



Power protection solutions
for ICT critical applications

Eni Green Data Center

Maximum protection at the highest efficiency thanks to new technologies developed by Borri

“Borri designs and manufactures a new generation of UPS based on patented technology Green Conversion to meet the requirements of Eni”

Key players

End-user

Eni is one of the largest integrated energy companies in the world, operating in the sectors of oil and gas exploration & production, international gas transportation and marketing, power generation, refining and marketing, chemicals and oilfield services. Eni is active in 90 countries with 78,000 employees.

Consultants

Founded in 1992, Ariatta Ingegneria dei Sistemi specializes in consulting, design, project coordination and management of technical plants in civil, industrial, healthcare and urban fields. Since 2000 the firm has designed electrical plant infrastructures for more than one million euros cooperating with the most eminent international architects and, in most cases, it has also managed the construction work, following the start-up and functional tests. Marco Negri and Walter Nardelli (Reorder) were entrusted with the scientific supervision.

The challenge

Eni has decided to build a new data centre in Italy, located in Ferrara Erbognone, Pavia adjacent to Enipower's power plant to host all their data processing systems, including administrative information and high performance computing calculation systems (HPC).

The company Ariatta was entrusted with the direction of the project, design, execution and supervision of works.

The goal of the project is to reach an annual average PUE (Power Usage Effectiveness) value of less than 1.2 .

Eni Green Data Center

Building area:
45,000 m²

Data rooms area:
5,200 m²
in 6 IT rooms (2,600 m² phase 1)

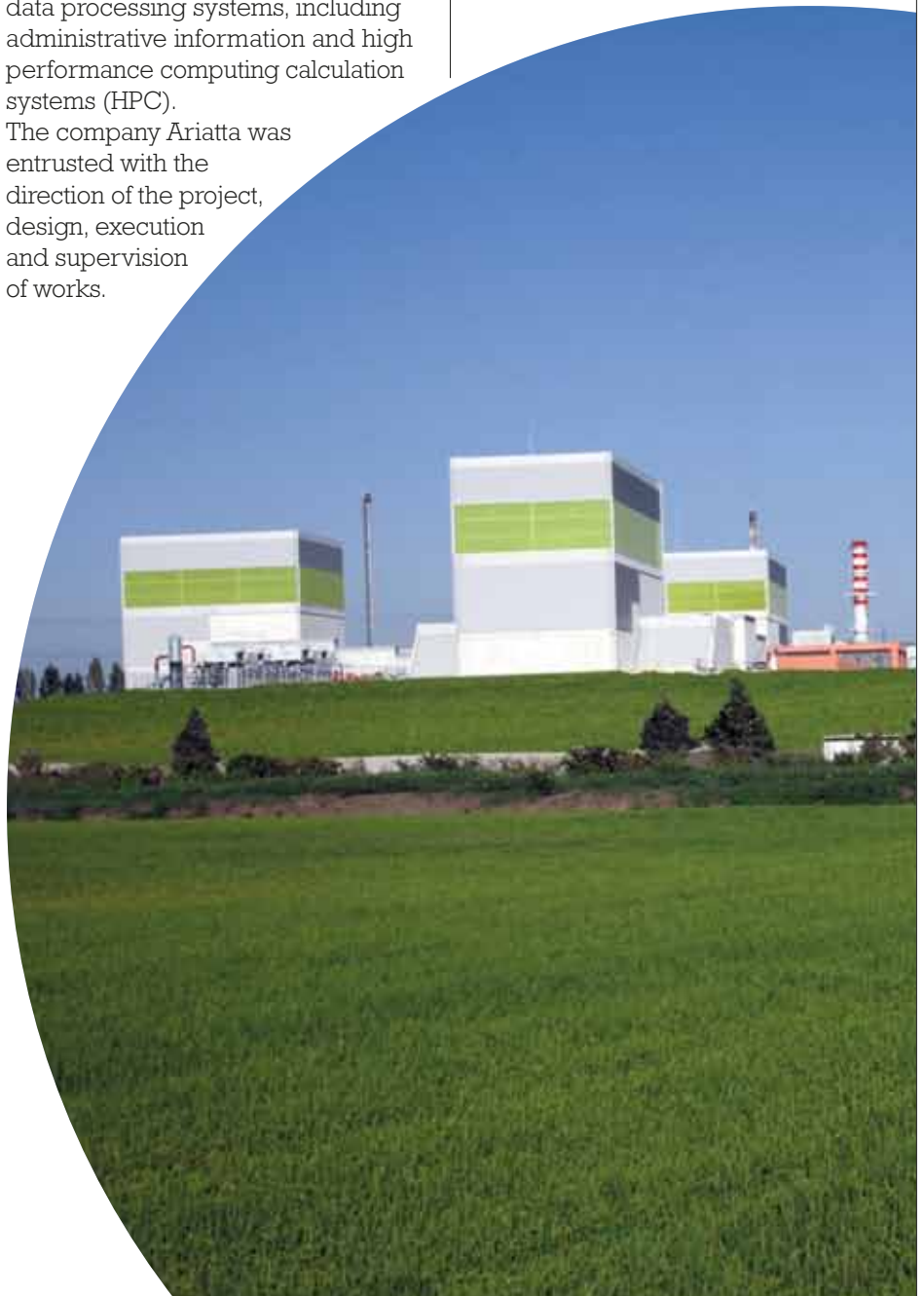
IT systems
7,000

Core CPUs
60,000

PUE
<1.2

Riduction of CO₂ emissions
335,000 tons per year

Electric Power by UPS
30 MW



Eni Green Data Center

Our solution

Borri Spa has developed a double conversion, transformer-free 200 kW UPS which is based on two innovative technologies:

- High double conversion efficiency, up to 95% based on Green Conversion patented technology
- Ultra High Efficiency (UHE) reaching 99.46% efficiency based on Borri off-line technology

Benefits are:

Low dissipation losses of the UPS, in addition to saving electrical energy, minimize room cooling by virtue of negligible heat release.

Automatic or manual switching from one mode of operation to another always optimizes critical loads power supply efficiency.

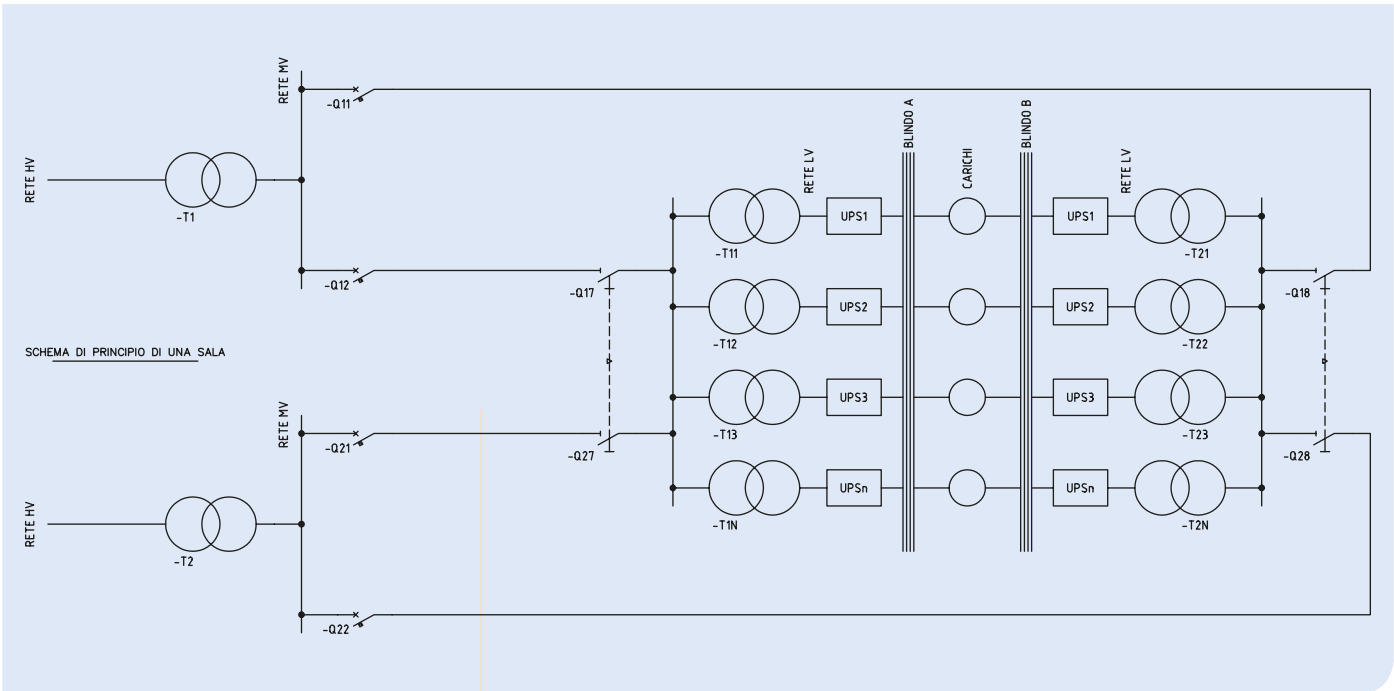


The system

Borri UPS are powered by two independent lines, coming from two separate medium voltage transformers. Should the main line fail, the system automatically switches on the backup line.

The uninterruptible power supply section consists of no. 50 200 kW UPS for both lines, A and B, feeding the server rooms via a double busbar. The UPS is cooled by natural air convection and the design ambient

temperature is 50° C. Each UPS is equipped with its own battery cabinet, providing 5 minutes autonomy at full load.

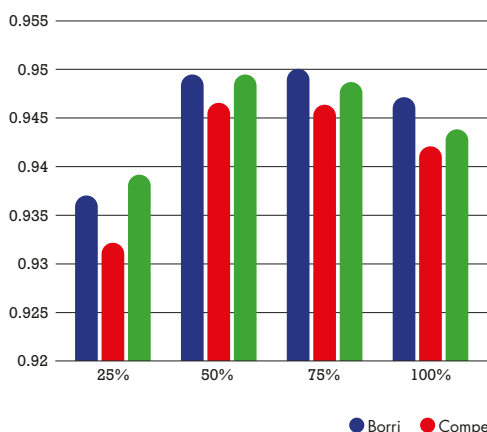


Validation tests

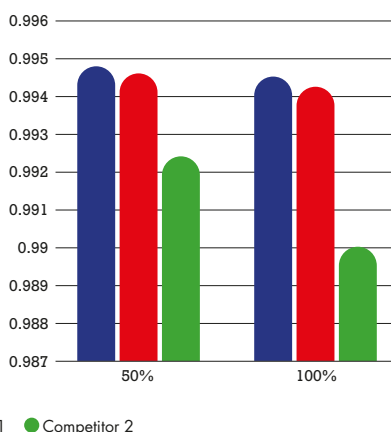
A testing schedule was included in the project. All tests, commissioned by Eni, have been developed by the Electrical, Electronic and Information Engineering Department at the University of Bologna and conducted by TÜV laboratories. The test results show that Borri UPS

exceeded the 99.4% target efficiency, achieving a remarkable 99.46% efficiency at 50% load and 99.43% efficiency at 100% load. All the remaining CE mark type tests, namely electromagnetic compatibility, safety and performance were carried out at Borri in our testing area.

On-line double conversion efficiency versus load



UHE efficiency versus load



Results and future developments

The development of 200 kW UPS for Eni has allowed Borri to respond to the technological challenge of designing a UPS powering the critical loads of a modern data center to get the highest ever value of PUE. The low losses of the UPS and the high temperature design (50° C rather than the standard 40° C) allow the use of air at ambient temperature to cool the local UPS, physically demonstrating the advantages of the solution adopted. The UPS section covered by Borri consists of 50 200 kW UPS, but it is expected that an expansion will bring the UPS installed to 150 units for a total computing power of 30 MW with an energy saving of 1.5 MW.



“We completed a challenging and innovative project with ambitious goals that required all the key players to think outside thebox. Borri created a new technology Green Conversion, proving its ability to fulfil this requirement. Excellence has therefore been achieved thanks to those who have expressed willingness to think of something completely new.”

Michele Mazzarelli

Vice President Project Manager
Programme Eni Green Data Center



“The contribution of Borri was not limited to the supply and installation of high-efficiency UPS but it was fundamental in the preparation of the project. I really appreciated their proactive attitude, contribution of innovative ideas, collaboration in the analysis of feasibility and availability during all its phases confirming Borri’s vocation to providing solutions based on the specific needs of its customers.”

Alberto Ariatta

Project Director and Director of works
for Eni Green Data Center



Who we are

Borri is a company specialised in custom design, manufacturing and servicing of power electronics equipment for oil & gas, energy and utilities, industrial process and service, ICT, solar static power converters and storage systems. Borri's R&D department is one of the most complete regarding the different disciplines in the field of power conversion.

Long experience in magnetic component design and semiconductors is combined with the most advanced digital regulation algorithms and microcontroller programming know-how.

Borri has a leading position in the oil and gas market thanks to its proven customizing expertise and continuous pursuit of excellence in a state-of-the-art product and is approved supply in more than 40 vendor list.

However, wide experience in several branches of power electronics such as UPS systems for data centers and inverters for renewable energy and storage, make Borri a leader in this technology not only for oil and gas applications.

UPSaver, the latest patented three-phase solution, based on its green conversion operation can guarantee the best PUE for green data centers: proof of the ongoing company commitment to innovation.

Under Astrid brand the company

offer systems for green energy: confirmation of Borri' s commitment to sustainability. Thanks to his highly skilled custom engineering Borri follows the entire process in-house: from preliminary studies to design, production and after-sales service guaranteeing a state of art solutions.

Based in Italy with 15,000 m² production space and a large full-testing area, the company can call on more than 80 years experience and multidisciplinary research and development. Borri has strong presence with over 1000 worldwide installations for critical applications, qualified staff and partners across the globe providing on site service and technical support everywhere.