

IntegraBike: Pedaling towards sustainable urban development

With over 100 km of bicycle paths, Sorocaba is a national reference point for excellence in urban mobility. Its successful free bike sharing program, IntegraBike, not only promotes the integration between transport modes, but has also improved the quality of life among Sorocaba's citizens, and contributes to the reduction of greenhouse gas emissions.

Summary

Sorocaba's bike sharing program, IntegraBike, celebrated its three year anniversary in 2015. The program has been an immediate success in the city; during its first month in existence, there were 6,000 bicycle leases. This number has risen steadily: following its second year of operation, the IntegraBike program accounted for 231,500 bicycle leases, therein establishing the city as a national reference point, and inspiring similar projects in other cities. Yet Sorocaba's urban mobility successes did not happen overnight. Since 2005, the City Council has undertaken a three stage Bicycle Plan. Stage 1 concerned establishing bicycling infrastructure in the form of paths, networks, dedicated bicycle lanes, bicycle racks and parking space as well as other structures. These improvements were consistently planned in integration with the city's public transport system (in this case, the bus network); Stage 2 was the implementation of a permanent municipal program to support and incentivize the use of bicycles; and Stage 3 focused on the provision of a Public Bike Sharing System provided to the population for free. Although it is an immediate legacy of Stage 3, the IntegraBike program, and the fact that 34 percent of bicycle trips made within the program are integrated with public transport, would not have been possible without a decade of focused transportation planning in Sorocaba.

Introduction: The importance of bicycling for Sustainable Urban Mobility and addressing climate change

With the majority of the global population now living in urban areas, the crisis of vehicle-based urban planning is no longer a problem affecting only major cities; small and medium sized cities also suffer from heavy traffic and its associated mobility issues and atmospheric pollution. However, by establishing an integrated urban transportation network, cities can provide viable solutions to these challenges. Case studies from around the world demonstrate how shifting the modal split from vehicle-based transport to human-powered and public transport can have profound effects on the quality of life within a city. These experiences – from Copenhagen, to Amsterdam, to most recently New York – also indicate the importance of integrating public policies at the local level. Case studies which capture good practices in South American cities, such as Bogota and Curitiba, also demonstrate replicable examples of urban planning that prioritizes public transport and also non-motorized transport modes.

When a city considers rethinking its urban mobility paradigm, as has been the case



Facts & Figures

Sorocaba City Council
Brazil, São Paulo

Population / Area

637,187 (2014 estimate)
/449.80 km² (2014)

Municipal Budget

R\$ 2,627 million (2015)
(≈ USD 719 million)

GHG inventory available

Yes, since 2014

Total GHG emissions

1.57 tons CO₂eq/year per capita

Sorocaba has been a Member of ICLEI since 2011.



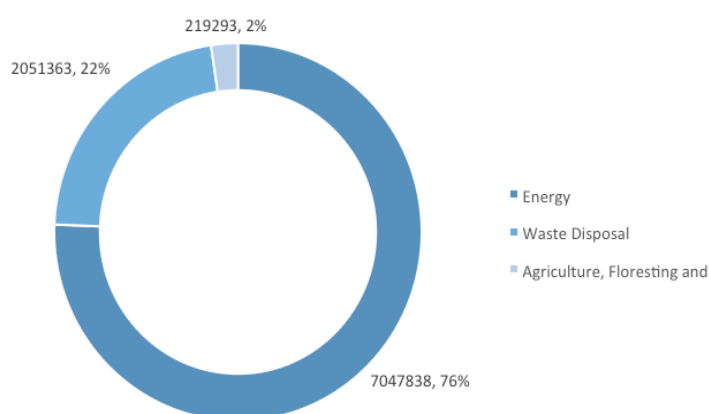
in Sorocaba, it generally means they are confronting the problems of transportation congestion and emissions (both of CO₂ and of other pollutants, such as particulate matter). The IntegraBike program, a product of the third stage of the City's three-stage Bicycle Plan, further integrates cycling with other transport modes, such as the current bus system and future Bus Rapid Transit (BRT) corridor. The IntegraBike program has also seen other positive impacts which correspond to quality of life and a healthier city.

Context: Sorocaba, Healthy City

The Municipality of Sorocaba is situated in the southeastern region of the state of São Paulo, about 90 km from the regional capital. The city has about 610,000 inhabitants and is considered to be one of the most sustainable cities in Brazil. The Municipality integrates the concept of sustainability as one of the main principles in its planning, and bases its understanding of sustainability on global initiatives for urban development and the experiences of other cities, such as Montreal (Canada).

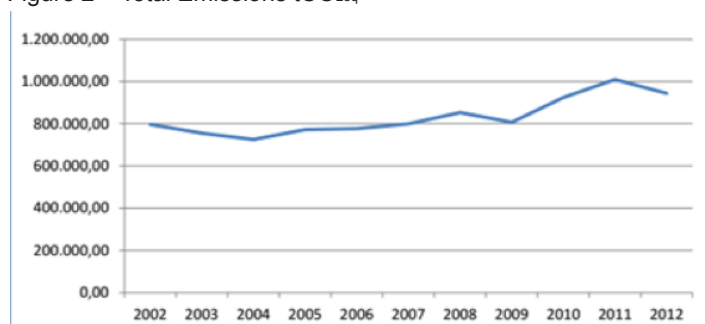
Sorocaba has a positive track record in the area of sustainability, having won the State Government of São Paulo's Green and Blue Seal four consecutive times. The certificate "Blue Green Municipality" ensures that the administration receives priority consideration for State investment through the State Fund for Prevention and Control of Pollution (SFPCP). To earn the Seal, a city must perform significant actions in the sewage treatment, solid waste disposal, urban forestry, and water usage sectors, among others. Regarding urban mobility, the city is a reference point for how it proactively integrates the use of bicycles with other transport modes. After more than a decade of dedicated planning, Sorocaba now has one of the most significant cycling networks in the country, with more than 100 km of bicycle paths implemented.

Figure 1 – Comparison of GHG Emissions by Sector (tCO_{2eq})



Source: GHG Inventory for the Sorocaba Municipality. Sorocaba Municipal Secretariat for the Environment, 2014

Figure 2 – Total Emissions tCO_{2eq}



Source: GHG Inventory for the Sorocaba Municipality. Sorocaba Municipal Secretariat for the Environment, 2014

In 2013, Sorocaba was one of eight cities selected to participate in the Urban-LEDS project (Promoting Development Strategies Low Carbon Urban in Emerging Countries), funded by the European Commission and implemented by ICLEI - Local Governments for Sustainability, in partnership with UN-Habitat. Participation in the Urban-LEDS project allowed Sorocaba to take its first steps towards comprehensive, structured low carbon development planning.

In 2014, Sorocaba concluded its first greenhouse gas (GHG) inventory. The inventory, which covered data analysis for the period from 2002 to 2012, provided a stark warning to municipal officials: the energy sector, including transport, accounted for the biggest share of GHG emissions in the city. Sorocaba emitted 9,315,863 tons of carbon dioxide equivalent (tCO_{2eq}) between 2002 and 2012, with the energy sector contributing 75.7 percent of the total. The electricity sector emitted 695,442.9 tCO_{2eq} and the transport sector emitted 5,003,343.61 tCO_{2eq}. The transport subsector represents the greatest share in the emissions inventory, with 70.9 percent in relation to the energy sector and 53.5 percent in relation to the overall inventory. The results indicated the need for investing in a Sustainable Urban Mobility policy and undertaking the development of a long-term strategic plan integrating sectoral urban policies.

Table 1 – Transport Sector Emissions

Emissions Sector	
Fuel type	Emissions (tCO _{2eq})
Ethanol	7,583.422
Regular Gasoline	2,672,290
DIESEL OIL	2,281,228
Natural Gas	14,783.32
Aviation Kerosene	16,444.66
Aviation Gasoline	11,015.93
TOTAL TRANSPORT EMISSIONS	5,003,345

Source: GHG Inventory for the Sorocaba Municipality. Sorocaba Municipal Secretariat for the Environment, 2014

Pedaling in Sorocaba: From the Bicycle Plan to IntegraBike

In 2005, Sorocaba took the first bold step towards shifting its transportation modal share away from vehicle-based transport with the launch of the Sorocaba Bicycle Plan. When implementation of the three-stage plan began in 2006, the cycling network of the city already incorporated 78 km of bicycle pathways. During this initial period of the Plan, stimulus programs such as Pedal Sorocaba (2008) and the Via Viva were also launched. Today, with an infrastructure of more than 100 km of bicycle paths, the Sorocaba cycling network is one of the largest in all of Latin America.

The Bicycle Plan is a key element of another structural policy for the city: the Municipal Urban Mobility Plan. Municipalities with populations over 20,000 inhabitants are required by law to develop a Mobility Plan, and Sorocaba's Municipal Urban Mobility Plan forecasts further expansion of bicycle transportation within the city, and looks to integrate it with the city's anticipated BRT project.

In 2013, Sorocaba launched its bike-sharing program, IntegraBike, which has been invaluable in helping the City integrate bicycle transportation into its existing public transportation network. Use of the IntegraBike service is free for all citizens, and offers 152 bikes spread out across 19 stations. These stations are located at strategic points of the city and are integrated into the Sorocaba bus system. The program also has a Central Control Unit, an Operational Unit and solar energy infrastructure for powering the stations.



Figure 3 – Bicycle Path on Prof. Athur Fonseca Avenue.

Source: URBES, Sorocaba City Council

The Urban-LEDS Project

An Urban Low Emissions Development Strategy (Urban LEDS) defines a pathway to transition a city to a low emission, green and inclusive urban economy, through its integration into existing city development plans and processes.

The Urban-LEDS project (March 2012 - March 2016), funded by the European Union, was jointly implemented by UN-Habitat and ICLEI. It supported local governments in emerging economy countries (Brazil, India, Indonesia, South Africa) and in Europe to transition to urban low emission development using ICLEI's GreenClimateCities methodology, comprehensive process guidance, to integrate low emission strategies into all sectors of urban planning and development.

For more information, please visit: <http://urbanleds.iclei.org/>

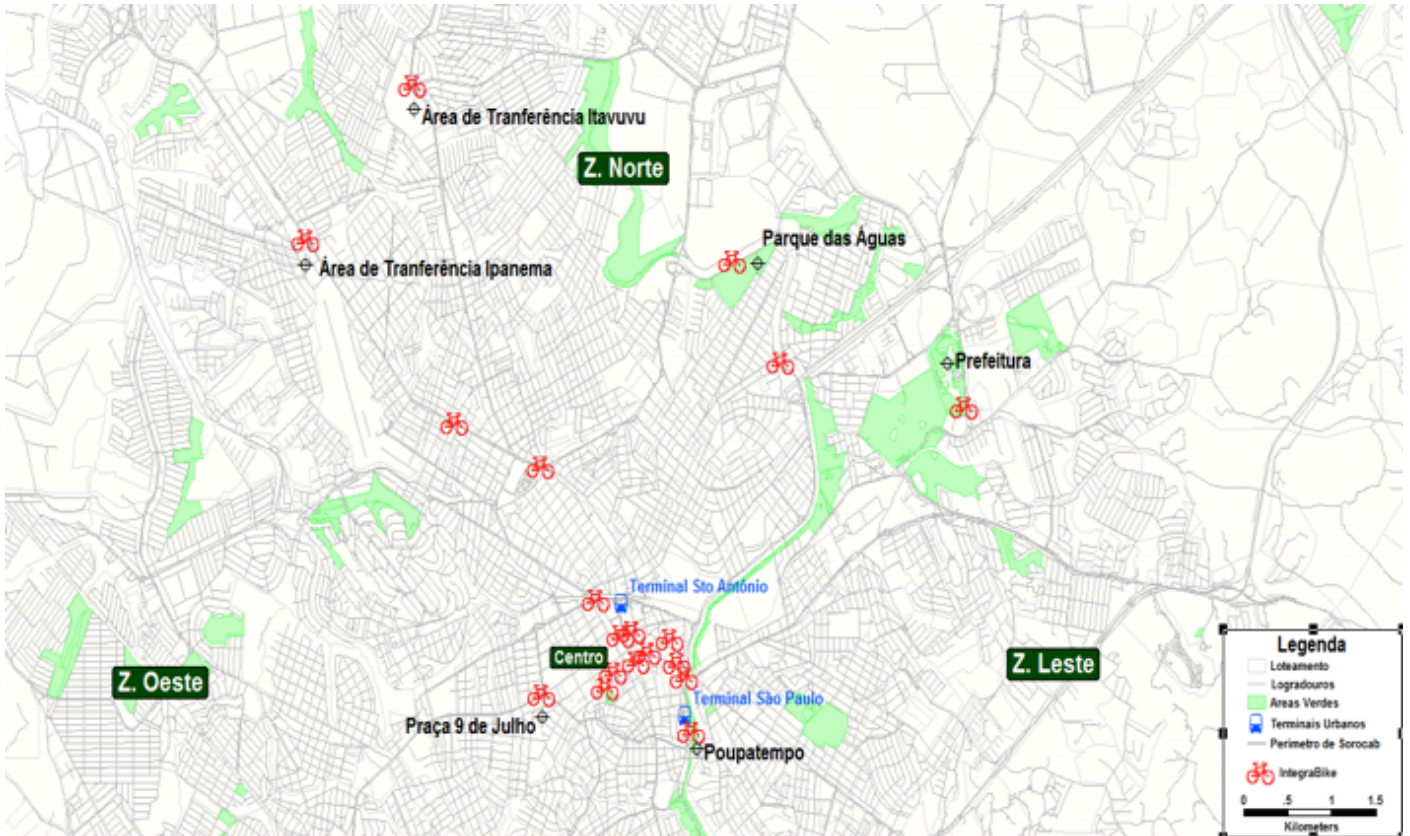


Figure 4 – Map with the distribution of the 19 stations.

Source: URBES, Sorocaba City Council

Results

Public acceptance of the IntegraBike program can be verified by the usage data, which dates back to its inception: IntegraBike has reached its originally stated goal of 10,000 monthly trips. The program has been designed to assist the Sorocaba Bicycle plan, in furthering modal integration and promoting a healthy lifestyle, and has therefore been structured and integrated in a way that seeks to guide the sustainable development of the city.

Sorocaba has received several delegations from other Latin American cities – such as Campinas, Santos, São José dos Campos, Macapa, among others – that are interested in replicating the initiative.

- The original goal for the IntegraBike program was to achieve **a monthly total of 10,000 trips**. This goal has been reached.
- In light of achieving its intended goal of 10,000 monthly trips, and the fact that **25,560 users are registered in the system**, the Sorocaba City Council have made it an objective to expand the system from 19 to 25 stations in the next public bidding process.
- **Municipal officials are listening to what the users have to say.** The City Council is considering relocating certain stations based on user feedback. User feedback is also influencing the potential locations of any new stations.
- Integration with the existing public transportation system was a stated goal of the IntegraBike project. Currently, **34 percent of trips made on the IntegraBikes are combined with public transport**, and this number is expected to grow with the creation of the BRT.

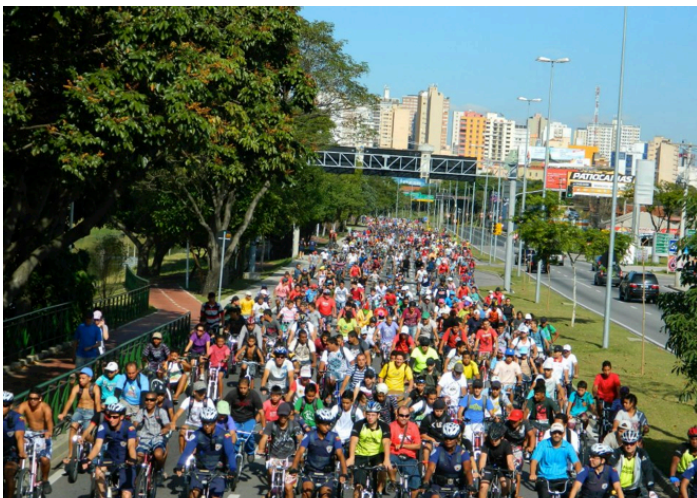


Figure 5 – Bike ride with around 5000 participants.

Source: URBES, Sorocaba City Council

Lessons Learned

The IntegraBike program in Sorocaba can be applauded in several regards. It has represented good practice in the promotion of sustainable urban mobility through bicycling. This is a product of long term planning of a public policy, as IntegraBike is a direct result of the Sorocaba Bicycle Plan established in 2006 by the municipal administration. Its success with users and the financial viability that the program shows for a medium-sized city can also serve to inspire other cities with similar characteristics - both within the State of São Paulo, in other regions in Brazil, and throughout Latin America.

From the various lessons learned one can highlight:

- **Sound planning and implementation strategies can lay the groundwork for success:** The preparations made by the City promoted in the early stages of the Bicycle Plan, were essential to providing a favorable environment for investment and the successful operation of the bicycle sharing system.
- **Integration of transport alternatives is a key to success:** IntegraBike was developed based on the crucial objectives that it would provide a dedicated mode of alternative transport, that it would be integrated with the public transport network, and that it would be free to use. Making a public transport system card required for using the IntegraBike service was crucial to achieving this integration.

Figure 6 – An IntegraBike station with shared bikes in an Integrated Transfer Area with access to public transport

Source: URBES, Sorocaba City Council



Figure 7 – Bicycle Parking on the Central Square.

Source: URBES, Sorocaba City Council



Figure 8 – Bicycle Path on Dom Aguirre Avenue

Source: URBES, Sorocaba City Council

- **Distribution and availability of bicycles is a dynamic process:** The obligatory use of the transport system card has provided invaluable data on IntegraBike users' movements. With this information, bicycle distribution amongst stations can be monitored, and more bicycles can be provided at the times and locations with higher demand. These daily logistical operations are necessary to maintain system balance, and demonstrate a commitment to public approval and support of the program.
- **Equipment and stations must be strategically laid out:** The station equipment, which relies on solar power, must consider the local installation conditions.

Replication

Bicycle sharing programs are growing in popularity, and are seen on the streets of several cities in Brazil (and worldwide). A contextually relevant model of implementation and system management is recommended for each city, and would be based on a number of factors. The IntegraBike case is paradigmatic for disseminating the feasibility of a project for medium-sized cities looking to make their program free for users and integrated with the municipal mobility policy. Unfortunately, the costs of such projects can often derail the initiative, especially in Latin America, where it is a relatively recent activity with few suppliers and operators.

In the case of IntegraBike, the cost is fully borne by the Sorocaba public administration, with funding being provided from within the municipal budget. This makes the case of Sorocaba regionally unique. Dedicating the funding from its own budget has enabled Sorocaba to provide its population with a free-of-charge system, subject to terms of use which are dictated by the municipality. In Sorocaba's case, this has meant mandatory use of public transportation cards, which reflect the Municipality's goal of integrating IntegraBike with its public transportation network. On the other hand, because it funds the IntegraBike program by itself, the City Council cannot expand it as quickly as might have been possible given external support.

This also reflects the fact that bicycle sharing in Brazil gravitates towards larger cities. In big cities such as Rio de Janeiro, São Paulo, Belo Horizonte, and Recife, advertising has been used to obtain financial support, or return on private investment. However, this situation is only possible when advertisers determine it to be cost-effective based on exposure; accordingly, in a middle-sized city such as Sorocaba, there has been no support from advertisers.

Costs and financing

The program is fully financed through funds from the municipal budget provided in the Sorocaba Annual Budget Law (ABA). The total amount budgeted is R \$ 1,440,000 (≈USD 400,000), which, in addition to annual adjustment, includes the possible expansion of the system in 2016. This expansion would look to increase the number of stations from 19 to 25 stations and the number of bikes from 152 to 200. The current cost of the program is approximately R \$ 68,000 per month (≈USD 19,100), or R \$ 820,000 per year (≈USD 230,000).

An initial contribution was needed to implement the IntegraBike infrastructure and the maintenance during the program's early years. Any expansion to the original number of stations and bicycles implies an increase of the city's annual investment in the program. The City Council of Sorocaba, through URBES Traffic and Transportation - the Company for Urban and Social Development of Sorocaba, is the program's supervisor, with Serttel undertaking the maintenance and system operation.

The IntegraBike program was opened for a public tender for companies to show interest in developing the project. Serttel Ltd was the winner of the process, obtaining a one year renewable contract. According to the public tender, URBES Traffic and Transport provides a compensation of R\$ 630,000 (≈USD 177,200), while the contracted company executes, implements, and maintains the program.

The company that operates the system must meet the following requirements on a daily basis:

- Keep in operation 19 bike stations from 6:00 AM to 11:00 PM;
- Keep 152 bicycles in working condition, distributed across the 19 stations mentioned above;

Figure 9 – Integration of an IntegraBike station with the bicycle path network

Source: URBES, Sorocaba City Council



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- Redistribute the bikes amongst the stations during peak demand times (the company uses two "Montana" vehicles);
- Provide user support (via phone or e-mail) during the period of operation;
- Perform bicycle maintenance at least twice a month; and
- Keep operating control of the system through management software which operates 24 hours a day, 7 days a week.

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**Prefeitura de
SOROCABA**



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