorship. IBX's support was crucial to funding the launch of the system in 2015, and their ongoing support allows the program to serve a larger swath of Philadelphians than would otherwise be feasible.

Spectra is Indego's Sponsorship Broker. They are responsible for obtaining station and title sponsorship agreements and help manage the relationship between the City of Philadelphia and private sector partners.

There are several other funding partners supporting Indego. Philanthropic support, such as grants from The JPB Foundation and the William Penn Foundation, have paid for program expansion and community engagement

initiatives. The City of Philadelphia contributed seed capital to launch the system, and Federal and state funds have supported additional capital investments in new stations and bikes.

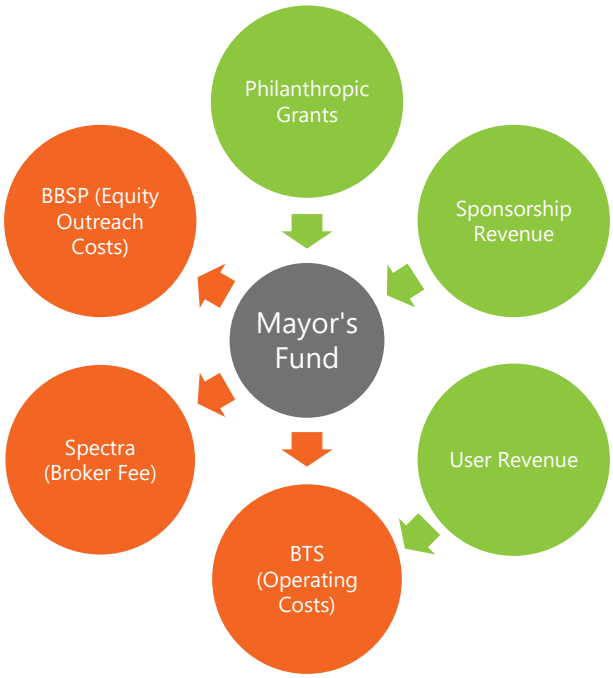
3.5.2 Funding Relationship

oTIS is the financial steward of all operational and capital dollars associated with Indego. Indego's operating funding comes from user fees, philanthropic grants, and sponsorship fees.

- User fees are collected and retained by BTS. The City of Philadelphia is billed for the remaining operating costs.
- Grants are applied for by oTIS in the name of the Mayor's Fund.
- Sponsorship agreements are between sponsors and the Mayor's Fund. Sponsorship fees and grant awards flow into the Mayor's Fund and then are distributed back out as committed through various agreements. The Mayor's Fund keeps five percent (5%) of all revenue to its own administrative costs.

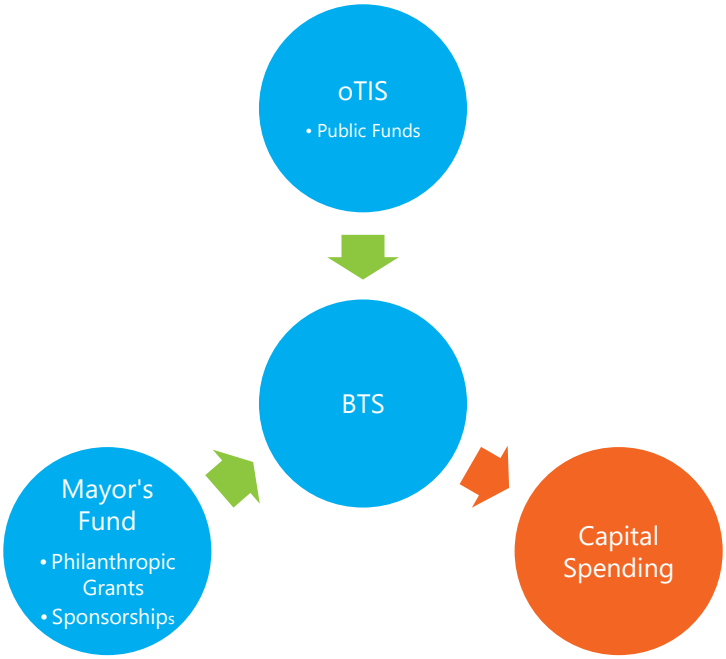
Because user fees cover less than half of total operating costs, most sponsorship and grant revenue paid to the Mayor's Fund is used to cover the remainder of BTS's operating costs. The Mayor's Fund also disburses payments to Spectra, which receives a percentage of sponsorship fees for the sponsors that they bring in, and to BBSP, a recipient of a portion of the philanthropic grant funding.

Figure 10 | Operating Funding Flow



Indego's capital funding sources include City capital funding, federal and state government grant funding, philanthropic grant funding, and private sponsorship fees. Public funding flows directly through oTIS to BTS, who procures and installs capital infrastructure. Philanthropic and private sponsorship capital funding flows through the Mayor's Fund. As with operating revenue, the Mayor's Fund charges the program a five (5%) fee on revenues that pass through the fund.

Figure 11 | Capital Funding Flow



3.5.3 Current Organizational Findings

While the current organizational structure is complex, it has been serving Indego well for the past five years. The wide range of partners provides Indego with a diverse range of expertise, including leaders in bike share operations, community engagement, and sponsorship fundraising. Indego's funding relationship insulates the program in part from external City financial challenges and reflects the fact that the program relies exclusively on private and non-profit funding for operations. The following are observations of where there could be opportunities to improve the Indego program through organizational adjustments.

- The Mayor's Fund charges a five percent (5%) fee on monies managed by the fund. While this set-up allows oTIS to bring in grant and sponsorship dollars for the program, the five percent (5%) fee on that money reduces the program's operating budget. As such, opportunities should be sought to reduce the amount of money that needs to pass through the Mayor's Fund wherever possible.
- Marketing and outreach activities at Indego are provided by BTS, BBSP, and at times IBX. Additionally, Spectra markets Indego to potential sponsors. BTS, which is primarily a bike share operator and not a marketing firm, sub-contracts some marketing activities and covers other activities in-house. Although oTIS manages coordination and collaboration between the multiple groups promoting Indego, there are opportunities to better guide and coordinate each group's marketing approach and activities.

- Indego-focused staff at oTIS collaborate with City colleagues to help guide the program's strategic direction and for support on practical matters, like how to resolve issues when installing a new bike share station. However, the operating vendor, BTS, is responsible for station permitting and installation and as such much of that process is left to the vendor to execute. The Indego program would benefit from closer collaboration with other city departments like Parks and Recreation and the Streets Department. BTS would benefit from better communication on any right of way impacts to its bike share stations. The Streets Department and Parks and Recreation would benefit from an understanding of desired station locations, to allow for those locations to be better accommodated through the site plan review process and capital investments in things like roads, sidewalks, trails, and parks. Potential Indego sites could also be vetted during the Civic Design Review Process, run by the Philadelphia City Planning Commission, which reviews proposals for large-scale developments.
- Indego should ensure it is getting the full value of its sponsorship broker deal with Spectra. The agreement should prioritize expansion of sponsorship agreements, with the understanding that maintaining existing sponsorship agreements requires less legwork from the broker team. Other organizations have utilized a multi-tier arrangement for sponsorship fees, with lower fees paid for sponsorship renewals
- Lastly, the Indego program has a strong and positive relationship with naming rights sponsor IBX. There is a strong positive brand associated with Indego within Philadelphia and a strong association between Indego and IBX. At this phase in the relationship there are likely additional ways that Indego can provide value added for IBX and vice versa, whether it is in-kind support for Indego on IBX's part by promoting Indego to their insurance holders, or membership discounts provided to IBX staff if the company buys in bulk.

3.6 Funding Model

3.6.1 Program Costs

In 2017, the Indego program incurred operating costs of just over $4 million. Payments to Bicycle Transit System (BTS), Indego's operating vendor, made up 87 percent (87%) of the program budget. The remainder of the operating budget went to administrative fees charged by the Mayor's Fund, marketing expenses, and commissions related to sponsorship and advertising revenue.

BTS's contract with Philadelphia is organized differently than those of peer vendor-operated systems. Instead of charging a fixed-fee, BTS is compensated based on direct expenses and labor. Every month, BTS submits itemized invoices to the City, which provides transparency on factors driving operating costs.

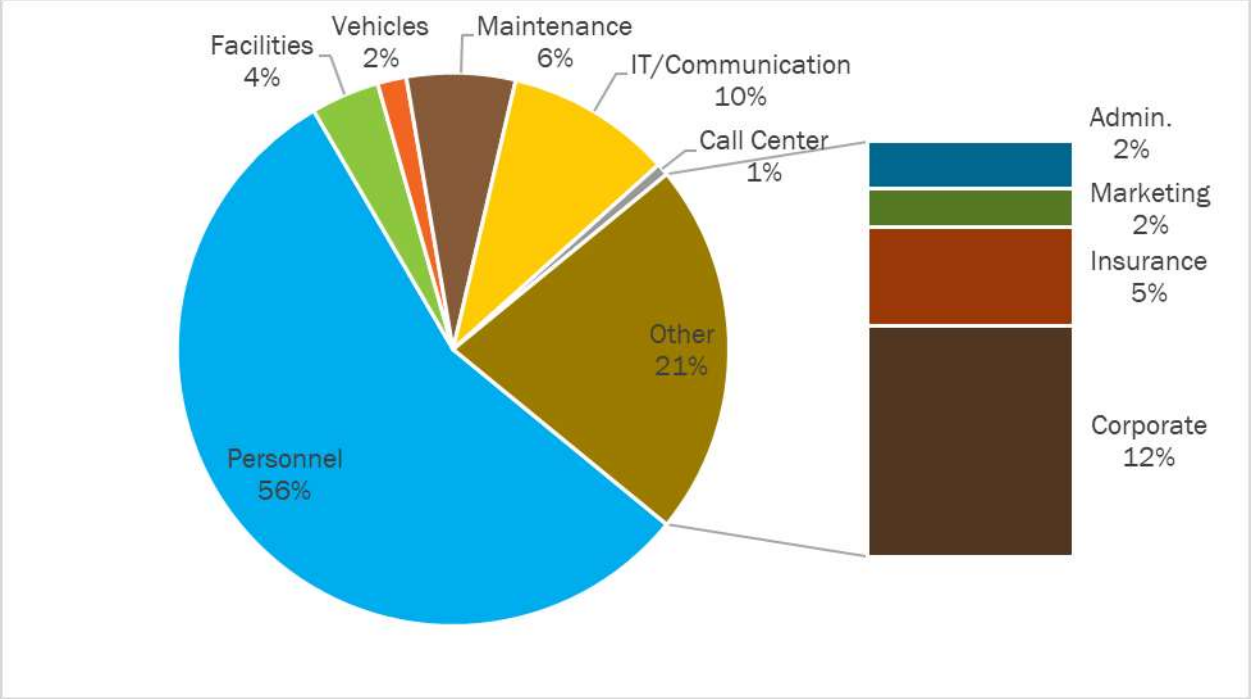
In 2017, the average monthly operating cost for Indego per dock was $125.[3] Direct comparisons to peers is a challenge as vendor contracts tend to report costs in different ways; discussions with peer programs suggest that

[3] *This figure excludes directly-reimbursed grant expenses. For example, the Better Bike Share Partnership receives grant funding to implement equity and community engagement initiatives.*

Indego's operating costs are on the high end, with costs typically ranging from about $60 to $100 per dock among peer systems.[4]

Based on limited itemized operating data provided to Indego's business planning consultant by other peers, there are a few specific cost centers that drive the program's higher than average operating costs. Personnel and IT costs (notably licensing fees to BCycle) are the largest contributor to higher costs at Indego. To a lesser extent, facilities and parts/equipment expenses are higher than expected based on peer data. Indego's higher cost structure may be a result of the program being smaller than its peers; larger systems can amortize fixed expenses (e.g. facilities, vehicles, administrative staff) across more docks and bicycles.

Figure 12 | 2017 Program Operating Costs (Excluding Non-Vendor Costs)

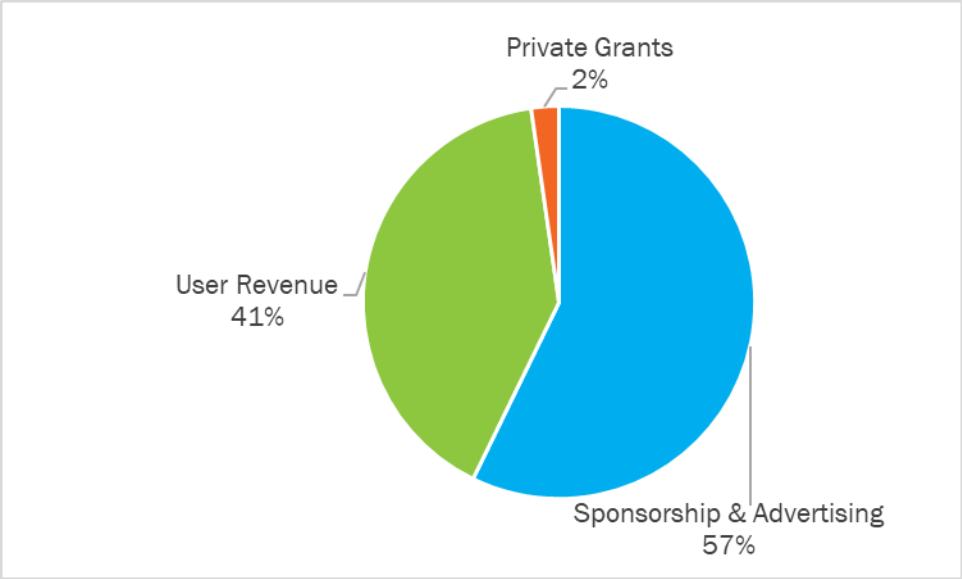


3.6.2 Program Funding

Ninety-eight percent (98%) of Indego's 2017 operating budget was funded through a combination of user revenue (41%) and Advertising and Sponsorship Revenue (57%). The program does not use any public funding to support operations. Indego's funding structure is similar to peer systems. However, user revenue is a smaller share of operating revenue than Philadelphia's peers. The program's higher operating cost is likely a contributing factor to the lower cost recovery rate, as revenue per rider is comparable to other systems.

[4] *Factors like the scope of services provided by the vendor and flow of user revenue greatly impact the operating* cost.

Figure 13 | Breakdown of Operating Revenue Forecasted in 2017



3.7 Key Findings

Indego has been a success since its launch in 2015. The program today ranks among the 10 most-used bike share systems in the country and has made a name for itself as a pioneer in promoting equity and access to disadvantaged communities. This analysis has identified several ways that Indego can continue to build upon its success to-date, including the following items detailed below.

Membership Base:

- Equity: Indego has greater participation among communities of color and low-income households than many peer bike share programs. While Indego has made great strides in promoting user equity, there is still room for improvement as member demographics do not fully reflect the demographics of the service area.
- User Retention: Fifteen (15%) of Indego memberships lapse each month, with only a minority of lapsed members returning to the program. Membership growth is driven by new members joining the system at a higher rate than existing members leaving. Improving user retention may help drive faster ridership growth.
- Membership Type: Casual users are a smaller share of riders at Indego than some peers. Attracting more tourists and visitors to the program would help improve cost recovery.

Ridership:

- Ridership per Bicycle: Indego's ridership rate is consistent with other peers but lags behind top performers like Capital Bikeshare in Washington D.C.
- Trip Flows: Indego ridership is fairly balanced between neighborhoods, meaning the number of trips between two neighborhoods is roughly equal in both directions. The only areas that show a high net-attraction of trips in the morning and loss in the evening are Center City (notably Logan Square and the Market West office district), University City, and to a lesser degree the Temple University area. For roughly

every five trips occurring during the AM peak (6am to 10am), roughly two more trips enter Center City, University City, or Temple University than leave those areas, resulting in an uneven distribution of bicycles.

- Ridership Growth: Ridership has grown consistently year-over-year since the program launched, but the number of rides per bicycle has declined over time. This decline is explained in part by the program's focus over the last 18 months on expansion in outlying neighborhoods instead of within the system's core.

Service Gaps:

- Station Expansion: Increasing the size of stations in high traffic areas can reduce the need for rebalancing and improve bicycle availability. Stations around the University of Pennsylvania Hospital, the Children's Hospital of Philadelphia, and Presbyterian Hospital are especially susceptible to capacity constraints.
- Existing Service Area: There are several opportunities to densify the system within its current service area. Within Center City, there are gaps in network coverage that likely contribute to lost ridership. Station densities are much lower outside of Center City, resulting in neighborhoods that are not fully served by the system even if bike share is present
- System Expansion: The best opportunities for system expansion are in neighborhoods directly adjacent to the existing system. There are long-term opportunities to expand Indego into outlying neighborhoods such as Germantown or Manayunk as the system expands outward.

Organizational Structure:

- Minimize Revenue Loss Between Partners: While the program's private-public partnership model is a source of strength, administrative fees and commissions to the Mayor's Fund and Spectra account for over 15 percent (15%) of program operating costs.
- Coordination Across City of Philadelphia Departments: Implementation of Indego relies on close coordination between multiple City departments. While communication between oTIS and the operating vendor are excellent, other city departments may not be aware of Indego's operating needs, station locations, and future plans. Improved communication may lead to stronger inter-departmental collaboration and reduce service disruptions.

Costs and Funding

- Operating Costs: Indego's operating costs per bicycle are among the highest in the industry. The largest driver of these costs are personnel and IT expenses.
- User Revenue: User fees make up a smaller share of revenue than expected for a large urban system. This is due largely to higher costs, not lower revenue. Indego's revenue per user is in line with those reported by peers in Washington DC, Boston, and Chicago.

4 Trends Impacting Bike Share in Philadelphia

Over the next five years, Indego will be impacted by nationwide and global trends affecting the bike share industry. To accurately formulate a vision for the future of the program, this business plan must consider how national changes will impact local bike share. This section begins by outlining recent changes in bike share technology, business models, and local market dynamics that may affect Indego. The study team has used this information to inform and outline a series of scenarios predicting how the Indego program and Philadelphia's bike share marketplace can change.

4.1 Changes in the Bike Share Industry

The bike share industry has changed considerably over the last five years. When Philadelphia developed its first bike share business plan in 2013, privately owned bike share systems were rare. The few that existed (e.g. DecoBike in Miami Beach, CitiBike in New York) were in unique operating environments that resulted in high bicycle utilization. In most other places, non-profits and local governments were the primary drivers behind bike share expansion. In 2013, all major bike share systems utilized docked base technologies, with equipment almost exclusively served by one of two firms: PBSC or BCycle. At that point, dockless system had only been used on a limited scale such as on college or corporate campuses.

4.1.1 Business Trends

Over the last two years, the bike share industry has seen the emergence of more privately-operated bike share systems. Backed by over $2 billion in total venture-capital funding, firms like Jump, Mobike, Ofo, Spin, and Lime are now competing with one another as well as with more established bike share systems for market share. These new firms operate without public funding and claim to support their operating and capital costs through user fees alone. Unlike traditional bike share models, which use dock-based infrastructure, these private firms rely on dockless technology that allows a trip to start or end at any point within a service area. The first city to permit private operators was Seattle. Initial permitting began in July 2017. Within six months, three companies were operating nearly 10,000 bicycles in the city. Today, private dockless firms operate in over 25 markets across the country, but significant volatility in the private bikeshare market has caused fluctuations in market participation. As of the time of this report, many the initial players in the dockless bike share area have ceased operations entirely in the US.

New Operating Models

Until a few years ago, bike share equipment and operating vendors focused largely on selling equipment and services to public-sector or non-profit clients. Multiple bike share systems rarely competed head-to-head in the same marketplace, and individual systems often had distinct branding and pricing structures. The new generation of private bike share firms operate quite differently: while they may be regulated to varying degrees by the cities they operate in, they are fully private and do not receive funding from public sources. In cities like Seattle,

Washington DC, and Dallas, they compete extensively with one another and existing municipal programs in the same market, charging as little as $1 per trip.

As private companies, these firms do not release information on operating costs, workforce, or capital expenses. It is generally understood that they run lean operations, with fewer resources committed to maintenance and rebalancing than publicly owned programs. Capital costs are also low because these systems use dockless systems that do not require stations, and provide cheaper bicycles.

Regulatory Concerns

These operators have faced pushback in recent months as some cities in which the operate – such as Dallas and Seattle - have had to contend with abandoned, improperly parked, and/or damaged bicycles scattered across their public right-of-way. A survey conducted in Seattle found that 11 percent (11%) of dockless bike share bicycles were not operational, with 56 percent (56%) having at least one maintenance issue. The same survey found that 13 percent (13%) of bicycles were improperly parked, either blocking the public right-of-way or being illegally parked on private property.[5] To keep costs low, these programs do not appear to provide the same level of equipment and service quality as public bike share programs.

Local governments have responded to dockless firms in different ways. Some municipalities, such as Dallas, initially avoided regulating new entrants, instead encouraging open competition among firms. Others, like Philadelphia, have instituted permitting and regulatory requirements that dictate the distribution and size of these systems.

Bike Share as Mobility

One of the major drivers of investment in the industry is a growing interest by technology companies in mobility solutions. Firms like Uber and Lyft are among the most valuable technology companies to come out of Silicon Valley in the last decade. Investors have begun looking at other modes, including bike share, for opportunities to replicate the success of ride-sharing. The recent purchase of the bike share company Jump by Uber, and Motivate by Lyft, suggests that market may begin to see greater consolidation of mobility services across modes.

Changes to the Vendor-Operated Model

The emergence of dockless firms is not the only change to the bike share industry's business model. There is an industry-wide decline in operating costs. Capital Bikeshare and Hubway (rebranded as Blue Bikes) both recently renegotiated their operating vendor contracts, resulting in a significant decline in per-unit operating costs. The

[5] *https://nabsa.net/wp-content/uploads/2017/09/Seattle-Dockless-Observations_Portland_R2.pdf*

industry is increasingly moving away from a fixed-fee approach toward cost/risk sharing. Vendors are taking on greater responsibility for sponsorship and advertising revenue acquisition, as well as member recruitment and retainment.

Market Unknowns

New operating models and private capital are having a positive effect on the bike share industry as they expand access to and affordability of bike share to users and communities. Despite positive trends, these new operating models often also result in market instability that makes it challenging for a system like Indego to plan for the next five years.

It is unclear whether dockless firms will compliment or compete with Indego. In Washington DC, the arrival of dockless firms appears not to have affected Capital Bikeshare ridership, but has anecdotally impacted sales of some pass types. Dockless operators in Philadelphia could hurt Indego if they attract a disproportionate share of the casual users who currently generate revenue for the Indego program. Dockless bicycles may also impact the value of sponsorship and advertising agreements and dilute the Indego brand.

A greater threat to Indego is the financial sustainability of new competitors. Despite lack of financial data, the industry understanding is that these firms are losing money on their bike share operations and focusing primarily on building their user base and achieving a large market share rather than on generating profit. Large amounts of venture-capital funding insulate these firms from making rational pricing decisions, which has led to fears that they could cannibalize Indego sales and then dissolve as they run out of cash. Major dockless firms like ofo have aggressively entered markets, only to retreat months later. If private dockless firms can demonstrate they have a sustainable business model, it could open the door for greater cooperation between Indego and its competitors, but until they do so they remain risky ventures.

4.1.2 Technology

Indego utilizes dock-based bike share equipment. The equipment vendor, BCycle, supplies systems for 38 other bike share programs in the United States. Some of the key features of Indego's technology are:

- The locking mechanism and IT hardware are integrated onto modular stations rather than into individual bicycles. Most stations are solar powered.
- Indego bicycles are designed for robust usage and easy maintenance. They do not feature IT systems or an internal locking mechanism but rely on docking stations for these functions.
- Bicycles are unlocked at a station kiosk or through a contactless key fob provided to members, or through a pin number texted to users and entered into the kiosk's user interface.
- Users manage their accounts online, and can use the Indego app to locate stations and see availability of bicycles and docks.
- Indego is one of the few bike share systems with a cash payment option through PayNearMe.

Indego's technology is mostly the same as other first-generation bike share programs, but new technology is emerging that could impact Indego's future business model. Spurred by new competition, the bike share industry is seeing greater technological innovation. New bike share technologies fall into two broad categories: (1)

innovations to the physical bike share equipment and (2) IT improvements to make bike share usage more seamless for customers.

Innovation in Bike Share Equipment

- **Dockless bike share systems** forgo kiosks and stations by integrating IT equipment and locking mechanisms on the individual bicycles. The two main benefits of dockless systems are lower capital costs, and greater operational flexibility. Dockless systems do not require costly stations or the time and resources required to find suitable sites and receive municipal and community approval for installation. Bicycles can be left anywhere within a system's service area and then checked out by another user from its current location. Capacity is tied simply to the availability of bicycles instead of the ratio of bicycles to docks.

  There are a few disadvantages to dockless programs. Because bicycles are not tethered to stations, they are easier to steal or vandalize. Dockless systems can also raise operational issues for maintenance and rebalancing crews, as bicycles are widely distributed instead of concentrated at stations. For users, the lack of stations can also make the bicycles harder to find, especially when multiple people in a group are looking to rent bicycles. Finally, many dockless systems require a smart phone, which may exclude lower-income individuals and foreign tourists.

Figure 14 | Three Dockless Bike Share Providers Parked Side by Side in Seattle.

- **Hybrid bike share systems** combine attributes from both docked and dockless equipment. These systems feature often utilize simplified stations that act merely as anchor points for bicycles, which have the locking and IT systems. The lack of moving mechanical parts in the docks reduces the cost of stations. These hybrid systems combine the flexibility of dockless systems with some of the high-visibility and operational

convenience of dock-based bike share. A hybrid system would potentially allow a dock-based program like Indego to transition into a dockless system over time, without forgoing existing investments in station equipment.

- **Electric assist bicycles**, better known as e-bikes, integrate a battery and small motor into individual bicycles to provide the rider with a boost when pedaling. They are especially helpful when carrying heavy objects or riding in hilly areas. While e-bikes could allow riders to travel at faster speeds than traditional bicycles, these systems are often speed regulated to below 15 or 20 miles per hour. The biggest challenge to deploying e-bikes is charging the batteries: some systems require the e-bike be returned to special stations where the bicycles are charged, while others deploy dockless bicycles with removable battery packs.

Figure 15 | JUMP Dockless E-bike

Photo: JUMP

- One emerging niche in bike share is **peer to peer (P2P) bike share technology**. These systems are powered by smart locking devices that allow owners to rent out their own bicycles to anyone with an app. P2P system have not been deployed in large numbers yet but could encourage a new generation of crowd-sourced bike share systems without any centralized ownership, maintenance, or operations of equipment. This model is already used in the car share industry by providers like Turo, a platform that allows users to rent out their own vehicles.

Innovations in Payment and Multi-Modal Integration

- Bike share systems are increasingly being **integrated with multi-modal smart phone apps**. Trip planning platforms like the Transit app already provide the location and availability of bicycles within the

Indego system. The next step in integration is allowing users to directly purchase memberships and passes and access bicycles through third-party apps. In April 2018, Uber purchased e-bike share provider JUMP and is integrating access to JUMP's bicycles directly into the Uber app. Closer integration will allow users to access bicycles without creating a new account.

- **Integration with transit smart cards** is another option to expand access and convenience for bike share users. In Los Angeles, LACMTA's Metro Bike Share utilizes the regional Transit Access Pass (TAP) smart card in lieu of a specialized key fob. Making Indego stations work with SEPTA Key would allow hundreds of thousands of Key users to seamlessly take out bicycles without a separate payment instrument.
- **Integration with open payment standards** is another option for making payment and bicycle access more seamless. Most smart phones today include an integrated contactless payment system (e.g., ApplePay, Google Pay). Bicycle share stations could accept smart phone contactless cards at the dock in lieu of a key fob.

Other Innovations

There are several technological innovations that do not fall into the two categories above. Bike share equipment makers are introducing new designs that reduce maintenance and capital costs. Airless tires are used by several dockless bike share systems and eliminate the risk associated with flat tires. Some bike share systems have innovated beyond the standard bicycle by introducing new types of equipment such as accessible recumbent bicycles and shared scooters.

4.2 Possible Scenarios Impacting the Program

While it is nearly impossible to predict the future of a quickly evolving mode like bike share, it is important that Philadelphia is actively thinking about how changes to system size, funding, technology, and competitive landscape impact the Indego program. For this business plan, the study team identified a variety of potential future scenarios. These scenarios are not necessarily mutually exclusive; for example, a scenario where the system grows into new neighborhoods does not rule out a scenario where Indego is one of many bike share operators in the City of Philadelphia. The goal of this scenario planning exercise is to help the Indego program explore the range of potential future outcomes and develop a set of alternatives for how the program may evolve over the next five years.

The scenarios are grouped in four categories:

1. System Coverage and Expansion Strategy: How will Indego grow over the next five years?
2. Funding: What are potential funding structures for the program?
3. Technology: What kinds of technology could Indego adopt?
4. Competition: What will the competitive landscape among bike share operators look like in Philadelphia?

Each scenario has been evaluated through the lens of a SWOT analysis. A SWOT Analysis is a strategic planning method used to evaluate the strengths, weaknesses, opportunities, and threats of a project or venture. It is intended to help guide development and prioritization of strategic initiatives. SWOT analyses are often used in business planning to identify strategic advantages and anticipate future challenges.

Strengths and weaknesses look directly at tangible outcomes of each scenario. For example, adding new stations will in-turn expand ridership (strength) and increase capital and operating costs (weaknesses). Opportunities and threats focus on external benefits and drawbacks of a scenario. A larger system could open the door for more lucrative sponsorships and partnership deals (opportunity), but also threaten the programs ability to maintain equipment or invest in new technology (threat). The following summarizes the questions that drive the SWOT:

- Strength: What are the direct benefits of this scenario?
- Weaknesses: What are the downsides of this scenario?
- Opportunities: What kinds of positive outcomes could this scenario generate?
- Threats: What are potential negative outcomes of this strategy?

These scenarios were presented to city government stakeholders in May and June 2018. These discussions guided the recommendations included later in this business plan.

4.2.1 Expansion Strategies

Growth Scenario 1: No Change

Under this scenario, Indego would not expand or reallocate capacity through the system.

No Change to System Size	
Strength	Potential for administrative cost savings.
Weakness	Does not address evolving needs or improve program cost recovery.
Opportunity	Capital funding could be reinvested into programmatic improvements.
Threat	Could lead to program stagnation and declining relevance. Opens the door for competition from dockless providers.

Growth Scenario 2: Focus on Densifying the System

Over the last few years Indego has invested largely in outward expansion, adding new neighborhoods to the program while not adding a significant number of stations to the program's core. This scenario would focus resources on adding more stations to where Indego already exists.

Focus on Densifying the Existing System…	
Strength	A denser system will help improve cost recovery and financial performance. Close-spaced stations cost less to service and help re-balance themselves. More stations in high-demand areas like Center City will generate strong ridership.
Weakness	Does a poor job of meeting equity and coverage goals. Does not align with goals of all Indego partners and advocates.

Opportunity	Indego can respond better to competition in its core market and improve user retention.
Threat	Can create perception that Indego is not a program for all of Philadelphia. May damage Indego's network of supporting partners.

Growth Scenario 3: Focus on Expanding Program Coverage

Today fewer than half of Philadelphians live within a quarter mile of a bike share station. This scenario would expand the program into new neighborhoods.

Focus on System Coverage …

Strength	Better address Indego equity and health goals by expanding program access.
Weakness	Will negatively impact cost recovery and increase operating costs. Does not address need for more stations in the system core.
Opportunity	Expands brand awareness of Indego and sponsorship penetration. Larger system size can expand political support (assuming surrounding residents use the program).
Threat	Opens space in the bike share marketplace for dockless competitors to capture a share of the lucrative casual user and commuter market in Center City.

4.2.2 Funding

Funding Scenario 1: Continue with Existing Sponsorship and Grant Driven Model

Indego's funding model relies primarily on grants and sponsorships to support operating costs not covered by user fees. The City of Philadelphia provided $3 million in initial launch capital but does not fund day-to-day operations of the program. Indego's operating vendor is reimbursed for operating expenses and does not have a financial or ownership stake in the program.

Existing Funding Model…

Strength	Diverse sources of operating funding (sponsorships, station advertising, grants, user fees). Provides greatest degree of continuity and minimizes risk associated with major changes to funding structure. Under current model, City has strategic control over program.
Weakness	Relying on sponsorships, advertising, and private donations requires constant investment in donor development, fundraising, and grant writing. Funding structure adds complications to how program is administered, and funding distributed. Grants come with strings attached that affect program policy.
Opportunity	Expand and leverage existing partnerships (e.g., special program to attract IBX members). Expand street advertising.
Threat	Challenge of funding less flashy initiatives like equipment maintenance/replacement. Loss of buzz due to greater competition in the bike share market place. Reliance on a single major corporate partner to fund program.

Funding Scenario 2: Operator Takes on Larger Funding Role

Private funding has been a major driver of expansion in the bike share industry. Venture capital backed dockless firms have entered the market, trying to transform bike share the same way ridesharing has transformed the taxi industry or carsharing the rental car industry. Alongside these firms, are private programs that partner closely with municipalities, raising capital through user fees and sponsorship revenue at no cost to their host city. Indego could take advantage of this private capital by requiring the operator to play a larger role in funding the program.

Greater Private Involvement in Funding System.

Strength	Leverage private capital to grow and expand system. Diversify program funding. Share funding risk with a partner.
Weakness	Reduces oTIS's control over the program. Venture capital funding unsustainable in the long term unless the program can generate a profit.
Opportunity	Private capital could allow Indego to better compete with dockless bike share.
Threat	Long-term viability of the model uncertain. Vendor's success depends not just on local market, but its viability nationwide.

Funding Scenario 3: Increase Public Contribution to Program

Many of Indego's large-city peers receive some level of public financial support to subsidize bike share operations. In this scenario, Indego would obtain a public commitment (local or state funding) to subsidize program operations and capital.

Greater Amount of Public Funding to Program…

Strength	Reduces pressure to achieve profitability and allows Indego to pursue community objectives like promoting equity and public health. Allows oTIS to maintain high degree of control over program.
Weakness	Could lead to reduced operational discipline as station placement is not constrained by profitability. Highly unlikely in Philadelphia's current funding climate.
Opportunity	Allow Indego to achieve city-wide expansion, which otherwise may not be feasible solely through private funding.
Threat	Opens program up to greater political influence. There is inherit instability in public funds.

4.2.3 Technology

Technology Scenario 1: Continue to Use Current Technology

Under this model, Indego would continue to solely use the dock-based system employed across the system. Future stations and bicycles would be compatible with the current infrastructure.

No Change to Technology…

Strength	Minimizes risk as system uses same well-tested technology as today; the high-profile meltdown of Velib service in Paris highlights the pitfalls of transitioning technology. Maintains Indego's existing investment in bicycles and stations.
Weakness	Less operational flexibility and higher (25%+) capital costs than dockless systems.
Opportunity	Dock-based technology could be Indego's differentiator from dockless competition.
Threat	Indego could be investing in outdated technology. May fail to keep up with competition that more readily adopts new types of technology.

Technology Scenario 2: Introduce E-bikes into the Program

E-bikes, or electric-assist bicycles, include a battery powered motor that provides users a boost while pedaling. E-bikes allow users to travel farther while expending less energy. This technology is especially promising in hilly areas where topography is a barrier to bicycle use. In this scenario, Indego would introduce e-bikes into the system, likely alongside the conventional bicycles currently used.

Introducing E-bikes…

Strength	Bring in new users to bike share. Make bike share more viable in the (few) hilly neighborhoods of Philadelphia. Allow for longer-distance bike share trips.
Weakness	More expensive to operate and maintain. Logistical challenge of keeping bicycles charged. Unclear how deploying two types of bicycles in one system would work. Potentially requires hardwiring into electrical grid.
Opportunity	Provides Indego a more "premium" product that it can charge more for. Responds to competitive pressures from privately funded e-bike systems. Has proven more popular than conventional bicycles in other cities.
Threat	Higher capital costs will also result in greater future state of good repair expenses. E-bikes bring up additional safety and regulatory hurdles, notably if the bicycles travel at higher speeds than other bicycle traffic.

Technology Scenario 3: Create a Hybrid Dock and Dockless System

In this scenario Indego would introduce dockless bicycles alongside its current fleet. These bicycles may still be compatible with existing station infrastructure or may need to be parked elsewhere.

Hybrid Dock and Dockless System…

Strength	Provides Indego different types of bicycles for different contexts. Dockless bicycles may be a better fit for lower-demand areas where dock-based systems cannot achieve suitable cost recovery. Allows the program to innovate without abandoning its existing technology.
Weakness	Having two types of bicycles introduces a greater amount of operational complexity, including how these two fleets are re-balanced. More confusing for customers.
Opportunity	Provides direct competitor to dockless firms. Allows Indego to transition to a new technology gradually over time.
Threat	May dilute the Indego brand. Reduces differentiation between Indego and its dockless competitors. Dockless bicycles may be more susceptible to vandalism and theft and have not seen increased use over conventional dock-based systems

Technology Scenario 4: Move to Dockless System

In this scenario, Indego would transition to a dockless system. The program can be managed through pre-determined "hubs" or allow users to lock up anywhere within the right-of-way.

Dockless Technology…

Strength	Allows more flexible bike share operations. Eliminates problem with station's being entirely full.
Weakness	Moving to a new technology features an upfront cost and risk. Unclear whether market has preferences for dockless over dock-based systems.
Opportunity	Allows Indego to directly respond to dockless competitors while leveraging Indego's existing large user base and strong brand awareness.
Threat	Reduces differentiation between Indego and dockless competitors. Dockless bicycles more susceptible to vandalism and theft. Adds additional risk of clutter to already-limited public right-of-way, especially in dense parts of the city.

Scenario 5: In-App Integration with Existing Mobility Platform

Uber's recent purchase of Jump Bikes and the entrance of Lyft into the bike share marketplace through a purchase of Motivate sets a precedent for the integration of shared-mobility systems across modes. Under this scenario, riders could access Indego through an existing mobility platform. This integration could happen directly on a mobility platform provided by a transportation network company like Uber or Lyft, or through a third-party trip planning platform like Transit or Google Maps.

Mobility Platform Integration…

Strength	Increases the visibility of the Indego program by highlighting Indego alongside other mobility options. Streamlines access to Indego for App users. Could bring new users to the program.
Weakness	Integration with another platform could require overcoming major technological hurdles. May not be feasible through existing IT platform.
Opportunity	Could open new funding streams if mobility partner acquires a stake in the program.
Threat	Reduced control over end-user experience. Adds additional organizational complexity.

4.2.4 Operations and Market Competition

Operating Scenario 1: Indego Remains Sole Bike Share Operator

Under this scenario, Indego's competitive position in the Philadelphia marketplace would remain the same. No additional bike share operators would serve Philadelphia. This outcome could be simply because of a lack of interest among competitors, or regulatory barriers that block market entrants.

Indego Exclusive Bike Share Operator in Philadelphia…

Strength	No direct competition.
Weakness	May only be feasible through regulatory barriers. Any regulations would block the entrance of firms that could expand the reach and access to bicycle share in Philadelphia.
Opportunity	Ensuring Indego is the exclusive bike share operator in Philadelphia may increase the value of program sponsorship, advertising, and branding.
Threat	Likely to face legal challenges. Indego could be impacted by other entrants such as shared-scooters.

Operating Scenario 2: Indego Exists within a Competitive Multi-Operator Marketplace with Limited Regulations

Several cities have chosen to place few or no restrictions on the number and size of private bike share operators. In this scenario, Indego would exist in a market where multiple firms operate bike share systems in Philadelphia.

Firms would not feature any pricing requirements or interoperability requirements and be free to deploy bicycles as they please.

Philadelphia Becomes an Minimally Regulated Bike Share Market…

Strength	High degree of competition could lead to more bicycles and lower prices for consumers.
Weakness	Competition may harm the viability of the Indego program. Concerns over bicycle clutter and vandalism. Difficulty in communicating appropriate user behavior between dockless and station based systems.
Opportunity	Dockless systems introduce new users to bike share, some of whom become Indego users.
Threat	Industry instability and consolidation. Dilution of Indego brand. Damage to image of bike share.

Operating Scenario 3: Indego Exists within a Competitive Multi-Operator Marketplace with High Degree of Regulations

An alternative to unfettered competition of bike share in Philadelphia is a competitive yet regulated marketplace. Several cities have adopted a permitting and regulatory mechanism for bike share operators that include features such as pre-determined drop-off or pick-up locations (hubs), geographic limits, and limits on the number of bicycles allowed on city streets. While each bike share operator operates independently, they are held to consistent standards to ensure there is some level of organization in the bike share market place.

Philadelphia Becomes an Regulated Multi-Operator Bike Share Market…

Strength	Helps minimize the disruption caused by multiple operators. Regulations are a tool to reduce bicycle clutter and control where and how bikes are deployed.
Weakness	Potential legal limits to City's regulatory power over bike share. Enforcing regulations carries a cost for the City.
Opportunity	Create a more level playing field for Indego by requiring operators to meet similar coverage or equity goals.
Threat	Industry instability and consolidation. Dilution of Indego brand. Damage to image of bike share. Lack of cooperation among private bike share vendors.

Operating Scenario 4: Private Systems and Indego Establish Integrated Multi-Operator System

One of the downsides of having multiple bike share operators in the City of Philadelphia is that it may subdivide the market into too many small slices and make no single operator viable in Philadelphia. Under an integrated multi-operator model, Indego would exist alongside private systems. While each program would be separately operated and free to set their own prices, users would access bicycles through a single app and user profile.

Philadelphia Becomes an Integrated Multi-Operator Bike Share Market…

Strength	User friendly by allowing riders to seamlessly switch between bike share operators. Encourages competition.
Weakness	Requires app and member integration that may not be feasible. Unclear whether Indego, with a large existing user base, has more to gain then private competitors.
Opportunity	Multi-operator bike share app could become a multi-modal mobility platform for the city.
Threat	Brand dilution as Indego becomes only one of many featured bike share options. Users may not differentiate between operators if they are all available through a single platform.

Operating Scenario 5: Indego Adopts a Franchise Business Model

In this scenario, Indego would be transformed from a bike share operation into a bike share franchise operated by one or more vendors. This scenario takes the model in Scenario 4 one step further by eliminating most bike share differentiation between vendors from the consumers perspective. While vendors would be responsible for their own operations and equipment, each operator would utilize the Indego branding and pricing. Franchise contracts would be bid out on a competitive basis. The City-managed Indego program would not own any physical bike share assets but would maintain responsibility for strategic planning and program oversight.

The franchise model is used by cities like New York (CitiBike) and San Francisco (GoBike), where a single vendor owns the equipment and operates the system. To date, this model has not been deployed with multiple operators.

Indego Becomes an Umbrella Franchise for Bike Share in Philadelphia…

Strength	City retains control over the bike share brand in Philadelphia. Frees the City from financial obligations related to bike share.
Weakness	Requires extensive regulatory and oversight commitment by the City to implement. City gives up a degree of control in franchising out operations to a private firm. Unclear whether there is market willingness to take over the system.
Opportunity	Private partner could have the resources and expertise to broker more lucrative sponsorship deals or implement integration with other mobility options such as rideshare. Regional opportunity for suburban expansion.
Threat	Brand dilution as operators may not provide a consistent user experience due to differences in equipment and maintenance practices.

4.2.5 High-Level Screening

In May and June 2018, oTIS and its partners at other City departments held internal discussions to vet these scenarios and formulate a preferred policy for the program. The screening considered the program goals and

objectives to confirm which scenarios conform to Indego's strategic vision. These discussions resulted in a set of policy decisions regarding which types of technology, expansion policies, and operating model make the most sense for Indego. These results are presented in the next chapter.

4.3 Conclusions from Scenario Planning Exercise

While the evolution of the Indego program over the next five years will rely in part on external factors like the availability of private funds, the competitive landscape of the bike share industry, and available technology, the scenario planning process has allowed Indego to identify a basic framework for how it would like to evolve:

- Expansion Policies: The City would like Indego to expand to new areas to the degree feasible by ridership and operating revenue. Future growth will have to strike a balance between investing in Indego expansion within the current service area – where the system has an established market and ridership base – and incrementally adding stations in more neighborhoods.
- Technology: The City wants to transition to a hybrid dockless/docked technology. The system will still have stations and kiosks but riders will have the option of locking bikes outside of a station. Parallel to this effort, Indego would like to introduce an e-bike option.
- Funding and Operating Model: The ideal funding and operating model for the program will depend largely on external factors outside the program's control. To prepare itself for different possible outcomes, the City would like to outline three potential operating alternatives that seek to achieve the same goal in terms of system size and ridership:
    - Alternative 1: Indego follows the same basic funding and operating model it currently utilizes, while continuing to work on improving operating efficiency, lowering costs, and introducing new technologies.
    - Alternative 2: Indego enters into a cost and risk share agreement with a private vendor. The vendor will be responsible for operating the system and will generate its own revenue directly through user fees and advertising. The City will own all Indego equipment, fund capital costs, and provide an operating subsidy through its title sponsorship revenue.
    - Alternative 3: Indego will franchise out operations of Indego to a private firm. The firm will take ownership of all equipment and be responsible for self-funding operations and capital expenses. In return, they will receive all revenue generated by the program, including sponsorship agreements.

5 Study Recommendations

5.1 Overview of Five-Year Vision

The vision behind Indego was bold: to create a dense, community and equity-oriented bike share system that takes best practices from established systems while pioneering new outreach and pricing strategies. The 2013 Business Plan was essential for bringing stakeholders together and creating the momentum to establish Indego. This updated business plan proposes that Indego be just as bold when planning for the next five-years. While not all the recommendations in this business plan are funded under existing financial constraints, the bike share market is quickly evolving. Having a strong vision for the system will allow Indego and its partners to grasp opportunities as they arise.

Expanding the current system is key to achieving the 2018 Vision. Indego is susceptible to poor economies of scale and increased competition at its current size. Without sustained expansion, the program will not be able to reach its full potential. Over the next five years, the City of Philadelphia would like to see Indego expand from 121 stations to over 250 stations, at a rate of expansion of 25+ stations a year. This expansion will include both investment in the number of stations and bicycles within the current service area and expansion outward into neighborhoods that are not currently served. As outlined in this section, the cost of this expansion will vary based on the funding model for the program.

This section outlines the cost implications of three alternatives: Indego operating under the current basic model, Indego operated through a joint cost/revenue sharing agreement with an operator, and Indego handing over both operations and equipment ownership to a franchisee.

Beyond the operating model, the City would like to implement several policy principles that will set the program on a more sustainable financial path and help achieve its strategic vision:

1. Expand the program to greater financial sustainability – Indego envisions the program increasing from 121 stations today to over 250 stations over a five-year period.
2. Ensure that growth is geographically balanced so there are enough new high-revenue stations to support expansion into new neighborhoods.
3. Continue to invest in additional stations and docks within the system core to meet demand.
4. Continue to invest in equity and community engagement initiatives; Indego's focus on serving low-income and communities of color are a key aspect of the program.
5. Conduct semi-annual system audits to determine which stations can be down or upsized based on demand.
6. Introduce new technologies, including a transition from the existing dock-based system to smart-bikes that utilize simplified docking infrastructure. Pilot e-bikes within the network.

7. Continue to strengthen partnerships with program stakeholders, including IBX, various city departments, and the Bicycle Coalition. They bring together resources and expertise that are invaluable for the program.
8. Lower program operating costs; Indego's current cost basis is too high.
9. Ensure Indego's state of good repair needs are met.

5.2 Policy Recommendations

5.2.1 Expand the Program

Indego is currently smaller than peer bike share systems in cities like Washington D.C., Boston, Chicago, and San Francisco. The program's smaller size handicaps it in several ways. One of Indego's the key weaknesses is its high operating costs. System expansion is a key strategy to lower those costs. The system has fixed costs in staff, facilities and equipment that can be spread across more bicycles and trips if the program expands. Furthermore, adding stations to the system can address operational weaknesses such as capacity constraints at busy stations. New stations can absorb capacity, reducing the need for costly rebalancing.

Operating costs are not the only reasons to expand Indego. The program currently covers only a small portion of Philadelphia. A larger system would benefit from the network effects of serving more destinations. Many of the neighborhoods adjacent to the existing Indego system are lower-income neighborhoods with accessibility challenges, the types of places that may benefit most from bike share. Growing the system will allow Indego to become a more important part of Philadelphia's transportation system and have a bigger impact on the quality life and mobility of city residents.

Finally, Indego at its current size is susceptible to competition from private dockless firms. The system still has gaps in coverage within high ridership areas like Center City. If private operators were to fill this gap they would draw revenue away from Indego. The current equity-focused program relies on high-ridership stations to cross-subsidize lower-ridership stations in lower-income and historically disadvantaged communities. Private bike share firms do not have the same commitment to serving these neighborhoods.

oTIS has set a goal to add over 130 stations to the Indego program to achieve a five-year build out of over 250 stations. While this would more than double the program size, Indego would still be smaller than similar programs in Boston and Washington, DC, cities with fewer than half as many residents. The City has not yet identified the location of stations but based on other recommendations in this section, that expansion would enable the program to grow its service area by over 15 square miles, while significantly densifying Indego within its current service area boundaries. Philadelphia currently has funding to grow the system by an additional 20%; this business plan is a critical first step to raise funds for the full 250+ station vision.

5.2.2 Grow in a Balanced Manner

Indego's future growth should occur in a balanced manner to ensure there are enough stations in high-revenue areas to support the system's operating costs. Because ridership rates across the existing system vary widely, with

ridership generally declining the farther one travels from Center City, this business plan has broken Philadelphia into four zones to model ridership and forecast revenue from future expansion. These zones are defined based on existing station performance and the results of the propensity analysis:

1. Core Zone: Area attracting a net positive number of trips during the AM Peak Period. Features high ridership, including the highest rate of casual usage in Philadelphia.
2. Outer Zone 1 – High Ridership: This area features similarly high ridership rates as the Core zone but with fewer casual-user trips. Encompasses neighborhoods adjacent to Center City.
3. Outer Zone 2 – Moderate Ridership: Area with ridership around the system-wide mean trips per bike per day. This zone predominantly clusters around the Core and Outer-Zone 1.
4. Outer Zone 3 – Low or Undefined Ridership: The majority of Philadelphia is categorized in this zone. These include areas that currently have low bike share ridership or lack suitable comparison stations to determine ridership. Stations in these zones are expected to perform well below the system-wide average.

The business plan has developed a ridership profile for these four zones based on typical peak (April to October) and off-peak (November-March) ridership at existing stations within each zone. The zone boundaries and ridership figures should be revisited over time. As certain stations mature in ridership and new stations come on-line, adjustments will have to be made. For example, future growth may lead areas in Outer Zone 3 to be recategorized as a higher ridership zone. See

Table 8 for a summary of ridership assumptions by zone and year.

Table 8 | Ridership and Membership Breakdown by Zone

Zone	Avg. Trips Per Day/Bike		Share of Trips by Annual/Monthly Member	
	April to October	*Nov. to March*	*April to October*	*Nov. to March*
Core	3.28	1.54	84%	89%
1-High Ridership	3.09	1.59	89%	90%
2-Moderate Ridership	1.49	0.71	88%	91%
3-Low Ridership	0.64	0.31	87%	91%

The business plan includes two different build out forecasts, highlighted below. The first is the recommended system size of 250+ stations which presumes appropriate levels of capital funding. The 250+ station forecast is based on growing the existing system by 140 stations, which results in 261 total stations. While the financial model requires a precise station number, the expansion goal is set more broadly at over 250 stations. The second forecast is more conservative at 185 stations, and mirrors the projections from the 2013 plan. The 250+ station system will require aggressive expansion of the system, while the 185-station forecast can provide guidelines if necessary funding levels are not achieved.

250+ Station Build-Out

Based on the financial model developed for this Business Plan (see Financial Plan section of this chapter), a distribution of stations by zone was identified that allows Indego to expand while generating adequate revenue by Year 5 to fully cover operating costs and state of good repair set-aside needs. This distribution of stations calls for Indego to front-load higher ridership stations in the first two years of this business plan, when average per-station operating costs are higher, and transition to focusing more on expansion in later years as marginal operating costs go down (see Table 9). While this business plan does not identify specific station locations, the proposed distribution would enable the system to expand the service area by approximately 15 square miles.

Table 9 | Total Number of Additional Stations by Year and Zone (261 station build-out)

	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Core	13	10	9	8	8	48
1-High Ridership	6	3	2	2	2	15
2-Moderate Ridership	7	7	6	5	5	30
3-Low Ridership	2	8	11	13	13	47
Total	28	28	28	28	28	*140*

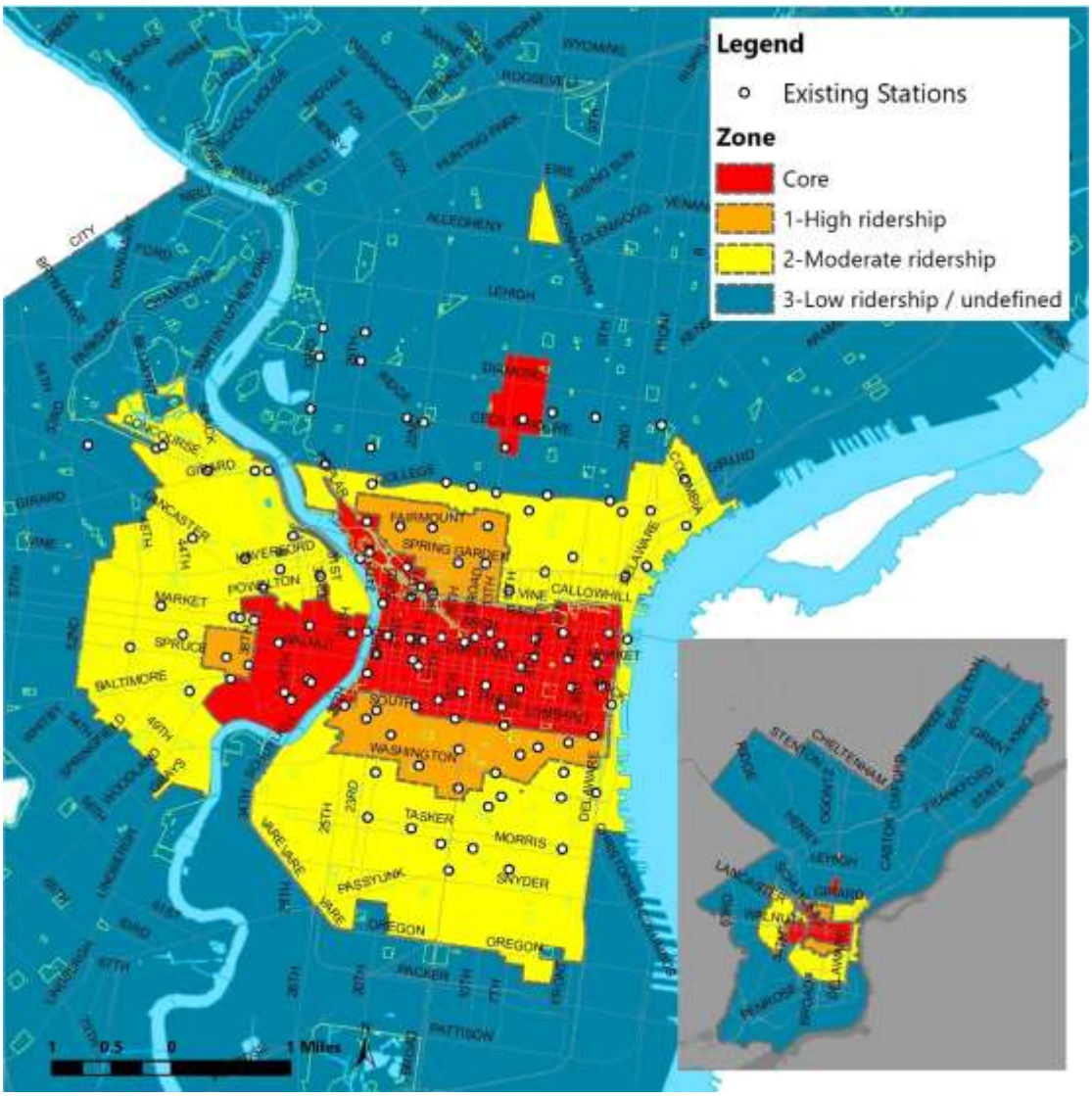
185 Station Build-Out

Indego's previous business plan outlined a 185-station system. Building out the program at this reduced size would impact the timing and allocation of stations by area. A smaller proportion of new stations in this scenario would go toward expansion, with the majority focusing on expanding capacity in high-revenue locations to maintain a balanced program budget.

Table 10 | Number of Stations by Year and Zone (185 station build-out)

	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Core	13	10	1	-	-	24
1-High Ridership	6	1	1	-	-	10
2-Moderate Ridership	7	7	2	-	-	16
3-Low Ridership	2	10	4	-	-	14
Total	*28*	*28*	*8*	-	-	*64*

Figure 16 | Boundary of Model Ridership Zones



5.2.3 Invest in Core Capacity to Absorb Demand as the System Grows

A large share of trips within the Indego system begin or end within the system's core zone, defined as Center City, University City, and Temple University. During the AM peak period (weekdays 6am to 10am), for every five Indego trips that occur, two more end in the core zone than leave the core zone. This means that as the system expands, additional stations need to be added within the core to absorb more trips. Without investing in core capacity, the Indego system will become less reliable as stations become regularly full or empty. Rebalancing is already one of the major cost drivers for Indego and the operator cannot currently re-distribute bicycles quickly enough during peak periods to meet all demand. If the system expands without increasing core zone capacity, this issue will likely worsen.

The Business Plan proposes that over the next five years, between 33 percent (33%) and 40 percent (40%) of new stations be placed within the core zone. This ratio is reflected in the expansion policy discussed in the previous section.

As the Indego system grows outward, it's likely that a smaller share of trips will begin or end within the core, warranting a reevaluation of this policy on regular intervals. It should be noted that the lack of right-of-way in Center City could be a limiting factor in meeting station expansion targets within the Core zone. Some of this expansion could be accommodated by simply adding docks to existing stations.

5.2.4 Continue to Invest in Equity Initiatives

As the existing conditions chapter highlights, Indego still needs to make progress to achieve parity between its rider demographics and the demographics of the populations it serves, but it is on the right track to realizing its vision of an equitable bike share program. The system has one of the highest rates of participation among low-income and persons of color in the bike share industry Diversifying the user base of bike share takes concerted effort and time, and Indego has pioneered several strategies that can promote bike share among a wider user base. Even as the program works to trim its operating costs and become more efficient, it is important not to lose sight of its equity goals.

Indego should continue to invest in equity activities. The program's focus on equity is a major differentiator between Indego and any potential competition. In marketing bike share, the city could emphasize the public good provided by Indego and how each full price membership helps support providing access to bike share in historically disadvantaged communities.

5.2.5 Audit Ridership Patterns and Redistribute Capacity on a Regularly Scheduled Basis

Redistributing infrastructure is a sound practice to ensure the best return on investment in bike share infrastructure. Demand throughout the Indego system is likely to shift over time, and certain stations will see ridership grow and decline. Indego should audit the system regularly to identify which stations are under and over-utilized. Docks and bicycles should be redistributed accordingly, to better fit ongoing shifts in demand. For example, a low ridership station with 15 docks can be downsized to nine docks without impacting accessibility to bike share. The six docks removed from that station can then be added to locations where demand exceeds the supply of bicycles and docks.

Transit providers regularly review route performance and conduct schedule changes. Indego can mimic this by scheduling semi-annual service adjustments when stations are resized. Having scheduled months (e.g. March and October), can ensure the reallocation of equipment happens in a predictable and consistent manner, which all public stakeholders on board and aware of upcoming adjustments.

5.2.6 Introduce New Technologies including Dockless Capable Bicycles and E-bikes

Introducing new technology to a bike share system can be challenging. Bike share systems invest in equipment that lasts for years, and bicycles and stations must be able to withstand heavy use in varying conditions. There is also a strong incentive to preserve equipment compatibility across a system, so that any bicycle can be returned to any station. With these constraints in mind, it is still important for programs like Indego to continue to invest in

new technologies that make the system more convenient and easier to use. Indego would like to introduce two major changes to its bicycles during the life of this business plan, both of which are discussed in further detail below.

Hybrid Dockless Technology

The first proposed improvement is to transition the system to a hybrid dockless system. Indego stations feature mechanized docking points that lock the bicycle in place. A hybrid system would move the locking mechanism onto the bicycle itself, allowing bikes to be locked to designated stations or other secure bike parking locations, such as public bicycle U-racks. The system would still utilize stations to manage the downsides of dockless systems, including concerns about bicycle clutter and lack of predictability over bicycle parking locations. Hybrid dockless stations will differ from Indego's existing equipment by utilizing a simplified docking point. Hybrid dockless stations are expected to cost at least 25% less to purchase than traditional bike share stations. Moreover, Indego will have more flexibility to innovate in how bicycles are deployed; for example, the system could designate overflow zones when adjacent stations are full, or allow users to lock a bike up halfway through their trip.

This business plan assumes it will take between 12 and 24 months for Indego to begin rolling out dockless technology. The largest challenge is to ensure compatibility between new and old equipment. Retrofit kits could be used to enable existing stations to receive the new bicycles and make existing bicycle compatible with new simplified stations.

Figure 17 | Example of Hybrid Smart-Bike System (Source: BCycle)

Hybrid station differs from existing Indego stations as locking mechanism is integrated onto the bicycle instead of on the station, reducing the cost and complexity of stations.

E-bikes

Electric assist bikes, better known as e-bikes, are another technology Indego should explore as equipment becomes available. Lower cost and better performing batteries have made e-bikes increasingly popular across the consumer bicycle industry as well as an increasing presence in bike share. These bicycles provide riders a boost while pedaling, enabling users to take longer trips, travel up hills, and carry heavier loads than would be possibly on a standard bike share bike. E-bikes could expand Indego's appeal to new users. The bikes could also open a new revenue source by allowing Indego to charge a price-premium for e-bikes over regular bicycles. Indego is planning to launch a pilot in the Fall of 2018 to test e-bikes on a limited basis. This pilot will provide the program a better understanding of the cost and operational complexities associated with these bicycles. Based on the results of the pilot, the City may opt to increase the size of the e-bike fleet. As with hybrid dockless bicycle technology, Indego will seek e-bikes that are compatible with the system's existing infrastructure.

5.2.7 Continue to Strengthen Program Partnership and Stakeholder Coordination

As discussed in Chapter 3, a wide range of private, non-profit, and public organizations are responsible for making Indego work. This network of partners is a strength for the program because it brings diverse expertise and resources together, but it also requires ongoing work by oTIS to ensure good communication between parties and efficient utilization of resources. Based on discussions with program stakeholders, making several simple improvements could strengthen the program's partnerships:

- **Appoint a Marketing and Engagement Lead:** Marketing activities are currently split between BTS, oTIS, and non-profit partners like the Bicycle Coalition. Indego could streamline this process by nominating an individual or organization as Indego's marketing point person. This individual or organization would be primarily responsible for Indego's overall messaging, and for setting the strategies for marketing and community engagement. Having a clearly defined marketing and engagement lead will reduce duplication of effort and ensure consistency in messaging and outreach strategies.
- **Institute Semi-Annual System Reviews:** As mentioned previously, Indego could implement a semi-annual system audit to identify stations in need of either upsizing or downsizing. This process should take place at regularly-scheduled intervals and bring together the program vendor, oTIS, and other partners to ensure an efficient permitting process, with ample communication and outreach to impacted customers.
- **Improve Communication Between Indego and Streets Department:** Several strategies were identified to improve communication and coordination between Indego and the Streets Department. Streets is responsible for conducting site plan reviews for major new developments and sharing information on planned Indego station locations can help ensure that bike share is adequately considered in the review process. Encouraging developers to set aside right-of-way for bike share stations will ease some of the space constraints that limit growth of the program in parts of Philadelphia. Beyond improving coordination during the site plan review process, Indego could improve communication between Streets and the program vendor. There is currently no formal process in place to communicate planned street work to BTS. Better communication would allow BTS to properly plan for service disruptions caused by street closures and construction.

- **Incorporate Indego site suitability into the Civic Design Review process:** Sites can be vetted as potential Indego station locations during the Civic Design Review Process, run by the Philadelphia City Planning Commission. This process applies to projects that meet certain thresholds described in the Philadelphia Zoning Code.
- **Explore More Cross-Promotions Between Indego and its Sponsors:** Indego's sponsors, most notably IBX, bring funding support, specialized expertise, and a large customer base to the program. Indego should leverage these non-monetary assets to promote the program and strengthen these existing relationships. Cross-promotional activities can reinforce the value of supporting Indego, while helping bring new riders to the program. Outside of marketing and promotion, there may be additional non-monetary ways that Indego's corporate sponsors can help the program.

5.2.8 Lower Program Operating Costs

Indego's operating costs are the single largest challenge to the program today. Indego currently generates a loss on each trip taken within the system, with the shortfall supported by advertising and sponsorship revenue. In the long-run, the program's high costs limit its ability to expand and fund state of good repair investments. Table 11 presents a sensitivity analysis highlighting average daily unit ridership necessarily for Indego to break-even on operating costs at various unit operating cost levels. Presently, Indego would have to achieve an average trip rate of 4.08 trips per bicycle per day - over twice the current rate of 1.90 trips per bicycle per day - r to break even. By comparison, if Indego's unit costs matched the system with the lowest operating costs in the country (~$110 per bicycle per month), it would need to only achieve 1.36 trips per bicycle per day.

Table 11 | Daily Ridership per Bicycle Break-Even Point at Various Unit Operating Costs

Monthly Operating Cost per Bicycle	Trips Per Bicycle Per Day
$284 (2018 Average for Indego)	4.08
$240	3.40
$220	3.09
$200	2.77
$180	2.46
$150	1.99
$110 (Lowest Observed Figure in Industry)	1.36
Indego Current Trip Rate	1.90

Break-even does not include Title Sponsorship revenue

While Indego's service standards, equipment type, and the overall cost of business in Philadelphia make operating costs as low as $110 unrealistic, this exercise demonstrates how lower operating costs allow the program to break even with less ridership. Indego cannot currently afford to expand in all but the highest ridership locations. If operating costs declined, the program could sustainably add stations to lower ridership areas.

Strategies for Lowering Costs

A wide range of factors impact operating costs. Through discussions with Indego's vendor and internal stakeholders, this Business Plan has identified three primary strategies to lower program costs:

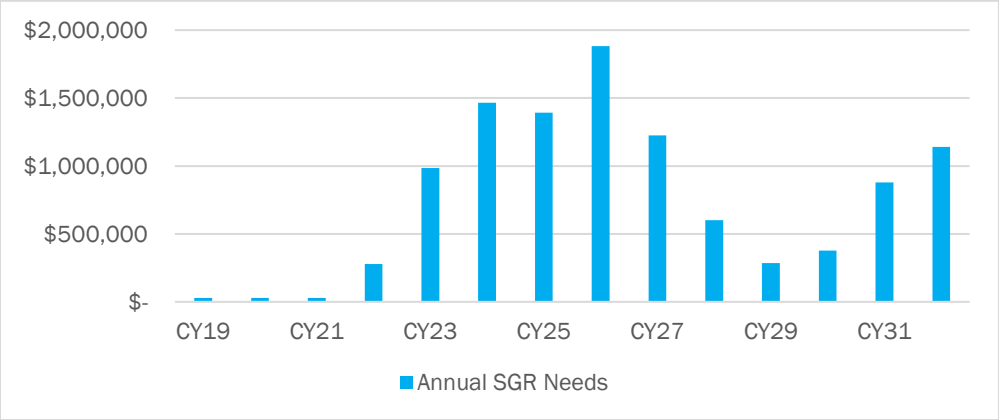
1. Grow the Program: Growing is essential if oTIS wants to amortize the fixed costs of operating Indego over a larger system. Because the marginal cost of additional stations is fairly low, Indego's partners estimate that operating costs per bike would decrease by over 40 percent (40%) if the system grew from 121 to 250+ stations.
2. Modify Service Level Agreement Metrics: Philadelphia's contract with BTS includes service level agreement metrics (SLAs) that dictate things such as frequency of bicycle inspection and station rebalancing. Transitioning from input focused measures (e.g., inspect each station every 30 days) to output focused measures (e.g., ensure each station is operational 99.5 percent of the month) could give the vendor more latitude to allocate resources efficiently. Another strategy is to modify SLAs that set too high a standard for current service levels. For example, Indego's rebalancing capacity is driven in part by the need to meet demand during peak periods, and some of that capacity goes unused during the rest of the day. Even small reductions in rebalancing requirements can lead to big cost savings due to the high marginal cost of rebalancing a bicycle during the peak.
3. Negotiate Lower Costs Through the Procurement Process: Indego's current operating contract heavily incentivizes the vendor to meet service standards but not specific cost points. The procurement process gives oTIS the opportunity to drive down its operating vendor costs in several ways. First, a new contract can dictate a price ceiling within which the vendor must stay. The procurement process also enables competition between bike share operators that should place downward pressure on costs. Finally, a new contract can include cost and revenue sharing that incentivizes the operator to lower costs.

5.2.9 Create a State of Good Repair Fund

Because Indego's stations and bicycles are all under 4 years old, the cost of replacing equipment at the end of its useful life is currently negligible. These costs are expected to increase substantially over the next decade, as Indego's current fleet ages. Indego will need to spend approximately $11.5 million on replacement equipment[6] over the next 15 years, at an average cost of $720,000 per year and a peak year cost of $1.8 million in 2026. These costs account only for existing Indego equipment; adding another 140 stations will increase the 15-year SGR need to $21 million.

[6] All state of good repair figures assume stations are replaced by hybrid dockless equipment. Replacement costs are based on the current cost of equipment and may be substantially lower if equipment costs go down over time.

Figure 18 | Equipment State of Good Repair Costs (Existing System Only)



To ensure the financial sustainability of the program, Indego should begin preparing for these looming state of good repair costs. While some systems opt for a pay-as-you-go approach, Indego could ensure more cost stability by setting aside a fixed amount of funds per year for equipment replacement. In the case that some of these funds are generated by program-related revenue they would be set aside in an interest-bearing account, helping to lower the overall funding need. To meet future SGR costs, Indego would have to set aside approximately $5,000 per station per year.

5.3 Funding Scenarios

The cost of maintaining and expanding the Indego program will depend on multiple factors, including the scope of system expansion, geographic distribution of stations, and program funding model. To manage all these unknowns, this business plan presents cost estimates for expanding the system to 185 stations, the amount currently funded with existing revenue, and to 250+ stations, the program's five-year expansion goal. For both growth levels, the cost to the city was prepared based on three operating alternatives:

1. Indego will continue operate under the same contracting arrangement as today. The City will be the recipient of all program revenue and reimburse the operating vendor for operating expenses. SLAs and contract terms may be modified to allow Indego to lower costs as it expands and better take advantage of economies of scale.
2. Indego will enter a cost/risk sharing agreement with the operating vendor. The vendor will be responsible for funding operations through user revenue, ancillary revenue, and an operating subsidy that will decline over time. The City will continue to own all equipment and fund capital investments.
3. Indego will be leased at low cost as a franchise to a private operator, who will be the recipient of all program revenue and in turn be responsible for all program costs, including additional capital costs. The City's role with Indego will exclusively be to oversee the contract and set minimum expansion requirements by number of stations and general location.

These three alternatives fall on a spectrum between the City holding all risk and responsibility for the system, and the City holding minimal risk and responsibility for the system. Indego's future operating model depends largely on the next vendor contract procurement and may fall somewhere between two of these alternatives.

5.3.1 Summary of Results

Table 12 highlights the net cost to oTIS over a five-year period based on the three funding alternatives outlined above. The cost savings seen between Alternative 1, 2, and 3 are due to the operating vendor taking on a greater share of program costs. While the City has an interest to reduce its cost of expansion and operations of Indego, the ultimate financial model chosen will depend largely on the willingness of private vendors to partner with the City and take on a greater role in financing the Indego program. The bike share market is changing rapidly, and it will not be clear until the next contract procurement whether Alternative 2 or 3 are viable. The city must also recognize that in handing over a greater share of financial responsibility to a private vendor, it also sacrifices a degree of control over the program. Alternative 3 is considered the least feasible of the three as only a handful of bike share system have entered into such agreements and it is unclear if there is interest among bike share firms in taking on the full fundraising liability of Indego in exchange for program revenue.

Table 12 | 5-Year Net City Operating and Capital Costs by Financial Alternative and System Size

Financial Alternative	185 Station System	261 Station System
Alternative 1: Existing contracting model	$9,496,000	$13,790,000
Alternative 2: Vendor cost/risk share model	$3,266,000	$8,639,000
Alternative 3: Private franchise model	$0	$0

5.3.2 Assumptions

This business plan makes several assumptions that impact the costs in this business plan. Any changes to the underlying assumptions will impact these figures:

Ridership and User Revenue

Most ridership and revenue assumptions are based on 2017 data. The casual user revenue assumption is based on April/May 2018 data to reflect the change in program pricing.

- Ridership assumptions are based on the zone typologies outlined in Section 5.2.2. and are derived from 2017 ridership rates, and historical data. These rates are assumed to improve by 2 percent (2%) a year
- The model calculates ridership totals and translates them into equivalent memberships based on how many trips a typical member takes. This comes out to 118 trips per annual user (9.8 trips per month) and three trips per casual user. A decrease in the number of trips per user without a decrease in the overall number of trips in the system would yield improvements in revenue per trip.
- Revenue per member is based on average membership revenue per user. The annualized revenue per registered user is $159 dollars (blended rate between monthly and annual memberships). For casual users it is $13.54 (blended rate between all casual user membership types, including Indego Flex).
- Users also incur usage fees for trips that go beyond 30 or 60 minutes depending on pass type. Registered users generate on average $0.04 per trip in usage fees. Casual users generate on average $3.00 per trip in usage fees.
- Fees increases are planned for every-other-year and track baseline inflation (assumed to be two percent).

Non-User Revenue

A major source of funding for the program is non-user revenue, including title sponsorships, station sponsorships, advertising, and grants. The model assumes the following revenue:

- The title sponsorship revenue is from 2019 to 2021 based on oTIS's existing agreement with IBX. After that agreement expires, sponsorship rates are assumed to grow by standard inflation rates.
- Station sponsorship revenue totals $175,000 annually and stays flat over time.
- Advertising revenue equals $200 per station per month.

Operating Costs

Operating costs paid by the City will vary depending on the financing model. The baseline assumption is that operating costs will decline from the current rate of $284 dollars per bicycle per month to $162 dollars per bicycle per month at full build-out of 261 stations. For Alternative 2, the model assumes the city's operating subsidy would equal a percent of the net operating cost in Alternative 1. This subsidy would cover 50 percent (50%) of the net operating cost in year one and decline to 10 percent (10%) by year five. The difference is expected to be made up by the operator through accelerated cost savings or higher revenue. Operating costs will track with inflation. If operating costs decline more quickly than forecasted in the model, the City will see larger cost savings.

Expansion Assumptions

This business plan models the cost of expansion based on growth to 185 stations and to 250+ stations. The growth will be front-loaded to focus on higher revenue areas in early year before transitioning to focusing on outward expansion. This strategy is being proposed to keep the program's operating deficit in line with 2017 in Year 1 of the plan, before transitioning to a positive operating income in Year 3.

Capital Assumptions

The model assumes that, except for Year 1 expansion, all expansion and replacement equipment will be with dockless equipment that is compatible with existing equipment. Costs are based on comparable figures from peers with similar technology. In addition to new equipment, every station will generate $5,700 in planning and installation costs.

State of Good Repair

Equipment will be replaced in total at the end of its useful life. End-of-life is forecast based on the assumed probability that a bicycle or station will need replacement. Non-replacement maintenance costs are folded into the cost of operating the program. Because few systems have reached the end of their useful life, there is limited data on the lifespan of bike share equipment. With proper upkeep, stations and bicycles in other systems have

lasted longer than initially projected[7]. Technology obsolesce is the major driver in determining whether bike share assets are at the end of their useful life. Actual state of good repair costs may be lower if systems are able to replace and retrofit components instead of retiring bicycles and stations entirely.

Table 13 | Replacement Likelihood by Asset Age - Bicycles

Replacement Assumptions (years)	7	8	9
Probability of Replacement	15%	50%	35%

*assumption based on condition of existing equipment and discussions with various vendors

Table 14 | Replacement Likelihood by Asset Age - Stations

Replacement Assumptions (years)	9	10	11	12
Probability of Replacement	15%	25%	45%	15%

*assumption based on condition of existing equipment and discussions with various vendors

[7] Statement applies to equipment by established bike share providers. Quality of equipment varies greatly across the system and some providers choose to trade off equipment longevity for lower upfront costs.

5.3.3 Alternative 1: Existing Vendor Model

In Alternative 1, the basic contracting relationship between oTIS and its operating vendor would remain the same. Cost savings are largely driven by expansion of the system, since Indego achieves greater economies of scale as it expands. This alternative assumes that after the first year, the program transitions to a hybrid bicycle technology, lowering capital costs.

In this alternative, there is a clear benefit to greater system growth. The greatest operating cost savings are realized after the system surpasses 185 stations. The City would need to raise $9.4 million in new revenue to support ongoing operation, expansion, and equipment depreciation (annualized SGR needs) over the next five years for a 185-station system, but only an additional $4.4 for a 261-station system. By year five, the 261-station system would have the scale to sustainably support operations and equipment replacement needs, while the 181-station scenario would have over $600,000 in unmet state of good repair needs.

Table 15 | Net Costs for Alternative 1 – 261 Stations (Negative values represent net revenue)

Net Costs ($1,000)							
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	5-Year Total
Operating Budget Shortfall		$394	$179	$84	-$651	-$1,296	-$1,291
Expansion Capital	$1,992	$1,767	$1,802	$1,838	$1,875	$0	$9,274
Annualized SGR Costs	$613	$755	$897	$1,039	$1,181	$1,323	$5,808
Total	**$2,605**	**$2,915**	**$2,878**	**$2,961**	**$2,405**	**$27**	**$13,790**

Table 16 | Net Costs for Alternative 1 – 185 Stations (Negative values represent net revenue)

Net Costs ($1,000)							
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	5-Year Total
Operating Budget Shortfall		$394	$212	-$117	-$291	-$284	-$87
Expansion Capital	$1,992	$1,767	$515	$0	$0	$0	$4,274
Annualized SGR Costs	$631	$777	$923	$964	$964	$964	$5,223
Total	**$2,623**	**$2,937**	**$1,650**	**$847**	**$673**	**$680**	**$9,410**

5.3.4 Alternative 2: Vendor Cost/Risk Share Model

Under this Alternative, the City would share financial responsibility for the system with an operating vendor. The City would remain responsible for capital costs, including replacement of equipment at the end of its useful life. The operator would be responsible for funding operating costs from direct program revenue, such as user fees and advertising, as well as a City-provide subsidy funded by sponsorship revenue. The subsidy would decline over time, presumably because Indego would achieve greater efficiencies with expansion. In Year 1, the City would provide just over $1 million in operating assistance, which would decline to between $164,000 and $63,000 depending on the growth scenario.

This Alternative would allow the City to preserve a greater share of its sponsorship revenue for capital expenses than Alternative 1. The marginal cost of expansion between the 185-station and 261-station scenario would differ less than in Alternative 1, with costs growing in a relatively linear fashion as the program expands. The 261-station scenario would yield small operating cost savings for the City over the 185-station scenario.

Alternative 2 transfers some of the risk associated with operating the system to a vendor, and as such places greater incentives on the operator to lower operating costs and maximize user revenue.

Table 17 | Net Costs for Alternative 2 – 261-station Scenario (Negative values represent net revenue)

Net Costs ($1,000)							
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	5-Year Total
Operating Budget Shortfall		-$654	-$1,010	-$1,275	-$1,642	-$1,861	-$6,442
Expansion Capital	$1,992	$1,767	$1,802	$1,838	$1,875	$0	$9,274
Annualized SGR Costs	$613	$755	$897	$1,039	$1,181	$1,323	$5,808
Total	**$2,605**	**$1,868**	**$1,689**	**$1,602**	**$1,413**	**-$539**	**$8,639**

Table 18 | Net Costs for Alternative 2 – 185-station Scenario (Negative values represent net revenue)

Net Costs ($1,000)							
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	5-Year Total
Operating Budget Shortfall		-$654	-$997	-$1,335	-$1,570	-$1,760	-$6,316
Expansion Capital	$1,992	$1,767	$515	$0	$0	$0	$4,274
Annualized SGR Costs	$631	$777	$923	$964	$964	$964	$5,223
Total	**$2,623**	**$1,890**	**$441**	**-$370**	**-$606**	**-$796**	**$3,181**

5.3.5 Alternative 3: Franchise Model

Under this model, a private firm would take over all responsibility for Indego. The City's responsibility for the program would be solely to oversee the contract and ensure that contract requirements are met. As such, oTIS would not have any direct costs related to the Indego program.

5.3.6 Non-Financial Considerations

The difference between each alternative cannot be framed solely based on financial metrics. Each alternative brings with it different trade-offs that the city will have to weigh when it procures its next operating contract. Some key factors to consider are:

- Vendor Sustainability: While vendor failure would be disruptive regardless of the operating alternative chosen, the risk associated with the vendor terminating a contract increases as the vendor takes on additional responsibility for costs and fundraising. Under Alternative 2 and 3, the vendor's business case relies on their ability to raise funds, lower operating costs, and generate more revenue. If the system underperforms, the vendor may walk-away from the contract instead of absorbing a loss. It is important that oTIS assess the health of the operating vendor and the financial sustainability of their contract proposal. Much of the growth in the bike share industry is supported by venture capital; if a vendor relies disproportionately on outside capital to fund its operations, it would be very susceptible to failure were that funding to dry up.
- Control Over the System: Under the existing operating model for Indego (Alternative 1), oTIS has wide discretion in guiding program operations, including quality of service, pricing, and station location. In Alternatives 2 and 3, the City would sacrifice a degree of control. In such instances, the contract with the vendor becomes the primary tool to ensure Indego reflects the City's goals and objectives. The contract would have to carefully stipulate things like expansion targets, service metrics, and cost structure. Once set, changing contract terms may be challenging.
- City Funding Liability: Under Alternative 2 the vendor takes greater responsibility for operating costs and the City retains responsibility for capital costs. Because operating and capital costs are closely intertwined, this model raises some risks for the City. First, a contract would likely stipulate minimum expansion requirements, as expansion will be essential to improve the business case of Indego. If the City cannot raise the capital necessary to meet minimum expansion requirements, it could be penalized by the vendor. Alternative 3 may also carry unexpected financial liabilities; the City may have to reimburse the private operator for disruptions to service.
- Capitalization of Operating Expenses: Related to City funding liabilities, the vendor in Alternative 2 may be incentivized to reduce operating costs to the detriment of capital costs. For example, the City would face higher state-of-good-repair costs if the operating vendor cut its costs by reducing maintenance expenditures. The contract would have to set strict standards for equipment maintenance that the City can reasonably monitor and enforce.

6 Conclusion

When Philadelphia's 2013 Bike Share Business Plan was completed, the bike share industry was in a state of flux. The largest equipment supplier in the industry had recently gone bankrupt and there were concerns about the sustainability of the industry. Philadelphia managed this uncertainty by learning from the successes and failures of established programs. Indego was the result of this careful planning, a system that has made a name for itself in bike share by promoting user equity and access. Indego has established itself as part of Philadelphia's transportation network, hosting thousands of trips a day. Unlike other forms of public transit, Indego's operations are entirely funded by user revenues, sponsorship, advertising, and grants.

This 2018 Business Plan update comes at a time when the bike share industry is once again in a state of change, with new competition and business models disrupting established ways of operating bike share programs. This Business Plan outlines several ways Indego can be prepared for change. The existing conditions explores the program's weaknesses. The industry-wide assessment examines how technology and new operating models could impact Indego, and the options for how Indego responds to these changes. Finally, the recommendations section outlines key ways the program can make itself more competitive. The recommendations of this study are:

1. Expand the system to achieve a greater scale and cost efficiency. This study sets a goal of more than doubling Indego over the next five years to over 250 stations. The program currently has secured funds to add approximately 20 stations to the system. oTIS will continue to explore new funding options and vendor contract alternatives to fund the total vision.
2. Grow in a responsible manner to ensure that there are enough high-revenue stations to support expansion into new neighborhoods. Balanced growth is key to ensuring Indego is on a financially sustainable footing and can continue to support equitable access across the system.
3. Add stations and capacity to the City's Core. A large share of trips either start or end in the City's core, defined as Center City, University City, and Temple University. Indego must add stations and capacity to these areas to absorb increasing demand.
4. Continue investing in user equity and engagement to remain nationally recognized as a leader in these areas.
5. Establish regular audits of station performance to determine if bicycles and docks need to be redistributed to other locations. Semi-annual adjustments will help ensure maximum utilization of equipment.
6. Work to incorporate new technologies and other innovations. Since 2013, e-bikes and dockless bike share have emerged as major technological innovations in bike share. The Business Plan proposes that Indego transition to a hybrid dockless system with simplified stations. E-bikes, dependent on the success of a 2018-19 pilot, should also be considered for Indego.
7. Pursue strategies that will strengthen existing public and private partnerships. Indego relies on a wide range of public and private partners. Building on these existing partnerships will help ensure the program realizes the full potential of these relationships.

8. Pursue cost-saving measures through ongoing performance evaluation and future contract structures. Indego has one of the highest operating costs in the country for bike share. Indego should work towards improved efficiency to lower overhead costs and enable expansion and maintenance.
9. Develop a strategy to address state of good repair. State of good repair is a looming financial liability for Indego. Within the next seven years, the program will begin replacing bicycles and stations. These costs, unless planned for ahead of time, could overwhelm the system. The City should develop a strategy to address state of good repair.

As Indego enters its next phase of growth, the business plan provides a comprehensive set of recommendations to strengthen and improve the program. The recommendations above cannot be completed without proper funding. Indego has already been successful at bringing together private and public-sector partners to fund bike share. Additional stations and updated technology provide opportunities to leverage these partnerships further. Re-bidding the operating contract can improve the overall organizational efficiency of the program and increase risk/reward share with an operator. If properly executed, this will allow for greater flexibility, as well as additional opportunities to tap into private investments which are currently driving the bike share industry.

Strong plans build strong programs, which is critical in dynamic industries such as bike share. Bike share technology evolves, business models change, and new players enter the market at a rapid rate. This constant change provides both opportunity and uncertainty; this Business Plan outlines ways Indego can prepare for change and navigate uncertainty to ensure Philadelphia's transportation system benefits everyone.

Appendix

Detailed Tables for Financial Scenarios

Alternative 1: Existing Vendor Model

261-Station Scenario

The following tables illustrate the projected capital, operating, and state of good repair costs on the City's balance sheet for a 261-station system under the current vendor contracting model. The net costs table represents the total amount of funds needed to realize this scenario.

Table 19 | Expansion Capital Costs

New Capital Costs ($1,000)						
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
# of New Stations	28	28	28	28	28	0
# of New Bicycles	294	294	294	294	294	0
Equipment Purchases	$1,826	$1,597	$1,629	$1,662	$1,695	$0
Installation Costs & Startup	$166	$169	$173	$176	$180	$0
Sub-Total	**$1,992**	**$1,767**	**$1,802**	**$1,838**	**$1,875**	**$0**

*Capital costs are assumed to occur in the year before installation to better reflect cash-flow needs

Table 20 | Operating Costs

Operating Costs ($1,000)						
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Annual Ridership (1,000s)		1,022	1,223	1,413	1,598	1,790
User Revenue		$2,253	$2,860	$3,305	$3,966	$4,443
Advertising Revenue		$358	$425	$492	$559	$626
Title Sponsorship		$1,994	$2,116	$2,179	$2,218	$2,258
Station Sponsorship		$179	$182	$186	$189	$193
Operating Revenue Subtotal		**$4,783**	**$5,583**	**$6,161**	**$6,933**	**$7,521**
Contractor Operating Costs		$4,705	$5,267	$5,737	$5,764	$5,697
Sponsor Broker Commission		$326	$345	$355	$361	$368
Mayor's Fund		$43	$46	$47	$48	$49
Marketing		$102	$104	$106	$108	$110
Operating Cost Subtotal		**$5,177**	**$5,761**	**$6,245**	**$6,282**	**$6,225**

Cost Recovery Ratio		92%	97%	99%	110%	121%
Operating Balance		-$394	-$179	-$84	$651	$1,296

*No operating projection for Year 0 (current year)

Table 21 | State of Good Repair Costs

State of Good Repair Costs ($1000)						
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Stations Purchased	0	0	0	0	0	0
Bicycles Purchased	15	18	21	24	131	420
Station Replacement	$0	$0	$0	$0	$0	$0
Bicycle Replacement	$0	$0	$0	$0	$249	$956
Vandalism and Theft	$33	$40	$48	$55	$63	$65
Replacement Station Installation	$0	$0	$0	$0	$0	$0
Total	$33	$40	$48	$55	$313	$1,020
15-Year Annualized Funding Need	$613	$755	$897	$1,039	$1,181	$1,323

Table 22 | Net Costs (Negative values represent net revenue)

Net Costs ($1,000)							
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	5-Year Total
Operating Budget Shortfall		$394	$179	$84	-$651	-$1,296	-$1,291
Expansion Capital	$1,992	$1,767	$1,802	$1,838	$1,875	$0	$9,274
Annualized SGR Costs	$613	$755	$897	$1,039	$1,181	$1,323	$5,808
Total	$2,605	$2,915	$2,878	$2,961	$2,405	$27	$13,790

185-Station Scenario

The following tables illustrate the projected capital, operating, and state of good repair costs on the City's balance sheet for a 185-station system under the current vendor contracting model. The net costs table represents the total amount of funds needed to realize this scenario.

Table 23 | Expansion Capital Costs

New Capital Costs ($1,000)						
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
# of New Stations	28	28	8	0	0	0
# of New Bicycles	294	294	84	0	0	0

Equipment Purchases	$1,826	$1,597	$466	$0	$0	$0
Installation Costs & Startup	$166	$169	$49	$0	$0	$0
Sub-Total	$1,992	$1,767	$515	$0	$0	$0

*Capital costs are assumed to fall in the year before installation to better reflect cash-flow needs

Table 24 | Operating Costs

Operating Costs ($1,000)						
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Annual Ridership (1,000s)		1,022	1,208	1,270	1,295	1,321
User Revenue		$2,253	$2,827	$2,970	$3,214	$3,278
Advertising Revenue		$358	$425	$444	$444	$444
Title Sponsorship		$1,994	$2,116	$2,179	$2,218	$2,258
Station Sponsorship		$179	$182	$186	$189	$193
Operating Revenue Subtotal		**$4,783**	**$5,549**	**$5,779**	**$6,066**	**$6,174**
Contractor Operating Costs		$4,705	$5,267	$5,154	$5,257	$5,362
Sponsor Broker Commission		$326	$345	$355	$361	$368
Mayor's Fund		$43	$46	$47	$48	$49
Marketing		$102	$104	$106	$108	$110
Operating Cost Subtotal		**$5,177**	**$5,761**	**$5,662**	**$5,774**	**$5,889**
Cost Recovery Ratio		92%	96%	102%	105%	105%
Operating Balance		**-$394**	**-$212**	**$117**	**$291**	**$284**

*No operating projection for Year 0 (current year)

Table 25 | State of Good Repair Costs

State of Good Repair Costs ($1000)						
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Stations Purchased	0	0	0	0	0	0
Bicycles Purchased	15	18	19	19	123	412
Station Replacement	$0	$0	$0	$0	$0	$0
Bicycle Replacement	$0	$0	$0	$0	$249	$956
Vandalism and Theft	$33	$40	$43	$44	$44	$45
Replacement Station Installation	$0	$0	$0	$0	$0	$0
Total	**$33**	**$40**	**$43**	**$44**	**$294**	**$1,001**
15-Year Annualized Funding Need	**$631**	**$777**	**$923**	**$964**	**$964**	**$964**

Table 26 | Net Costs (Negative values represent net revenue)

Net Costs ($1,000)							
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	5-Year Total
Operating Budget Shortfall		$394	$212	-$117	-$291	-$284	-$87
Expansion Capital	$1,992	$1,767	$515	$0	$0	$0	$4,274
Annualized SGR Costs	$631	$777	$923	$964	$964	$964	$5,223
Total	**$2,623**	**$2,937**	**$1,650**	**$847**	**$673**	**$680**	**$9,410**

6.1.1 Alternative 2: Vendor Cost/Risk Share Model

Under this model, a oTIS would be responsible for only funding a declining share of operating costs. The financial figures presented here only reflect oTIS's cost and revenue balance as operating costs and revenue would go directly to the vendor. In this model, capital costs represent the bulk of oTIS's costs. Unlike the previous alternative, costs grow in a more linear fashion between the 185-station and 261-station scenarios.

261-Station System

The following tables illustrate the projected capital, operating, and state of good repair costs on the City's balance sheet for a 261-station system under a cost/risk sharing agreement with the vendor. The net costs table represents the total value of funds needed to realize this scenario. There is no expected change to the cost of new capital and state of good repair compared to Alternative 1.

Table 27 | Operating Costs

Operating Costs ($1,000)						
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Annual Ridership (1,000s)		1,022	1,223	1,413	1,598	1,790
User Revenue		$0	$0	$0	$0	$0
Advertising Revenue		$0	$0	$0	$0	$0
Title Sponsorship		$1,994	$2,116	$2,179	$2,218	$2,258
Station Sponsorship		$179	$182	$186	$189	$193
Operating Revenue Subtotal		**$2,173**	**$2,298**	**$2,365**	**$2,408**	**$2,451**
Operating Subsidy		$1,047	$793	$582	$248	$63
Sponsor Broker Commission		$326	$345	$355	$361	$368
Mayor's Fund		$43	$46	$47	$48	$49
Marketing		$102	$104	$106	$108	$110
Operating Cost Subtotal		**$1,519**	**$1,287**	**$1,090**	**$765**	**$590**
Cost Recovery Ratio		143%	178%	217%	315%	416%
Operating Balance		**$654**	**$1,010**	**$1,275**	**$1,642**	**$1,861**

*No operating projection for Year 0 (current year)

Table 28 | Net Costs (Negative values represent net revenue)

Net Costs ($1,000)							
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	5-Year Total
Operating Budget Shortfall		-$654	-$1,010	-$1,275	-$1,642	-$1,861	-$6,442
Expansion Capital	$1,992	$1,767	$1,802	$1,838	$1,875	$0	$9,274
Annualized SGR Costs	$613	$755	$897	$1,039	$1,181	$1,323	$5,808
Total	**$2,605**	**$1,868**	**$1,689**	**$1,602**	**$1,413**	**-$539**	**$8,639**

185-Station System

The following tables illustrate the projected capital, operating, and state of good repair costs on the City's balance sheet for a 185-station system under a cost/risk sharing agreement with the vendor. The net costs table represents the total value of funds needed to realize this scenario. There is no expected change to the cost of new capital and state of good repair compared to Alternative 1.

Table 29 | Operating Costs

Operating Costs ($1,000)						
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Annual Ridership (1,000s)		1,022	1,208	1,270	1,295	1,321
User Revenue		$0	$0	$0	$0	$0
Advertising Revenue		$0	$0	$0	$0	$0
Title Sponsorship		$1,994	$2,116	$2,179	$2,218	$2,258
Station Sponsorship		$179	$182	$186	$189	$193
Operating Revenue Subtotal		**$2,173**	**$2,298**	**$2,365**	**$2,408**	**$2,451**
Operating Subsidy		$1,047	$806	$522	$320	$164
Sponsor Broker Commission		$326	$345	$355	$361	$368
Mayor's Fund		$43	$46	$47	$48	$49
Marketing		$102	$104	$106	$108	$110
Operating Cost Subtotal		**$1,519**	**$1,301**	**$1,030**	**$837**	**$691**
Cost Recovery Ratio		143%	177%	230%	288%	355%
Operating Balance		**$654**	**$997**	**$1,335**	**$1,570**	**$1,760**

*No operating projection for Year 0 (current year)

Table 30 | Net Costs (Negative values represent net revenue)

Net Costs ($1,000)							
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	5-Year Total
Operating Budget Shortfall		-$654	-$997	-$1,335	-$1,570	-$1,760	-$6,316
Expansion Capital	$1,992	$1,767	$515	$0	$0	$0	$4,274
Annualized SGR Costs	$631	$777	$923	$964	$964	$964	$5,223
Total	**$2,623**	**$1,890**	**$441**	**-$370**	**-$606**	**-$796**	**$3,181**