

### **Important Notes:**

- 1. All site visits should be reserved on site together with the conference registration.**
- 2. Transportation/lunch fees will be charged on site as appropriate.**
- 3. Visa for entry to China is required for Trip 2, so please apply for a valid visa in advance.**

### **Trip 1 (50 max): Tour of Solar farm at Siu Ho Wan Sewage Treatment Works**

#### **Aug 26 2018**

- 9:00 - Departure from PolyU campus
- 10:00 - 11:30 - Tour of Solar farm at Siu Ho Wan Sewage Treatment Works
- 12:00 - Departure to Discovery Bay
- 12:30 - 13:30 - Lunch
- 14:00 - Free afternoon at Discovery Bay
- 16:30 - Pick-up at Discovery Bay to PolyU campus



The solar farm at the Siu Ho Wan Sewage Treatment Works of the Drainage Services Department (DSD) came into operation on December 2016. The largest of its kind in Hong Kong, the solar farm comprises over 4,200 polycrystalline photovoltaic panels with an installed generation capacity of 1,100 kilowatts. It can generate as much as 1.1 million kilowatt-hours of electricity annually. The electricity generated by the solar farm at Siu Ho Wan Sewage Treatment Works will be fed through an internal power distribution network to various facilities inside the plant, including screening facilities, a workshop, an administration building, an ultra-violet disinfection system and sludge treatment facilities, which account for about 25% of the current annual electricity consumption of the plant.

## **Trip 2 (50 max): Tour of Shenzhen Low Carbon Construction Achievements**

### **Aug 27 2018**

- 09:00 - Departure from PolyU campus
- 10:00 - Arrival at the International Low Carbon City
- 10:00-11:00 - Tour of the Low Carbon City and DC building open laboratory
- 11:00-12:00 - Bus to the Shenzhen IBR building
- 12:00-13:30 - Lunch
- 13:30-14:30 - Tour of the Shenzhen IBR building
- 14:30-15:00 - Bus to the Shenzhen Bay Eco-Technology Park
- 15:00-16:30 - Tour of the Shenzhen Bay Eco-Technology Park
- 17:00 - Back to PolyU campus



**Shenzhen International Low Carbon City** is one of the 10 flagship projects of the China-EU Urbanization Partnership signed by Premier Li Keqiang in May 2012 with the chairman of the European Commission. The involved area includes the Pingdi Subdistrict of the Longgang District, with a planned area of 53.4 km<sup>2</sup>. Based on the emerging low carbon industrial clusters, the city is driven by institutional innovation and gathers international advanced low carbon technologies and management measures. With the high-standard orientation, high start point planning and high-level construction, the project plays a leading role in promoting industrial transformation and upgrading, transforming economic development mode, and exploring the "intensive, intelligent, green, low carbon" urbanization road.

**DC building open laboratory** is located in the International Low Carbon City, the 500 m<sup>2</sup> open laboratory has been built and put into operation. Based on the future cube of the low carbon city, the laboratory realizes the comprehensive transformation from traditional AC power supply to DC power supply.

**Shenzhen IBR building** is located at No. 29, Meiao 3rd Road, Shangmeilin, Futian District, Shenzhen, the IBR building covers an area of 3,000 m<sup>2</sup>, with a total construction area of 18,000

m<sup>2</sup>, 12 floors on the ground and 2 floors below the ground. In this propagable and populist green R&D office building, the functional areas with similar features, space requirements, and organizations are vertically located based on the climate characteristics of hot summer and warm winter, enclosed with the external retaining that meets different requirements. The entire building from inside to outside shows a unique natural structure.

**Shenzhen Bay Eco-Technology Park** is located in the core area of high-tech zone in the South District of Shenzhen high-tech Industrial Park. The park covers an area of 203,100 m<sup>2</sup>, with a total building area of 1,870,000 m<sup>2</sup>. The total area of the project is 1,218,000 m<sup>2</sup>, including industrial housing, office, business, hotel, and apartment. The total investment was 15 billion yuan and the park was completed in April 2016. The project is a 3rd generation industrial park based on the "vertical city, green architecture" concept, integrating the functions of production, life, and ecology. The industrial area accounts for 70% of the total park, which attracts the headquarters of high-tech enterprises and R&D of strategic emerging industries.

# Shenzhen Low Carbon Construction Achievements Investigation

## Schedule for ICAE Participants

### 1. Visitors

About 50 ICAE participants

### 2. Arrival Date

August 27, 2018

### 3. Schedule

No.	Time	Action	Remarks
1	9:00	Assemble at the parking lots of the Hong Kong Polytechnic University, and then go to the International Low Carbon City.	About one hour ride
2	10:00-11:00	Visit the Low Carbon City and DC building open laboratory.	
3	11:00-12:00	Go to the Shenzhen IBR building.	About one hour ride
4	12:00-13:30	Lunch	
5	13:30-14:30	Visit the Shenzhen IBR building.	
6	14:30-15:00	Go to the Shenzhen Bay Eco-Technology Park.	
7	15:00-16:30	Visit the Shenzhen Bay Eco-Technology Park.	
8	16:30-17:00	Back to hotel.	

**Attachment: Introduction to the visiting spots**

## Shenzhen International Low Carbon City

Shenzhen International Low Carbon City is one of the 10 flagship projects of the China-EU Urbanization Partnership signed by Premier Li Keqiang in May 2012 with the chairman of the European Commission. The involved area includes the Pingdi Subdistrict of the Longgang District, with a planned area of 53.4 km<sup>2</sup>. Based on the emerging low carbon industrial clusters, the city is driven by institutional innovation and gathers international advanced low carbon technologies and management measures. With the high-standard orientation, high start point planning and high-level construction, the project plays a leading role



in promoting industrial transformation and upgrading, transforming economic development mode, and exploring the "intensive, intelligent, green, low carbon" urbanization road. Shenzhen is making efforts to build a comprehensive experimental area for national low carbon development. The Low Carbon City won the 2014 Sustainable Cities Prize rewarded by CCIE and the Paulson Institute of the United States in November 2014.

The Shenzhen International Low Carbon City Exhibition Center is in the core area of the Shenzhen International Low Carbon City. It is adjacent to Dingshan river in the Southeast, Hakka house in the west, and R&D pilot land in the north. The total land area of the project is 120,000 m<sup>2</sup>, with a total construction area of about 23,000 m<sup>2</sup>.



Based on the concept of "Green and Low Carbon", the project uses 10 technical systems and 97 technical strategies to make the building performance superior to the national green buildings three-star standard. The energy consumption is 50% lower than that of the traditional exhibition

centers, and carbon production is reduced by 1000 tons or more per year.

The exhibition center consists of three main buildings: low carbon technology exhibition hall, low carbon international conference room, and low carbon city exhibition hall, involving two major indoor and outdoor low carbon demonstration areas and more than 20 conference rooms and negotiation rooms for various conferences and business activities. In addition, the center has open laboratories, expert apartments, innovation workshop and dining rooms. The center can provide offices to companies and organizations and hold open social activities.

## DC building open laboratory

Located in the International Low Carbon City, the 500 m<sup>2</sup> open laboratory has been built and put into operation. Based on the future cube of the low carbon city, the laboratory realizes the comprehensive transformation from traditional AC power supply to DC power supply.

The laboratory consists of the experimental area at 1st floor and office areas at 2nd and 3rd floors. The entire laboratory uses DC power supply, including computers, printers, projectors, TV sets, sockets, lighting equipment, and air conditioners. The functions of office and experimental areas are integrated to unveil the mysterious laboratory. People can feel the charm of DC in daily work.

The DC laboratory includes the power distribution area, test area, electrical appliance area and interactive area. Equipped with the DC microgrid system for intelligent buildings, the laboratory uses the power distribution system as "heart". The input side is the 22 kW, 540 V DC bus, equipped with a 15 kW photovoltaic power generation system. The output voltage includes 220 V DC, 48 V DC, 24 V DC, and 5 V DC, meeting various power supply requirements. In addition, the laboratory has a 54 kWh lead-acid battery. By the enforcement of the building DC monitoring platform operation policy, the laboratory operates with high energy efficiency. The laboratory fully shows the "source - network - charging - storage" and "peak shaving" concepts of microgrid.



The test area of the DC laboratory provides multiple levels of DC voltage to meet the running and compatibility test requirements of lighting systems, air conditioner control systems, and DC electric appliances. The building DC smart control system provides a platform for system design optimization, control policy enforcement, and experimental verification of DC buildings.

The research topics of the DC laboratory include:

1. Design standard of low voltage DC power distribution for civil buildings
2. DC power application scenario analysis in buildings
3. System verification and test
4. DC voltage level and topology structure of buildings
5. System control policy comparison and analysis, for example, minimum electric charge mode, requirement response mode, and electricity obtain with constant power
6. DC system emulation and experimental verification

On this open and shared DC experimental platform, all like-minded people are welcome to join in exploring the development of DC construction.

## **Shenzhen IBR building**

Located at No. 29, Meiao 3rd Road, Shangmeilin, Futian District, Shenzhen, the IBR building covers an area of 3,000 m<sup>2</sup>, with a total construction area of 18,000 m<sup>2</sup>, 12 floors on the ground and 2 floors below the ground. In this propagable and populist green R&D office building, the functional areas with similar features, space requirements, and organizations are vertically located based on the climate characteristics of hot summer and warm winter, enclosed with the external retaining that meets different requirements. The entire building from inside to outside shows a unique natural structure.

The IBR building uses more than 40 green construction technologies, complying with the three-star (top grade) green building standard. The operation statistics of the building show that the power consumption of the office area is 66.6 kWh/m<sup>2</sup>, which is 64% lower than that of similar office buildings in Shenzhen, and the water consumption is reduced by 53%.

The IBR building has become a typical carrier for spreading the green technologies with Chinese characteristics and green life culture of China. Since the completion in April 2009, the building has received more than 30,000 visitors. In 2013, the building was introduced in the "Light of Science and Technology" column of CCTV-10 by the subject "A building that can breathe" and the "Topics In Focus" column of CCTV-1 by the subject "To Find a Prescription After a High Fever".

The building has won many prizes, including the first prize of Green Building Innovation Award, the three-star green building (top grade), Good Design Creates Good Benefits - Best Green Building Prize jointly rewarded by Architectural Record, Business Weekly, and Times Architecture, golden prize for Green Architecture of World Green Design International Award jointly rewarded by Guanghua Design Foundation, European Parliament China - Europe Friendship Association, and International Design Federation, and Hong Kong Green Building Award. In 2014, the IBR building was awarded the Pioneer Award for Green Building in Asia Pacific Region of the Global Green Building Committee (9 buildings awarded in the 1st conference, and only one in Chinese Mainland).

In the architecture of the IBR building, Shenzhen Institute of Building Research unprecedentedly put forward the green technology philosophical view of "balance, share, space-time, and system", the green technical principle of "local, low consumption, and

refinement", and green technical system consisting of "policy, market, and technology", and form the "shared design" based on the equal view of life. These ideas enrich the green city theory with Chinese characteristics in the exploration of the green technology system with Chinese characteristics. These ideas have been integrated into national green architecture design standards and national green ecological urban evaluation guidelines, providing good experience for the urbanization in China.



## **Shenzhen Bay Eco-Technology Park**

Shenzhen Bay Eco-Technology Park is located in the core area of high-tech zone in the South District of Shenzhen high-tech Industrial Park. It is adjacent to West Shahe Road in the east, South Keji Road in the west, High-Tech Nanshi Road in the south, and Baishi Road in the north. The park is adjacent to Qianhai, Houhai development center and Shahe golf course. The surrounding road network is complete and rail transportation is convenient. The travel from the park to Hong Kong and the important functional areas of Shenzhen is very convenient and fast. The park has superior location conditions.

The park covers an area of 203,100 m<sup>2</sup>, with a total building area of 1,870,000 m<sup>2</sup>. The total area of the project is 1,218,000 m<sup>2</sup>, including industrial housing, office, business, hotel, and apartment. The total investment was 15 billion yuan and the park was completed in April 2016.

Shenzhen Bay Eco-Technology Park a project deployed and promoted by the investment and financing system reform of Shenzhen. It becomes a base gathering the strategic emerging industries, the headquarters of listed companies, scientific research institutions, and modern comprehensive service industries. It will become a new platform for the development of strategic emerging industries in Shenzhen and the service center for the high-tech zones in Shenzhen. The strategic emerging industries such as new generation information technologies, Internet, new energy, and new materials will continuously enter the park.

The project is a 3rd generation industrial park based on the "vertical city, green architecture" concept, integrating the functions of production, life, and ecology. The industrial area accounts for 70% of the total park, which attracts the headquarters of high-tech enterprises and R&D of strategic emerging industries. The campus service supporting area accounts for 30%, which provides the functions of office, business, hotel, and apartment. The park changes the traditional industrial park style that has only production area but no life area.

The vertical design includes a 93 m cyber garden, a 24 m air platform, and a 50 m roof garden, combining the business, R&D, and headquarters functions into one park. The park with a 60 plot ratio provides a 100,000 m<sup>2</sup> air garden for people to work in breeze, fine water, green field, and soft light.

The park uses 18 green technologies such as ecological skin, temperature and humidity control, and intelligent operation in the water resource use and four technical modules (campus

system, building body, indoor environment, and construction and operation), to ensure low consumption, low emission, high performance, and high comfort level. The green can make profits.

