

The New Challenge of Architecture Design
Zero Net Carbon
Professional Training Program



零碳绿建技术推进委员会 建筑 2030 咨询

建筑设计新挑战

净零碳设计 研讨会



同济设计 TJAD

同济大学建筑设计研究院（集团）有限公司

2017年9月20日至22日，中国上海，同济院
September 20th to 22nd 2017, TJAD, Shanghai, China

Background

The Paris Agreement establishes the target to keep the increase in global average temperature to well below 2 degrees C above pre-industrial levels. The building sector is responsible for about 1/3 GHG emissions globally. To achieve the Paris Agreement, it is crucial to reduce the energy consumption and GHG emissions of the building sector.

To accommodate an urban population that is expected to reach one billion by the year 2030, China is adding roughly two billion square meters of new buildings annually. It is more important than ever to train Chinese design professionals in the principles, tools, and processes that deliver highly efficient, carbon neutral buildings and developments.

In October 2015, 52 Chinese local design institutes and international architecture and planning firms signed the China Accord, setting “carbon neutral or near carbon neutral” as the design standard for all new building projects in China. The China Exploration and Design Association Architecture Branch (CEDAAB) and Architecture 2030 have since established Zero Net Carbon (ZNC) as a necessary and achievable goal for Chinese building practice. The China ZNC Professional Training Program builds on this established commitment and momentum towards Zero Net Carbon.

Project Goals

The China ZNC Professional Training Program will be the first ever to prepare architects, building sector professionals, and future trainers from all parts of China in the design of Zero Net Carbon buildings and developments.

Unlike most green building training programs being offered so far, this program is principally targeted at empowering architects to lead in the design process by providing them with sustainable design principles and case studies. Not only will participants learn about ways to achieve green building certifications, they will also understand the rationale behind different sustainable design strategies, and be able to confidently deploy informed analysis and well-integrated design strategies to cost-effectively reduce energy consumption and carbon emissions.

This training event, along with provided course materials and learning resources, is intended to facilitate the development of future professional training and education programs through CEDAAB, universities, local design institutes, international firms and other organizations throughout China.

The two and a half-day China ZNC Professional Training Program will be held in Shanghai on September 20-22, 2017 and is organized by Architecture 2030 in partnership with the Zero Carbon Green Building Technology Promotional Committee of the CEDAAB, hosted by Tongji Architectural Design (Group) Co., Ltd.

The China ZNC Professional Training program will provide 100+ professionals with the answers to the following questions:

- What can we, as architects, do in response to climate change?
- What is the design process for ZNC buildings and urban developments?
- How is iterative energy modeling critical to achieving energy targets?
- Which design strategies will be most effective for a given climate zone?
- How can passive strategies minimize or even eliminate the need for mechanical systems in buildings?
- What is the role of on-site and off-site renewable energy sources in achieving ZNC targets?



Signing Ceremony of the China Accord, Oct 2015

9月20日议程 Agenda of 20th September

Session 1
0830-0900

OPENING
Registration

0900-0930

Opening and Welcoming Speeches

Edward Mazria, FAIA, Hon FRAIC, Founder and CEO of Architecture 2030

Xueya Che, Director of Zero Carbon Green Building Design Committee, Tongji Architectural Design (Group) Co., Ltd, Deputy Chief Architect, Deputy Director, Technology Development Dept

Session 2

PROFESSIONAL TRAINING

0930-1100

1A: Low Carbon Urban Planning and Development

- o Transit-oriented development
- o Mixed-use development
- o Street networks
- o Public open space
- o Non-motorized transit
- o District renewable energy
- o Water efficiency

Philip Enquist, FAIA, Partner in Charge of Urban Planning and Design, SOM

1100-1115

Break

1115-1230

1B: Introduction to ZNC Building Design; Energy and Emissions Targets

- o Overview of design approach and tools
- o Target setting and performance metrics

Greg Mella, FAIA, LEED AP Discipline Leader Sustainable Design, SmithGroup JJR

1230-1330

Lunch

1330-1430

Tools and Software: Introductions of Insight and EDGE

1430-1600

1C: Climate, Solar, and Site Analysis

- o Climate data
- o Solar access, sun path diagrams
- o Site analysis
- o Building form, orientation, and zoning for:
- o Daylighting
- o Heating-dominated, cooling-dominated, and mixed climates

Margaret Montgomery, FAIA, LEED AP, Principal and Sustainable Design Leader, NBBJ

1600-1615

Break

1615-1745

1D: Building Envelope

- o Facade design for heating-dominated, cooling-dominated, and mixed climates
- o Window-to-wall ratio, glazing properties
- o Thermal and moisture barriers
- o High-rise and double envelope facades

Ajla Aksamija, Assistant Professor, University of Massachusetts Amherst and Building Technology Researcher/Associate at Perkins+Will

1745-1800

Q&A

9月21日议程 Agenda of 21st September

- 0900-1030** **2A: Passive Heating Design Strategies**
o Design for passive systems
o Passive solar heating
o Solar glazing
o Heat storage
Amarpreet Sethi, CEM, HBDP, BEMP, LEED AP, Principal DLR Group
- 1030-1045** **Break**
- 1045-1200** **2B: Passive Cooling Design Strategies**
o Shading
o Natural ventilation
o Night vent cooling
Pablo La Roche, PhD, LEED AP, Associate VP and Sustainable Design Leader, CallisonRTKL and Professor of Architecture, California State Polytechnic University, Pomona
- 1200-1215** **Q&A**
- 1215-1330** **Lunch**
- 1330-1500** **2C: Daylighting and Integrated Lighting Design**
o Building form and orientation
o Side daylighting
o Top daylighting
o Daylighting controls
Christopher Meek, AIA, IES, Associate Professor, Director of the Integrated Design Lab, University of Washington
- 1500-1515** **Break**
- 1515-1700** **2D: Efficient Equipment, Controls, and Renewable Energy Systems**
o On-site fossil fuel free heating systems
o Photovoltaics
o Wind systems
o Rightsizing vs. oversizing
o Systems selection and controls
o HVAC system alternatives and selection criteria
Daniel Watch, FAIA, NCARB, LEED AP S&T Practice Leader, Principal, Perkins+Will
- 1700-1715** **Q&A**
- Session 3** **CLOSING**
- 1715-1745** **Closing Speeches**
Zhen Chen, Secretary General of China Exploration and Design Association Architecture Branch

9月22日议程 Agenda of 22nd September

- 0900-1230** **Insight Workshop: Modelling for ZNC Buildings**
o Early-phase, real-time energy simulation analysis modeling software
Trainers from Autodesk Insight
- 1230-1330** **Lunch**

Note:

Should you wish to test out some features of Insight, please install REVIT and Insight on your personal laptop prior to the workshop.

软件 Software



Autodesk Insight is a building performance analysis software based on cloud computing. It aims to help architects to understand all aspects of Architecture (orientation, enclosure, lighting and etc.) in the early design stages, and their impact on the overall performance of the building in the full life cycle. Therefore, it assists architects to optimize the design options in the early stage and generate decision report so that to save energy and protect the environment.

Insight is integrated into Revit and FormIt as a plug-in. Users can directly optimize energy use of design options, conduct energy consumption calculation, daylight analysis, solar energy analysis, heating and cooling load with EnergyPlus cloud computing and other functions extended. Some of the key pillars of Insight include:

1. Energy Consumption Range Calculation based on Various Performance Factors
2. Quickly Compare Design Scenarios
3. Heating and Cooling Loads – with EnergyPlus
4. Solar Radiation & Photovoltaic Energy Production
5. Customizable Daylighting Results & Automated Documentation
6. Automated AIA DDX Report
7. Incorporate ASHRAE90.1 and 2030 Challenge

Architecture 2030 is collaborating with Autodesk, integrating the 2030 Challenge into Insight 360 options of baselines.

主办单位 Organizers



零碳绿建技术推进委员会

Zero Carbon Green Building Technology Promotional Committee

Zero Carbon Green Building Technology Promotional Committee (Zero Carbon Committee, or ZCC) was established in 2016 as a working unit under the China Exploration and Design Association Architecture Branch (CEDAAB).

The ZCC aims to actively implement the national goals for architecture of being "applicable, economic, green and beautiful" in order to "protect the human living environment, leading the industry in design strategy and standardize the industry design standards". These are achieved by developing actions in relation to the basic functions of "industry services, industry training, industry management, industry representatives, and industry coordination". The ZCC strives to improve the zero carbon green building technological standard and management standard of China's architectural design industry as a whole, contributing to the country and the world's environmental protection and low carbon development.

The task of the ZCC is to actively participate in the promotion of the industry's zero carbon green building technology; organize member units and relevant experts and scholars, and actively explore zero carbon green building design strategies that are adapted to the characteristics and conditions of China. Through collaborations with domestic and international organizations, the ZCC will actively explore effective pathways to connect the Chinese and international architectural design industry in zero carbon green buildings design.

With the development of the global economy, environmental protection issues are an increasing concern of all countries. Protecting the earth means protecting human beings ourselves. Scientists tell us that in order to limit the average global temperature rise within 2°C to avoid irreversible catastrophes, the world must completely eliminate greenhouse gas emissions from fossil fuels by 2050. As a major carbon emitting country, China should play a positive and important role. The built environment accounts for nearly one-third of total global carbon emissions. The building industry is key in this critical challenge of slashing carbon emissions. The ZCC was born out of this local and global context, composed of experienced zero carbon green building professionals from the building industry.

The ZCC now has 20 members, led by Director Che Xueya from Tongji University Architectural Design and Research Institute (Group) Co., Ltd., and supported by Jiao Jian of Beijing Architectural Design and Research Institute Co., Ltd., Li Fang of Zhongnan Architectural Design Institute Co., Ltd., Zhang Jinyi of Tianjin City Architectural Design Institute, and Qiu Lihong of DLR Group, who all serve as both Deputy Directors and Secretary-General of ZCC.



ZCC Group photo
Jun 2016

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Architecture 2030 Consulting LLC

Architecture 2030 Consulting LLC is a company that provides consulting services on reducing energy consumption and greenhouse gas emissions in the built environment. Architecture 2030 Consulting LLC is affiliated to Architecture 2030, which is established in 2002 in response to the energy and climate crisis by architect, author and educator Edward Mazria. Architecture 2030's mission is to rapidly transform the built environment from being the major contributor of greenhouse gas (GHG) emissions to a central part of the solution to the climate crisis.



Architecture 2030 is headquartered in Santa Fe, New Mexico State in the United States, with another office in Seattle, Washington State. Please visit our website at www.architecture2030.org for further information.

Architecture 2030 pursues two primary objectives:

- the dramatic reduction in global fossil fuel consumption and GHG emissions of the built environment by changing the way cities, communities, infrastructure, and buildings, are planned, designed, and constructed;
- the regional development of an adaptive, resilient built environment that can manage the impacts of climate change, preserve natural resources, and access low-cost renewable energy resources.

On 12th Dec 2015, more than 190 countries signed the Paris Agreement. Signatories agreed to strengthen global efforts in response to climate change, committed to limiting global average temperature increase “well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C” in order to drastically reduce the risks and impacts of climate change. In accordance with the agreement, carbon emissions from fossil fuels must be eliminated from the global urban built environment by 2050. Between 2060 and 2080, zero carbon emissions must be achieved globally.

Urban areas are responsible for over 75% of global GHG emissions. By 2030, 80 billion m² of buildings will be built and rebuilt worldwide, the equivalent of 60% of the current global building stock. Between 2015-2035, the U.S. and China will account for 53% of the total global building floor space growth. If buildings do not adopt low carbon, sustainable design strategies, they will lock us into a high-carbon pathway for 80 years (average lifespan of a building).

In January 2006, Architecture 2030 issued the “2030 Challenge”, calling for all architects and designers to incrementally reduce new building and major renovation fossil fuel energy consumption by 50%, incrementally increasing the reduction target to carbon neutral by the year 2030. In 2006, the American Institute of Architects formally adopted the 2030 Challenge, a number of organizations, research institutions, firms and government agencies followed suit.

In more recent years, Architecture 2030 has been actively advocating for building energy and emissions reduction in response to climate change in the United States and globally. Projects include: AIA+2030 Professional Training Series, developed in collaboration with the American Institute of Architects (AIA); 2030 Districts, a public-private partnership program in 15 cities; 2030 Palette, a free, online low-carbon passive design guide; as well as the Zero Cities program designed to support city governments in developing their roadmaps to zero carbon.

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In October 2015, Architecture 2030 in collaboration with the China Exploration and Design Association Architectural Branch (CEDAAB) facilitated the signing of the "China Accord" for architecture and urban design by 52 top Chinese and international architectural and planning firms. Accord Signatories voluntarily pledged to plan and design cities, towns, urban developments, new buildings and major renovations to carbon neutral standards. In December 2015, Founder and CEO of Architecture 2030, Edward Mazria attended the United Nations Climate Change conference COP 21 and was one of the main organizers of the "Buildings Day" event which served to highlight the impact of buildings on global warming and the actions needed to be taken. There he made two important speeches on why and how the building sector could achieve zero carbon emissions by 2050.

《中国倡议》 China Accord

2030 Challenge ----

CHINA ACCORD Global Cities, Architecture, Low--Carbon Development

Urbanization is a major trend in the 21st century with cities and urban areas worldwide accounting for over seventy percent (70%) of global greenhouse gas emissions. Today, over half of the world's population lives in cities, by 2050, over two-thirds of the world's population will be urban.

China is leading this global trend with its urban population projected to increase by 300 million reaching one billion in 2030. To accommodate this new urbanization, China is expected to add about 2 billion square meters (21.5 billion square feet) of residential, commercial, and institutional buildings each year accounting for 38% of worldwide building construction during this period.

As it accommodates this massive influx of new urban residents, China has an unprecedented opportunity to create healthy, resilient, and integrated regional infrastructure, cities, towns, and buildings that are models of economic and urban sustainability.

The recently released Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report concludes that in order to keep the global average temperature increase below the 2oC threshold established by the international community, global greenhouse gas emissions must peak and then reach zero by the middle of the second half of the century. The magnitude of its urban development over the next two decades puts China in a unique position to lead the international community in meeting this target.

As part of its UNFCCC pledge this year, China has agreed to peak its CO2 emissions by 2030 or sooner, and increase the share of non-fossil generated energy to 20% of its total energy production. Slowing the rate of emissions growth, and achieving a rapid decline after the emissions peak will present a significant challenge as China continues to grow and urbanize, especially since buildings and infrastructure are extremely long-lived assets that create long-term energy consumption and emissions dependencies.

As part of its urbanization strategy, China has committed to embark on a new pattern of urban growth that integrates concepts of low-carbon development into the entire process of urban planning, building design, construction, and building management. China will look to increase the quality of its building construction, extend buildings' life spans, intensify the energy conservation transformation of its existing building stock, build energy-saving and low-carbon infrastructures, and promote the reutilization of construction wastes.

In other words, China has a unique opportunity to implement low-carbon and sustainable planning, building design and development, non-fossil fuel generated energy, and environmental protection policies that lead to a steep decline in CO2 emissions. Given the extraordinary urbanization underway in China, urban planning and architectural design decisions made over the next two decades will have long-lasting implications; they can ensure that China meets its emissions commitments, and its cities are habitable, sustainable, engaging, and efficient.

As building sector professionals working in China, we understand the responsibility and rare opportunity we have to support urban development in China and throughout the world. In response to these unprecedented events, opportunities, and commitments, the key member firms of the China Exploration and Design Association - Architecture Branch (CEDAAB), Architecture 2030 and international Architecture/Engineering/Planning (A/E/P) firms working in China are establishing a new initiative – the "China Accord" – to advance the planning and design of sustainable, low carbon/carbon-neutral built environments that protect and enhance natural resources and wildlife habitats, provide clean air and water, generate on-site renewable energy and promote smarter, more livable communities.

《中国倡议》 China Accord

As a first step, we convene a Roundtable on 22nd October 2015 in Shenyang, China, to endorse the China Accord, initiate the Accord to our industry counterparts, and commit to working hard towards the following goals:

- Cities, towns, urban developments, new buildings, and major renovations shall be planned and designed to be carbon neutral, meaning they use no more energy over the course of a year than they produce, or import, from renewable energy sources.

- When reaching carbon neutral is not feasible or practical, cities, towns, urban developments, new buildings, and major renovations shall be designed to be highly efficient with the capability to produce, or import, all their energy from renewable energy sources in the future.

To promote the implementation of the China Accord, we further commit to strengthen our collaboration in: accelerating the localization of existing, advanced design and planning tools, advancing the setting of emissions reductions and energy saving goals, and establishing the framework for the 2030 China professional training program.

22nd Oct 2015

China Accord Signatories (in no particular order):

- China Exploration and Design Association – Architecture Branch
- Architecture 2030

International Firms:

ARUP
CallisonRTKL
Skidmore, Owings & Merrill
Perkins Eastman
Cunningham Group Architecture
DLR Group
FENTRESS
Perkins + Will
Gensler
GLUMAC
HDR, Inc.
HKS Architects
KMD
NBBJ
Leo A Daly
Moore Ruble Yudell
Mott MacDonald
Lake | Flato
CBT Architects
FKP Architects
Calthorpe Associates
tvsdesign
Cannon Design
VOA

Chinese Firms:

Shanghai Xian Dai Architectural Design (Group) Co., Ltd
China Architecture Design & Research Group
Beijing Institute of Architectural Design (Group) Co., Ltd.
China Southwest Architectural Design and Research Institute Corp. Ltd
China Northwest Architecture Design and Research Institute Co. Ltd
China Northeast Architectural Design & Research Institute Co., Ltd
Architectural Design and Research Institute of Tsinghua University Co. Ltd
Tongji Architectural Design (Group) Co., Ltd
Central-South Architectural Design Institute Co., Ltd
Tianjin Architecture Design Institute
Dalian Architectural Design & Research Co., Ltd.
Architectural Design and Research Institute of Guangdong Province
Shenzhen General Institute of Architectural Design and Research Co., Ltd
The Architectural Design and Research Institute of HIT
China IPPR International Engineering Co., Ltd
Shandong Provincial Architectural Design Institute
Jiangsu Provincial Architectural D&R Institute Ltd.
Sichuan Provincial Architectural Design and Research Institute
Zhejiang Prov. Institute of Architectural Design and Research
Jiangxi Province Architectural Design & Research General Institute
Shandong Tong Yuan Design Group Co. Ltd
Heilongjiang Institute of Architectural Design
Xinjiang Uygur Autonomous Region Architectural Design & Research Institute
Anhui Provincial Architectural Design and Research Institute Co., Ltd
Fujian Provincial Institute of Architectural Design and Research
Guangxi Hualan Design and Consulting Group
Jilin Provincial Architecture Design Institute Co., Ltd
Shenzhen Institute of Building Research Co. Ltd

《中国倡议》 China Accord

Supporters in 2016 (in no particular order):

HOK
ZGF
ZEDFactory

China Academy of Building Research Architectural Design Institute
Huahui Engineering Design Group Co., Ltd
Shanghai JZONE Architectural & Planning Design Co., Ltd
Guangzhou Design Institute

Supporters in 2017 (in no particular order):

SmithGroup JJR

Paris Agreement

An international agreement within the United Nations Framework Convention on Climate Change (UNFCCC) dealing with greenhouse gases emissions mitigation, adaptation and finance. The Agreement was adopted by over 190 countries at the 21st Conference of the Parties of the UNFCCC in Paris in December 2015. China and the US led the ratification process by ratifying the Agreement ahead of the G20 meeting in Hangzhou in September. Other countries followed suit and the Agreement will officially enter into force on 4th November 2016. The Agreement includes a long-term goal to achieve zero net greenhouse gas emissions in the second half of this century and a global stock take every five years to ramp up ambitions and efforts.

Zero net carbon building or zero carbon building

A highly energy efficient building that produces on-site, or procures, enough carbon-free renewable energy to meet building operations energy consumption annually. (Architecture 2030, New Buildings Institute and Rocky Mountain Institute. See zero net carbon definition white paper)

演讲者 Presenters



Edward Mazria
FAIA,
Hon. FRAIC
Founder and CEO,
Architecture 2030



Philip Enquist
FAIA, Partner in
Charge of Urban
Planning and
Design, SOM



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Daniel Watch
FAIA, NCARB,
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Leader,
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Perkins+Will

Materials and simultaneous interpretation will be provided.

Organizers



零碳绿建技术推进委员会



建筑 2030 咨询

Host



同济设计 TJAD

同济大学建筑设计研究院 (集团) 有限公司
TONGJI ARCHITECTURAL DESIGN (GROUP) CO.,LTD.

Sponsors



Supporting Organization



中国被动式超低能耗建筑联盟
CHINA PASSIVE BUILDING ALLIANCE



注册 Registration

Registration

2 Day Pass + Bonus Insight Workshop (20th to 22nd Sept): 3500 RMB including access to all sessions, plus lunch and dinner. Please complete registration and payment by 10th September 2017.

Early Bird Pass (20th to 22nd Sept): 2800 RMB. Please complete registration and payment by 20th August 2017.

Insight Workshop (22nd Sept): 200 RMB, includes access only to the Insight workshop and lunch on 22nd Sept. Please complete registration and payment by 10th September 2017.

Please fill in the registration form and send to Ms You Jia at 5yj@tjadri.com and Ms Shi Saijin at 51ssj@tjadri.com, and to complete the registration and payment by the dates listed above.

If you have any questions about the training, please contact info_china@architecture2030.org

Payment

Please pay via bank transfer to the following account:

Bank account name : Tongji Architectural Design (Group) Co., Ltd
Branch : Bank of Communications, Shanghai, Hongkou Branch
Account number : 310066030010141020308
Message: ZNC + the name of participants

If you have any questions about payment, please contact Ms You Jia by phone 021-35375032, mobile 18930165862 or email 5yj@tjadri.com. A confirmation email will be sent to you once we receive the registration fee.

Accommodation

Kingswell Hotel Shanghai

50 Zhangwu Rd, Yangpu District, Shanghai
Double Standard 598 RMB/night
Single Standard 568 RMB/night
*Breakfasts included



Tongji Guest House

69 Zhangwu Rd, Yangpu District, Shanghai
Standard 340 RMB/night
Business 390 RMB/night
*Breakfasts included



Should you wish to stay at either Kingswell Hotel Shanghai or Tongji Guest House, TJAD will reserve rooms on behalf of participants accordingly. Please list your accommodation needs in the registration form. Payments will be made by participants at check out. Booking earlier will increase the chances of securing your preferred hotel and room type. Accommodation booking will close on 31st August, 2017.