



Celia de Coca

Happy learning

Totally Integrated Power: Beyond featuring interesting architecture, the design of the German School in Madrid is focused primarily on efficient building management systems.

The new German School in Madrid, Spain, funded by the German government, is built on a site on the northern outskirts of the city provided free of charge by the Madrid city administration. The approximately 35,000-m² site in the newly built Montecarmelo district features some 21,000 m² of built space, housing an elementary school and a high school for around 1,700 students. The facility also includes a dining hall, a cafeteria, a lecture theater with a capacity of 750, a gymnasium, open-air sports facilities, an underground parking garage, and a kindergarten for up to 300 children.

“Green” building management

The German School’s mission statement includes the assertion: “In their classes, our students learn what they really need in order to live their lives.” A key consideration in this context is something that is not part of the curriculum but relates to the building itself: The supply of electrical power and other energy. The new-build project focused especially

on sustainable energy use. The building’s pillar-mounted design, recesses in the facade, and roofed-over exterior areas protect against the summer heat. Low cooling and heat loads and good air quality are ensured by appropriate levels of insulation and a ventilation system featuring heat recovery. Solar power installations on the roof and a combined heat and power plant ensure energy-efficient power and heat supply. Beneath the building there is additionally a 600-m-long thermal labyrinth, which raises the air temperature in winter from 0°C to 8°C Celsius and cools it down in summer from 36°C to 19°C.

The project team used the Simaris design planning tool right from the planning stage of the electrical system for the building complex begun in 2010. The tool helped the engineers design the system and dimension the energy distribution around the building. It enhanced planning certainty and made modifications in the course of the planning process easier.

The interesting modern architecture of the German School in Madrid is immediately revealed by its open-air foyer

Maintenance-free and sustainable

All the products and systems applied for the power distribution system are part of the Totally Integrated Power (TIP) portfolio. For the medium voltage, the building operators chose five panels of the 8DJH gas-insulated medium-voltage switchgear, as well as two 800-kilovolt-ampere Geafol cast-resin transformers. The transformers are insulated by an eco-friendly epoxy resin / quartz powder mixture. As a result, the windings are maintenance-free, damp-proof and suitable for tropical conditions, flame-retardant, and self-extinguishing.

Throughout the complex, as an alternative to cabling, more than 400 m of the Sivacon 8PS busbar trunking system were installed, with six tap-off units that connect the transformers to the Sivacon S8 low-voltage main distribution board (LVMDDB). From there, they are routed to the distribution boards in the main areas of the school building. The Sivacon S8 system comprises five panels fitted with 3WL and 3VL molded case circuit-breakers. In the area of the heating, ventilation, and air-conditioning (HVAC) system five panels of the Sivacon S4 low-voltage switchboard were installed. Approximately 20 Alpha 630 distribution boards were installed for low-voltage distribution. They, too, are fitted with Siemens circuit-protection components.

The HVAC system is controlled, monitored, and optimized in all parts of the building by the Desigo building management system, which is flexibly programmable, scalable, and modular in design. The German Federal Ministry for Economic Affairs and Energy recognized the new school's innovative design and sustainable building management system and awarded the German School in Madrid the 2011 "Architecture with Energy" award for energy-optimized building.

Fit for the future

Founded in 1895, the German School in Madrid is one of the largest international German schools. Its mission is to provide German school children in the Spanish capital with a link to their homeland, while at the same time providing Spanish students with a sound grounding in German language and culture. With its new facilities, state-of-the-art infrastructure, and sustainable building management systems, the school is now ideally positioned to meet the changing conditions of the future. ■

➤ siemens.com/tip-cs
 ✉ ronald.franz@siemens.com

Facts and figures



An elementary school and a high school for around

1,700 students

have been built on a

21,000-m² site

The new kindergarten has capacity for

300 children



The facility includes a dining hall, a cafeteria, and a lecture theater with capacity for

750 people



Beneath the complex, there is a

600-m-long thermal labyrinth

TIP products and systems applied

- 5 panels of the gas-insulated medium-voltage switchgear type 8DJH including circuit-breakers
- 2 800-kVA Geafol cast-resin transformers
- 400 m of Sivacon 8PS busbar trunking system with six tap-off units
- 5 panels of the Sivacon S8 low-voltage switchboard with 3WL and 3VL molded case circuit-breakers
- 5 panels of the Sivacon S4 low-voltage switchboard
- 20 Alpha 630 distribution boards with circuit-protection components
- In addition: Control, monitoring, and optimization of the HVAC system by the Desigo building management system