Topic: Bridging the gap between Design, Construction and Facility Management. The role of a boiler manufacturer.
ICI CALDAIE

OUR HISTORY
FROM MORE THAN 60 YEARS

1958
ICI Caldaie Sp.A., is founded in Italy, in the field of industrial boilers.

1974
ICI acquires the largest boiler manufacturer in the sector.

1980
ICI introduces the first pumpless circulating systems.

1990-2000
ICI enters the USA market with a new plant.

2009
Development of high-temperature boilers.

2014-2015
ICI enters the market of high-temperature boilers with a new plant.

2017
Expansion of the network of boilers and introduction of remote monitoring services.

2018
ICI celebrates its 60th anniversary.

WHERE WE ARE
HEADQUARTER AND COMMERCIAL PRESENCE

ICI CALDAIE FOCUSES ON
Skills and tools for product development:
advanced software for design and simulations

PRODUCTION CAPABILITY
OUR YEARLY NUMBERS

Total capacity of the boilers manufactured each year
7000 MW

Numbers of boilers rooms served each year
# 2300

Number of boiler rooms managed each year
#140

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98% of megaprojects face cost overruns or delays.

1) 2013, global investment in energy, infrastructure, mining, and real-estate-related projects was about $6 trillion; by 2030, that, could be $13 trillion;  
2) Megaprojects will account for a greater share of these developments;  
3) The industry does poorly completing megaprojects on time, on budget, and to specifications.

DESIGN, CONSTRUCTION, FACILITY MANAGEMENT
THERE ARE ALREADY SOLUTIONS TO THIS GAP

(source: “Imagining construction’s digital future” - written by Rajat Agarwal, Shankar Chandrasekaran, and Mukund Sridhar – June, 2016)
DESIGN, CONSTRUCTION, FACILITY MANAGEMENT
THERE ARE ALREADY SOLUTIONS TO THIS GAP

(source: “9 reasons you want to integrate design and construction data” - written by Angi Izzi July 10, 2018)
Once completed a project is a “alive”.

(source: “Introduction to LCA of Buildings 1st edition, 2016” - Harpa Birgisdóttir and Freja Nygaard Rasmussen, Danish Building Research Institute)
Once completed a project is a “alive”.

It needs energy and cares…

(source: “Introduction to LCA of Buildings 1st edition, 2016” - Harpa Birgisdóttir and Freja Nygaard Rasmussen, Danish Building Research Institute)
Energy benchmarks were introduced for several new building types in Qatar by the Global Sustainability Assessment System (GSAS).

(source: “Towards Near Zero Energy Home” - written by Esam Elsarrag and Yousef Alhorr, Published: January 18th 2017)
Improving the energy efficiency measures has taken the attention of researchers in hot, humid climate in the Gulf region. Experimental and theoretical studies were conducted recently to improve building fabric efficiency. Energy and carbon framework model has been developed and implemented in the Gulf region, as shown in this picture. Passive design of high-rise buildings attracted researchers from different parts of the world.

(source: “Towards Near Zero Energy Home” - written by Esam Elsarrag and Yousef Alhorr, Published: January 18th 2017)
World Athletics Championships: an open and air-conditioned stadium

The Khalifa International Stadium in Doha was built in 1976, and renovated in 2017 at an estimated cost of 82 million euros.

**Air-conditioning system**
1. 1 km from the stadium, an absorption refrigerator cools water.
2. Cold water is pumped to the stadium.
3. Cold water cools the air, which is then pushed into the centre of the stadium by about 500 vents around the stands.

**Athletes**
Arrive by a 150 metre air-conditioned tunnel.

**Roof covers**
70% of the stadium allows natural light to enter and creates shadows.

**Capacity**
46,000

**Outside temperature**
- On the track: 23 °C
- In the stands: 24-28 °C

Sources: IAAF, ineIffas, maps4news.com/EHERE, AFP Photo/HO/Supreme Committee for Delivery and Legacy
super-efficient design can reduce the cooling need by almost 50%.

Figure 14. Annual total cooling need (cooling coil) MWh.

(source: “Towards Near Zero Energy Home” - written by Esam Elsarrag and Yousef Alhorr, Published: January 18th 2017)
Also in the boiler business, we are near at the state of the art in terms of efficiency.
Condensing boilers with premix burners have been developed to propose very efficient and very clean boilers.
Instead of the initial cost of a new system, it’s the operating and maintenance costs the most important ones to be taken into consideration.

We studied a number of boilers used by different companies for various applications over the course of 10 years.

We added up all the costs incurred over that 10-year period for the initial purchase, installation, natural gas and electricity consumption, and maintenance interventions.

The analysis showed that the boiler’s initial cost was less than 4% of the entire cost of the system (a figure that grew progressively smaller the longer the system was in service).

The majority of the costs were due to fuel and electricity consumption and maintenance.
DESIGN, CONSTRUCTION, FACILITY MANAGEMENT
THERE ARE OTHER GAPS AFFECTING THE PROJECTS
But this is still not enough…

Who guarantees that a state-of-the-art solution is properly managed on the field?

Whatever is the application we are designing and installing, from buildings and hospitality to industrial processes, we must ensure that the solutions chosen on the design stage as the best one for that application, are able to perform as it has been designed.

Facility management is the key player to ensure that all the new technologies we are introducing are really performant and they save resources.
To do this it’s crucial that the manufacturers of the equipment (who have the know-how and being a specialist in their field) provide solutions:

- integrated
- intelligent
- smart manageable
THERE ARE OTHER GAPS AFFECTING THE PROJECTS
THE ROLE OF A MANUFACTURER OF EQUIPMENTS

This is how typically a boiler is supplied
THERE ARE OTHER GAPS AFFECTING THE PROJECTS
THE ROLE OF A MANUFACTURER OF EQUIPMENTS

This is how typically a boiler room looks like
THERE ARE OTHER GAPS AFFECTING THE PROJECTS
THE ROLE OF A MANUFACTURER OF EQUIPMENTS

Many equipment and accessories compose a boiler and requires to be integrated each other, and integrated with all the rest of the equipment of the boiler room.

We started to wonder if a boiler be made like this, or if we are doing it so only because of we always did it in this way…
THE ROLE OF A BOILER MANUFACTURER 
INTEGRATED, INTELLIGENT AND SMART SOLUTIONS
THERE ARE OTHER GAPS AFFECTING THE PROJECTS
THE ROLE OF A MANUFACTURER OF EQUIPMENTS

ECOVAPOR is completely different from a usual boiler, but the hardware it’s not the only one which makes it so different…
Whatever is the boiler it has been chosen, and common to both hot water, steam or thermal oil boilers, the management system is what can guarantee the matching and the lasting of the performance expected on the design stage with the actual one on site.
THE ROLE OF A BOILER MANUFACTURER
INTEGRATED, INTELLIGENT AND SMART SOLUTIONS
Capability to control and monitor the whole system, not only some of the equipment being part of the same.
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THE ROLE OF A BOILER MANUFACTURER
INTEGRATED, INTELLIGENT AND SMART SOLUTIONS

And to collect information from the site
We designed the ECOVAPOR management system able to collect information about the load of the application in order to have the possibility to change the working condition according to the demand and we placed it in a boiler room where there was installed #3 boilers same capacity.
A change in the load generates a change in the set of ECOVAPOR, introducing the possibility for the machine to “follow” the load.
### The Role of a Boiler Manufacturer

#### Integrated, Intelligent and Smart Solutions

The results were surprising even for us…

<table>
<thead>
<tr>
<th></th>
<th>U.M.</th>
<th>Traditional boiler</th>
<th>ECOVAPOR</th>
</tr>
</thead>
<tbody>
<tr>
<td># of start</td>
<td>#</td>
<td>275</td>
<td>1</td>
</tr>
<tr>
<td>Specific electrical consumption</td>
<td>%</td>
<td></td>
<td>-20%</td>
</tr>
<tr>
<td>Specific fuel consumption</td>
<td>Nm³/h</td>
<td></td>
<td>-14%</td>
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THE ROLE OF A BOILER MANUFACTURER
A CASE STUDY – DIARY PROCESSING PLANT

Dairy Processing Plant

MANUAL SKILL, CARE AND DEVOTION
Our Grana Padano DOP
THE ROLE OF A BOILER MANUFACTURER
A CASE STUDY – DIARY PROCESSING PLANT

The result

Environmental sustainability and quality

As soon as the installation process was complete, the Ecovapor began immediately managing the other boilers, thereby drastically reducing their natural gas consumption.

The annual savings on operating costs amounted to around 15%.

Thanks to the independent management of the loads, the members of the Ghidetti dairy team can finally dedicate themselves to what they like doing most: making cheese.

The heating plant room is now managed independently, and no longer requires extra attention from the team.

Steam Boiler Efficiency

-12.7% Methane Savings

-25% Electric Savings

-28% Feedwater Savings

-15,700€ Labour Costs

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THE ROLE OF A BOILER MANUFACTURER
A CASE STUDY – HOSPITAL

The Hospital of Verona
THE ROLE OF A BOILER MANUFACTURER
A CASE STUDY – HOSPITAL

Initial results

Efficiency and continuity of service

The efficiency of the individual boilers is high and exceeds 94% on average, but that which makes us even more proud of the service we provided to the customer is the improvement of the entire system’s performance, in addition to that of the individual boilers.

The continuous monitoring of the system guarantees that the performance is maintained over time, avoiding any deviations from the optimal parameters.

The data collected over the course of the entire calendar year will allow us to validate the partial results obtained so far.

The high load modulation and the “smart” steam production will provide for considerable annual savings on natural gas costs.

For us, cost savings and the use of innovative production technologies have always been a must, and we’re now looking forward to completing the innovative projects at the Borgo Trento and San Bonifacio hospitals.
Conclusions

The road to bridge this gap between design, construction and facility management passes through an holistic approach to the design of the equipment and a strong collaboration with designers, consultants, and facility managers whom have the possibility to choose integrated, intelligent and smarter solutions.
THANK YOU FOR YOUR ATTENTION

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