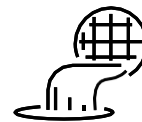
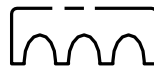
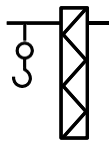
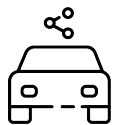
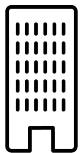




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SENSING THE FUTURE

RE-THINKING CITIES.

The city services revolutionized
by new technologies and
processes.



RESOURCES AND CITIES

The modern cities do not only produce great wealth

Resource consumption and **environmental impact** are closely linked, growing exponentially when urbanization of cities is not carefully regulated.



70%

of the polluting
emissions



75%

consumptions of
natural resources

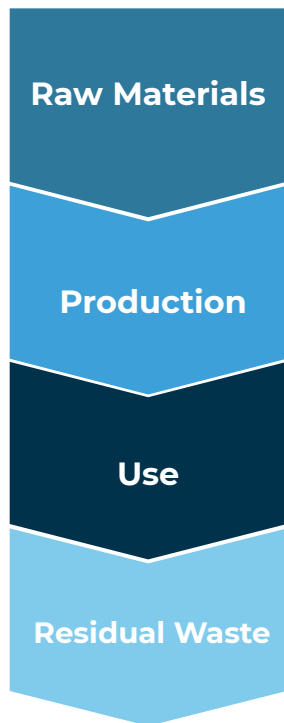


50%

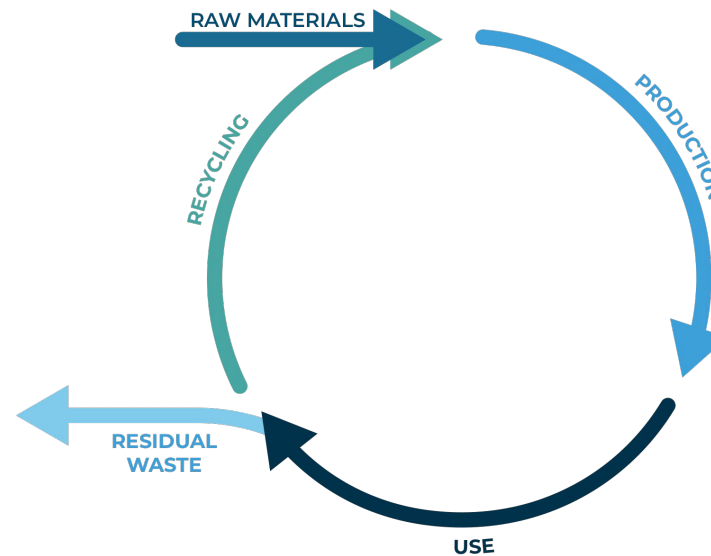
of the waste global
production

LINEAR vs CIRCULAR ECONOMY

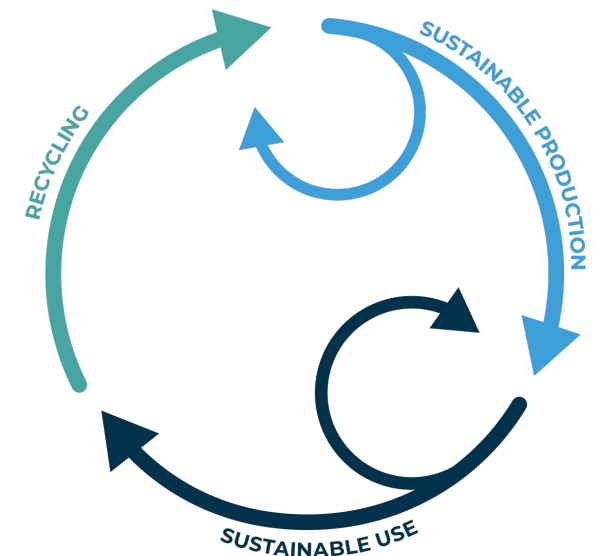
LINEAR ECONOMY



ECONOMY WITH FEEDBACK LOOPS

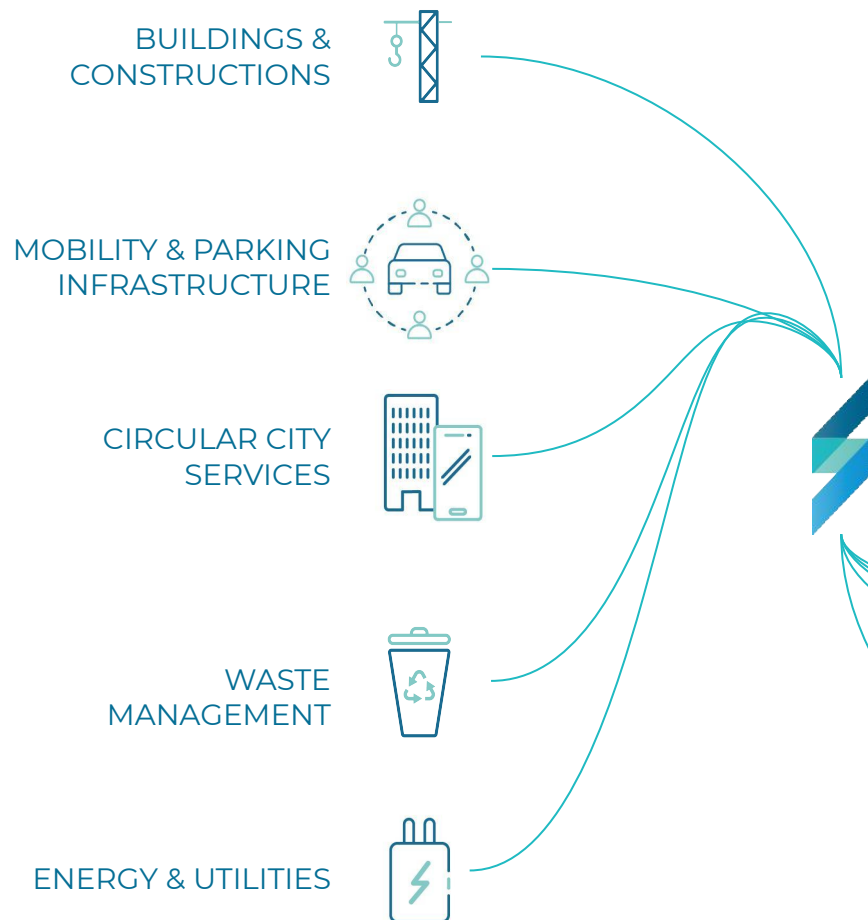


CIRCULAR ECONOMY



INTELLIGENT INFRASTRUCTURE MONITORING SOLUTION

MONITORING THE CIRCULAR CITY



KEY BENEFITS



OUTCOME

What opportunities does the circular city market offer?

OPPORTUNITIES

New services are being created from scratch, and old one are being reinvented to produce new wealth, be more efficient and economic.

DIGITAL

Business is increasing becoming more fast and open to new smaller player. Companies are structuring themselves to find **innovation** inside and outside their environments.

ENVIRONMENT

As mass media and consumers are getting more sensitive to ecological topics, businesses are changing their **internal processes** and their **external communication** on this topic

OUTCOME

What are the advantages of a systemic approach to circular cities?

SYSTEMIC APPROACH

A comprehensive and systemic approach helps to **use better the data collected**. Each city service can exploit all the data collected by other services. Citizen benefit of a single, improved user experience.

SECURITY & PREVENTION

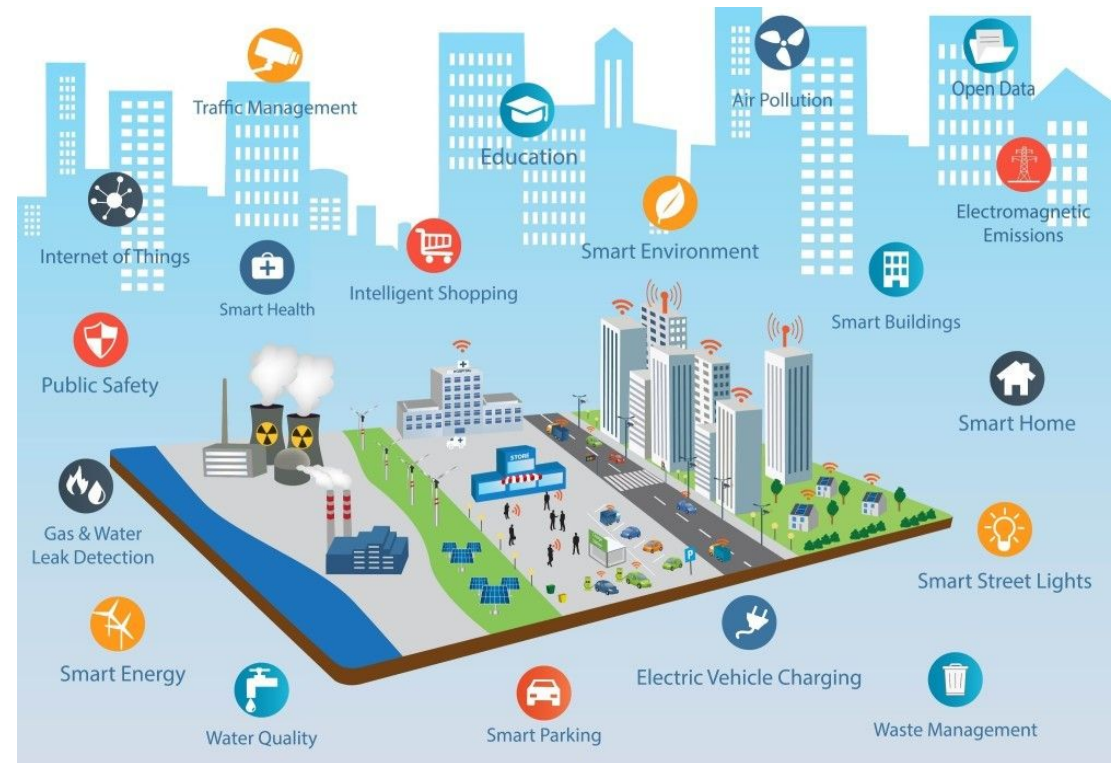
Anticipating future events allows us to better target **strategic choices**. But it also makes it possible to immediately improve the **safety of the infrastructures** and of the people who use them, improving the life of the entire community.

FROM LINEAR TO CIRCULAR

New **technologies** help us to regenerate waste. New **skills** allow us to reorganize business processes to do so. A new collective **citizen awareness** requires us to rethink city services from a circular perspective.

FROM LINEAR TO CIRCULAR ECONOMY

- Sensoworks IIoT Platform enables transition from linear to circular economy
- Data ingestion, aggregation and analysis enables the understanding of data collected from our cities (IoB)





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*“We choose to go to the Moon in this decade
and do the other things, not because they are
easy, but because they are hard.”*
JFK (Rice University on September 12, 1962)

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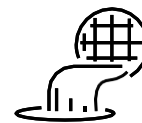
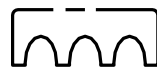
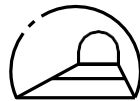
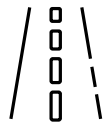
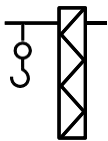
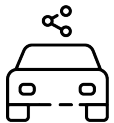
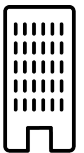
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ATTACHMENTS: more use cases



WASTE MANAGEMENT



Smart picking solution from containers able to provide direct and univocal information relating to the identification of the container itself, the state of filling of the container (volume of the residue), the state of the container (e.g. accidental falls, shocks, placement out of position of the container), container, fires, ...), date and time of picking. Some of this information can also be collected in the case of domestic users (differentiated door to door).

The **management of the vehicle fleet** for collection, the optimization of the picking activities of the conferred can be optimized thanks to the information received in near real-time from the smart tracking devices inserted in the containers. In this way, the path and picking activities of the consignee are calculated based on the actual state of filling of the containers.

The information collected thanks to the devices installed in the containers, together with the information relating to picking, allow a detailed analysis of the actual use of the containers, their state of health and any need for maintenance as well as travel optimization performed by the means used for collection.

SMART PARKING



SMART PARKING

Innovative Smart Parking solution in terms of product and process for optimizing the use of parking and helping motorists in search of a free space

Next generation smart sensor network for:

- Identify available places
- Measure the air quality
- Analyze the vehicular flow
- Digital panels to report traffic and parking availability
- Multivariable price mathematical model to incentivize turnover

Tools used:

- Proximity Info Parking and Proximity Marketing (Gamification Marketing)
- Geo / spatial forecasting and analysis of (Big) Data Mining
- Governance and urban planning

WATER SERVICE



Water losses

Identify the sections of the network most likely to break. Water piping analysis with priority management of the most critical assets with consequent decrease in water losses and increase in management efficiency.

Pumping optimization

Development of a network model with AI algorithms, powered by realtime data from the field, to optimize the network pressure to reduce losses and energy consumption for pumping

Predictive network maintenance with optimization of the teams in the field

Prioritization according to the associated risk of maintenance interventions and planning of interventions by operators and routes through georouting algorithms

Smart alarms

Creation of smart alarms and integration of any smart meters to increase efficiency and timeliness of intervention by managing to intervene in advance with respect to a potential failure or drift of the meters.

Digitization of asset management

Revamping and digitization of assets for the adoption of European regulations, such as the Water Safety Plan and new provisions from ARERA (e.g. Decree No. 76 July 2020).

PUBLIC LIGHTING



Traditional public lighting is usually regulated with timers, able to switch them on and off. The smart evolution of the street lamp is transforming them into a highly technological pole capable of providing new services and communicating in time real.

Through specific sensors is possible to offer Smart City services connected to intelligent poles such as:

- **lighting dimming** - increase/decrease depending on the presence of people, vehicles, etc;
- **urban video surveillance;**
- **air quality control;**
- **traffic control** and **parking management;**
- **APN Wi-Fi connection;**
- **Vibrations** and **oscillations** control in buildings;
- **Fire prevention** (detecting fires, smoke, etc);
- Control of municipal **waste collection;**
- **City weather forecasts;**
- Pole transformed into **charging stations** for electric vehicles

DISTRICT HEATING



The monitoring of the physical parameters of the **district heating network** has undergone an important technological development in recent years.

NB-IoT communication networks are capable of improving the management of data relating to the temperature and pressure of district heating systems, simplifying installation and reducing costs related to heat accounting.

The main problems in the area of district heating systems are due to the impossibility to communicate from underground to the outside.

Narrowband IoT technology overcome this limit.

Specific IoT devices for monitoring **pressure** and **temperature** in the network or for monitoring district heating substations, acquire and share the telemetry received to the various technical departments.