



RFID JOURNAL LIVE!

SEPTEMBER 26 - 28, 2021
PHOENIX CONVENTION CENTER | PHOENIX, AZ

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“TRACKING URBAN SOLID WASTE via RFID and the IoT: Improving Visibility & Reducing Costs”



Agenda

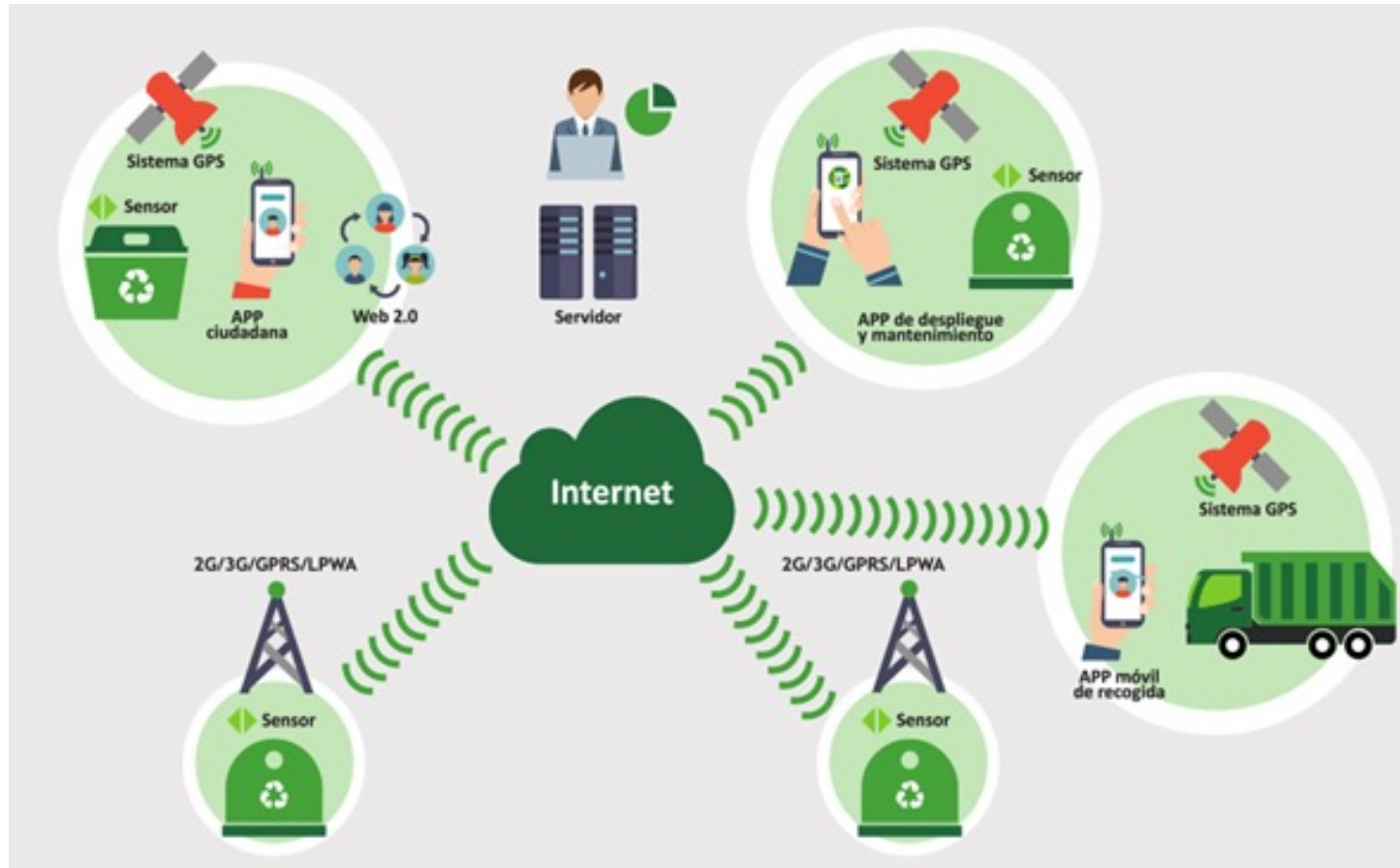
- Why bother?
- The use of Technology (Why, before and after): *IoT comes to the rescue !!*
- Technology Implementation
- Use of Geographical Distribution/Population Density
- Results after implementation
- Benefits
- The Future !!



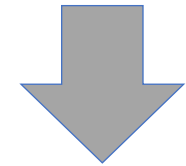
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Why bother?



**SMART CITY
CONCEPT**



**SMART
PEOPLE**

Why bother (I)?

- Operational costs reduction
- Contributing to the environment (carbon footprint, cleaner city)
- Overall efficiency increased
- Stay ahead with latest tech.
“Planning the future”



The use of Technology (why?)

- Estimate qty of containers/tippers and trucks to recollect Urban Solid Waste (USW).
- Help in the design of installations for recycling, transfer & final deposition.
- Relocation of containers/tippers.



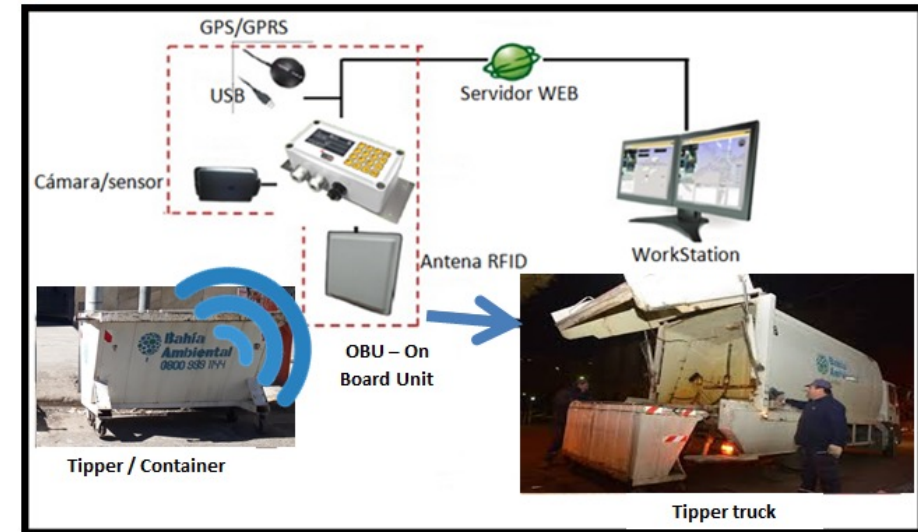
The use of Technology (before & after)

Identify advantages and/or disadvantages of utilizing IoT on a Container Waste collection Management route, ***comparing current operating costs versus the costs of implementing the aforementioned technology.***



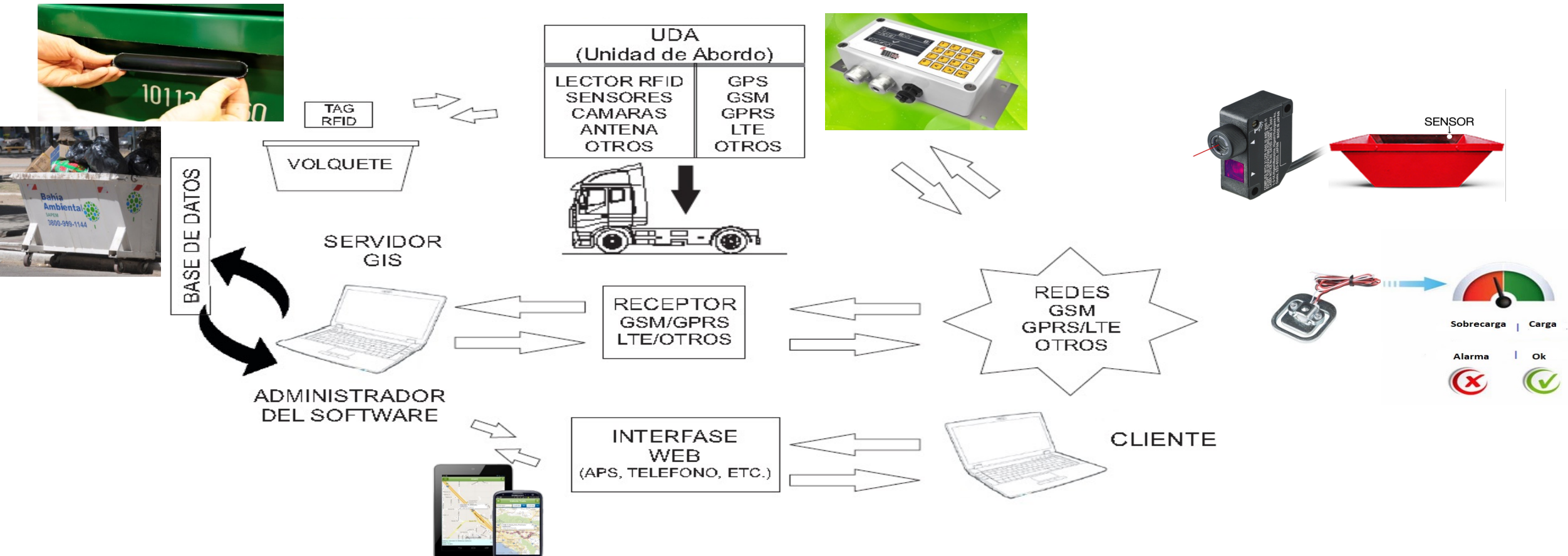
Traditional “container/tipper” tracking system

vs.



Proposed Method

Using RFID (one of IoT enabling Technologies)



Source: Patent 20170102118 – Ernesto Castagnet/Julio Pertusio

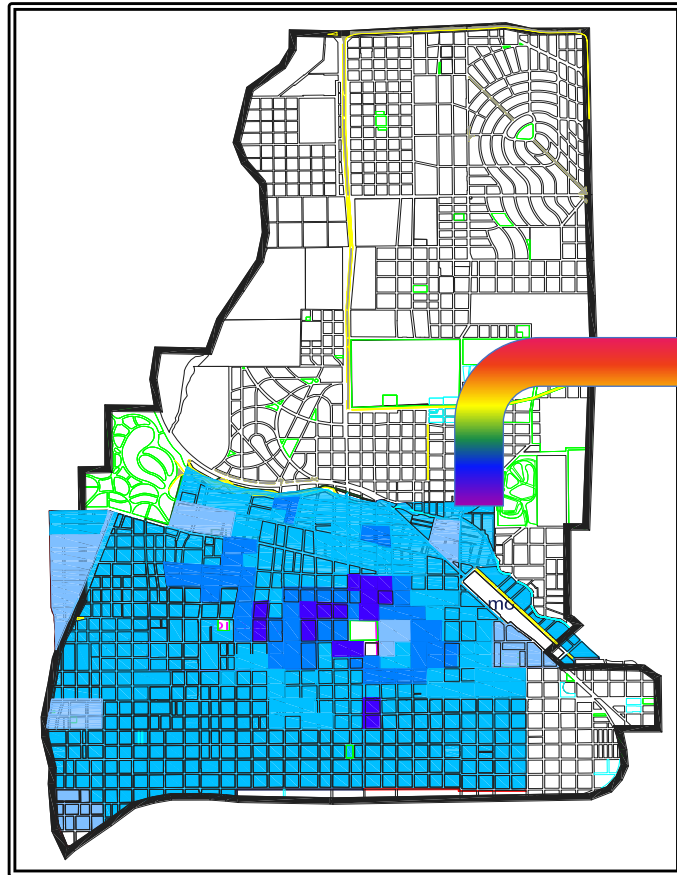
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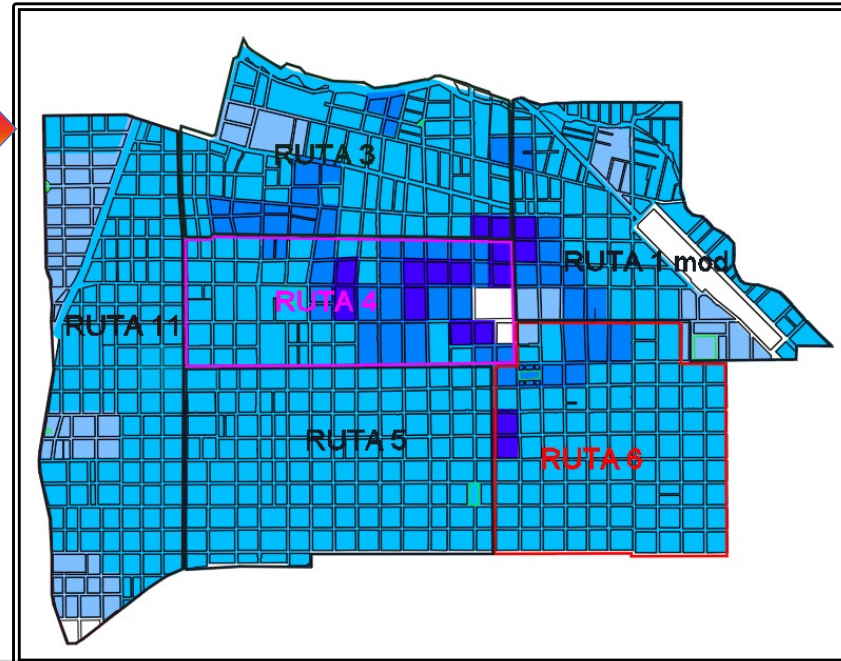
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Technology Implementation (I)

Example: relocation of container/tippers



Total zones. In blue zones under study.



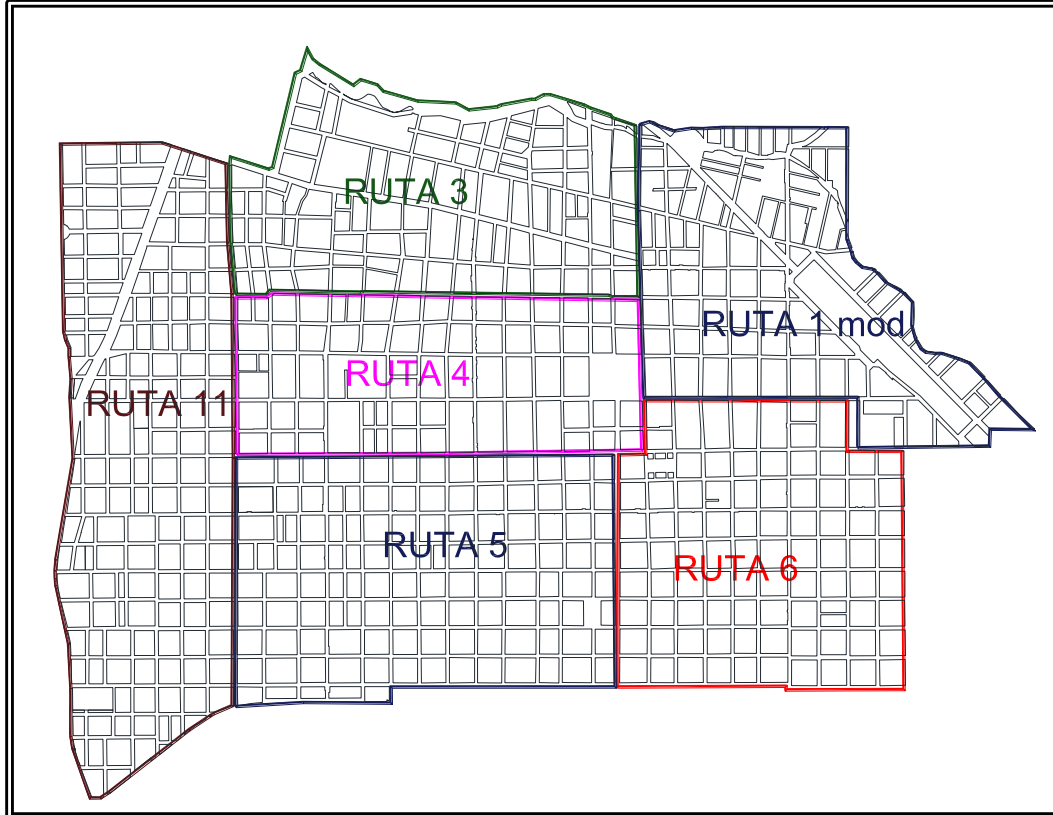
From actual 17 routes by night and 15 by day we choose 6 night routes for the study

REFERENCIAS



Technology Implementation (II)

Example: relocation of containers/tippers



Chosen routes: 1 (modified), 3, 4, 5, 6, 11

Routes	Blocks	1) Km/day covered	Population (estimated)	GPRSU/P
1 modif.	183	58,40	6.140	2,43
3	163	55,20	8.980	1,99
4	202	61,70	9.560	1,96
5	179	57,60	10.256	1,63
6	252	73,80	8.923	1,88
11	462	76,00	14.400	1,14
Total			58.259	1,84

1,84 Kg/person/day = 4 pounds/p/d

Source: Bahía Blanca City Hall and our own data

Technology Implementation (III)

We will not explain here all the processes to calculate:

- Methods depending on the complexity level of the system
- Physical composition of the USW (organic & inorganic) depending on income level/inhabitants
- Daily average USW production
- Production design for USW recollection (weekly/monthly/annual variation)
- Systems design for container/tipper recollection
- Equipment design for the recollection of USW (EDRUSW)
- Number of points served by USW recollection equipment (USWRE)
- Itinerary of the USWRE based on time (trips per day, Nr of trucks needed, others)

Use of Geographical Distribution / Population Density

Example: route testing/relocation of containers/tippers



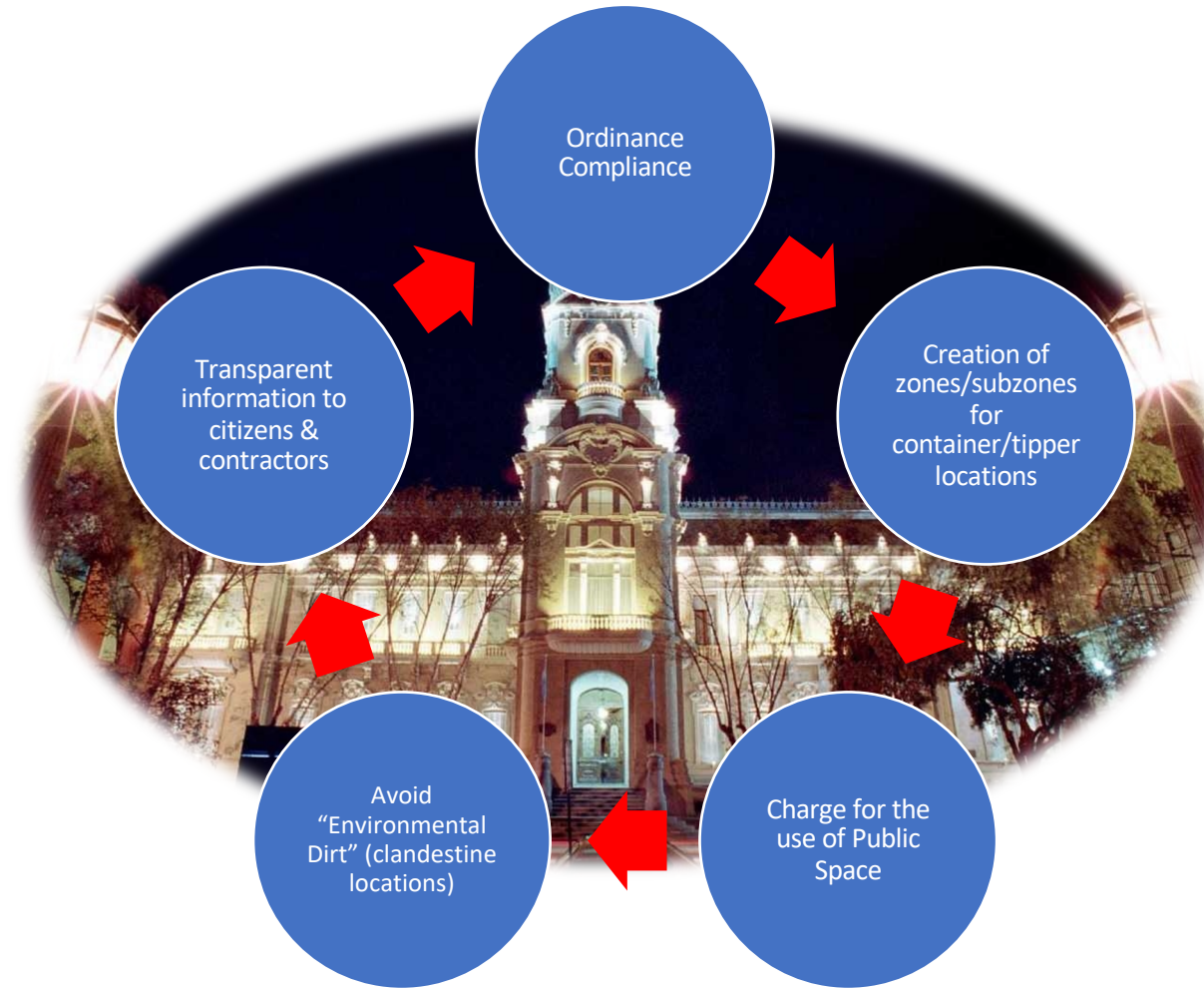
Results after Implementation

- Redistribution of containers/tippers based on geographical distribution/population density brought:
 - ✓ changes on recollection days,
 - ✓ heavier containers,
 - ✓ Fewer trucks per route
 - ✓ Population served better (intangible)



Economic result: **<costs ; >Benefits**

Benefits for the City Hall



Benefits for the Contractor



**Bahía
Ambiental**
I SAPEM

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Benefits for Citizens



Should be part
of a
Smarter City
Initiative

And the future?

Multi-criteria analysis methodologies and location techniques based in IoT and Big DATA will change distribution of resources in Geographical Division, or even themselves.



Geographical Division. City of Bahía Blanca, Province of Buenos Aires, Argentina.

!! THANK YOU !!



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THANK YOU

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