Project Teorema: from Industrial IoT to Servitization

CARPIGIANI

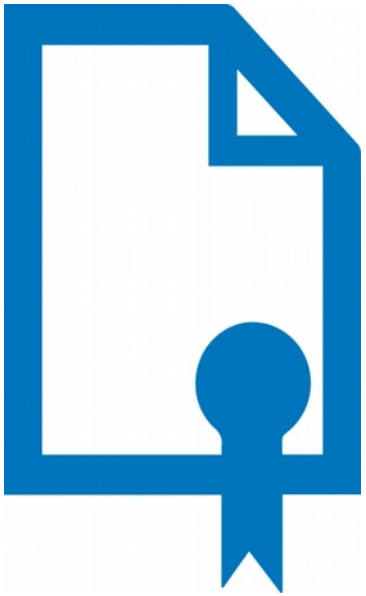
TECHNOLOGY FOR A SWEETER LIFE

Founded in **1946**, Carpigiani quickly established itself as the **market leader** in the **production of machines for gelato and soft serve.**

As the culture of Italian ice cream spread across the globe during the 1960s and 1970s, **Carpigiani began to expand rapidly all over the world,** opening its first overseas branches and developing a sales network of exclusive dealerships which have since guaranteed widespread distribution and continuous, prompt support for end users.
In **1989** Carpigiani became part of **Ali-Group**.

Every day
100 million people
all over the world
eat gelato made with
Carpigiani machines

RESEARCH AND DEVELOPMENT



> 170 Inventions currently applied

> 400 Patents Internationally Granted

Most Important R&D Cooperations:

University of Bologna: Food Technology

University of Ferrara: Computer Science

University of Padova: Engineering Thermodynamics

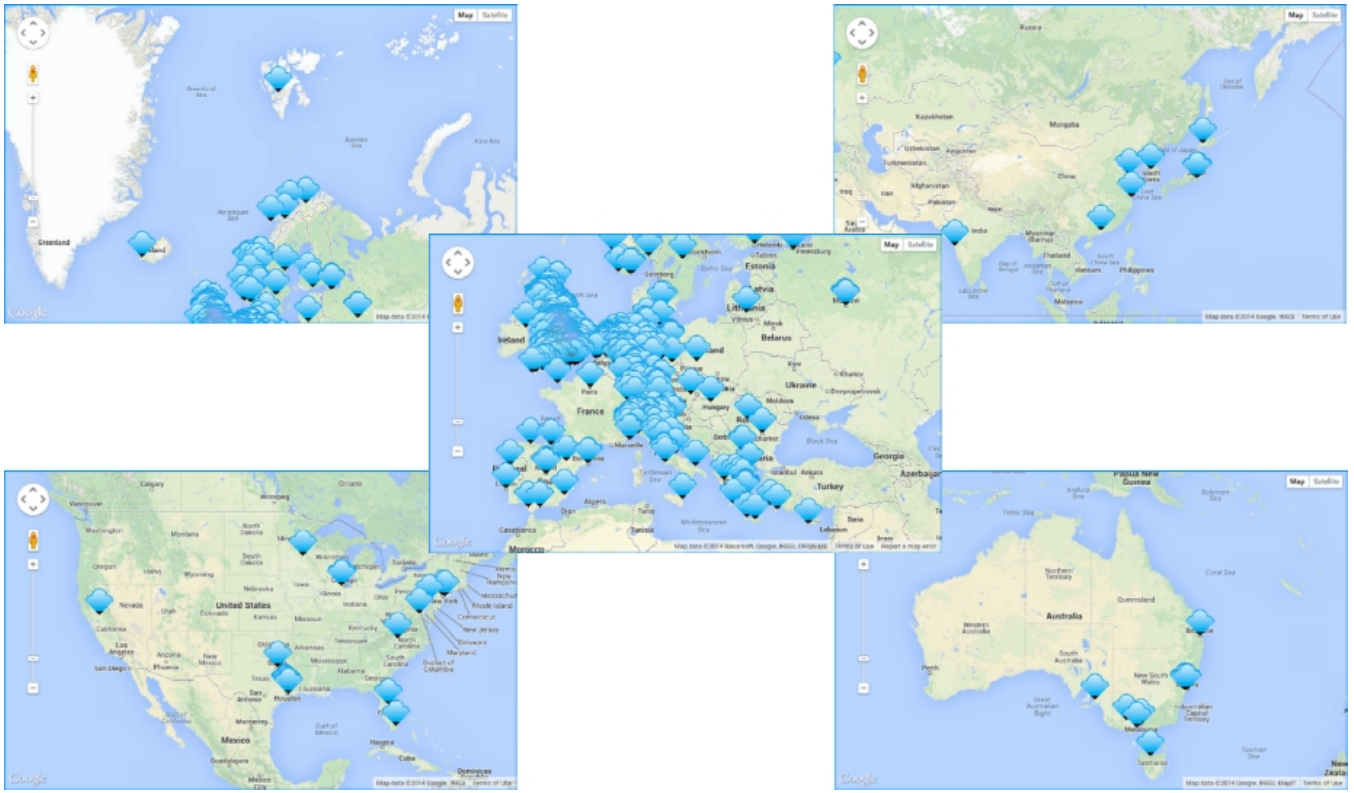
ENEA Italian National Agency for New Technologies, Energy and Sustainable Economic Development **:** LCA

AFTER SALES – THE PROBLEM

- **complex** machines
- **heavy** duty
- lifecycle higher than **10 years**

AFTER SALES – THE PROBLEM

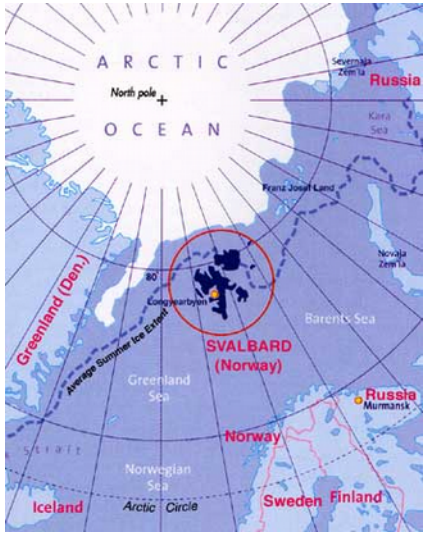
- **High quantity** of installed machines (more than 150,000)
- Geographical **distribution**



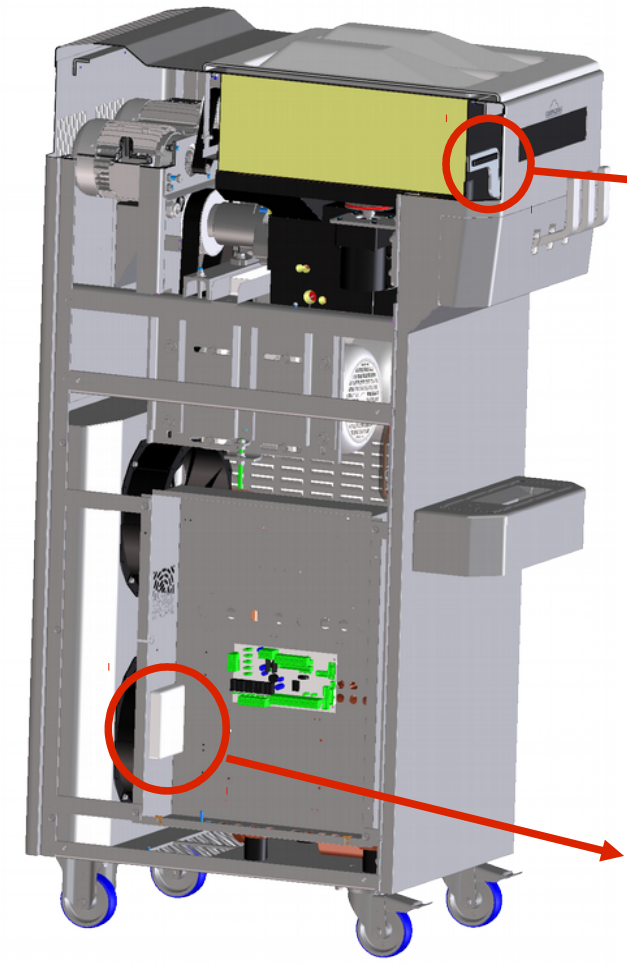
AFTER SALES – SCENARIO

Longyearbyen, Svalbard Islands (NOR), where the transport is carried out with boats, skidoos and helicopters.

To summarize: **very high maintenance costs**.



TEOREMA – HARDWARE

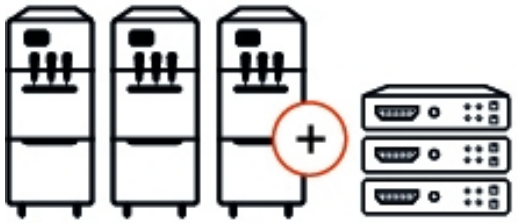


GSM antenna

A machine equipped with **Teorema** has an additional hardware which is composed by **GSM antenna** and **electronic board**, which is continuously communicating with the **CPU** board.

Teorema electronic board

TEOREMA – SYSTEM ARCHITECTURE



Remote
Monitoring Kits

Central Monitoring
and Control Station

Carpigiani
Customers

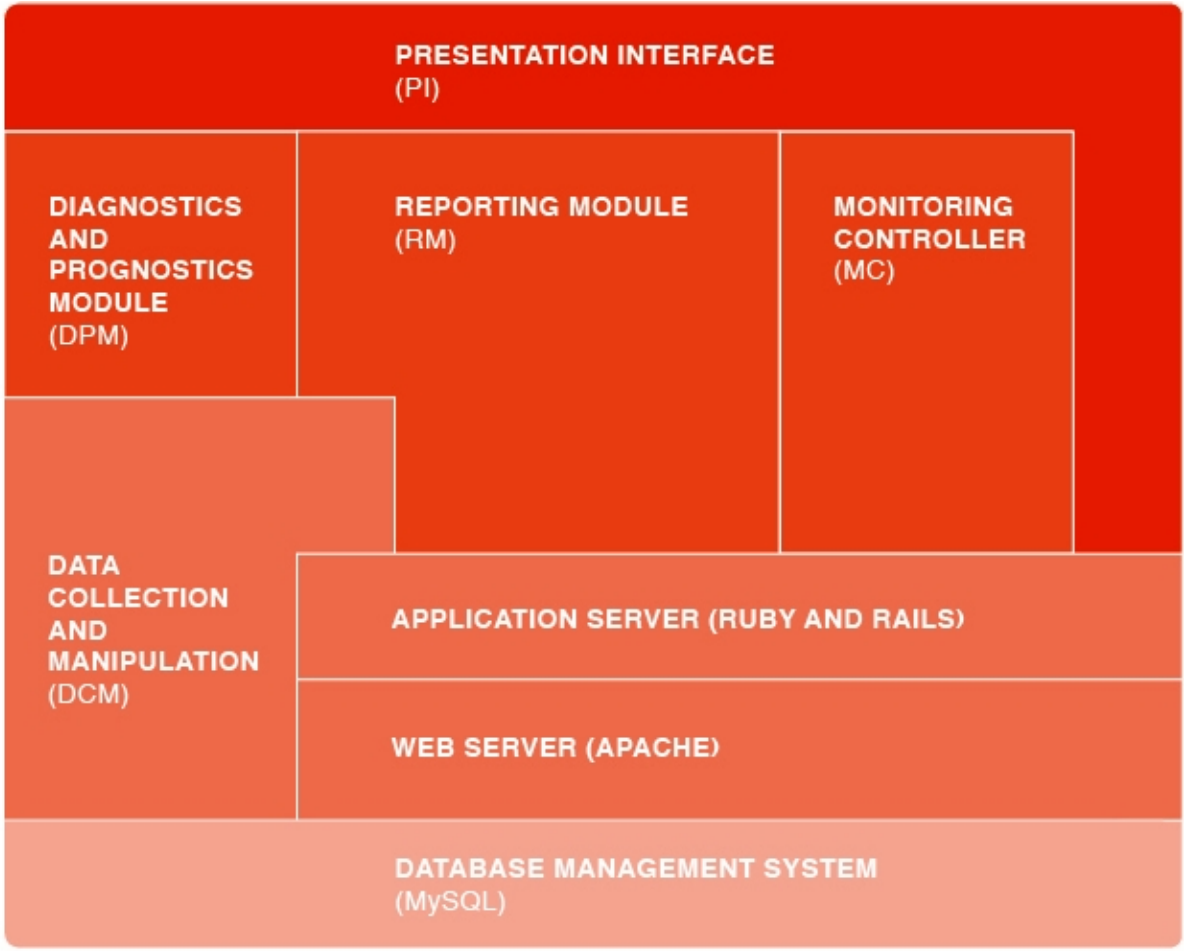
DATA ACQUISITION
AND REMOTE CONTROL

DATA MANIPULATION,
ANALYSIS AND STORAGE

MANAGEMENT
INTERFACE

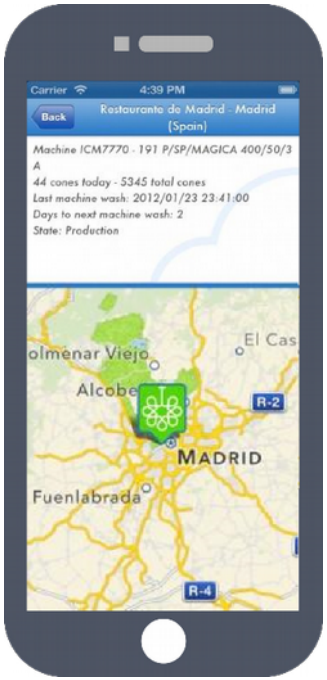
Carpigiani Technical
Support Personnel

TEOREMA – SERVER ARCHITECTURE

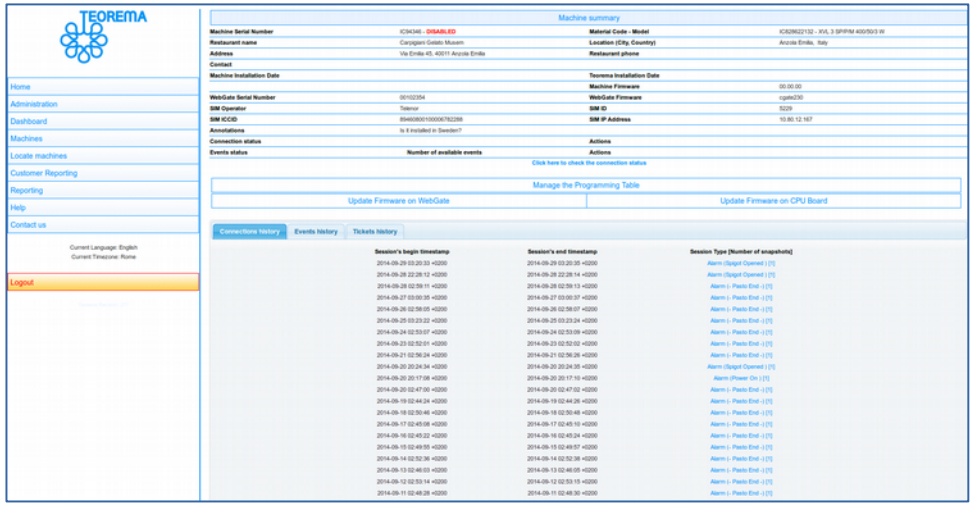


TEOREMA – DATA ACCESS

Mobile



Web



Download on the App Store

ANDROID APP ON Google play

TEOREMA – SOME BASIC INFORMATION

- **Machines' real-time monitoring with “on-demand” connections.**
- **Software and working parameters set update.**
- **Periodic or on-demand reporting, with possibility to customize.**
- **Remote diagnostics and prognostics.**
- **Integrated with Company's ERP and CRM systems.**
- **Many different types of data managed.**
- **Data transmission via encrypted protocol.**

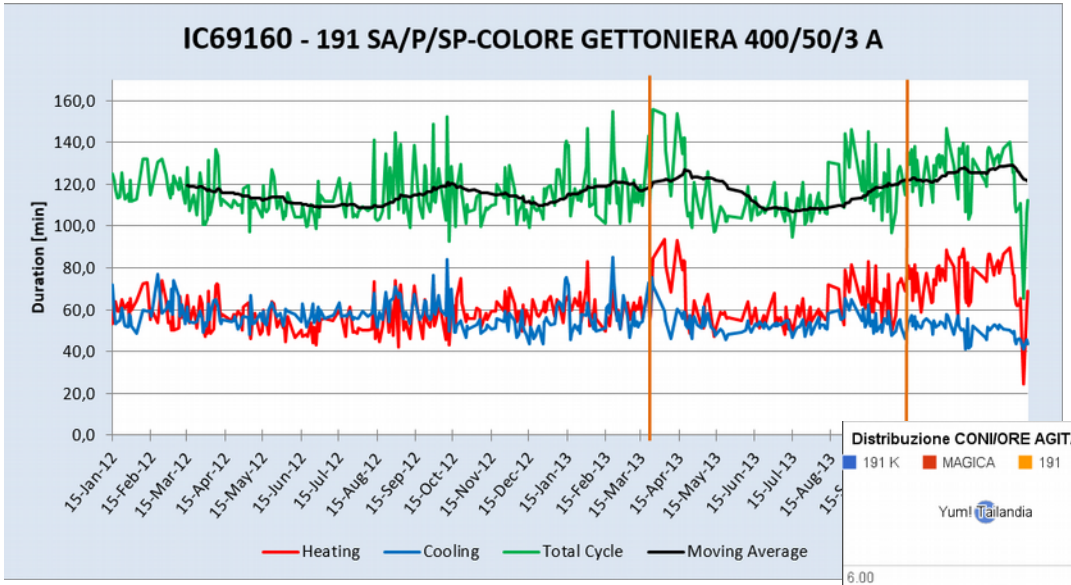
TEOREMA – DATA TYPES

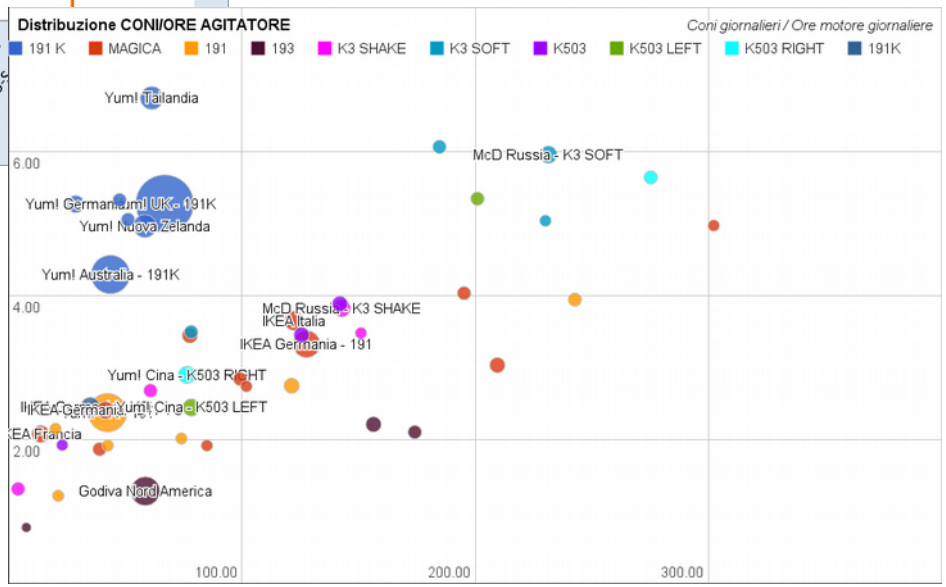
- Technical data:
  - Temperatures and pressures of refrigeration plant
  - Motors and compressor status
  - Mix level and temperatures
  - Software version

- Working data:
  - Pasteurization cycles completion
  - Alarms related to machine and product
  - Days to machine wash
  - Value of product consistency

- Production data:
  - Number of cones produced or batch freezer cycles
  - Working hours of beater motor and compressor

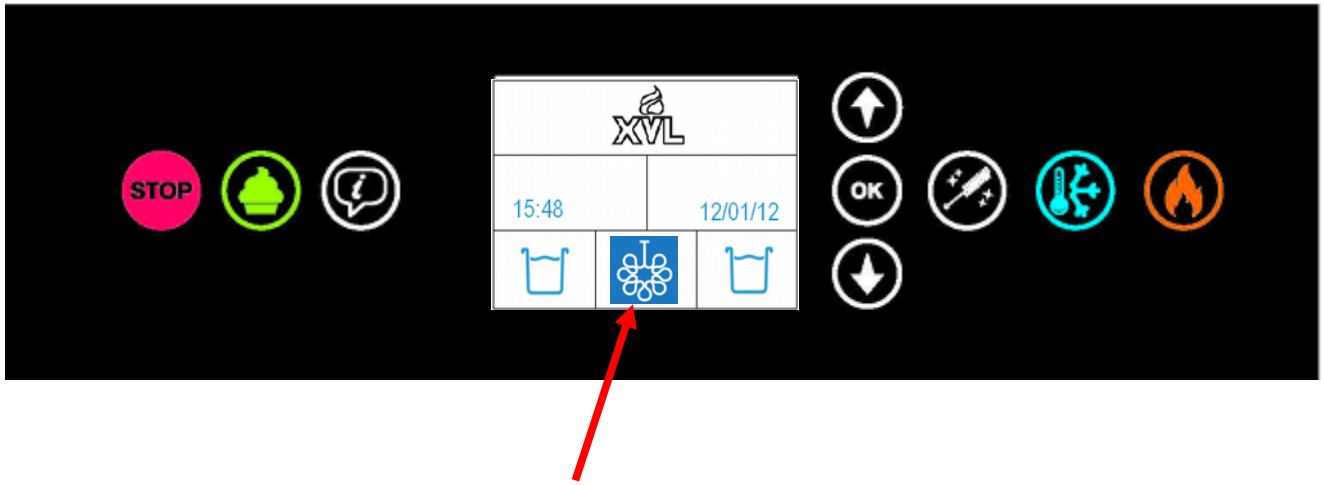
TEOREMA – DATA MINING





TEOREMA – SERVICE REQUEST

The icon **Teorema** on machine's HMI let the customer ask for a service call without calling the technical service. When the customer press the icon, the machine automatically activates a service call by opening a new ticket on Carpigiani CRM.



Teorema Icon

SERVITIZATION – THE NEXT LOGICAL STEP

Taking things one step further, Carpigiani see **Servitization** as the next logical progression in the evolution of Teorema.

The concept of servitization has been around since the late 1980s, but is currently experiencing a boost thanks to new capabilities such as networked, intelligent products. The basic idea of servitization is that manufacturers move from a model based on selling assets toward a model in which they offer a service that utilizes those assets.

Examples: HILTI “Fleet Management” and Rolls-Royce “Power by the Hour”.

SERVITIZATION – PREREQUISITES

- **Information and Communication Technologies (ICT).**
- **Industrial Internet of Things (IioT).**
- **Customer Relationship Management (CRM).**
- **“No service, No sale” Approach.**
- **Skilled people within the Company to properly develop, sell and support service offerings.**

SERVITIZATION – WHAT WE KNOW

- **Well established examples of servitization exist.**
- **The product platform can be critically important.**
- **Information and Communication Technologies are key, but as a component in a tightly integrated system.**

CARPIGIANI

THE WORLD OF CARPIGIANI SERVICE

EXPLORE THE BENEFITS FOR YOUR BUSINESS

6 **PARTS AND SERVICE**
ORIGINAL PARTS AND THE VERY BEST SUPPORT FROM EXPERT ENGINEERS

8 **EXTENDED WARRANTY**
EXTEND YOUR WARRANTY, STAY WORRY-FREE

10 **PREVENTIVE MAINTENANCE**
TAKE CARE OF YOUR MACHINE, PROTECT YOUR BUSINESS

12 **TEOREMA SERVICES**
FOUR PACKAGES, TAILOR-MADE TO IMPROVE YOUR BUSINESS

14 **CARE PLUS**
Pre-empt and prevent downtime.

15 **SAFETY PLUS**
Relax in the knowledge your gelato is safely and hygienically prepared.

16 **EFFICIENCY PLUS**
Less waste, more profits.

17 **ENERGY PLUS**
Reduced consumption is better for you and the environment.

ONE COMPLETE PACKAGE CONTAINING ALL THESE BENEFITS WITH

18 **TEOREMA 4 YOU**
Maximum protection with zero worries.

TEOREMA SERVICES PACKAGES

CARE PLUS

Care Plus is an optimal maintenance program to prevent breakages and downtime.

Care Plus knows the workflow of the machine and anticipates servicing to lengthen its lifetime.

The system monitors the life of the machine based on actual use (not time) and schedules the substitution of critical parts only when necessary.

SAFETY PLUS

Safety Plus ensures constant attention to all aspects of food safety and hygiene. It controls each phase of the work cycle (i.e., pasteurization, production, conservation, cleaning) ensuring all standards for HACCP are met.

It also provides detailed reports that document the compliance and supplies all the information necessary to answer any enquiries during a health inspection.

EFFICIENCY PLUS

Efficiency Plus helps to organize the operative management of the cleaning and refill cycles, based on the consumption and actual production volume, to avoid waste. The system identifies the operative workflow and cleaning days, indicates the correct amount of mix to add according to the wash cycle chosen, and so helps to save mix and avoid washing the machine due to incomplete pasteurization.

ENERGY PLUS

Energy Plus analyzes all the details of the production needs and can advise how to save energy. It will always recommend the most efficient use of the machine, based on the actual business needs. The system indicates if the machine is ready to produce or has to be switched to conservation according to the specific needs of the customers and communicates daily average consumption.

SERVITIZATION

In this context, the term **Servitization** refers to the new business models enabled by **Teorema**. In fact, this approach produces new, invaluable knowledge that can support many phases of the machine management process and that can profoundly change the after-sales business model.

Traditionally, due to the worldwide distribution of their machines, Carpigiani outsources the after-sales maintenance of machines to specialized local companies. The introduction of the Teorema e-Maintenance allows Carpigiani to manage all these activities directly.