Tongji University
Institute of HVAC&GAS Engineering

Dr. & Prof. Xu Zhang
Director of Institute of HVAC&GAS Engineering of Tongji University
City Area 6340 km²
Population: 20 Million
Contents

• Chinese Building Energy Standard
• Introduction of Tongji University and Delegation
• Some Research Projects relating to EESCU
building area in China

- Existing building area
- New construction area

Growth of primary energy consumption in China

- Total Consumption (Gtce)
- Growth Rate%
Chinese Building Energy Standard

Building energy standard system

Building energy conservation standard

Commercial Building
- Severe Cold & cold area

Residential Building
- Hot summer cold winter
- Hot summer warm winter

Products
- Window
- Shading
- Wall

Equipment efficient standard

Room air conditioner
- Heat Pump
- Chiller
- AHU and FCU
Chinese Building Energy Standard

The JGJ 26-95, JGJ 134-2001 and JGJ 75-2003 will be merged into one national standard <Design Standard for Energy Efficiency of Residential Buildings>.
Introduction of Tongji University and Delegation
Tongji University was founded by a German doctor, Erich Paulun in 1907.

Tongji University is one of the leading universities in China and it was one of the oldest and most prestigious University in China.

It is now a comprehensive university with seven disciplines in engineering, science, medicine, management, arts, law and economics with strength in architecture, civil engineering and oceanography.

It has over 50,000 students at all levels, among them more than 7,000 for Master and 3500 for Doctor. Over 4200 academic staff, among them, 830 professors and 1470 associate professors now.
Venue – Tongji University

The Maps of Tongji University
Academic Schools

- School of Sciences
- School of Civil Engineering
- School of Environmental Science and Engineering
- School of Electronics and Information Engineering
- School of Software Engineering
- School of Foreign Languages
- Medical School
- School of Architecture and Urban Planning
- School of Mechanical Engineering
- School of Material Science and Engineering
- School of Traffic and Transportation
- School of Liberal Arts and Law
- School of Economics and Management
- School of Ocean and Earth Science
Faculty

- **32 Staff** in the institute, including **19** teachers and **13** researchers or workers in the laboratory.

- **8 professors** and **8 Associate professors** in the institute.
Students

• Undergraduate specialty:
  • Building Environment and Equipment Engineering
• At present 381 undergraduates study in the specialty.
• 180 graduate students work here, among them there are 28 doctoral candidates.
• 3 staffs work in post-doctoral research station.
There are three academic research directions.

Academic team leader

- Heat & moisture transfer in AC, Building energy efficiency
- Low concentration pollution control & indoor air quality
- Gas application technology
Xu ZHANG

- Director of the Institute of HVAC&GAS, Tongji University
- Deputy Chair of The Society of Building Energy Conservation of China
- The Society of Thermal Physics Engineering of China
- The American Society of Heating, Refrigerating and Air Conditioning Engineering
- The Society of Heating, Ventilating and Air Conditioning of China
- The Society of Refrigerating of Shanghai, China

Major Award:
- 1996 China Grand Contribute Award for Science and Technology Progress in 9th 5 year National researching Program.
- 1997 Third Class Award for Technology and Progress of China Science Academy
- 2004 Third Class Award for Technology and Progress of Shanghai, China
- 2007 Second Class Award for Technology and Progress of Chongqing, China
Brief Introduction of Representatives

Zhengrong LI

Professor of the Institute of HVAC&GAS, Tongji University

Major Research Interests:
1. Heat and moisture transfer in air conditioning
2. Solar shading
3. Energy efficiency and audit
4. Renewable energy applications

Major research experience:

- 2003 Economic operation energy systems for Energy Center of Pudong International Airport
- 1995 Shanghai thermal performance of new wall materials laboratory bench
- 1994 Research for Shanghai Energy Conservation
- 2001 International cooperation project: energy efficiency standards for public buildings in Shanghai
- 2005 International cooperation projects: the Shanghai public building energy efficiency design standards for details
Qun Zhao
Assistant Professor
College of Architecture and Urban Planning

Research Fields: Sustainable building design

Xiang ZHOU
Assistant Professor
the Institute of HVAC&GAS, Tongji University

Research Fields: Human Thermal Comfort and Air quality
Low Exergy Air Conditioning System
Some Research Projects relating to EESCU
1. Ground source heat pump

I. Research of Temperature limit of the boundary and thermal imbalance for Ground Source Heat Pump

II. Feasibility study of ground source heat pump system in Large-scale Transportation Hub of Shanghai
1. Ground source heat pump

III. Recovery characteristics of soil temperature and Dynamic Performance Evaluation ground source heat pump

IV. World Expo Axis—Research on GSHP system application
1. Ground source heat pump

V. Tongji – DAIKIN: Ground-Source Heat Pump VRV system

- Whole annual operation and measurement
- Jiading Campus, Tongji University
2. Research and development of temperature humidity independent control heat pump unit for residential building

Low Exergy cooling and heating
Demonstration of temperature humidity independent control heat pump unit for residential building

- Kunshan, Jiangsu province
- Changsha, Hunan province
bi-evaporator temperature humidity independent control air-conditioner
The control strategy of intermittent operation of radiation - fresh OA system
3. Low cost energy system in rural area
3. Low-cost energy system in rural area

• The Key Technology of Ecology and low cost energy system for rural area. (National 863 project)
• The key technology and demonstration of Low exergy energy utilization of rural building. ("12th Five-Year" National Project)

Huangbaiyu Demonstration Project, Liaoning Province
4 Daylighting and shading technology

- In September 2007 to December, from chongqing residential sunshade investigation cases selected representative case, do sunshade innovation design. Completed design 20.

Southwest toward room, design the removable type activities sunshade to solve the problems and daylighting flower. Ensure room any time to adjust according to demand the “sunshine one meter” comfortable.
Building sun-shade technical application research - control, regulation, selection, effect
Scope and definition of building LCA

Energy consumption

Resources consumption

Energy life-cycle

Materials mining

Resources mining

Materials production

Energy mining

Energy production

Energy transportation

Envelope Frame Equipment

Discarding

Recycling

Greenhouse gas emissions

Criteria pollution emissions

Function unit: m² building area
EESCU Partners in Shanghai
• November ISHVAC 6-9.11.2011 Tongji University – Workshop of EESCU