HERAGROUP

HERGOAMBIENTE

The intelligent waste management services control system

GRUPPO HERA

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The intelligent waste management services control system

What might a waste collection container say if it could speak? Well, it might, for example, tell us where it is.
Or perhaps that it has been damaged.
Above all, though, it could tell us when it was last emptied.
The good news is that the 300,000 containers managed by Hera really do talk.

Thanks to **HergoAmbiente**, **the "intelligent" system designed by the multi-utility provider to support its waste management services**, each container can be clearly identified. That means it's possible to run real-time checks on its position, whether it's working properly and, at the same time, find out if and when it's been emptied.

However, the innovation goes beyond waste collection containers. Thanks to dedicated technology and cutting-edge IT systems, **HergoAmbiente** gives each asset (vehicles, waste drop-off points, processing plants, etc.) a unique voice, **locating** it, **scheduling** its tasks, **checking** for effective execution of such tasks and **assessing** its performance.
Waste collection and road cleaning **management** is, then, **integrated**, **fast** and **far-reaching**.
This management also includes outsourced services and handles **feedback** from both citizens and staff, quickly transforming them into task orders.

The goal?
To boost the **quality**, **effectiveness and efficiency** of the services we supply to **2.6 million people**, optimising use of a combined Hera-third party workforce that is some 3,000 strong while ensuring real-time **traceability** of collected waste. And only by introducing these key elements of **innovation** and **transparency** will it be possible to bring about the conditions for **precise pricing**, providing ever-greater incentives for waste collection behaviour that rewards both citizens and public administration bodies.

An extraordinary opportunity for local communities, HergoAmbiente "thinks" and operates as a network: people and devices capable of **governing** all waste management services processes: **design**, **planning**, **scheduling**, **feedback management**, **in-the-field execution**, **reviewing**, **reporting** and... service re-design, as data analysis always makes the achievement of new, customised goals possible.
In terms of capillarity and extension, **HergoAmbiente** takes waste management services to a level seen nowhere else in Italy and offers **European-level best practices**.

HergoAmbiente is an innovative IT system that allows integrated control of the Hera Group's waste management services, boosting quality, effectiveness and efficiency while ensuring full flow traceability

THE **BENEFITS** OF **HERGO**AMBIENTE

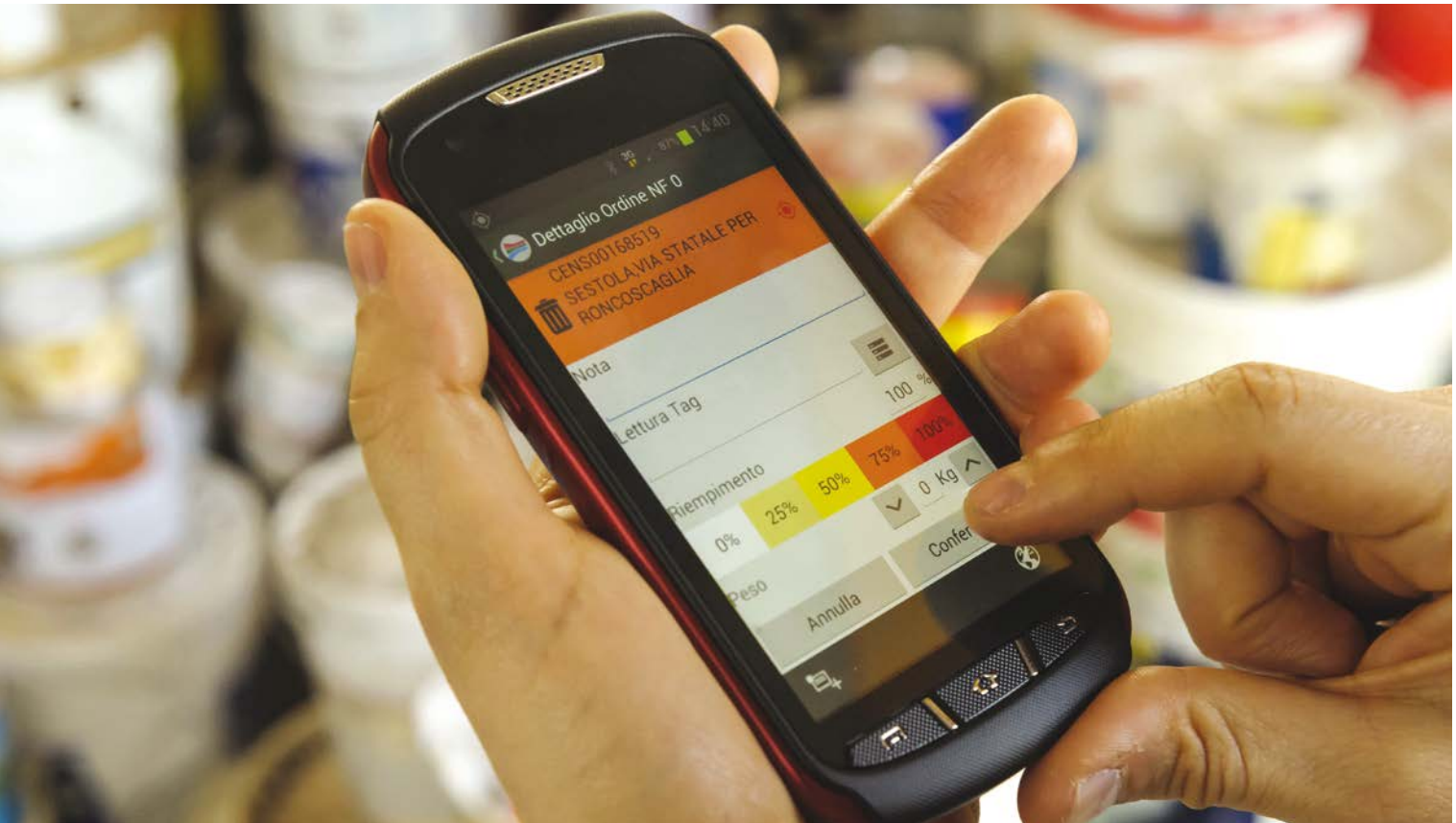
Service quality, integrated process control, fast assessment of results: these are the key advantages of HergoAmbiente, the system that makes information-sharing easy

In waste management services, **HergoAmbiente increases the value of the available information** exponentially by integrating data location points: it records, geo-references, interconnects and transforms them into a significant amount of knowledge that is immediately useful for the continuous improvement of public services. With a drastic reduction in data entry and transmission errors.

Thanks to HergoAmbiente, in fact, it's possible to:

- **know the updated number, position and status** of containers in the served area (to find out, for example, if they've already been emptied and when);
- enact **continuous improvement** of service **design** and **scheduling**;
- accurately **trace waste collection** and road sweeping work;
- **organise workforces** quickly and flexibly;
- **ensure that the information** obtained in the field by Hera and third party workers, sent at the end of their shifts, **is acted on quickly**;
- accurately **define the real "productivity"** of a waste collection centre, a drop off point or even a single container;
- **boost the efficiency** of the "bulky waste" (e.g. old sofas) collection service;
- **integrate** information flows from call centres and Apps such as Il Rifiutologo, translating them into corresponding disposal orders;
- **produce reports** aimed at providing clear analysis of services in a way that ensures transparency for both citizens and public bodies.

With HergoAmbiente you can identify the current position of the containers and find out if they've already been emptied and when



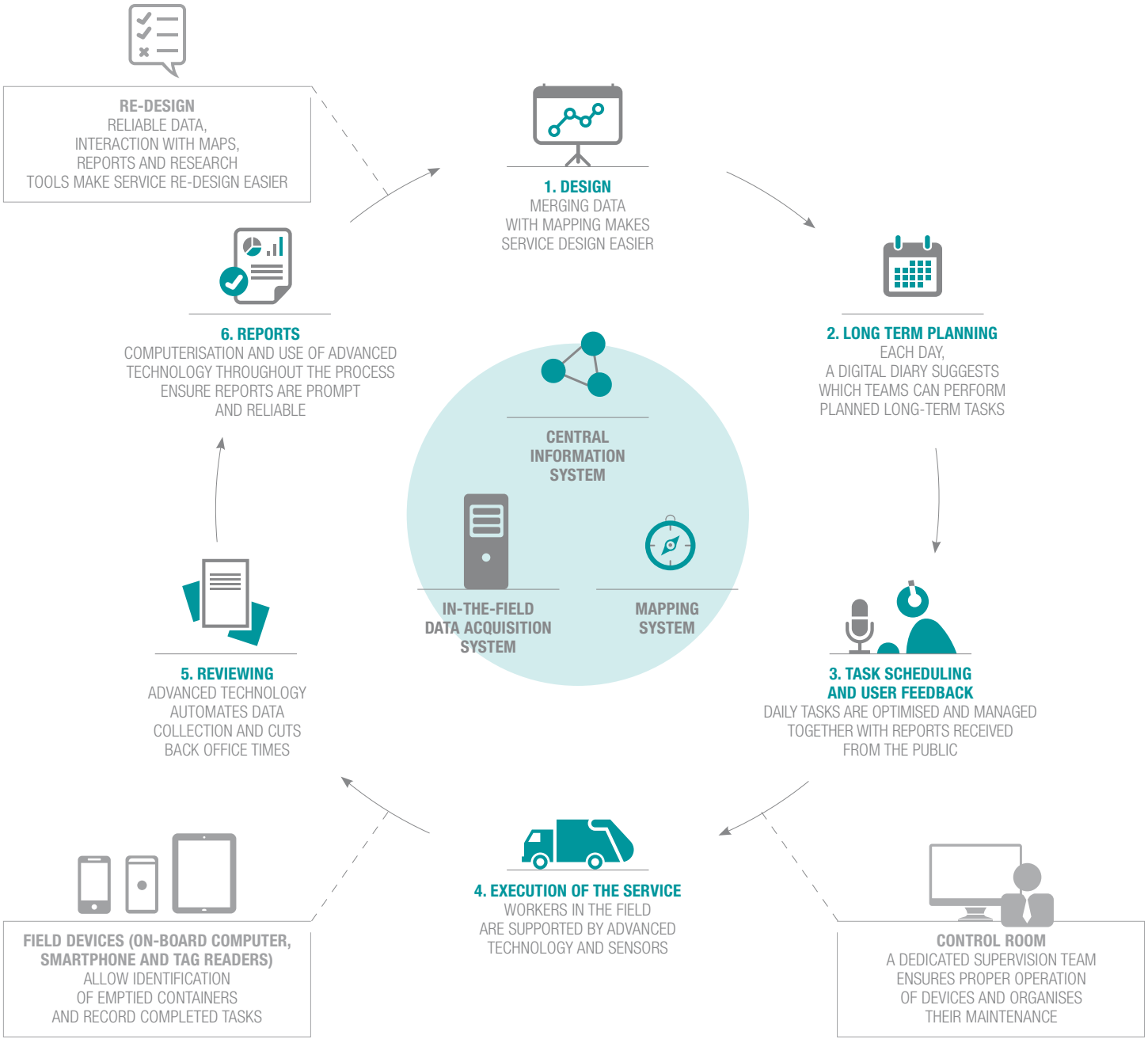
HERGOAMBIENTE **LENGTHENS DATA LIFESPANS: HOW?**

The system organises and processes information on supplied services in a way that multiplies its usefulness. In addition to illustrating what has been done in the form of structured reports, data becomes a **precious operating asset** which, thanks to HergoAmbiente technology and Hera personnel, is analysed by the design service teams to assess where and how processes can be improved.

In other words, HergoAmbiente enters all the information into a "circuit" that extends its "lifespan", allowing the data that describes today's services to become the added value of tomorrow's. The **circularity of information** – made possible by total computerisation of the system – thus becomes a **circularity of benefits**, with each stage of the process passing advantages on to the next.

Systems, then, are designed with greater awareness than in the past: this, in turn, simplifies task planning and scheduling, streamlines execution of the service and brings about the ideal conditions needed for progressive improvement of performance and results over time.

A wealth of data for better and better services



*HERGOAMBIENTE, THE **FIGURES** SPEAK FOR THEMSELVES*

The following figures describe the extent of the system and the attained levels of operational processes' coverage

approximately ***3,000***
WORKERS (HERA AND OUTSOURCED)

1,300
VEHICLES WORKING IN THE FIELD (BOTH HERA AND OUTSOURCED)

approximately ***400***
CENTRAL IT SYSTEM AND FIELD DATA ACQUISITION SYSTEM USERS (HERA AND OUTSOURCED PERSONNEL)

approximately ***4,500***
WASTE COLLECTION ROUTES

approximately ***3,000***
ROAD SWEEPING ROUTES

over ***10,000***
CALL-REQUESTED SERVICES

approximately ***1,900***
WASTE DISPOSAL ORDERS A DAY FOR WASTE COLLECTION AND ROAD SWEEPING, (INTERNAL AND OUTSOURCED), TOTALLING SOME 685,000 ORDERS A YEAR

approximately ***700***
CALL CENTRE CONTACTS A DAY TO REQUEST WASTE MANAGEMENT SERVICES

approximately **600**
ON-BOARD COMPUTERS INSTALLED ON VEHICLES WHICH DIALOGUE WITH THE CENTRALISED SYSTEM

1,200
MEMBERS OF PERSONNEL PROVIDED WITH SMARTPHONES HAVING THE SAME FUNCTIONS AS THE ON-BOARD COMPUTERS

300,000
TAGGED CONTAINERS (I.E. WITH AN ELECTRONIC ID CODE THAT IS READ DURING EMPTYING)

190
AUTOMATIC CONTAINER TAG READING ANTENNAS INSTALLED ON VEHICLES

1,400
PORTABLE ANTENNAS PROVIDED TO PERSONNEL TO READ TAGS INSTALLED ON CONTAINERS

140
COLLECTION CENTRES SERVED, PLUS

85
HERAMBIENTE PLANTS, PLUS THOSE RUN BY THIRD PARTIES, WHERE COLLECTED WASTE IS TAKEN

INNOVATING TODAY TO SAVE TOMORROW

Evolution of the service and near-future scenarios, from sustainability to precise pricing

HergoAmbiente may be a game-changer but it's far from the end of the game. It is, above all, a starting point. Designed to innovate waste management services, it represents both ongoing change and the basis for new, future developments.

There will be two main areas of interest in the near future.

On the one hand, HergoAmbiente gives **fleet management** a boost: thanks to the vehicle census and accurate monitoring of vehicle status, availability and performance, HergoAmbiente can implement ever-more rational, efficient use, reducing fuel consumption and environmental impact.
In this sense, HergoAmbiente gives a massive helping hand to the Group's policy of **sustainable transport**. That commitment has, over the years, led to the purchase of technologically advanced vehicles that run on bio-fuels and electric vehicles such as zero-impact road sweepers that eliminate noise pollution and can be manoeuvred in tight spaces.

On the other hand, complete computerisation of the service – which makes precise measurement of performance possible – is a huge step towards a future scenario that might see the introduction of **precise pricing**, with-ever greater rewards for separate waste collection and reduced waste production. More generally, the progressively higher efficiency of both resources and their utilisation (a direct consequence of the self-reinforcing positive information feedback that is, in HergoAmbiente, transmitted throughout the process) **aims to provide services** that are more and **more competitive** where they are put out to tender, generating positive effects – in terms of service quality and cost – that are advantageous to local communities and their administration bodies.

The challenges of tomorrow: to make the most of complete service computerisation to introduce precise pricing

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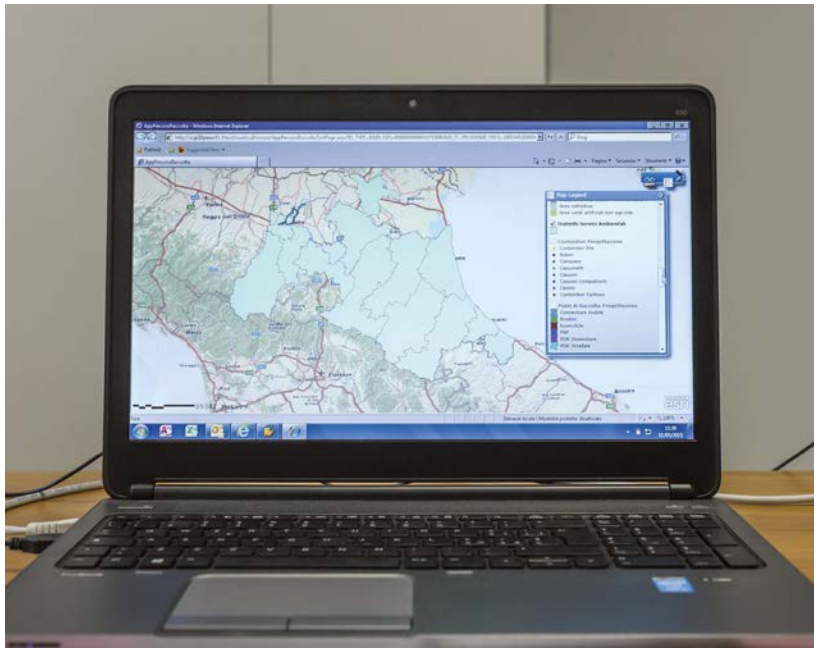
STEP BY STEP

How are waste management services created within HergoAmbiente? A tour of the system, from design to in-the-field operation and reporting

HergoAmbiente is a system that interconnects people and technology, ensuring all waste management service steps are linked to each other.

Each passage corresponds to a precise “system function”, assigned to perform specific tasks that lay the ground for the subsequent stages.

1. DESIGN



Design is the system function which shapes the service according to the needs of the local community. Digital maps are used to organise the waste collection/road sweeping event sequence (i.e. the ordered succession of collection points, in which HergoAmbiente lets planners enter the containers to be emptied, or the roads to be cleaned with specific instructions on the type of cleaning task to be performed). This, in short, is how service routes come into being.

2. LONG TERM PLANNING

System planning and operation that **places projects within a time frame**. At this stage, waste collection and road sweeping routes are associated with a **frequency of execution**, defining the dates and times when the various tasks are to be performed. On the basis of this information the system generates daily job orders, known as **“disposal orders”**.

3. OPERATIONAL PLANNING

By generating the disposal order HergoAmbiente lets coordinators **organise their daily routine**. It provides them with vital support by automatically assigning the right vehicles and the personnel with the skills needed to perform the planned tasks. Should vehicles or personnel be unavailable, the system suggests other replacement resources so the order can be corrected accordingly.

4. FEEDBACK

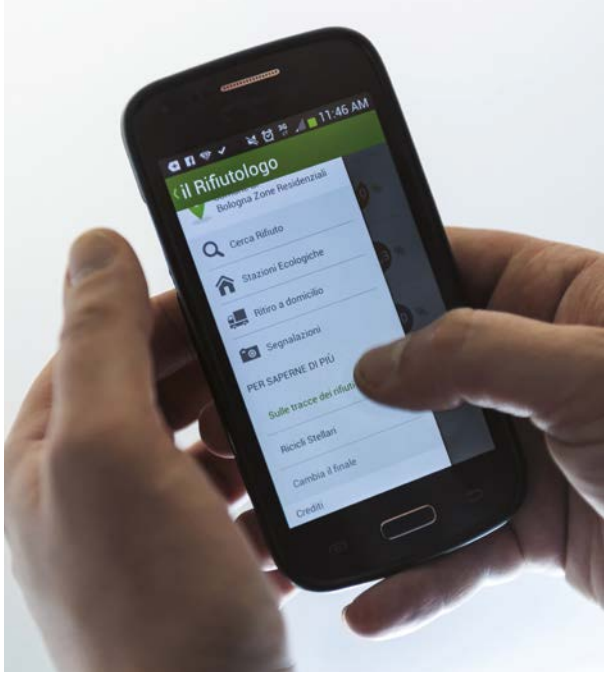
This system function receives information provided by citizens (via the call centre and the Il Rifiutologo app) **or workers** executing the services. A digital diary then allows **“feedback-based services”** to be added to planned routes. This ensures the service is able to respond to requests for the **collection of bulky** (e.g. sofas) **or abandoned waste**, for the repositioning of containers or to any other feedback from the field.

5. EXECUTION

Execution represents **the completion of the planned service**. Disposal orders generated by the central IT system are passed to the field data acquisition system and are received by workers via the supplied devices. Workers in the field thus receive the list of containers to be emptied or the stretches of road to be swept. Execution occurs simultaneously in the real world and its digital network counterpart. Effectively completed services are recorded ready for transfer to the centre at the end of the shift; here, the relative data is then managed and processed. This is where the **control room** and its personnel come into play. A dedicated facility that monitors the status of the in-the-field technology, the control room ensures proper information transmission, thus shortening review times and eliminating potential data entry errors.

6. REVIEWING

During the review stage **the central system** receives **data relative to services supplied in the field**. Information is transmitted by the workers via the terminals they're provided with. This way, the central system can provide a full picture of the completed tasks: hours worked, kilometres driven, containers emptied, plus specific notes on container and vehicle status and on the collection and drop-off points. This drastically reduces the need for manual data entry, speeding up back office times, streamlining the entire process and greatly reducing errors.



7. REPORTING AND RE-DESIGN

Reporting **produces information** that **is useful for service analysis and improvement**. Data acquired at the review stage is used to produce, above all, standardised reports on everyday working practices (shifts completed, vehicles used, personnel employed, team composition, hours of service provided etc.). Additionally, reports of a more corporate nature intended for bodies and stakeholders are available; for example, these may provide info on subscribers, waste flow, container emptying/road sweeping frequency or performance levels recorded by the collection centres. Lastly, reports of a "managerial" nature are generated: these are useful for monitoring key aspects such as the ratio between service efficiency and efficacy and technical-economic patterns. Careful analysis of the reports "regenerates" HergoAmbiente and the cycle begins again: once read and properly interpreted, the data provides further room for manoeuvre for optimisation of services. The outcome is a re-think of collection routes, container placement, road sweeping timetables, transfer site logistics and service itinerary start-end points. The goal? To boost the quality of waste management services while making them less costly.

HERGOAMBIENTE: **A BRIEF HISTORY**

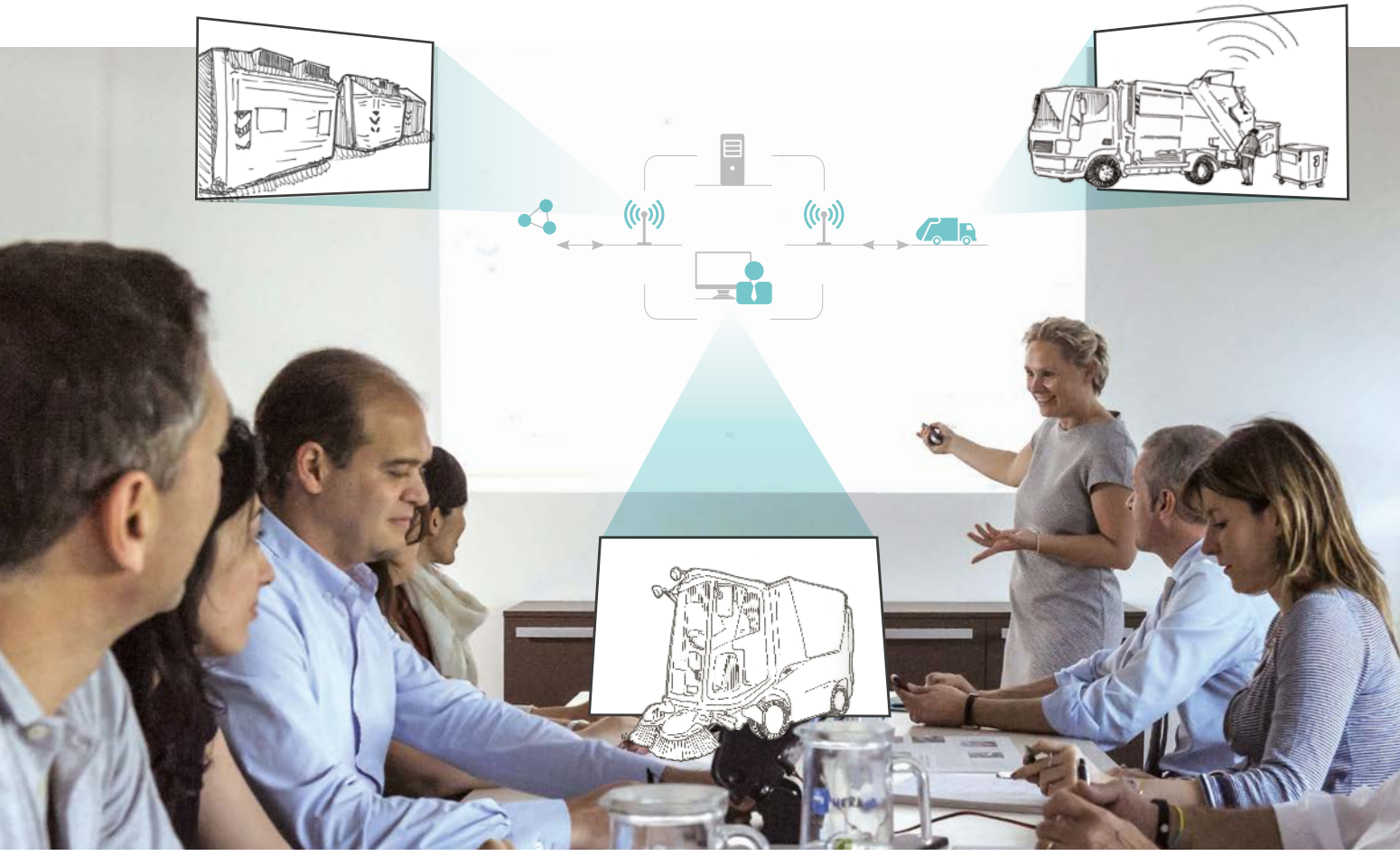
The stages that led to the completion of the entire system...

Founded in 2012 to meet the waste management needs of Hera Group, HergoAmbiente was developed with the support of numerous company departments.

HergoAmbiente was developed over three stages:

- May 2014: replacement of the old IT system begins. Design, planning, operational programming, feedback management, service reviews and the generation of reports are all **integrated on the Hera Group platform**, giving rise to a central system;
- June 2014: the results of a **pilot project** in Romagna – set up to identify the technology to be installed on vehicles and supplied to workers – are approved. At the same time a container census was performed. **The containers were then tagged**, an essential step for the creation of a database of geo-located assets;
- October 2014: launch of the **in-the-field data acquisition system**, which interconnects the central system with devices used by service workers. Lastly, in-the-field technology starts being used by workers in a controlled manner to mirror the gradual change in the way services are executed and reviewed.

Technology, investment, time. And work. And lots of people, Hera professionals who have brought about profound organisational changes by providing the HergoAmbiente adventure with a key ingredient: passion.



IN-THE-FIELD ***TECHNOLOGY***

It can rain, it can be hot, it can be freezing. HergoAmbiente technology is designed to cope with it all. So that, at any time and whatever the weather, everything stays interconnected: thus making HergoAmbiente a truly mobile solution

TECHNOLOGY	WHAT IT IS	WHAT IT'S FOR
1. TAG	Electronic memory device installed on the containers.	Following requests from antennas transmitting at known frequencies, the TAGS send their saved information.
2. FIXED ANTENNA	Electronic TAG-reading device installed on waste collection vehicles.	Fixed antennas receive and transmit electromagnetic signals, instruct the TAGS to save the contained information and send it to the on-board computer or smartphone.
3. PORTABLE ANTENNA	Mobile electronic TAG-reading device supplied to workers.	Portable antennas perform the same functions as the fixed antennas, for smaller containers that can be handled manually.
4. ON BOARD COMPUTER (OBC)	Computer installed in the vehicle and connected to both the central IT system and the TAG-reading antennas.	Obc: save and geo-locate waste collection and road sweeping information, allow workers to receive a list of the tasks to be performed, add notes concerning supplied services or send messages indicating faults detected in the field.
5. SMARTPHONE	Mobile device supplied to workers and connected to both the central IT system and the TAG-reading antennas.	Smartphones carry out the same functions as the OBCs, but used for manual tasks and on smaller vehicles.

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