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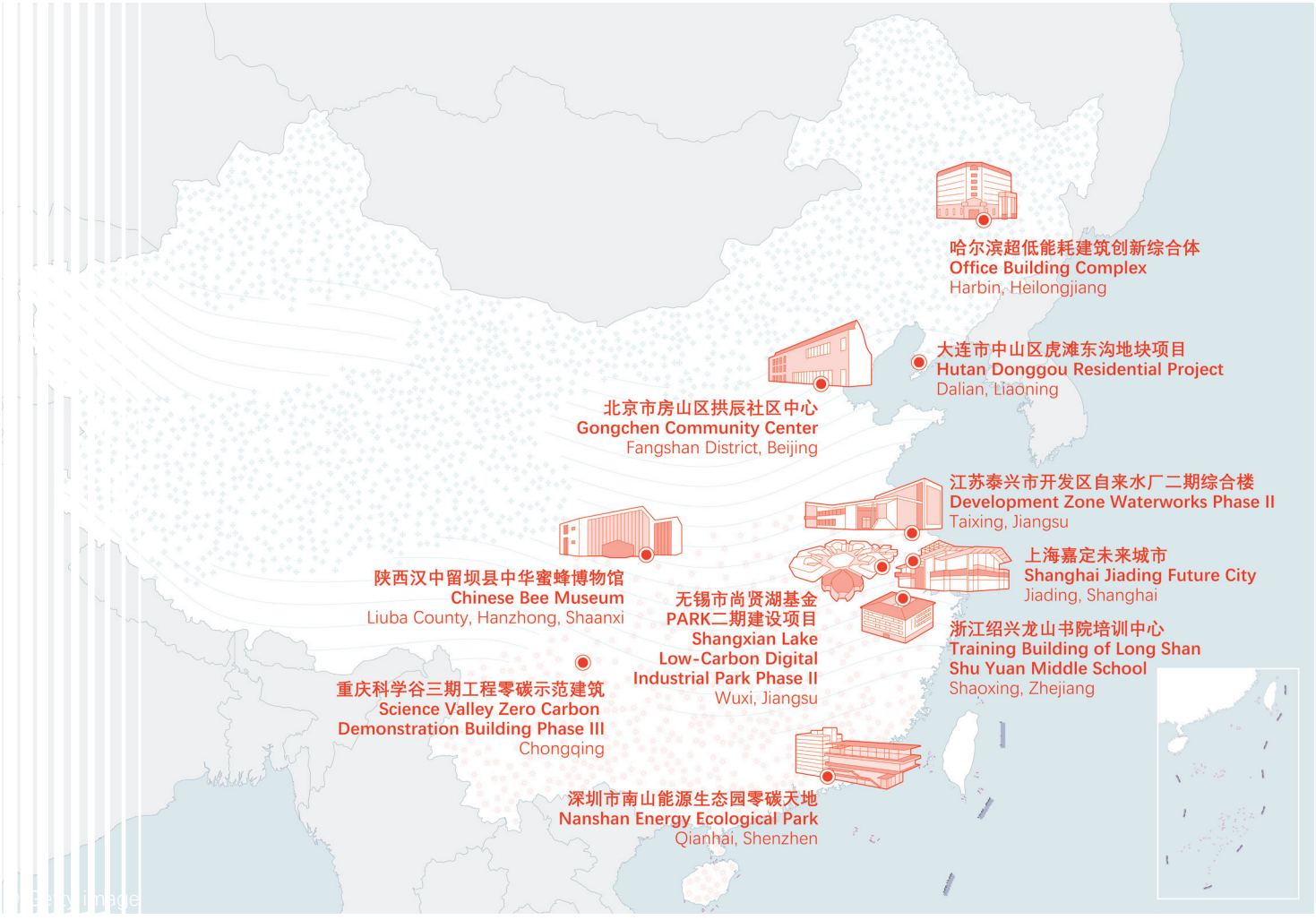
Building a climate neutral future together

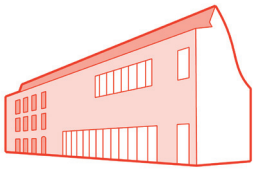
SINO - SWISS ZERO EMISSIONS BUILDING PROJECT

DEMOSTRATION PROJECT FLYER

Final Version 2, September 2025



GONGCHEN COMMUNITY CENTER
FANGSHAN DISTRICT, BEIJING



FACTSHEET

LOCATION

Fangshan District, Beijing

CLIMATE

Cold

PLANNING TEAM

ARCHITECT

SUP Atelier of THAD (the Architectural Design & Research Institute of Tsinghua University)

ENERGY CONSULTANT

China Academy of Building Research, Institute of Building Environment and Energy

INVESTOR

C-Land Real Estate Co., Ltd.

PROJECT INFORMATION

SIZE

Gross building area 1200 ㎡ (3 above-ground floors and 1 below-ground floor)

FUNCTION

Community center with a multi-functional exhibition hall and several senior apartments

TECHNICAL INPUT FROM THE PROJECT

The project team collaborated closely with Chinese manufacturers to develop a tailored BIPV system, establishing a benchmark in sustainable architecture.

Focusing on performance-driven design, the team prioritized energy efficiency, carbon reduction, and occupant comfort. They meticulously selected the best combination of building insulation and external window performance, significantly increasing the building's overall energy efficiency. The intelligent lighting system, capable of automatically adjusting light intensity to the external brightness, enables energy savings of over 70% on lighting. The project also highlighted the exceptional performance of the heat pump technology, which maintains a heating coefficient of over 2.3, even in severe cold conditions of -15°C.

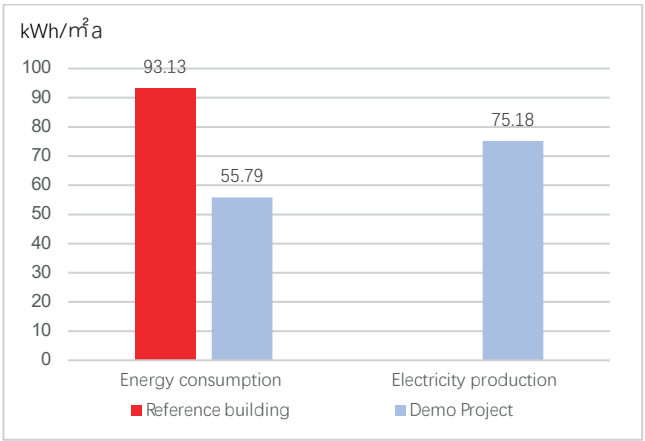
Beijing Demostration project after completion. ©SUP Atelier

Through this integration of expertise and resources, the team created a series of technically sound and aesthetically compelling prototypes. The project team offered valuable technical support and insights for the advancement of sustainable building practices.

HIGHLIGHTS OF THE DEMO PROJECT

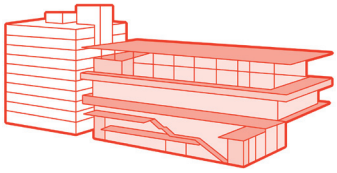
The project is characterized by significant technical advances, including the integration of photovoltaic systems on the façade and roof and the use of an air heat pump for efficient heating. Furthermore, it utilizes a mechanical ventilation system with heat recovery which allows natural ventilation through skylights during the transitional seasons. The installation of high-performance doors and windows further increases the building's efficiency.

In addition, the project increases sustainability through the use of recycled building materials. After more than two years of joint efforts between the Sino-Swiss teams, the construction was officially completed on September 27th, 2023 and the ZEB goal was achieved.



Energy consumption and production of DP Beijing

NANSHAN ENERGY ECOLOGICAL PARK, ZERO CARBON WORLD
QIANHAI, SHENZHEN



FACTSHEET

LOCATION

Qianhai Shenzhen-Hong Kong Cooperation Zone, Shenzhen

CLIMATE

Hot summer / warm winter

PLANNING TEAM

ARCHITECT

Jianxue Architecture and Engineering Design Institute Co., Ltd.

ENERGY CONSULTANT

Jianxue Architecture and Engineering Design Institute Co., Ltd.

INVESTOR

Shenzhen Energy Environment Engineering Co., Ltd

PROJECT INFORMATION

SIZE

Gross building area: 8162 ㎡ (4 above-ground floors)

FUNCTION

Swimming pool and sport center

TECHNICAL INPUT FROM THE PROJECT

The project enhances the Nanshan incineration plant in Shenzhen with a cultural and sports activity center. Designed to withstand hot and humid climate and substantial environmental noise, the building features innovative climate buffer layers on its south and north sides. These layers incorporate circulation areas and photovoltaic panels on the roof, creating an insulated "cavity" that improves thermal insulation and reduces noise for the interior spaces.

An innovative feature applied is the use of a 0.5cm water film on the glass facades of the lobby on the first-floor and the west side of the swimming pool on the fourth floor. Simulations have shown that this water film cools the glass surface, effectively reducing the cooling capacity required for the swimming pool area.

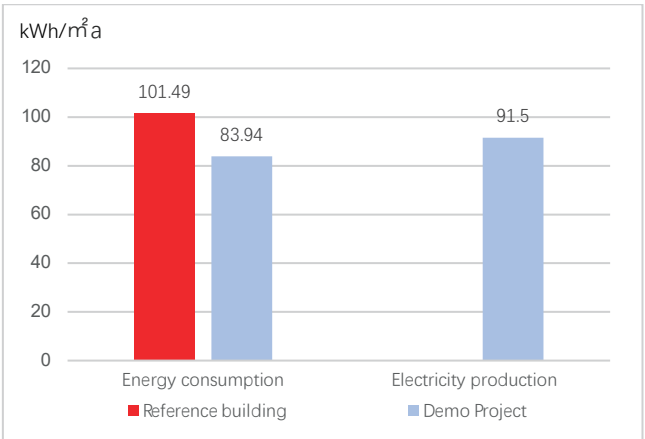
Rendering of the project in planning phase. ©DP Shenzhen

The project also pioneers in environmental sustainability by reusing "waste steam" from high-temperature steam electricity generation. By introducing 1.9t/h of low-temperature steam from the waste-to-energy incineration plant, the project utilizes this residual heat for various applications, establishing a critical strategy for reducing carbon emissions from material.

HIGHLIGHTS OF THE DEMO PROJECT

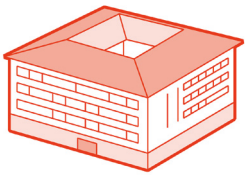
The Nanshan incineration plant has the capacity to process all household waste from the Nanshan district daily, playing a significant role in improving the urban environment and reducing the city's carbon emissions. The incineration of waste generates heat and ash, which are cooled by circulating water. The efficient reuse of the "three wastes" of the power plant (waste steam, waste water, and ash) is a key technological innovation of the project

Taking advantage of Shenzhen's high solar elevation angle, the photovoltaic panels on the roof face east, west, south, and north and are arranged at an 8° angle in an artistic formation. This creates a romantic view of "sea-side shimmer," which integrates with the ocean to form a "new aesthetic" for low-carbon architecture.



Energy consumption and production of DP Shenzhen

TRAINING BUILDING OF LONG SHAN SHU YUAN MIDDLE SCHOOL, SHAOXING, ZHEJIANG



FACTSHEET

LOCATION

Shaoxing, Zhejiang Province

CLIMATE

Hot summer / cold winter

PLANNING TEAM

ARCHITECT

China Academy of Building Research Co., Ltd.

ENERGY CONSULTANT

Centre for Science, Technology and Industrial Development, Ministry of Housing and Construction
Beijing Kangju Certification Centre Co., Ltd.

INVESTOR

Shaoxing Future Community Development and Construction Co., Ltd.

PROJECT INFORMATION

SIZE

Gross building area
Hall: 5697 ㎡
(4 above-ground floors)

FUNCTION

School building

TECHNICAL INPUT FROM THE PROJECT

The Shaoxing demonstration project incorporates a number of passive design strategies to improve its architectural blueprint. These include enhancing building airtightness, using high-performance external wall insulation systems, integrating advanced doors and window curtain systems, and adopting designs that eliminate thermal bridges. These concerted efforts ensure that the building exceeds ultra-low energy consumption benchmarks and seamlessly combines energy efficiency and optimal comfort.

By adopting recycled concrete, the project not only saves 62% of limestone resources, but also saves 40% of clay resources and 35% of iron powder resources required for manufacturing cement, enabling energy saving and emission reduction.

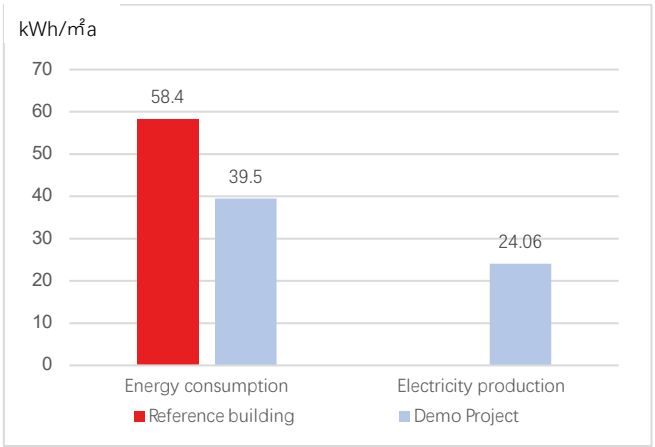
Rendering of the project in planning phase. ©DP Shaoxing

Photovoltaic tile modules have been installed on the roofs of the project buildings to make use of renewable energy. These modules are not only technically efficient but also aesthetically pleasing. This approach has significant potential for widespread adoption and application across China.

HIGHLIGHTS OF THE DEMO PROJECT

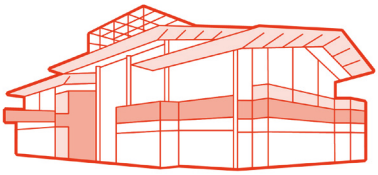
Architecturally, the project is characterized by a minimalist yet classic style. Its compact volume and the proportion of built to surface area are optimally balanced, achieving both aesthetic appeal and practicality. Photovoltaic technology has been applied to the main building and on other structures on the campus, including bicycle sheds, sports stadium stands, and pavilion roof

During the construction process, the project team conducted in-depth research and leveraged the lifecycle of the low-carbon concrete technology. Optimization of material, low carbon preparation, energy-saving transport, refined maintenance and durability improvement were achieved. This technology improved the low-carbon performance of concrete and addressed the challenges of aggregate sourcing and construction waste disposal, laying a solid foundation for the project's sustainable development.



Energy consumption and production of DP Shaoxing

SHANGHAI JIADING FUTURE CITY
JIADING, SHANGHAI



FACTSHEET

LOCATION

Jiading District, Shanghai

CLIMATE

Hot summer / cold winter

PLANNING TEAM

ARCHITECT

East China Architectural
Design & Research Co., Ltd.

ENERGY CONSULTANT

East China Architectural
Design & Research Co., Ltd.

INVESTOR

Shanghai Jia Future Property Co., Ltd.

PROJECT INFORMATION

SIZE

Gross building area
Market Hall: 5760 ㎡
(2 above-ground floors and
1 below-ground floor)
Exhibition Hall: 2942 ㎡ (2 above-ground floors)

FUNCTION

Market Hall and exhibition Hall

TECHNICAL INPUT FROM THE PROJECT

The main material of the market hall is wood, with a few steel columns and beams hidden behind wooden panels. The lighting and ventilation of the atrium has been meticulously calculated and combined with an intelligent system to ensure suitable temperatures and humidity for people and plants across different seasons.

The atrium is equipped with efficient HVLS ceiling fans, creating a comfortable experience indoors.

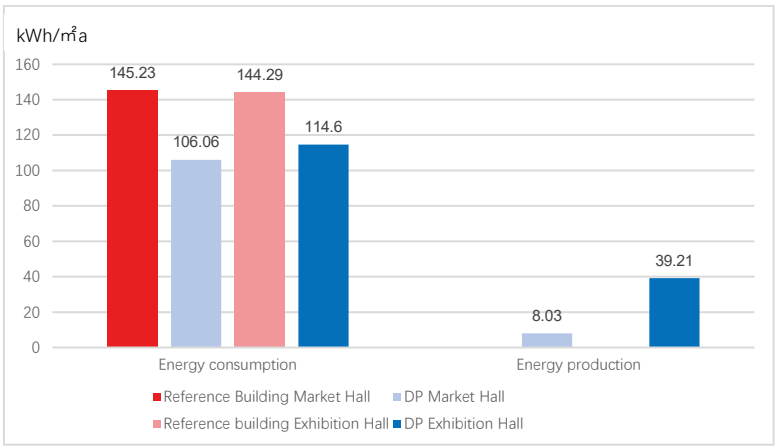
The integration of photovoltaics into the roofing not only increases power generation efficiency but also balances investment costs and aesthetic design. A restrained ventilation layer effectively reduces the summer heat radiation's impact on the building. The photovoltaic system can directly supply electricity for air conditioning of the public area and lighting, with surplus electricity being used for energy storage in the building and charging electric vehicles. The kitchen waste generated in the market hall is converted into organic fertilizer on-site through underground waste treatment facilities. This significantly reduces processing costs and minimizes odours.

Market hall after completion. ©DP Shanghai

Short-process steel (recycled from scrap steel) and recycled concrete (using construction waste as concrete aggregate) were selected as materials for the construction of the exhibition hall.

HIGHLIGHTS OF THE DEMO PROJECT

As important public structures within the low-carbon district, both the market hall and the exhibition hall demonstrate low-carbon living ideals through their architecture. Constructed from wood and steel, the market hall provides an open space and an indoor green courtyard, making it a central element of the new low-carbon district. The shops inside the market hall are dedicated to low-carbon principles, contributing to the transition towards future low-carbon cities. Similarly, the exhibition hall, distinguished by its skylight, functions as a dynamic space for the Future City Project, hosting workshops for community engagement.



Energy consumption and production of DP Shanghai

DEVELOPMENT ZONE WATERWORKS PHASE II TAIXING, JIANGSU

FACTSHEET

LOCATION

Taixing, Jiangsu Province

CLIMATE

Hot summer / cold winter

PLANNING TEAM

ARCHITECT

Tenio Architecture and Engineering Co., Ltd.

ENERGY CONSULTANT

Tenio Architecture and Engineering Co., Ltd.

INVESTOR

China Construction Eco-Environmental Group Co., Ltd.

PROJECT INFORMATION

SIZE

Gross building area: 2687 ㎡
(3 above-ground floors)

FUNCTION

Office, dormitory, dining and canteen

TECHNICAL INPUT FROM THE PROJECT

Guided by the core ZEB strategies for hot summers and cold winters climate zone, this project uses green design principles, focusing on insulation, ventilation, shading, and an efficient fresh air heat recovery system as its four central elements. For the exterior walls, roofs, and skylights, advanced facade building materials and rooftop photovoltaic technology are utilized to efficiently harness renewable energy, enhancing the building's energy efficiency.

The design of courtyards and open corridors provides natural ventilation and lighting for the building complex, creating a comfortable and pleasant indoor environment. Additionally, the project incorporates recyclable building materials for external louvers, effectively preventing direct sunlight and glare, offering both environmental and practical benefits.

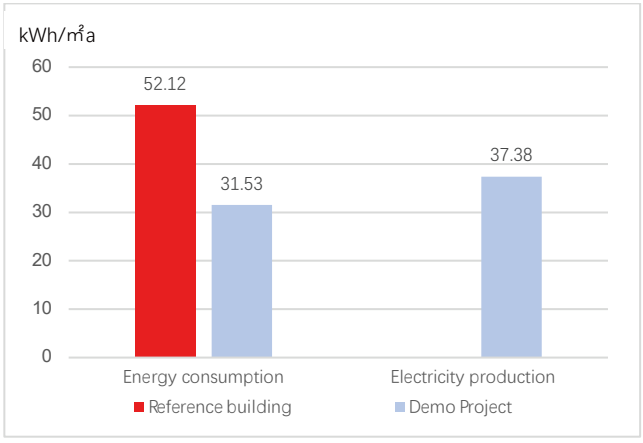
Rendering of the project in planning phase. ©DP Taixing

Moreover, the project integrates a water courtyard at the building entrance, employing sewage treatment devices and rain chains to collect roof rainwater into a rainwater collection pool. Purified by filtrationsystems, the rainwater is utilized in water feature displays, blending technology with art and facilitating recycling of water resources.

HIGHLIGHTS OF THE DEMO PROJECT

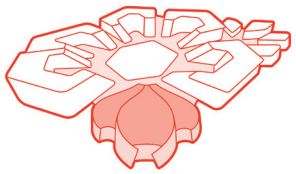
The building complex, located around the Taixing Water Plant, centers on efficiently utilizing the area's water supply facilities to enhance the building's energy efficiency in heating, cooling, and electricity, merging technical and spatial design.

In shaping the buildings, the design team drew inspiration from the energy-saving concepts of traditional Jiangnan residential architecture, translating these ideas into space. This approach not only imbues the buildings with unique aesthetic value but also integrates natural elements like water and wind, demonstrating harmonious coexistence with nature. Additionally, the project excels in resource management, comprehensively addressing water, wastewater, rainwater, and kitchen waste, embodying the principles of sustainable development.



Energy consumption and production of DP Taixing

WUXI SHANGXIAN LAKE LOW-CARBON DIGITAL INDUSTRIAL PARK PHASE II



FACTSHEET

LOCATION

Wuxi, Jiangsu Province

CLIMATE

Hot summer / cold winter

PLANNING TEAM

ARCHITECT

China Academy of Building Research Co., Ltd.

ENERGY CONSULTANT

China Academy of Building Research Co., Ltd.

INVESTOR

Wuxi Taihu New City Urban Development Co., Ltd.

PROJECT INFORMATION

SIZE

Gross building area
Building 1#: 14900 ㎡
(3 above-ground floors and
1 below-ground floor)

FUNCTION

Mix functions with office, conference, exhibition, education

TECHNICAL INPUT FROM THE PROJECT

This project is guided by the energy consumption values of ZEB in regions with hot summers and cold winters, designed according to the technical standards of passive zero-energy buildings. In terms of low-carbon technological measures, the project chose high-energy-efficiency, high-airtightness windows, and exterior curtain walls to reduce energy loss and improve energy efficiency of buildings. Additionally, the air conditioning system utilizes a ground-source heat pump system and a heat pump recovery system to fully exploit geothermal energy. The introduction of a photovoltaic system on the roof enables the building to generate its own electricity, reducing dependency on traditional energy sources. For lighting, the project employs zoned intelligent control technology and LED energy-saving light sources, enhancing lighting effects while achieving precise control of energy consumption. An intelligent management system dynamically monitors and manages the building's energy use, ensuring efficient energy utilization.

Rendering of the project in planning phase. ©DP Wuxi

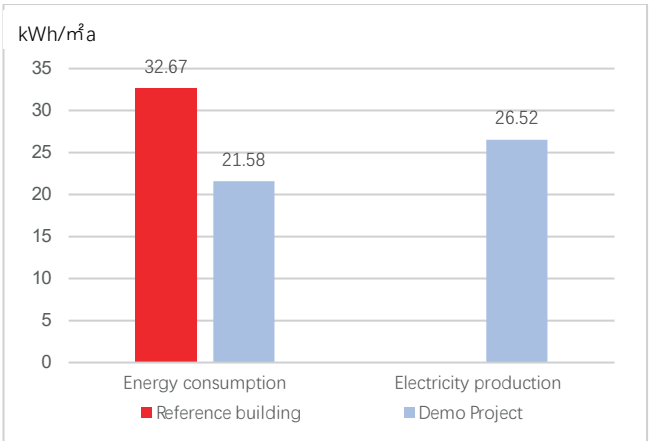
The project has implemented an indoor environment quality monitoring system to ensure environmental quality inside the building. The monitoring system continuously controls and adjusts indoor environmental parameters, creating a comfortable and healthy living and working environment for occupants.

HIGHLIGHTS OF THE DEMO PROJECT

The planning concept aligns with the government's central axis for landscape, leveraging the location's advantage to establish the park as a prominent cityscape. The design symbolized by the city flower of Wuxi, shapes the spatial concept of the entire park, creating the idea of Wuxi's core area as a vibrant financial hub. The design ensures coherence and offers diverse spatial experiences.

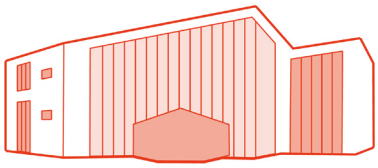
The architectural complex encompasses headquarters offices, technology research and development facilities, a park service center, and public service amenities. The project aims to integrate financial services, office spaces, and conference functions, aiming to establish an international low-carbon digital industrial park.

The architectural plan for Building #1, using the architectural language of "flowers," is located at the northeast corner of the project, serving as a financial-themed conference center.



Energy consumption and production of DP Wuxi

CHINESE BEE MUSEUM
LIUBA COUNTY, HANZHONG, SHAANXI



FACTSHEET

LOCATION

Huoshaodian Town, Liuba County, Hanzhong City, Shaanxi Province

CLIMATE

Cold

PLANNING TEAM

ARCHITECT

Architectural design and Research Institute, Xi'an University of Architecture & Technology

ENERGY CONSULTANT

Architectural design and Research Institute, Xi'an University of Architecture & Technology

INVESTOR

Liuba Yunmu Rural Tourism Development Co., Ltd.

PROJECT INFORMATION

SIZE

Gross building area: 1530 ㎡
(2 above-ground floors)

FUNCTION

Exhibition, Research and Shops

TECHNICAL INPUT FROM THE PROJECT

The demonstration project leverages reduction and lightweight design principles to minimize beam and column dimensions and reduce steel usage. By utilizing recyclable building materials, it anticipates a 29% reduction in carbon emissions from material production and transportation.

The project seamlessly integrates photovoltaic panels and shading systems into the roof and façade, crafting a comprehensive energy-saving strategy that enhances energy utilization and diminishes operational carbon emissions.

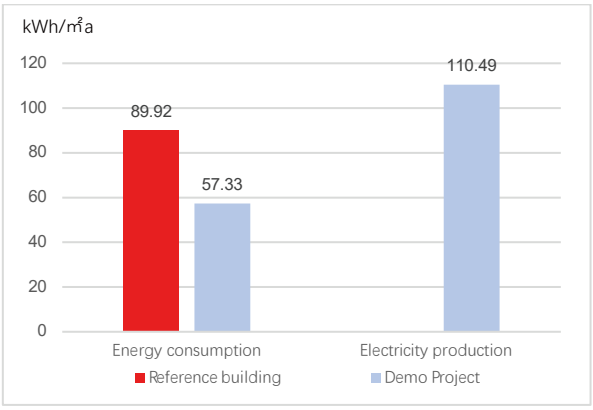
Structurally, the design offers versatile floor layouts, catering to diverse requirements. Its detachable design principle ensures easy adaptation to future exhibition needs of varying scales or functions, showcasing its outstanding flexibility and scalability.

Rendering of the project in planning phase. ©DP Shaanxi

Moreover, the project prioritizes landscape and biodiversity, striving to forge a harmonious coexistence between humans and nature through enhanced carbon absorption. This strategy aims for a synergistic benefit between architectural development and the ecological environment, promoting a balanced cohabitation.

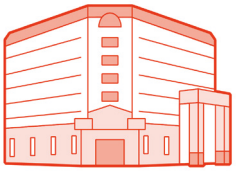
HIGHLIGHTS OF THE DEMO PROJECT

The Shaanxi demonstration project, situated in a rural area, not only serves as a research function but also incorporates tourism elements. Given the similarity between the local environment, project background, and Switzerland's architectural physics and natural setting, the project draws extensively from Switzerland's rich experience. Architecturally, the project features a unique honeycomb design, offering a more varied and rich façade compared to conventional rectangular structures. Through meticulously planned courtyards, well-lit glass curtain walls, and diverse double-layered open spaces, even the deepest parts of the building bask in abundant natural light. Furthermore, the project extensively utilizes green building materials that are recyclable and reusable, effectively reducing the building's embodied carbon emissions.



Energy consumption and production of DP Shaanxi

OFFICE BUILDING COMPLEX HARBIN, HEILONGJIANG



FACTSHEET

LOCATION

Harbin, Heilongjiang Province

CLIMATE

Severe cold

PLANNING TEAM

ARCHITECT

Heilongjiang Province Academy of Cold Area Building Research

ENERGY CONSULTANT

Heilongjiang Province Academy of Cold Area Building Research

INVESTOR

Heilongjiang Province Academy of Cold Area Building Research

PROJECT INFORMATION

SIZE

Gross building area: 8610 ㎡ (7 above-ground floors and 1 below-ground floors)

FUNCTION

Office

TECHNICAL INPUT FROM THE PROJECT

The design of the street-facing façades integrates a sophisticated composite system, combining internal insulation with an exterior wall thermal insulation coating, ensuring maximum energy efficiency. The courtyard façades take advantage of external insulation techniques to enhance thermal performance. To make the most of the constrained interior spaces while circumventing the limitations of vacuum insulation effectiveness, the project employs a strategic blend of vacuum insulation panels and other inorganic insulating materials, striking a balance between insulation effectiveness and spatial utilization.

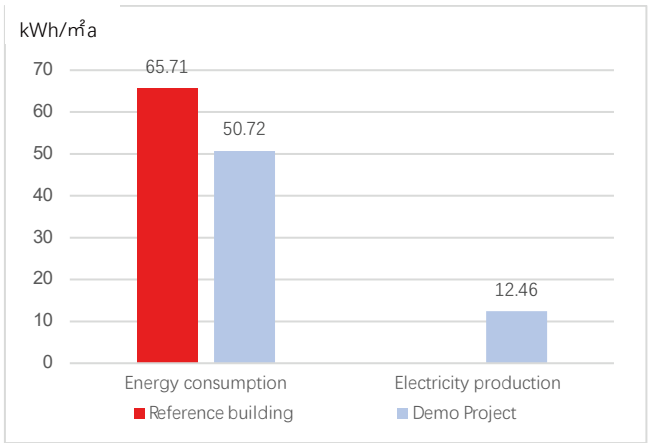
During the harsh winter months, the project leverages air source heat pump technology, providing efficient heating by harnessing energy from the air outside.

Rendering of the project in planning phase. ©DP Harbin

Acknowledging the challenge posed by limited floor-to-ceiling heights, the project pioneers in the realm of compound ventilation solutions. This approach not only optimizes air quality and thermal comfort but also supports the overall energy efficiency goals of the project. Through these strategic design and technological choices, the project stands as a testament to sustainable architecture, aiming to set a new standard for energy-efficient building design in challenging climates.

HIGHLIGHTS OF THE DEMO PROJECT

The Heilongjiang/Harbin demonstration project is China's first renovation project to adopt the ZEB standard. It is situated in a prominent location in the city center, surrounded by streets with historical facades, presenting significant design and construction challenges. The project's exploration of internal insulation techniques and fresh air preheating technology holds great significance for applications in cold regions. The planning and execution of the project demanded highly specialized knowledge and attention to detail. Various forms of insulation and heating, and HVAC systems were tested using a diverse range of products from multiple manufacturers, with long-term durability. As a ZEB demonstration project, the Harbin historic building renovation is poised to become a landmark project in China's architectural renovation field, setting a precedent for the industry's development direction.



Energy consumption and production of DP Harbin

让我们共同打造气候中和的未来
Building a climate neutral future together

SINO-SWISS ZERO EMISSIONS BUILDING PROJECT

To jointly address global climate change and strengthen cooperation between China and Switzerland in the field of emission reduction in the construction industry, on 24th November 2020, the Ministry of Housing and Urban-Rural Development (MoHURD) of the People's Republic of China and the Swiss Federal Ministry of Foreign Affairs (FDFA) signed a Memorandum of Understanding on the development of cooperation in the field of building energy efficiency. Within the framework of this MoU, the Swiss Agency for Development Cooperation (SDC) initiated and funded the Sino-Swiss Zero Emissions Building (ZEB) project. The project aims to support China in formulating technical standards of zero carbon buildings and long-term roadmaps for reducing carbon emissions in the construction industry by leveraging Swiss experience and technology. The project supports zero-carbon demonstration projects in four climate zones and conducts capacity building activities for policy makers, professionals from industry, and academia to promote carbon-neutral development of China's construction sector.

中华人民共和国
住房和城乡建设部

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Confederaziun svizra

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