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Case: Curitiba, Brazil

05/26/13- Technicity

1. TOPIC: I want to explore how technology can be used to improve management of solid waste in Curitiba .

I would like to explore application to smart phone, GPS and RFID to improve the collection and management of solid waste in Curitiba - Brazil. Society needs more conscience and greater participation on the solid waste that are being collected in the city, so they might help the management of solid waste.

2. WHAT : Tell us what you learned by exploring this topic

Exploring this topic I could learn more about smart cities, and how they lead smart strategies with society and technologies. Any city can be defined as Smart City when it has a smart economy; mobility ; environment ; engage with society; smart living and smart governance. Also we cannot discarded, these entire item , coming with ICTs (Information and Communication Technologies), which are helping city to walk through sustainable economic development .

When I started analyzing my topic, I searched different countries and results, by using technology, to select what could be applied in Curitiba. Also, I learned more about management of solid waste in Curitiba and how our society is not engage with this problem. Many of Curitiba's citizen (curitibanos) know less of 50% about how works the management of waste in Curitiba . It have not helped to recycle our garbage.

" For context, here are some stats: Greece recycles about 10% of its waste, the UK about 17%and Austria about 60%. Back in 2008, the European parliament passed a measure to

achieve a recycling rate of 50% for household waste and 70% for construction waste.... In Germany, which leads the world in waste reduction, the Green Dot program's strict rules dictate how citizens dispose of 30 million tons of garbage each year, helping the country reduce its waste by one million tons each year.

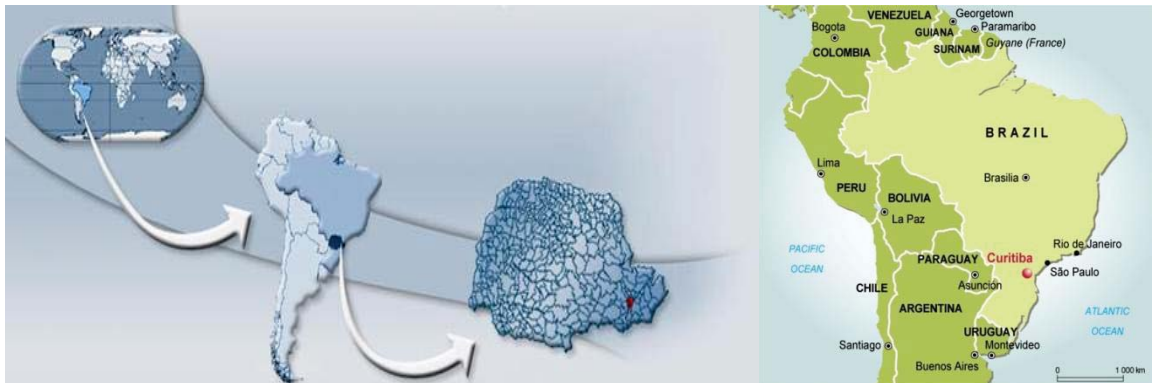
By *Lauren Drell - Mashable

**Lauren Drell is the Campaigns Editor at Mashable, where she manages custom content campaigns and ideates/writes/edits supported content. <http://mashable.com/2011/11/02/trash-tech-recycling/>*

According to IBGE (Brazilian Institute of Geography and Statistics), in Curitiba, 5% of 95% of waste collected, is recycled. I believe that this number might be increased by using technological sources.

3. WHERE: What city is the student exploring this topic in

This project will be in **Curitiba**. Curitiba is the capital of Parana, Brazil. It is the greenest capital in southern Brazil and earned some award like **Globe Sustainable City Award 2010** and **United Nations Environment**, and became known as international ecologic capital.



1- Localization of Curitiba

Source http://www.diaadiaeducacao.pr.gov.br/portals/portal/mapas/localizacao_parana.php



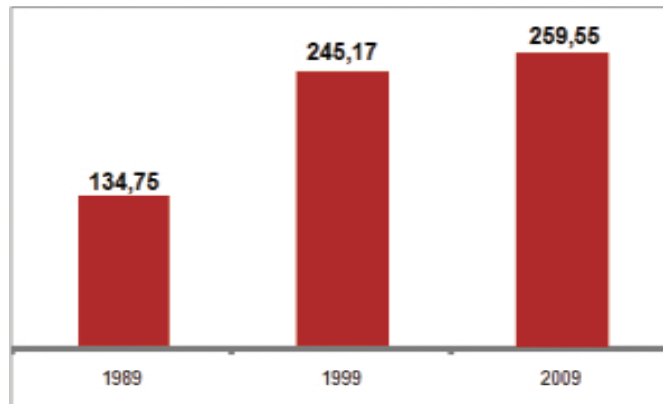
2- Images of Curitiba Source: <http://www.circulandoporcuritiba.com.br>

4. URBAN CONTEXT.

The management of solid waste is one of the most serious environmental dilemmas in modern society. Curitiba has been developing some actions about model of waste treatment , which helped Curitiba became the most sustainable capital of Brazil. But it doesn't mean the rate of recycle has increased.

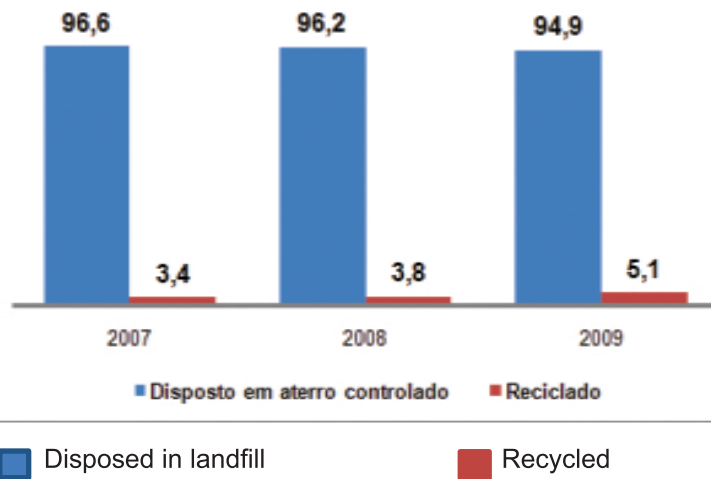
According to IBGE the household waste generated per capita in Curitiba has grown in recent decades, following by a trend of reduction of waste disposed in landfills . But the rate of waste recycled is still a low , representing no more than 5% of the total 95 collected. It means that more waste has been produced and less waste has been recycled. Although the solid waste collection in Curitiba meets more 90% of households, we still need recycle more our waste. As citizen, I have been seeing some flaws in the process of garbage collection, which could be improved by simple apps for smart phones, monitoring GPS and even RFID .

1.0 Annual waste production per capita in Kg (1989 -2009)



Source **FORTEPMC/SMMA/MALP / 2010**
IPPUQ (Institute for Research and Urban Planning of Curitiba)

2.0 Percentage of waste is recycled, composted * incinerated and disposed in landfill controlled - 2007 to 2009



Source **FORTEPMC/SMMA/MALP / 2010**
IPPUQ (Institute for Research and Urban Planning of Curitiba)

In Curitiba, there are specific days to collect organic waste and collect waste recycled. It is necessary, therefore, that residents know when separate the waste to be recycled. If citizens take out the recyclable waste in the day of collection organic, then, it will be ended up in the landfill, hence in a wrong way.

Garbage collection in Curitiba occurs the following section:

- 3 times a week the trucks for garbage pass to collect recyclable trash.
- 3 times a week the trucks for garbage pass to collect organic trash.
- There are trucks and special collection points for toxic trash, but for example I never know what days these trucks can pass and I do not know where the points of special collections are.
- Also has the paper pickers, who collect papers, cans, bottles, woods, which are abandoned on streets to take them to the recycling sheds.

The problem is that most part of population, is still lost about what should be recycled and which days the specific truck is passing.



3-Residential trash disposal in Curitiba Source :<http://surgiu.com.br>



4- Recycling trash truck and picker papers
 Source www.gazetadopovo.com.br

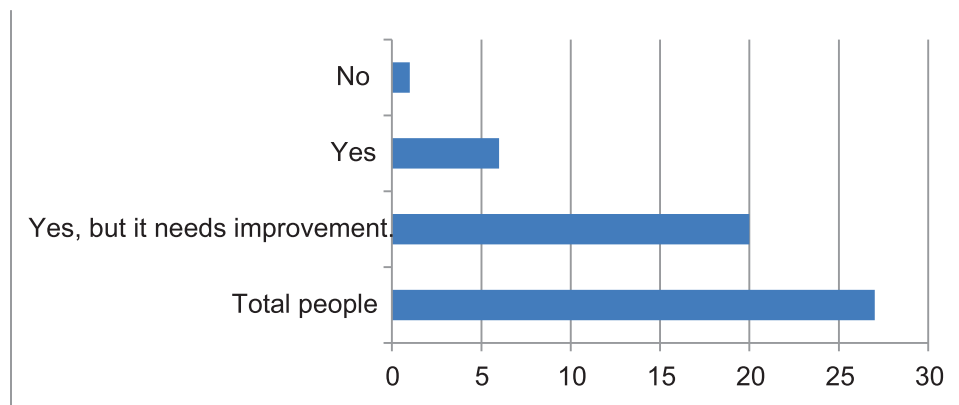
5.0 WHO : Tell us who you engaged through this project and how you engaged them. Explain what you learned from the people you engaged with .

My project has the goal of engaging more curitibanos with the problem about waste management, which includes recycling, in Curitiba. Despite the collect system is efficient, the society needs to participate and know what is going on in our city.

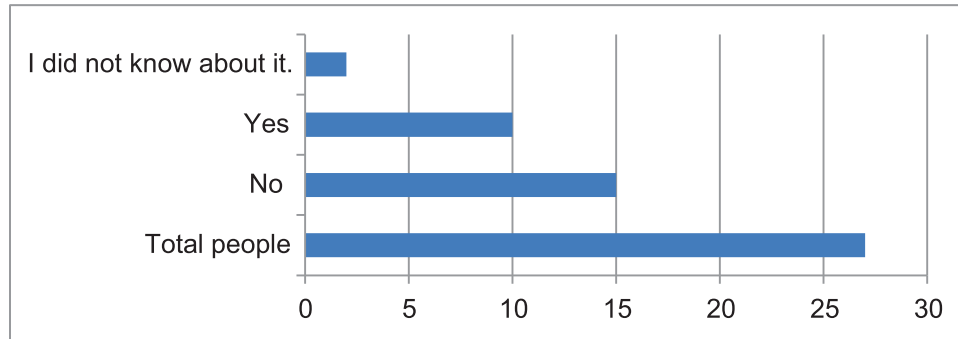
In this short time, I decided to survey through my friends by using Facebook, to know whether they are aware of recycling system and how it works in Curitiba.

**27 people responded the survey*

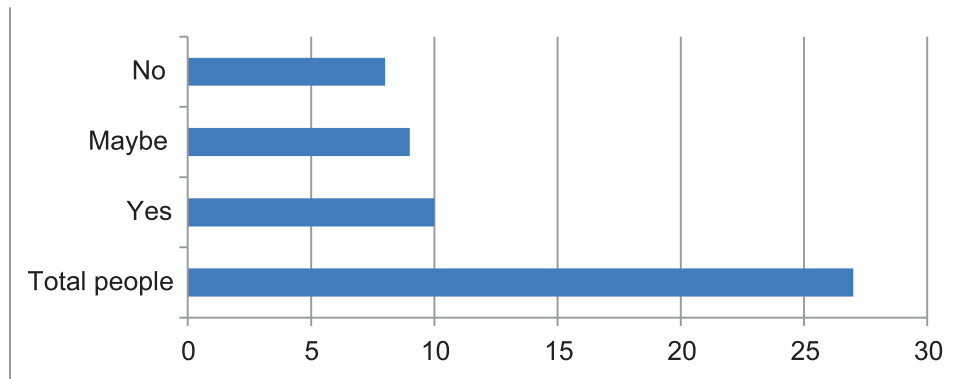
1. Do you consider the system of solid waste collection efficient in Curitiba?



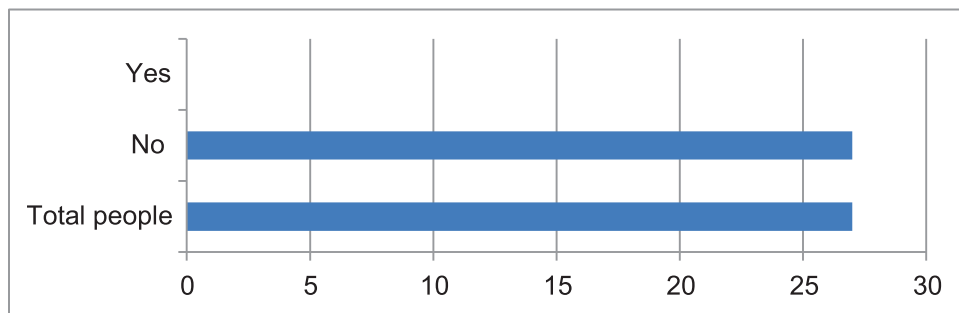
2. Do you know what day the truck to collect recyclable happening in your street?



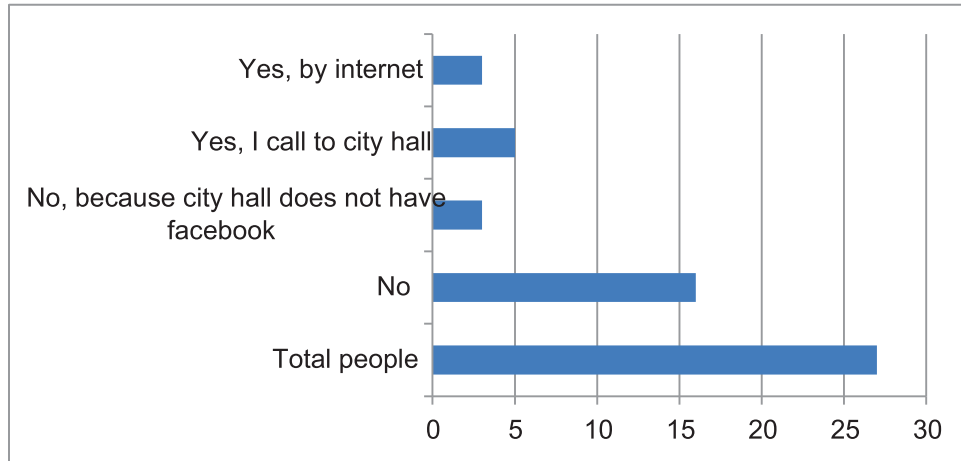
3. Do you know, with absolute certainty, what materials are recyclable?



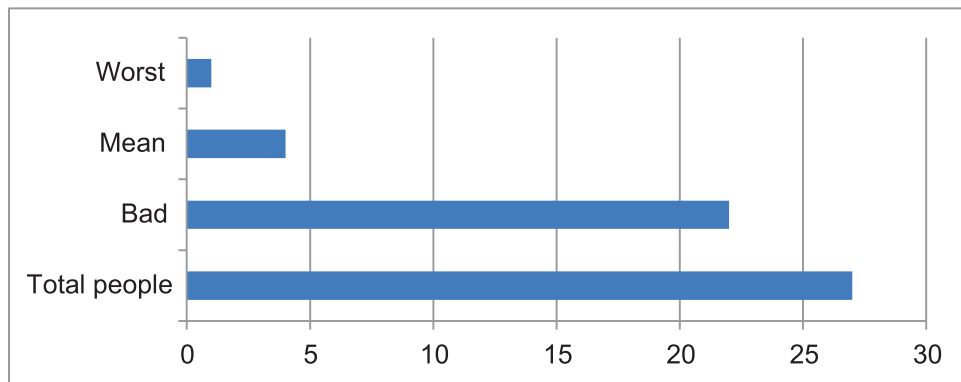
4. Do you know where this waste goes after and when% is being recycled per month?



5. Do you report problems in your city? How?



6. What do you think of feedback from governance?



5. Data Analysis: What data did you analyze for this project and what did you find? b. Design: Describe the key design elements of your project

Through my survey I could notice that if the governance created an app to be used to improve management of solid waste in Curitiba, the rate of recycle material could be increased, because society would participate more in it .

I have been searching several websites, many of which, I found by Technicity, to find ideas for my project. I got some of the ideas by surfing in:

<http://mashable.com/2011/11/02/trashtech-recycling/>

<http://www.sentientcity.net/exhibit/?p=31>

http://www.asla.org/sustainablelandscapes/Vid_Waste.html

<http://wastezero.com/>

For my **FINAL PROJECT** I have developed an application for smartphones, website and kiosk, which can be used by everyone.

In the Hyperlapse Project I showed my favorite places in Curitiba, and also they are places where are crowded in the week and weekend. I decided to map where virtual Kiosks could be implanted to better engage people who don't have smart phone or internet at home.

(<http://www.youtube.com/watch?v=MBMhXx3PDFM&feature=youtu.be>)



5 □ Example of Kiosk, it could be implanted

Source <http://publicdataweb.com/pdwebblog/definition-of-public-access-technology>

7. FINAL PRODUCT

Create an app to smart phone, kiosk and web , to engage society with the problem in order to improve recycles data and the management of solid waste in Curitiba

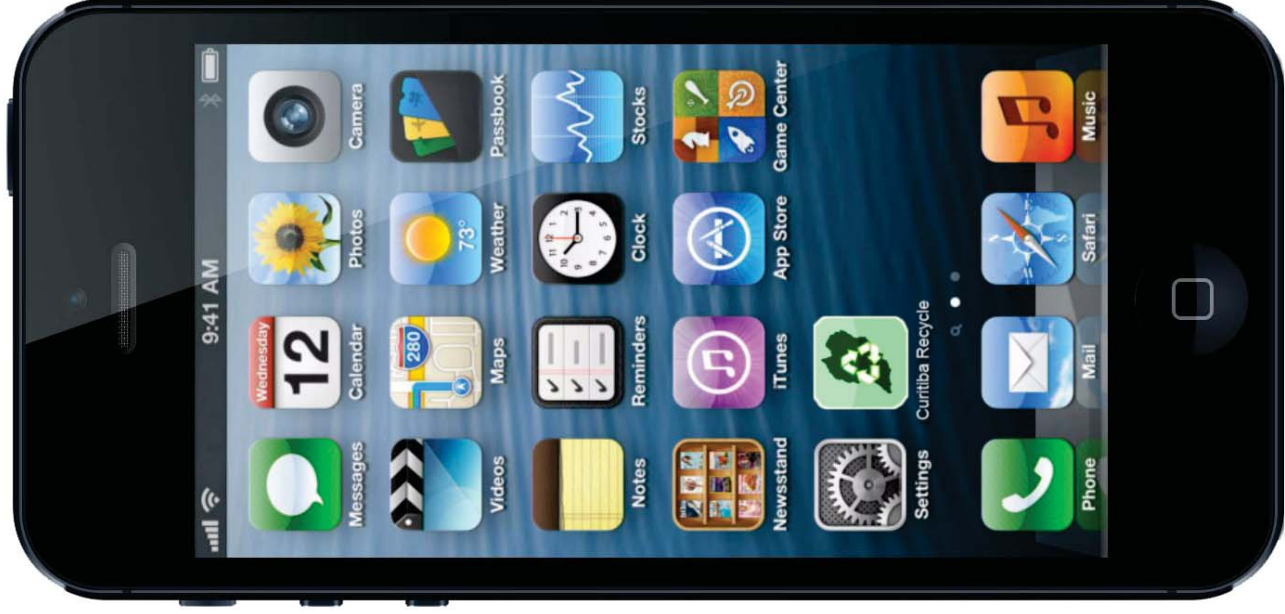
The following pages will presented the FINAL PRODUCT

8. I WORKED BY MYSELF

Curitiba Recycling App.

Curitiba Recycle is an app which it will help you to figure what do with your waste like:

- What is recycled
- Where you can find collect site
- When recycling trucks are coming
- Where your waste is ending up
- Engage with governance to do complaints, suggestion and earn benefits with recycling system.

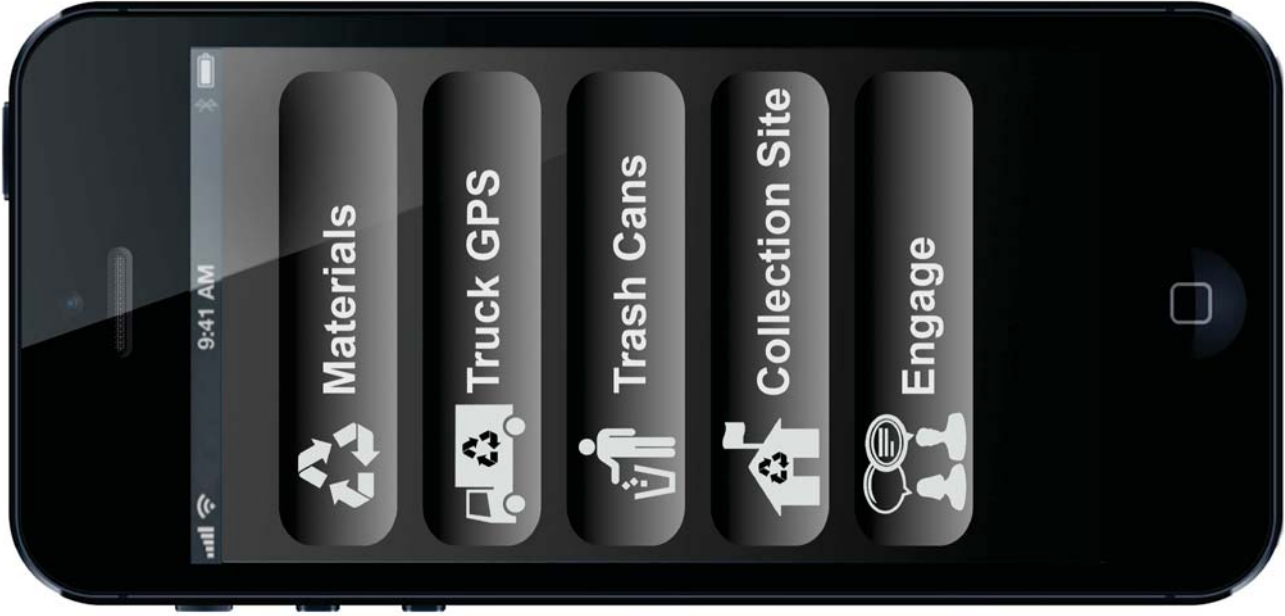


Home Menu

As soon as you open Curitiba Recycling, you will see a Home Menu that will give you the following options:

- Materials
- Truck GPS
- Trash Cans
- Collection Site
- Engage

Let's take a look at each of those options so we can explore the App.



Materials

By selecting the first option of the Home Menu, you will enter the "Materials" section. Here you can take a picture of the Query Code available on the material you want to analyze, take a picture of the material for the App to recognize what type of material it is or you can simply type the material on the search bar.

As soon as the App recognizes the material, a new window will show the profile of that material. You will be able to see the following information:

- Date that the material was fabricated
- Name of the fabricant
- Name of the company that is using the material
- If the material is made of previously recycled material
- If the material is recyclable
- The name of the material
- The average time for the material to decompose

This section of the App is very good because it will teach people about the characteristics of each material. People will know also who fabricates the material, being able to demand recycling actions from those fabricants.

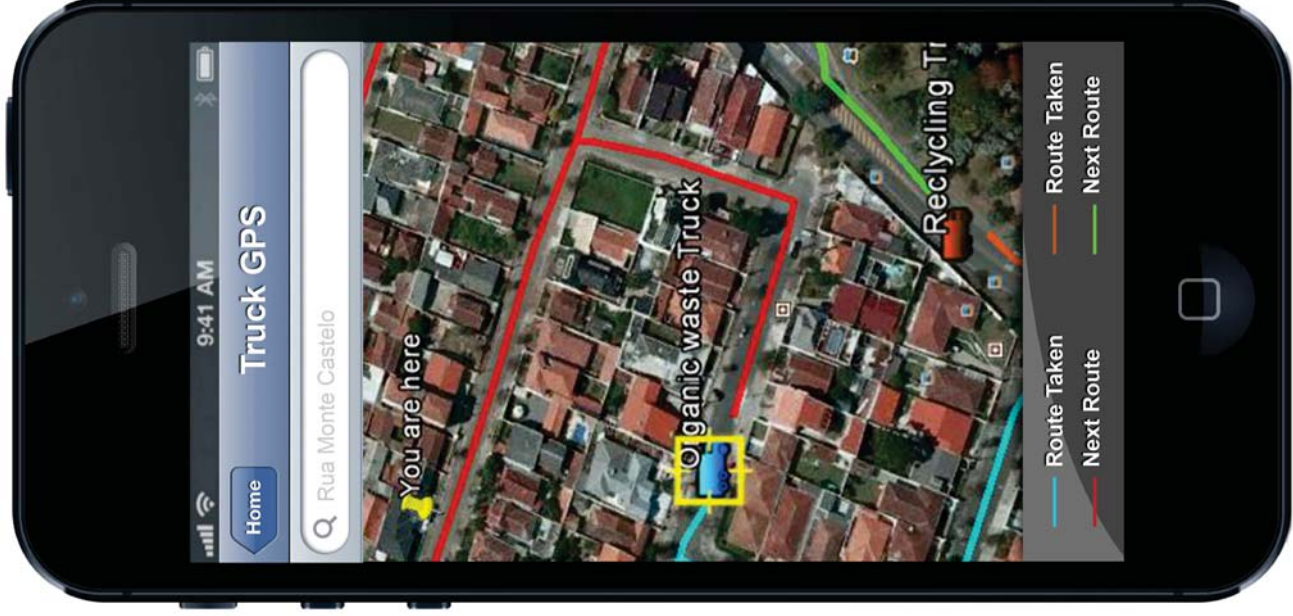


Truck GPS

The second option of the Home Menu of Curitiba Recycling App is the Truck GPS. This section of the App will provide information about the recycling trucks around the city. You will be able to see:

- The different trucks circulating around the city
- The route that the trucks have already taken
- The next route the trucks are going to take

With this information every user can be informed about when to expect the recycling truck. This will allow everybody to have a better timing of taking the trash outside and also will prevent people from leaving the trash outside for a long time, possibly causing it to be spread around.



Trash Cans

This option of Curitiba Recycling App is to provide people usefull information about where to find recycling cans/bins around the city. This is a great tool to have due to the fact that nobody wants to walk around carrying trash, but if they know where to find an appropriate place to dispose of the trash, they will probably do a little extra effort to recycle it.

By typing the address that you are at or by activating your GPS you will see:

- Nearest recycling trash can/bin
- All the recycling trash cans/bins around you.



Collection Site

This option of the Home Menu will take to one of the most important sections of the App. This due to the fact that it will provide the user information about where to find recycling collection sites. By taking the trash that is at home to one of these places, the user will be able to benefit from the points collected after recycling.

By typing the address that you are at or by activating your GPS you will see:

- Nearest Collection Site
- All the Collection Sites around you.

The mechanism works as following:

- You type your user code, which you registered on the website www.curitibarecycling.com, choose one of the waste categories for recycling: Aluminum, Glass Bottle, Cans, Plastic or Paper.
- Insert the elements inside the indicated place: [Insert Here](#)
- The machine will check if the inserted element matches the previously selected category.
- When you finish to insert all elements (garbage), you click **OK**
- The machine will show two options: save points or generate ticket now
- You choose one of options. In case of choosing to save points, the points will be virtually added to your account on www.curitibarecycling.com, where you can also check your historical operations.
- You can exchange these points for: bus tickets, cultural events tickets and have discounts on products with the companies participating in the program.



Engage

On this last option of the Home Menu, the user will be able to get some extra information and send messages for the City Hall and the Government Recycling Organization.

The options and the use of each of those options are:

- **Recycling Dates** - Here the user will find a calendar informing which dates the recycling trucks will be going around the city and in which area. This tool provides information that can be crossed with the Truck GPS to have more accurate information.
- **Complaints** - By selecting this option the user will be able to send direct messages to the responsables for recycling around the city. If the truck did not come on a certain day or if there are not enough trash cans/bins on the area are some example of things that the user can inform the responsables.
- **Suggestions** - Some people not only use tools but want to participate, that is a moment to use the Suggestions option. Here the user will be able to send direct messages to the responsables for recycling around the city with suggestions, hopefully people will participate and great ideas can come out of the community.
- **Related Links** - This sections is for the user that wants to get more informed about what is being done around the city and what is already being done around the world. By having access to links, videos and on-line recycling communities, the user can learn more and hopefully embrace the attitude of recycling.

