Aren'Ice

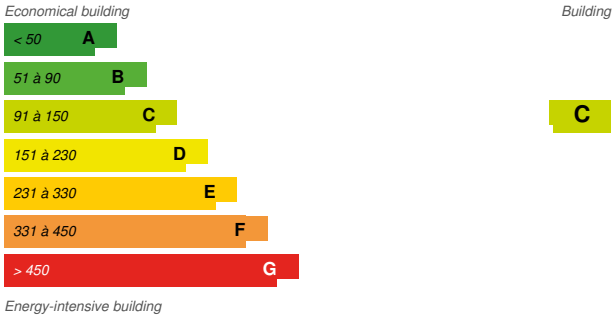
by Guy Turner / 2017-06-12 14:58:38 / France / 10137 / FR

Primary energy need :

126.3 kWhep/m².an

(Calculation method : RT 2012)

ENERGY CONSUMPTION



Building Type : Indoor gymnasium, sports hall, stadium
Construction Year : 2015
Delivery year : 2016
Address 1 - street : 95800 CERGY-PONTOISE, France
Climate zone : [Cfc] Marine Cool Winter & summer- Mild with no dry season.

Net Floor Area : 15 547 m²
Construction/refurbishment cost : 32 000 000 €
Number of Seat : 4 934 Seat
Cost/m2 : 2058.27 €/m²

Proposed by :

Rabot Dutilleul Construction

General information

Rabot Dutilleul Construction provided the TCE construction for this Ile-de-France hockey temple. The complex has two international-style skating rinks but is also capable of hosting shows and various off-ice sports in the main hall. Scalability made possible by an insulating cover of the ice and the deployment of telescopic steps. On its 3 levels, the complex also offers catering, seminar rooms or fitness. The offices of the National Hockey Center, the seat of the French Federation, as well as the two cergypontain hockey clubs have settled there. Acoustically high-performance facade complexes and metal roofs meet the constraints imposed by the surrounding environment. The air treatment of skating rinks is realized thanks to a patented system of transfer of energy in order to maintain a constant hygrometry there. Finally, the refrigeration process used was already in compliance with future standards for refrigerants.

Sustainable development approach of the project owner

The design of the Aren'Ice is part of a global environmental approach. In addition to the quality of the space, the project integrates a reflection strongly guided by environmental criteria as of the strategic orientations of the future development, to ensure that the site under study can fully participate in a landscape quality approach And environmental protection, respect for biodiversity, optimal management of rainwater, sensible management of green spaces. Particular attention was paid to the relation of the building with its immediate environment, to energy management, to the control of impacts in the construction phase, and to the management of the maintenance maintenance.

Architectural description

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See more details about this project

http://www.rabotdutilleulconstruction.com/realisations/equipements-publics/aren-ice.html

Stakeholders

Stakeholders

Function : Contractor

CFA Île-de-France (Groupe Financière Duval)

Sébastien Filly, sfilly@cfa-idf.com

http://www.groupeduval.com/

Function : Construction Manager

Chabanne & Partenaires

Jean-Marc Suspene, jmsuspene@chabanne-architecte.fr

http://www.chabanne-architecte.fr/

Function : Thermal consultancy agency

INGEROP

Vincent GIE, vincent.gie@ingerop.com

http://www.ingerop.fr/

Contracting method

Build and sell construction

Energy

Energy consumption

Primary energy need : 126,30 kWhep/m^2.an

Primary energy need for standard building : 132,40 kWhep/m^2.an

Calculation method : RT 2012

Breakdown for energy consumption : District heating: 75.49 Heating Capacity: 40.68 Cold ice: 128.59 Cold comfort: 28.44 Lighting: 30.47 Breakdown: 53.66 Auxiliaries: 37.03 Specific electricity: 9.81

Real final energy consumption

Final Energy : 404,17 kWhef/m^2.an

Envelope performance

Indicator : I4

Air Tightness Value : 1,12

Renewables & systems

Systems

Heating system :

- Urban network
- Heat pump
- Water radiator
- Fan coil
- Tape

Hot water system :

- Urban network

Cooling system :

- Water chiller
- Fan coil
- Tape
- VRV Syst. (Variable refrigerant Volume)

Ventilation system :

- Double flow heat exchanger

Renewable systems :

- Biomass boiler

Renewable energy production : 44,00 %

Solutions enhancing nature free gains :

Récupération de chaleur sur les groupes froids de production de glace via une PAC

Smart Building

BMS :

GTB

Environment

Urban environment

Arrangements and integrations at the ZAC level with connection of the complex to the existing transport network

Products

Product

Ice production

mise en oeuvre spécifique au projet, ensemble d'éléments de différents fabricants

mise en oeuvre spécifique au projet, ensemble d'éléments de différents fabricants

http://www.jpofroid.fr/

Product category : Table 'c21_china.innov_category' doesn't exist SELECT one.innov_category AS current,two.innov_category AS parentFROM innov_category AS oneINNER JOIN innov_category AS two ON one.parent_id = two.idWHERE one.state=1AND one.id = '18'

Ice production will be provided by an indirect cooling installation using R134a / MEG refrigerant fluids.
Furthermore, in order to optimize the installation, it is intended to implement the following technical devices:
· Recuperation of heat in condensation of the installation (preheating battery CTA)
· Recovery of the energy corresponding to the melting of the surfacing snow (at the level of the snow pit)
· Desuperheated heat recovery from compressors for DHW preheating
· Cooling of compressors by geothermal energy on a water table (higher coefficient of performance, reduction in the power of air coolers)
· Supervisory system for programming the ice temperature according to the activity
These technical choices are a strong point and allow to reduce the energy consumption of the building.
The refrigeration plants are dimensioned to obtain variations in the temperature of the ice within a maximum of 6 hours.
The refrigeration equipment consists mainly of a production unit operating on R134A and comprising
· Electric compressors & motors, boiler capacities and tubular or plate heat exchanger, pumps as well as main control cabinet.

· An air dryer type DRYCOOLER moist (adiabatic ramp) placed on the roof of the building in a zone reserved for this purpose
· Recovery heat exchanger set: for hot slab, snow pit & heat recovery network for air conditioning systems (PAC).
· Connection piping between the various devices as well as connections to the runway networks and its pending collectors.
The refrigerant fluids retained on this project are considered reliable, energy-efficient and easy to maintain:
· Choice of fluid R134A for the chilled water primary circuit: This fluid is an HFC type fluid (ODP = 0 and GWP = 1300). The use of this fluid implemented by professionals guarantees an economic use of energy and a sustainability that is not questioned to date.
· Choice of the MEG fluid at -9 ° C for the secondary circuit circulating under the slab: This fluid is a natural type fluid (ODP = 0 and GWP = 0).
The use of this fluid implemented by professionals guaranteed ecological exploitation.
The R134A / MEG association allows the design of an installation that is easy to operate, economical and viable.

System equivalent to the system recommended during the design phase

Costs

Health and comfort

Water management

Consumption from water network : 7 251,00 m^3

Consumption of harvested rainwater : 846,00 m^3

Water Self Sufficiency Index : 0.1
Water Consumption/m2 : 0.47
Water Consumption/Seat : 1.47

Indoor Air quality

The principle of double-flow ventilation retained for spaces with high occupancy makes it possible to introduce filtered fresh air. The quality of the ventilation will be treated, as much for the sanitary quality of the air as for the olfactory comfort. The proposed ventilation also allows to remove the pollutants emitted inside the buildings, which besides the sanitary aspect, facilitates the maintenance and the maintenance of the premises, while avoiding the humidity and the development of the molds. The indoor air quality depends on the quality of the materials used inside the building. They will be selected based on their VOC, formaldehyde emissions and any other products that may be harmful to humans or the environment. Consideration of the health component in the choice of materials (example: limitation of VOC emissions by the use of aqueous paints, eco-labeled products, etc.).

Comfort

Health & comfort : Hygrothermal comfort is the expression of the temperature felt, taking into account the temperature of the air, its humidity and the temperature of the walls of the building. In particular, the feeling of 'cold walls' will be minimized. To achieve this goal, the project management team has conducted a global reflection. Dual-flow ventilation ensures controlled air renewal and removes moisture from the stale air. Air flow rates will be adapted to the building's frequency and activity. Outdoor Thermal Insulation (ITE) significantly reduces thermal bridges, which are synonymous with loss of calories or frigories for the building. The management of the summer comfort is carried out by a bioclimatic research at the architectural level. The following solar protections are provided on the project: - Exterior blinds to the south on the administrative areas - Interior shades to the north - West facade protected by roof ridges at the top and side, coupled with vertical sun breezes. The west facade which is glazed on the secondary skating rink has been finely tuned to optimize the sun protection, since the natural light must not be detrimental to the consumption of cold. Natural lighting should be managed with caution in order not to dazzle users. Therefore, special attention will be paid to the need for artificial lighting. Artificial lighting is treated as a target 4. The natural light is optimized in offices thanks to the linear profile of the glazing and glass products with a high light transmission coefficient (> 70%).

Acoustic comfort : Target 9 HQE PERFORMANCE Optimization of acoustic performances on: Reverberation times Inner acoustic insulation Isolation from the outside and protection of the neighborhood Shock sound Noise levels of technical equipment inside the building Noise levels of technical equipment outside the building

Carbon

GHG emissions

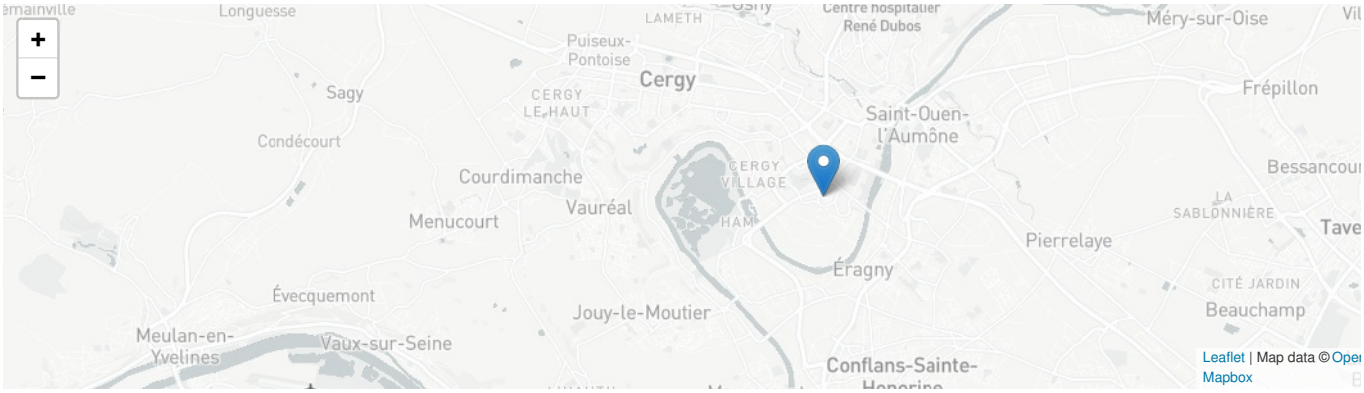
GHG before use : 37,90 $KgCO_2$ /m^2

Contest

Building candidate in the category

Energie & Climats Tempérés

Coup de Cœur des Internautes



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