Guangdong Technion-Israel Institute of Technology (North Campus)

by / 2023-03-23 08:46:12 / China / 119 / CN

New Construction

Primary energy need :

50.65 kWhpe/m².

(Calculation method : Experimental calculation method (China))

ENERGY CONSUMPTION

Economical building *Building*

< 50	A
51 à 90	B
91 à 150	C
151 à 230	D
231 à 330	E
331 à 450	F
> 450	G

Energy-intensive building

Building Type : School, college, university
Construction Year : 2016
Delivery year : 2018
Address 1 - street : 515000 ,
Climate zone : [BWh] Subtropical dry arid

Net Floor Area : 102 237 m²
Construction/refurbishment cost : 568 111 976 ¥
Number of Pupil : 1 073 Pupil
Cost/m2 : 5556.81 ¥/ m ²

Certifications :

General information

Guangdong Israel Institute of Technology (North Campus) started the program design work in 2013, with the goal of high quality development of green building, and the whole life cycle concept has been carried out, and the project has been certified with the Green Building Evaluation Standard GB/T 50378-2014 3-star green building design and operation mark respectively. Now the post-evaluation is carried out using the Green Building Evaluation Standard GB/T 50378-2019 and the Green Campus Evaluation Standard GB/T 51356-2019, which can also basically reach the three-star standard. In order to provide replicable cases for similar projects, the monograph "Green Campus - A Chronicle of the Construction of Guangdong Israel Institute of Technology (North Campus)" was published.

I. Biophilia design

The campus is surrounded by mountains and water, and greenery is introduced through elevated space, platforms, connecting corridors and sky gardens, constituting a three-dimensional and active research and innovative campus atmosphere and spatial feeling; by preserving and improving the original topography, vegetation and water system of the site, a Lingnan garden landscape with Chaoshan characteristics is created; the mountain scenery of Sangpo in the northern neighboring area is reflected with the water scenery of the campus, and the mountains and water blend together, creating a green ecological campus with sustainable development.

II. Comprehensive planning of water system

The water system of the site is planned in an integrated manner, and the artificial wetland in the campus landscape is created by retaining and improving the existing water system before the development of the site; for the replenishment of the artificial wetland, the reservoir water of Shantou University next to the site is used for replenishment; at the same time, the artificial wetland is used as a rainwater storage pond, and the purified water is used for greening and irrigation of the site and road washing, and the greening and irrigation system also adopts micro-sprinkler system and sets The green watering system also adopts micro-sprinkler system and is equipped with humidity sensor, which is connected to the campus intelligent system for unified management.

III. Active and passive energy saving

The buildings are oriented to meet the summer wind direction, and the office building and the teaching building are set up with elevated floors to direct the summer wind to the internal courtyard, so as to avoid a hot and windless space. In winter, the winds turn northerly, and the teaching and research buildings block most of the winds from the northwest and northeast, so that the courtyard does not feel cold and windy.

In terms of daylighting, the buildings are connected on the short side so that they do not block each other in the north-south direction as much as possible, leaving sufficient daylight for working hours. Offices and classrooms with high requirements for sunlight are placed on the south side of the building as much as possible.

The building structure is mainly a reinforced concrete frame structure with a partial steel structure. Self-insulating bricks are used and a green roof is set up to effectively reduce heat transfer.

In terms of active energy saving, the project selects multi-connected air conditioning and primary split air conditioning system according to the building characteristics, which can be ventilated by opening windows at any time and can effectively reduce the air conditioning load. The installation of light guide tube lighting system in the underground space of the campus can help reduce the energy consumption of underground lighting.

IV. Smart Operation

The energy management system provides itemized statistics for air conditioning, lighting, power consumption and campus water consumption for the whole project. There are also intelligent control systems for elevators, air conditioners, irrigation systems and other equipment to help property managers be able to manage the campus efficiently.

V. Post-user Evaluation

The university hired a third-party professional team to analyze the focal issues in the form of on-site surveys and questionnaires, and put forward optimization suggestions conducive to improving the evaluation of campus satisfaction, complementing the existing campus construction from the perspective of meeting users' needs, and providing guidelines for future campus optimization and renovation as well as the construction practice of the new campus.

Data reliability

3rd part certified

BIM approach

The project adopted BIM technology in the design phase and construction phase respectively, and won the second prize of the second BIM application competition in Guangdong Province in 2018.

During the design stage, the BIM team intervened in the work and firstly formulated a service plan and determined the workflow according to the project characteristics. After the multi-disciplinary BIM model was built, the BIM team firstly carried out pipeline pre-arrangement for areas with narrow space and dense pipelines, simulated their implementability and put forward targeted optimisation plans, and assisted the design unit to complete several design modifications.

The building shape of this project is mostly irregular, and there are many professional systems and it is difficult for different professional construction to cooperate. In order to completely solve this technical problem, the construction phase was carried out through BIM technology to check the collision of various professions and comprehensive layout, correcting design conflicts and proposing more than 100 design optimisations, ensuring the coordination and unity of various professions during the construction process and achieving a seamless docking between design and construction.

Through BIM technology, it has effectively helped the project management to achieve fine management of project construction, and achieved digital, collaborative and integrated management of progress, drawings, contracts and cost modules.

Photo credit

Shenzhen Lvda Technology Co., Ltd.

Stakeholders

Contractor

Name :

Construction Manager

Name :

Stakeholders

Function : Contractor

Shantou Agency Management Center of Municipal Government Investment Project is responsible for managing the construction of civil buildings and municipal infrastructure projects invested by the municipal government.

Function : Thermal consultancy agency

Shenzhen Lvda Technology Co., Ltd. is a green building whole process technical service company, responsible for project planning, design, construction, testing and operation of green building consulting work.

Contracting method

General Contractor

Allocation of works contracts

Macro packages

Building users opinion

Thermal comfort and light environment: the building has a large number of openable area for external windows, allowing effective use of natural ventilation and natural light. Each functional room is equipped with independently adjustable air conditioning ends (multi-connector, split air conditioning), which can adjust the indoor thermal environment according to individual preferences.
Air quality: The indoor air quality of the building is good and odourless.
Sound environment: The main source of noise in the North Campus is traffic noise, and there is noise pollution from external air-conditioning units in the aisles on the ground floor. In the construction of the North Campus, the envelope of the building meets the sound insulation requirements as far as possible, the teaching area and the administrative area both adopt multi-connected air conditioning units, and the building equipment is uniformly set up and isolated from the use space, so there is no noise pollution.

Energy

Energy consumption

Primary energy need : 50,65 kWhpe/m^2.

Calculation method : Experimental calculation method (China)

More information :

Shantou belongs to a hot summer and warm winter region, with long summer hours and no need for heating in winter. As the individual meters of the project were installed and put into use at different times, each building uses different functions. The energy consumption data of the office building, teaching building, senior administrative building, dormitory and staff dormitory were intercepted between 2018 and 2019; the energy consumption data of the teaching laboratory building, research laboratory building and canteen were intercepted between 2020 and 2021 because they were put into use at a later time.
The electricity used in the basement is for lighting, fire-fighting and water pumping, and the electricity used in the dormitories is for lighting and security monitoring.

Envelope performance

Envelope U-Value : 1,29 $W.m^{-2}.K^{-1}$

More information :

The roof of the project adopts semi-encapsulated extruded plastic panel composite insulation bricks, with a thermal conductivity of 0.055 and a thermal storage coefficient of 0.887, which have excellent thermal performance and can effectively reduce heat transfer.
The external walls are made of self-insulating concrete hollow blocks with a thermal conductivity of 0.270 and a thermal storage coefficient of 4.140, which have better thermal insulation performance compared to conventional masonry.
The external façade of the project dormitory is designed with vertical external shading in conjunction with decoration, effectively reducing direct sunlight in summer.

Real final energy consumption

Real final energy consumption/m2 : 34,80 kWhfe/m^2.

Year of the real energy consumption : 2 021

Renewables & systems

Systems

Heating system :
- Others

Hot water system :
- Heat pump
- Solar Thermal

Cooling system :
- Others

Ventilation system :
- Natural ventilation
- Double flow

Renewable systems :
- Solar Thermal

Renewable energy production : 10,25

The dormitory uses a centralised hot water supply system for all-day supply, with a combined heat source of solar collector panels and air source heat pumps; the water supply method is an upward and downward feeding, mechanical circulation open system. For the use of this project, the existing solar and air energy hot water system on the market is modified and optimised, and a new product and utility model patent is formed.
Each single bathroom in the science and education area is heated by an integrated solar water heater; solar energy systems and heat pump units are used as complete sets of equipment, and auxiliary equipment such as hot water tanks and hot water circulation pumps are configured by the manufacturer as a complete set.

Solutions enhancing nature free gains :
The orientation of the building complex caters for the outdoor winds in the summer, with the office and teaching buildings having elevated floors to channel the summer breeze into the internal courtyard, avoiding a stuffy, windless space. In winter, the wind direction changes to northerly, and the teaching and research buildings block some of the wind from the northwest and northeast, so that the courtyard does not feel cold and windy.
In terms of daylight, the buildings are aligned on the short side so that they do not block each other from the north to the south as much as possible, leaving plenty of daylight for working hours. Offices and classrooms that require high levels of daylight are placed on the south side of the building.

Smart Building

BMS :
The project is set up with an energy consumption analysis data system, which provides itemised statistics on the electricity consumption of air conditioning, lighting and power throughout the project. An air-conditioning intelligent control system is also set up to monitor the electricity consumption of the air-conditioning system, which can remotely control the opening and closing of the air-conditioning; regular maintenance and records are kept for the energy and water saving equipment of the whole project.
The project sets up a fresh air system, with multi-connected indoor fresh air units providing fresh air for densely populated places, and individual independent rooms with exhaust fans, using automatic infiltration to supplement the fresh air. A carbon dioxide concentration monitoring system is set up in the scientific research laboratory building to collect data on carbon dioxide concentration in densely populated and large spaces and link it with the ventilation system.

Users' opinion on the Smart Building functions :

According to the feedback from the property staff, the construction management system of the project is simple and easy to understand, and it is easy for managers to operate.

Environment

Biodiversity approach

Mitigation actions on soil and biodiversity :

The site was designed to be relatively flat in the early stages of the project, with an existing pond. The surrounding area has a small number of green trees, and the artificial lake is formed on the basis of the original pond, and some of the rocks and trees of the original site have been preserved as part of the campus landscape.

The overall planning of the campus is built according to the trend of the mountain system, basically not destroying the original topography of the site. The design plan reduces the heat island and greatly improves the local microclimate by planting large areas of greenery, setting up large landscape water bodies and rivers, roof greening and other ecological facilities. And during the construction process, the topsoil is used to backfill, retaining the original old trees in the site and increasing the campus greenery. Through the soil and water conservation program, the project has achieved 98% soil erosion control, 1.0 soil loss control ratio,

98% residue protection rate, 92% topsoil protection rate, 98% forest and grass vegetation restoration rate, and 26% forest and grass coverage rate.

Urban environment

Entrance/Exit and Public Transport:

The main entrance/exit of the project is located on the north side of Shantou University Road, which is close to the main traffic artery of the project. The distance from the site entrance to the bus stop is 260m on foot, reaching the Shantou University bus stop on the west side of the project and 240m on foot to the Longquanyan bus stop. The main routes passing through Shantou University Bus Station are No. 6, No. 17, No. 21, No. 27, No. 39 and No. 41; the main stops passing through Longquanyan Bus Station are No. 6, No. 17, No. 21, No. 27, No. 39, No. 41 and No. 107.

Public service facilities:

Activity venues are open to neighbouring residents on a staggered basis, supporting facilities are shared, resources are shared and open public space is available to the public, with specific measures as follows:

1. Before 8am and after 6pm, nearby residents and the public can use the outdoor venue for free for fitness and recreational activities.

2. Within 1000m of the site, there are 5 or more services such as canteens, entertainment, supermarkets and leisure, cultural and banking facilities to serve the students and teachers in the living areas of the project.

3. The canteen, entertainment, supermarket and sports and recreational space are free of charge for the students and teachers in the school area and the surrounding residents.

Activity space:

The campus is divided into living area and science and education area according to functional zoning. In the planning stage, through wind environment simulation analysis, terrace, courtyard and overhead space are used to divide the campus, so as to form smooth outdoor airflow while ensuring functional zoning. In summer, outdoor wind can be blown into the campus through the overhead corridor to avoid forming a windless area; in winter, the mountain on the north side is used to block the cold winter wind, and the wind speed is less than 5m/s through the measured data in winter.

Green area:

The actual green area rate of the campus is close to 40%. The large green areas are utilized to echo with the small green areas scattered in the campus, with the planting landscape in different courtyards, forming a staggered greening atmosphere. The landscape water body can be used as a tandem factor to connect the campus areas. Two through water systems are distributed in the middle and north of the campus, surrounding the administration building, which not only can cool down the campus in the hot summer, but also add some lively atmosphere to the campus. The courtyards of different sizes are enclosed between the buildings on the campus. The courtyards with permeable grounds become open spaces for students and teachers to discuss, communicate and relax, while the courtyards with shrubs or landscaping facilities constitute quieter semi-private spaces, maximizing different functional needs and enriching the space for campus activities. At the same time, the Sampo Mountain on the north side brings a natural landscape to the campus.

Ecological design:

The project is designed to focus on the interrelationship of landscape spatial pattern and spatial processes. The landscape spatial pattern is composed of elements such as patches, substrates, corridors and boundaries. As a space used by students and teachers for a long time, the ecological landscape design can integrate the surrounding natural landscape with the school space, which has a positive effect on the physical and mental health of the space users. The ecological landscape design of the campus focuses on "mountain", "water", "courtyard" and "corridor In the design of the campus ecological landscape, the four dimensions of "mountain", "water", "courtyard" and "corridor" are used to create a campus landscape with local Lingnan characteristics by combining the Sangpo Mountain around the project and the original water system and vegetation in the site.

"Mountain" - The layout of low south and high north is adopted to cater to the mountain to the maximum extent. The planning layout of the campus follows the topography and strives to create a garden-style campus space. In order to maximize the introduction of landscape into the campus, the building height gradually rises from south to north, while the building shape gradually tends to be free from the regular form - buildings near the south side of the road are arranged parallel to the road, with a more regular interface toward the city; buildings near the mountain in the north have a lively and diverse shape, with a free and permeable façade and mountain view The buildings near the mountain to the north have a lively and diverse shape, with a free and transparent façade that interacts with the mountain view, allowing students and teachers to have a rich landscape view and a rich and interesting spatial experience inside the building.

"Water" - connects to the water body in the form of a garden landscape and provides a public platform for rest and communication. The plan arranges diverse and lively shared spaces along the water side of the base. These active spaces freely dot the campus and form a dialogue with the mountain with a permeable interface, which includes functions such as exhibitions, coffee, club activities, and small lecture halls. It provides a comfortable and natural space for academic communication among students and faculty.

"Courtyard" - The buildings are linked together in the form of courtyards, allowing people to move freely through each space. The buildings of different functions on the campus form several similar but different "courtyards". In the scripture of "Zhou Yi", the building is classified as Yang and the courtyard is classified as Yin, and the combination of reality and fiction gives us the "front garden" and "backyard", which can greatly improve the infectious power of the building group. The concept of courtyard is integrated into the design of the green campus, and the clever use of indoor and outdoor gray space allows students and teachers to mingle with the natural elements of light, wind and rain as they wander through the courtyard, and as the axis linking these courtyards looks from east to west, people can feel the extension and continuation of the campus courtyard space.

"Corridor" - the corridor runs through the whole and provides a landscape platform for communication and rest. According to the climatic characteristics of the Chaoshan region with high temperature and rain in summer, the campus design draws on the design technique of the unique coastal bridge township with its modern architectural characteristics of the cavalry building, combined with its outer corridor type building The corridor is completely open and connected to the street corridor, forming a continuous and sheltered traffic space between the street and the buildings. At the same time, the setting of gray space enriches the sense of hierarchy and interest of the ground floor space, providing an efficient transportation corridor and a beautiful "sight corridor" between the "courtyards". At the same time, the second floor provides an open viewing platform, which runs through the courtyard and is hidden from time to time to experience the change of scale of different spaces. The deck is partially considered as a planted roof with wood flooring to harmonize with the natural color of the mountain.

Land plot area

Land plot area : 68 565,80 m^2

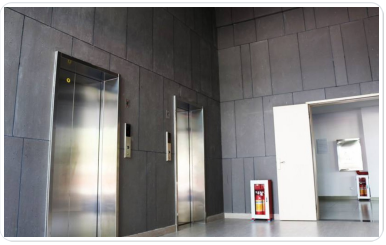
Green space

Green space : 21 919,00

Products

Product

MCM (Modified Clay) new ecological material



Product category :

MCM (Modified Clay) is a new ecological material with the advantages of being true to nature, flame retardant, breathable and non-discolouring. The possibilities of MCM (Modified Clay) eco-materials are not limited to this, it can replace cement, asphalt, polyurethane, rubber, wood and resin, the heat needed to produce the material is the waste gas from the power plant, the warm water cooled down can be used as domestic water, the whole line is almost zero pollution. It is a "breathable" eco-material, so to speak.
The product is made of inorganic materials such as waste soil, cement blocks, porcelain slag and stone powder, which are mixed and modified by classification, and shaped under photochemical isomorphism and curve temperature. It has good resistance to direct light irradiation, acid and alkali salt corrosion and mild characteristics. The compounded soil has a good plasticity and can be made into various sheets, blocks, rolls and profiles under photochemical isomorphism and controlled curve temperature.

The material can be 'customised' according to the customer's requirements and can be compounded into a variety of imitation stone, imitation terracotta tiles, imitation wood, imitation metal and other products, which can be used in a wide range of scenarios. The material is clay modified, from clay modification to low temperature baking, to final forming, no harmful gases and other pollutants, so when used in indoor scenarios, it has no impact on indoor air quality. The soft porcelain technology products (MCM materials) are mainly used in the decoration of the interior and exterior walls of various buildings and are particularly suitable for high-rise buildings as well as old wall renovation projects as they are soft, thin, light and very safe.

Costs

Construction and exploitation costs

Total cost of the building : 568 111 976 ¥

Energy bill

Forecasted energy bill/year : 2 471 500,00 ¥

Real energy cost/m2 : 24.17
Real energy cost/Pupil : 2303.36

Health and comfort

Water management

Consumption from water network : 29 044,00 m^3

Consumption of harvested rainwater : 3 245,00 m^3

Water Self Sufficiency Index : 0.1
Water Consumption/m2 : 0.28
Water Consumption/Pupil : 27.07

According to the sampling and testing conducted by the third-party testing unit on the quality of domestic drinking water, wastewater and landscape water in the campus for two days, all types of water quality in the campus meet the requirements of the limit values in the Sanitary Standard for Domestic Drinking Water GB 5749-2006, Water Quality for Urban Wastewater Recycling Landscape Environment GB 18921-2002 and Comprehensive Wastewater Discharge Standard GB 8978-1996.
The rainwater of this project will be collected through rainfall pipes, rainwater inlets and drains around the roads and then directly discharged into the rainwater pipes of the campus. The rainwater from the roads will be filtered and discharged to the landscape lake, which will be used as make-up water for the landscape lake. The water from the landscape lake is purified and used as irrigation water for the campus greenery, and the water is measured at the outlet. The project chooses a rainwater abandonment controller, which can control the abandonment according to the quality of rainwater, thus ensuring water quality.

Indoor Air quality

Indoor air quality depends on the outdoor air quality of the campus site and the volatiles of the selected building decoration materials. According to the outdoor air quality testing data from a third-party testing unit, the ambient air of the Guangdong Israel Institute of Technology North Campus contains nitrogen dioxide, sulphur dioxide, carbon monoxide and particulate matter that meet the secondary concentration limits of the Ambient Air Quality Standard GB 3095-2012.

Low-volatile materials were used in the construction and interior decoration of the project. During the construction process, windows were opened and ventilated as far as possible, and sufficient air blowing was carried out before the project was put into use to ensure good indoor air quality. According to the tests conducted by a third-party testing unit on the indoor air formaldehyde, TVOC, ammonia, benzene and radon in the functional rooms of each building, the test results all meet the standard limit values in the Indoor Air Quality Standard GB/T 18883-2002.

The scientific research laboratory building is equipped with a carbon dioxide concentration monitoring device, which is linked to the indoor fresh air system. When the carbon dioxide monitoring data is higher than 2000mg/m3, the fresh air system will be automatically turned on for ventilation.

Comfort

Health & comfort :

According to feedback from the property staff, the project's building management system is simple to understand and easy for the management staff to operate.

Acoustic comfort :

According to the test results, the sound environment of the surrounding sites during the operation of the campus meets the limits of the Sound Environment Quality Standard GB 3096-2008 for Class I sound environment zoning of not more than 55dB in daytime and 45dB in nighttime, which is in a good sound environment area. The indoor sound environment level depends on the outdoor sound environment level, the amount of sound insulation of the building envelope and the amount of noise from indoor units. According to the design drawings of the project, the buildings all adopt external walls, external windows, floor slabs and doors with good sound insulation performance. Firstly, the airborne sound insulation performance of each building component was tested on site and the test results all met or were better than the design value. Based on the above-mentioned outdoor sound environment and sound insulation of building components, the third-party testing unit conducted indoor noise level tests for each functional room in the campus. After the actual measurement data, it can be seen that the indoor background noise values of the main functional rooms of the buildings in the North Campus of Guangdong Israel Institute of Technology all meet or are better than the design calculation values, and the indoor background noise values meet the high requirements of the current national standard "Code of Practice for Sound Insulation Design of Civil Buildings" GB 50118.

Visual comfort :

The campus has designed reasonable light-transmitting external windows for each building at the design stage to ensure good indoor natural light. The natural light simulation results of the main functional rooms of each building all meet the requirements of GB 50033-2013 on the lighting coefficient of various rooms in the Building Light Design Standard. During the operation stage, the field tests conducted by a third-party testing unit have all met or exceeded the standard value of lighting coefficient in the design stage. Adjustable internal shading is provided in all functional rooms to avoid natural glare.

Quality of life and services

The pedestrian passages within the project site are designed to be barrier-free and meet the relevant requirements of the Barrier-Free Design Code GB50763-2012. The pavements, public green areas, public service facilities and supporting public buildings of the project are all designed to be barrier-free, with the longitudinal slope of the pavements not greater than 2.5%, and the entrances and access roads of public green areas at all levels and facilities such as rest pavilions have a gentle and non-slip plane; the entrances and exits of public service facilities and supporting public buildings are sloped.

Carbon

General infos

1. improving the thermal insulation properties of the envelope;

2. installation of external shading systems to reduce summer air conditioning energy consumption through the adoption of different external shading measures;

3. the use of energy-efficient air-conditioning, electrical appliances, lifts and other indoor energy-using equipment;

4. adopting passive design for part of the structure and using natural ventilation to reduce the energy consumption of the air-conditioning system

5. rationalisation of air conditioning system operating hours and lighting switching times to minimise carbon emissions and energy consumption during the operational phase of the building;

6. the use of a large number of highly recyclable green building materials such as steel and timber structures in some of the buildings to minimise the carbon emissions generated during the building demolition phase;

7. the selection of materials for the project is tailored to local conditions, minimising carbon emissions during the transportation phase of materials, etc.

Carbon sink

Local building materials: The proportion of local building materials (within 500km) used in the project is at least 80% by weight.

Initiatives promoting low-carbon mobility

The university encourages green transport such as public transport and bicycles. Motor vehicle parking is strictly controlled throughout the campus, and bicycle

parking spaces are provided on the overhead level of the buildings to provide parking spaces for non-motorised vehicles that can be shaded from the sun and rain.

GHG emissions

GHG in use : 235,75 $KgCO_2/m^2$/

Methodology used :

Carbon emissions are calculated for the whole life cycle of all buildings. The annual electricity consumption of the buildings in the science and education area was calculated using the energy simulation software EQUEST. As both the school building and the office building have a steel structure and are participating buildings, it is difficult to count the actual steel consumption separately, so the calculations are divided equally for subsequent calculations. In addition, taking into account the use of natural gas in the canteen, based on the number of stoves in the project canteen, their power and the statistics on the use of natural gas in the area, it is estimated that the amount of natural gas used in the canteen is approximately
8.1 10 4 m 3 / y, the density of LNG is 450kg/m 3 , the carbon emission factor of LPG is 0.5042tCO/t. The other buildings in the public building area do not involve the use of natural gas.
The following are the carbon emissions for each phase of the project:
Building material production phase: 7.72Kg CO2/m2
Material transportation phase: 5.23Kg CO2/ m2
Building construction phase: 0.46Kg CO2/ m2
Building operation phase (50 years): 11,787.39 Kg CO2/ m2
Building demolition phase: 3.26Kg CO2/ m2

GHG before use : 13,41 $KgCO_2$ /m^2

Building lifetime : 50,00

, ie xx in use years : 0.06

GHG Cradle to Grave : 11 804,10 $KgCO_2$ /m^2

The UN Intergovernmental Panel on Climate Change IPCC Guidelines for National Greenhouse Gas Inventories

Contest

Reasons for participating in the competition(s)

1

1563420 809069 1227264.7 SO2 121739

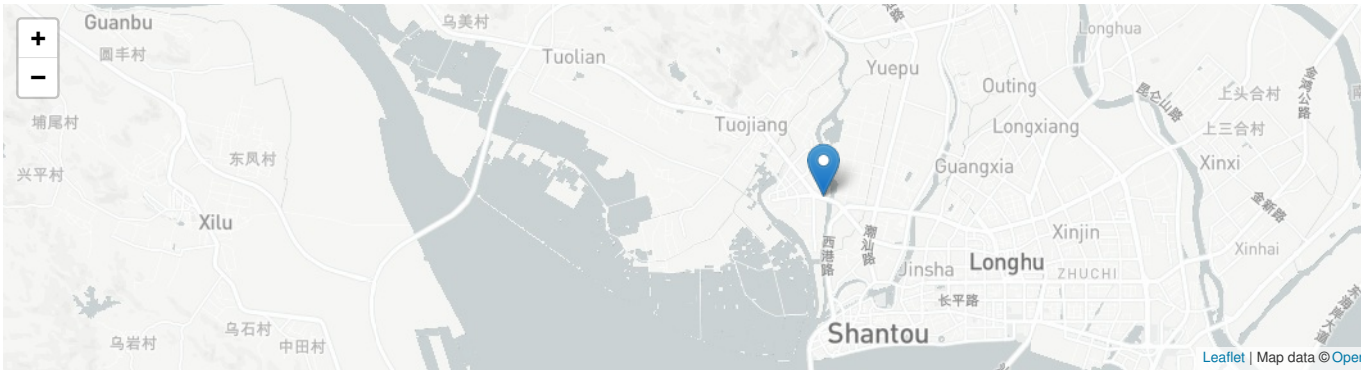
2

- 3465562.10 112.76

9

Building candidate in the category

Users' Choice



Date Export : 20230801145622