Technopole

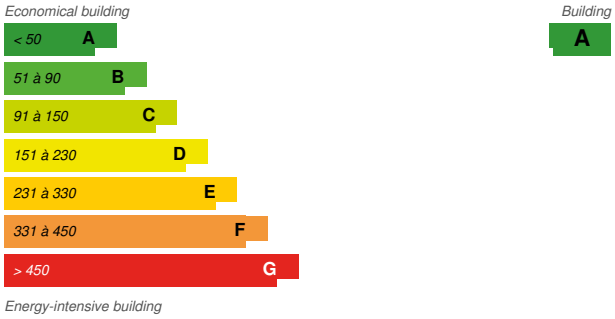
by Thierry DJAHEL / 2018-06-15 15:34:00 / France / 17494 / FR

Primary energy need :

48 kWhep/m^2.an

(Calculation method : RT 2012)

ENERGY CONSUMPTION



Building Type : Office building < 28m
Construction Year : 2016
Delivery year : 2017
Address 1 - street : Rue Henri Tarze 38000 GRENOBLE, France
Climate zone : [Cfb] Marine Mild Winter, warm summer, no dry season.

Net Floor Area : 18 000 m^2
Construction/refurbishment cost : 53 547 000 €
Cost/m2 : 2974.83 €/m^2

Certifications :

Proposed by :

General information

Technopole integrates many of Schneider Electric's leading technologies, including EcoStruxure for Buildings, its architecture and its building-specific platform for mass deployment of IoT solutions. It is a real showcase of the company's know-how.

EcoStruxure for Buildings, Technopole Conductor

EcoStruxure for Buldings is being implemented within Technopole. It integrates the most advanced and innovative technologies, through the 3 layers:

- Connected products such as controllers, sensors, valves as well as offers of current measurement, intelligent electrical panels, etc. This layer also supports third-party connected products.
- Edge control with EcoStruxure Building Management solution for operations management and more specifically, energy management, security, access, lighting and VDI cabling for the building.

- EcoStruxure Advisor Services for the management, through various software, of the inherent part of services and data analysis throughout the building's operational life.

For the needs inherent to the missions of the Energy BU, the building will also be equipped with EcoStruxure Grid, the Schneider Electric offer dedicated to the energy market.

The Workplace Efficiency space management solution will soon be implemented. It aims to reduce energy costs and make life easier for residents (room reservations, comfort management, etc.).

Technopole is Smart Grid Ready, that is to say that the technical installations, associated with the EcoStruxure piloting system, can be made energy flexible by being able to shift their consumptions over time. For example, they will make it possible to optimize the energy bill by using dynamic pricing or optimizing the site's carbon contribution, or to sell this flexibility through demand / response operations, or to put it in place. available locally.

Sustainable development approach of the project owner

Reduce our carbon footprint

A company's carbon footprint is a reflection of its environmental performance.

Schneider Electric regularly carries out a carbon audit from the activity of all its suppliers upstream to the downstream logistics activity to distribute its products to its customers. The Group can thus measure its main greenhouse gas emissions and analyze trends. With these results, Schneider Electric is prioritizing its carbon intensity. Between 2011 and the end of 2014, the three positions on which Schneider Electric set ambitious targets saw their greenhouse gas emissions decrease beyond their respective objectives:

• CO2 emissions in transport paid by the Group (-16%),

• SF6 emissions in industrial processes (-50%),

• CO2 emissions from energy consumption (-13%).

Put words into action with the energy efficiency program

This program plays a real role of an internal action plan for:

• **to achieve a lasting dissociation of electricity, gas and oil consumption from industrial added value,**

• deploy our own software, services and solutions on all our sites,

• strengthen the trust of our customers in our expertise in energy efficiency.

At the same time, ISO 50001 certification, deployed worldwide, now covers 30% of industrial and tertiary sites, and represents a significant share of energy consumption. Schneider Electric is continuing to implement its energy management system, a key factor in its exemplary energy management and energy efficiency approach.

In January 2015, Schneider Electric and Autodesk ™ Inc., the worldwide leader in 3D design, engineering and entertainment software and services, signed a Memorandum of Understanding to improve the lifecycle management of their buildings through Building Information Modeling (BIM). The two companies are exploring ways to combine their respective know-how to improve the energy efficiency of buildings, from design and construction to operation and end-of-life. The adoption of the BIM modeling process is one of the answers to make buildings more energy efficient as it ensures greater agility and sustainability.

Architectural description

As part of its real estate project on the Grenoble basin, SCHNEIDER ELECTRIC wished, for the sake of consistency and efficiency, to regroup SCHNEIDER ELECTRIC staff on 4 sites (against 11 sites occupied today). It is in this context that SCHNEIDER ELECTRIC wished to redevelop the TECHNOPOLE site in order to be able to comply with this new master plan. In this sense, a tertiary building has been created, as well as laboratories.

The TPôle building has a Living Lab vocation of the energy performance of buildings with 6 major points:

- An innovative methodology in the design, construction and operation phase to obtain a very high level of operational operational energy performance, with a guarantee of results on this performance during the construction phase.
- Beyond the active energy efficiency solutions contributing to the achievement of the energy goal, this building is over-instrumented to collect as much data as possible for the optimal operation of the building but also to have a Referent "tool" for future research and innovation actions, energy efficiency algorithms and analytics technologies.
- Big Data: creation of a digital model and an energy model of the building allowing beyond the collection of the dynamic data of the site coming from the instrumentation, to couple this data with the static data to invent new functionalities and services operating assistance for space management, energy, maintenance, operations on technical systems, information to the occupants. This connection of the static and dynamic data of the site also allows the visit of the site in augmented reality.
- An integration of photovoltaic solar panels to increase the site production coverage.
- A Microgrid test platform including: renewable energies of the site, possibly specific renewable energies, a Diesel group, conversion and control equipment in order to have a demonstrator allowing to validate architectures and processes of control, automation and optimization of these micro-networks that have their own complexity depending on their target markets. In particular, this platform allows the disconnected operation of networks by automatically generating and regulating the frequency 50Hz.
- Finally, given the calendar (1 year lag compared to XPôle), TPole also serves as a prototype to succeed XPole whose ambition is even stronger.

Building users opinion

Study not carried out

If you had to do it again?

With the T-Pole experience, the program continues with the construction of the second X-Pole building with even more performance requirements.

See more details about this project

https://www.schneider-electric.fr/fr/about-us/newsroom/actualites/schneider-electric-inaugure-technopole-a-grenoble-un-batiment-smart-grid-ready-intelligent-construit-dans-le-cadre-du-projet-greenovalley-52ab-636ff.html

Stakeholders

Contractor

Name : Schneider Electric
Contact : Olivier Cottet 37 Quai Paul Louis Merlin 38000 GRENOBLE olivier.cottet@schneider-electric.com
https://www.schneider-electric.fr

Construction Manager

Name : Arche 5
Contact : Lionel TROILLARD 1 rue Chenevrière 38240 MEYLAN
https://www.arche5.com/

Stakeholders

Function : Thermal consultancy agency

ARTELIA

6 rue de Lorraine 38432 ECHIROLLES Cedex

https://www.arteliagroup.com/fr
Fluid technical studies and dynamic thermal simulation

Function : Developer

GA PROMOTION

https://www.ga.fr/
Real estate development

Contracting method

General Contractor

Type of market

Realization

Energy

Energy consumption

Primary energy need : 48,00 kWhep/m^2.an

Primary energy need for standard building : 50,00 kWhep/m^2.an

Calculation method : RT 2012

Breakdown for energy consumption : HVAC: 62% ECS: 5% Lighting: 33%

Real final energy consumption

Final Energy : 45,00 kWhef/m^2.an

Real final energy consumption/m2 : 45,00 kWhef/m^2.an

Year of the real energy consumption : 2 017

Envelope performance

More information :
Wall area coefficient walls
(W / m2.K)
Exterior walls 0,247
High floors 0,178
Low floor 0,215
Exterior joinery 1,300

More information

The building is designed to achieve the energy performance objective of 45kWh / m2.year all-purpose use (regulatory uses + use). This high performance will be achieved thanks to several major axes: · Envelope of high-performance building · Heating, ventilation and efficient air-conditioning system (building) · High-performance LED lighting system · Management of occupancy and vacancy of premises (building) · Load shedding on temperature, ventilation and lighting (use). This shedding can be activated by a request from the energy supplier to reduce peak consumption. The following systems and sets are included in the commissioning mission: · Building envelope · Paving · Acoustic performance · Kitchen ventilation system · Global HVAC system of the building · Global plumbing of the building · Electrical distribution · VDI Installation (Voice, Data and Images) · Centralized Technical Management System · Fire Safety System · Photovoltaic system · Sound system

Renewables & systems

Systems

Heating system :
- Geothermal heat pump
- Fan coil

Hot water system :
- Heat pump

Cooling system :
- Geothermal heat pump
- Fan coil

Ventilation system :
- Free-cooling
- Double flow heat exchanger

Renewable systems :
- Solar photovoltaic

Renewable energy production : 10,00 %

Other information on HVAC :
Heat and cold production provided by reversible heat pumps water / water on drilling water placed in technical room on the roof (2 x 634 kW).

Panels installed in front of buildings to match the architectural aesthetics of the building.

Smart Building

BMS :
WorkPlace Efficiency Solutions, Ecostruxure Building Operation (GTB) equipped with an energy cockpit.
The main functions of GTB are:
- indicate the condition of the equipment necessary for the operation of the buildings,
- Provide the management, operating and maintenance teams with the tools needed to operate and maintain the technical installations of the building,
- Memorize the main metering information of the installations,
- Providing meter information for processing by third-party software,
- Guarantee the sustainability of the installations,
- Program the start and stop times
- Set the operating automations according to the occupation modes
- Manage office comfort (air conditioning and lighting: see Functional Analysis Comfort Management)
The system is structured around a "Server Enterprise" server whose role is to build, maintain and operate the network database.
In parallel, a "Reports Server" software makes it possible to process the data in order to make it available in SQL database, so that it can be used by other software.
The supervision network is Ethernet TCP / IP.
Field networks are in LonWorks.and in Modbus, For LON networks, Ethernet routers
IP / LonWorks are the bridges between the supervision network and the field network.
For the recovery of PLCs and counters in Modbus, AS PLCs process the data and back to the supervision.

Smartgrid :

Microgrid Advisor
The Technopole building is "smartgrid ready" to consider the optimized management of its energy resources.
For this, the profile of each use is analyzed in order to be able to characterize and predict the energy needs of the building and the activity it hosts and to put in place technical elements that allow the building a certain flexibility in its energy needs in carrying out its mission.
The concepts of mission and flexibility are essential in the ability to optimize consumption
Energy.
The mission is the raison d'être of the building. For example, one of Technopole's missions is to ensure the comfort of the occupants of the offices that compose it in the various dedicated spaces.
Flexibility refers to the levers on which we can play to modulate consumption
energy. These flexibilities are inherent to the building (thermal mass), or to the business activity
hosted by the latter in the application (offset actions without harming the achievement of the mission). Identifying and understanding the dynamics of these flexibilities is fundamental, so adding flexibility to a building is always possible by allocating energy storage.
On the basis of the prediction of their consumption, the coordination of the different uses of the building and its activities makes it possible to combine needs and flexibilities in order to generate synergies at the neighborhood level.
Thus, this building "smart grid ready" has the following capabilities:
• Predict and communicate your energy needs;
• Respond to external incentives (tariffs, CO2, etc.);
• To be able to modulate consumption, including by producing energy;
• Perform erasure actions (stop consumers).
These functions allow the building to communicate and interact with its environment,
the occurrence with the campus energy management system. The installation of Microgrid Advisor makes Technopole "smart grid ready".

Users' opinion on the Smart Building functions :

Survey will be conducted in late 2018

Environment

Urban environment

Land plot area : 48 000,00 m^2

Built-up area : 25,00 %

Green space : 10 000,00

Technopole is built on the peninsula of Grenoble.

Products

Product

Work Place Efficiency

SCHNEIDER ELECTRIC

SCHNEIDER LECTRIC 35 RUE JOSEPH MONIER 92500 RUEIL-MALMAISON 01 41 29 82 00

https://www.schneider-electric.fr/fr/work/solutions/for-business/building-workplace/workplace-efficiency/overview.jsp?

Product category : Finishing work / Electrical systems - Low and high current

As a holistic management and control solution for lighting, the HVAC system, blinds and roller shutters, the solution allows you to adjust the comfort parameters closer to the workstation.
Sensors probe the environment and, based on the information received, make the best use of natural light and heat.
The management algorithms allow to provide the best comfort for minimum consumptions.

The provision of a mobile or web application to employees allows access to services to facilitate their life in the building, such as a remote control for driving comfort or a plan to view in real time the meeting rooms available . The application also aggregates data from third-party services, such as transportation, the corporate restaurant or any service available in the building.

EcoStruxure Building Operation

SCHNEIDER ELECTRIC

35 RUE JOSEPH MONIER 92500 RUEIL-MALMAISON 01 41 29 82 00

https://www.schneider-electric.fr/fr/work/solutions/for-business/building-workplace/challenges.jsp

Product category :

The EcoStruxure ™ interoperable and architectural technology platform combines energy,
automation and software. It gives added value in terms of security, reliability,
efficiency, sustainability and connectivity. Thus, this advance opens to users the

digital world's doors in key end markets, allowing them to be competitive in the new economy of the Internet of Things (IoT).

EcoStruxure ™ is particularly suitable for buildings, data centers, industry and network - areas where Schneider Electric can draw on decades of expertise and practical experience. The solutions offered by EcoStruxure ™ can be deployed onsite and in the cloud, with the guarantee of integrated cyber security at every level of innovation: connected products, control, applications, analytics and services.

Costs

Construction and exploitation costs

Renewable energy systems cost : 117 000,00 €

Cost of studies : 5 000 000 €

Total cost of the building : 48 547 000 €

Energy bill

Forecasted energy bill/year : 108 000,00 €

Real energy cost/m2 : 6

Real energy cost/Work station : 196.36

Health and comfort

Water management

Consumption from water network : 3 080,00 m^3

Water Consumption/m2 : 0.17

Water Consumption/Work station : 5.6

Annual objectives: 12 liters of water / person

Indoor Air quality

Air handling unit with electronic speed control on the fans, connected to the Ecostruxure Building Operation building management system.

CO2 sensor in all areas of the building, electronic regulation of fresh air dampers

CO2 rate:

Comfort

Health & comfort :

The building gives the opportunity to visualize in real time the availability of meeting spaces and offers a finer management of lighting in large volumes such as open spaces. Zone controllers also allow control of electrical outlets.

Calculated thermal comfort : Consigne Hiver : 21 °C - Consigne été : 26°C

Measured thermal comfort : Hiver : 19,5 à 22,5 °C - Eté : 24,5 à 27,5°C

Carbon

GHG emissions

GHG in use : 5,00 $KgCO_2/m^2$/an

Methodology used :

Energetic and environmental cockpit producing environmental indicators in real time and in periodic report

Building lifetime : 50,00 année(s)

90,000 KgCO2 / year, on a SHON area of 18,000m²

Reasons for participating in the competition(s)

Technopole intègre de nombreuses technologies de pointe Schneider Electric, dont EcoStruxure for Buildings, son architecture et sa plate-forme adaptée au bâtiment pour le déploiement massif de solutions IoT. Il s'affiche comme une véritable vitrine des savoir-faire de l'entreprise.

EcoStruxure for Buildings, chef d'orchestre de Technopole

EcoStruxure for Buldings est en cours d'implémentation au sein de Technopole. Elle intègre les technologies les plus pointues et les plus innovantes, au travers des 3 strates :

• Les produits connectés tels que les contrôleurs, les capteurs, les vannes ainsi que les offres de mesure du courant, de tableaux électriques intelligents, etc. Cette couche supporte également les produits connectés de sociétés tierces.

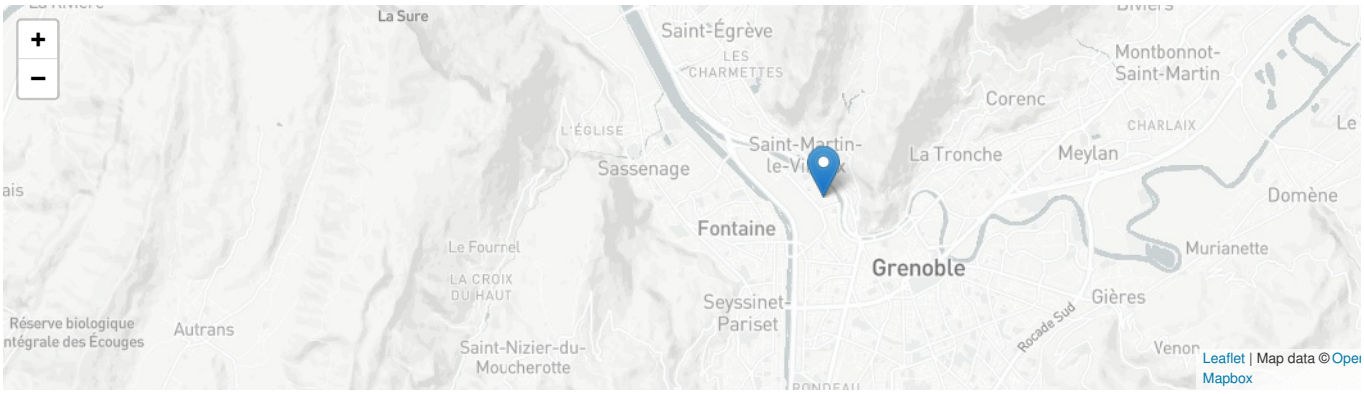
• Le contrôle de pointe (Edge control) avec la solution EcoStruxure Building Management pour la gestion des opérations et plus spécifiquement, la gestion de l'énergie, de la sécurité, des accès, des éclairages et du câblage VDI du bâtiment.

• EcoStruxure Advisor Services pour la gestion, via différents logiciels, de la partie inhérente aux services et aux analyses des données pendant toute la durée d'exploitation du bâtiment.

Pour les besoins inhérents aux missions de la BU Energy, le bâtiment sera également équipé d'EcoStruxure Grid, l'offre Schneider Electric dédiée au marché de l'énergie.

La solution de gestion des espaces Workplace Efficiency sera prochainement mise en place. Elle vise à réduire les coûts d'énergie et à faciliter la vie des résidents (réservation de salles, gestion des conforts, etc.).

Technopole est Smart Grid Ready, c'est-à-dire que les installations techniques, associées au système de pilotage EcoStruxure, pourront être rendues flexibles énergétiquement en étant capables de décaler leurs consommations dans le temps. Elles permettront par exemple d'optimiser la facture énergétique en utilisant la tarification dynamique ou l'optimisation de la contribution carbone du site, ou encore de vendre cette flexibilité grâce à des opérations d'effacement (demand/response), ou enfin de la mettre à disposition localement.



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