Toward A Sustainability-Oriented University

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Vice President of Tongji University
Dean of the Institute of Environment and Sustainable Development (IESD)

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TONGJI CAMPUSES
KEY FIGURES OF TONGJI

50,000 Students
22,000 BA/BSc, 18,000 MA/MSc, 3,300 PhD, 3,800 International Students
  81 undergraduate programs
  218 postgraduate programs
  94 PhD programs

3300 Teaching & Research Faculty and 2000 Staff
  830 full professors, 1,470 associate professors
  6 academicians from the Chinese Academy of Sciences
  7 academicians from the Chinese Academy of Engineering

250,000 Alumni
Background

- **2008** — “Cost-effective Campus Construction Technology Incorporation and Demonstration" project was awarded the Frist Prize of the Ministry of Education’s Scientific Progress Award

- **2009** — *Nature* Magazine reported on the green campus efforts in the world with Tongji University as one of the cases (the only case in Asia)

- **2010** — launching GUPES jointly with UNEP with more 300 member countries now

- **2011** — launching interdisciplinary courses such as “SD and Future”, “Low-Carbon Energy and SD”, “Low-Carbon Architecture and Human Living Environment”; initiating International Students’ Environment and Sustainability Conference

- **2012** — President Pei Gang was invited to the UN Sustainability Conference “Rio+20” Summit; the ISCN in Oregon, US, where Tongji University was awarded the “World’s Prominent Campus of Sustainability”, the first in the Asia-Pacific region

- **2013** — Morocco World Environment Education Conference, UNEP and UNESCO executives sang highly of the prominent contribution made by Tongji University in SD theories and practices in higher education

- **2013** — The 10th session of CPC Tongji Symposium when the vision and mission clearly defined:

  - Developing Tongji University towards a sustainability-oriented university
LOGICS

• Old Logic, Things
  Org. as machine
  Hierarchies
  Structure
  Boss
  Action
  Teaching
  Capital growth
  Inform Technology
  Market Share
  Conquer Nature

• New Logic, Ideas, Knowledge
  Org. as communities
  Networks
  Process
  Facilitator
  Interaction
  Learning
  nature capital growth
  Interaction technology
  Mind share
  Harmony with Nature

Source: Goran Carstedt, Prof Holmberg
SUSTAINABILITY-ORIENTED UNIVERSITY

From green to sustainability

University Competitiveness

Version 1.0

Green Oriented

Version 2.0

Sustainability Oriented

300 innovation companies
annual turnover 3 billion US$

Energy saving practice

Educational philosophy

Technology Transfer

Policy Research

hard power

soft power

smart power

2013/10/21

300 innovation companies
annual turnover 3 billion US$
VERSION 2.0

Sustainability-oriented University

Better education for sustainable development
Scientific research for sustainable development
Social service for sustainable development
Smart Campus for sustainable development
SUSTAINABILITY-ORIENTED EDUCATION

Strengthen general education to broaden students’ knowledge, and to integrate science, technology, and humanities.

Enhance students’ creativity through practice-based education, inside and outside of campus, including internship and social practices.

Educate students to shoulder social responsibility and to culture value of sustainable development.
TALENT CULTIVATION

Innovative Capacity

Humanistic knowledge

Practical ability

international perspective

Excellent Engineers Initiative
SUSTAINABILITY-ORIENTED RESEARCH

Inter- & multi-disciplinary study and research

Translation from basic to applied research to provide the solution

Social & economic development at regional, national, and international levels
SUSTAINABILITY ORIENTED SOCIAL SERVICE

- Talent
- Know-how
- Solution
- Culture
- Project

Partnership with government, enterprise, community, and NGOs.
Sustainability-oriented Campus

Manage campus operation with the guidance of sustainability, and build up a resource-saving and environmentally-friendly campus.

Design the general courses, raise the awareness, and nurture campus culture for sustainable development.

Showcase to the society for new technologies, efficient management, and social value.
Sustainability-oriented Campus

Rights Management

Navigation for campus

Real time data monitoring

History data

Ranking for energy consumption

2013/10/21
Sustainability-oriented Campus

Energy consumption structure

Energy consumption trends

Class Room 2%
Library 14%
Office 11%
Research 22%
Dormitory 29%
Other 22%

Actual Energy Cost

[10^4 RMB]

2004 2005 2006 2007 2008

Trade of campus energy budget
Green Building & Renewable Energy research base in campus

A residence: passive house in new county (brick concrete)
B residence: solar house of bamboo SD2010
C residence: Solar-containerized room SD2011

Green Energy Facility
Greenhouse Plantation
<table>
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<tr>
<th>Public Class of &quot;Sustainable Development and Future&quot;</th>
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<tbody>
<tr>
<td>• An interdisciplinary public elective course for undergraduates</td>
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<th>Minor Course of &quot;Sustainable Development“</th>
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<td>• A minor course to prompt sustainable development education for postgraduates</td>
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<table>
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<tr>
<th>EDUCATION</th>
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<td>Curriculum</td>
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<table>
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<tr>
<th>Environmental Ethics</th>
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<tr>
<td>Environmental Sociology</td>
<td>Environmental System Analysis</td>
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<tr>
<td>Environmental Science</td>
<td>Global Environmental Changes</td>
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<tr>
<td>Environmental Economy and Circular Economy</td>
<td>Environmental Project Management</td>
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<tr>
<td>Framework and Tools for SD</td>
<td>Atmospheric Science and Climate Change</td>
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<tr>
<td>Environmental Management and Policy</td>
<td>Professional Foreign Language</td>
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EDUCATION
Public Class of "Sustainable Development and Future"

An interdisciplinary public elective course for undergraduates

Public Class of SD

5 parts of courses: SD general introduction;
economy construction, management and SD;
eco-environment and SD;
science and technology and SD;
individual growth and SD;

More than 800 students from 14 faculties attended this class organized by IESD
6 students made reports on Sustainable Development Education Planning, Green Internet of Things and S.D., etc.
A minor course to prompt sustainable development education for postgraduates

4 core + 8 optional courses:
The Frontier of Global Sustainable Development;
Green Economy;
Integrated Management of Resource & New Energy;
Ecosystem Management

Supported by 8 colleges;
Attracted more than 200 students from 25 colleges of TJ
EDUCATION
International Education Programs

- International Ph.D Program in Environment Management and Sustainable Development
- International Master Program in Environment Management and Sustainable Development
- International Master Program in Environmental Engineering
Up to now, 209 Students from 47 nations have been recruited in IESD.
20 research teams led by experts

- Low-carbon Economy (Prof. ZHU)
- Water Resources Policy & Water System Remediation (Prof. ZHANG)
- Green Transport (Prof. CHEN)
- Energy Nano-materials; Water and Air Pollution Control and Utilization (Prof. Dai)
- Environmental Law and policies (Prof. ZHANG)
- SD Model in Rural and Arid Areas (Prof. ZHAO)
- Eco-city Planning (Prof. WU)
- Water Resources Mgt & Water System Remediation (Prof. ZHOU)
- Africa Water Resources & Water Treatment (Prof. LI)
- SD City Planning (Prof. YANG)
- Climate Change Policy (Prof. JIANG)
- ...
Research Fields at the National Level

More than 100 patents are applied in the environmental fields in China
Case study and demonstration

Kenya and Ethiopia
Nairobi water (drinking water and waste water treatment)
rain-harvesting
Uganda, Nigeria and Algeria (rain-harvesting and rural water supply)
JOINT STATEMENT

Africa’s urban population is projected to triple to over 1.2 billion by 2050 in cities already challenged in many places and in many ways by shortages of safe drinking water and inadequate sanitation services.

Access to clean drinking water and sanitation is perhaps one of the most important Millennium Development Goals because of its links to human health and the ability of people to carry out productive employment. It is also linked to gender and the nutrition of women and as well as their role in collecting water for families and communities.

Child mortality is also inextricably linked to water. Globally, at least 1.8 million children under the age of five years, or one every 10 seconds, die every year from water-related diseases. On the overall, more people die from water-related diseases than are killed by all forms of violence including wars. Thus access to clean water is in many ways a pre-requisite for sustainable development.

The challenge of providing safe water and adequate sanitation will be aggravated by unchecked climate change and rising urban populations. As the world prepares for the UN Conference on Sustainable Development in 2012, 20 years after the Rio Earth Summit of 1992, water and urbanisation need to be key issues on the sustainability agenda.

There is strong and growing evidence that a Green Economy, within the context of poverty eradication and sustainable development, can accelerate and scale-up delivery of these services if countries and communities commit themselves to managing the use and the sources of water such as forests, wetlands and other ecosystems central to this sustainability equation.

Creative and forward-looking policies, alongside partnerships across all sectors including agriculture, will also be key to sustainability.

This report, jointly produced by UNEP and UN-HABITAT in collaboration with the Africa Ministers’ Council on Water (AMCOW) and funded by Tongji University, the Ministry of Science and Technology of China and Bayer Foundation, shows that there is a way forward for a more sustainable future where restoration of ecosystems, often in the green hills and watersheds surrounding cities, can provide cheaper, efficient and resilient water supply systems in a changing world.

Launched in Cape Town, a South African city surrounded by green hills that support water supplies to that city, it is our hope that World Water Day 2013 can provide a fresh vision for cities across Africa and beyond.

Achim Steiner
Executive Director, UNEP

Jean Clos
Executive Director, UN-HABITAT
Global University Partnership on Environment and Sustainability (GUPES) initiated in cooperation with the UNEP

GUPES has been established in 2010 and Professor WU Jiang, Vice President of Tongji University was re-elected as the president in 2012. The Secretariat has been set up in IESD.
A platform for global university environment and sustainable development to prompt international network construction, especially south-south and south-north cooperation.

An opportunity to interact with policy-makers and others within the UN Environment Program (UNEP) and other international organizations as well as with one another specifically on sustainability issues.

OUTREACH
An annual event
400+ students
from 30+ countries

Beijing Green Future Environment Foundation
Establishing evaluation criteria
Establishing evaluation criteria

- **Participating in ESD ranking by QS**
  - *Establishing complementary ESD standards in addition to the QS evaluation system*
  - *Research on the correlation between QS and ESD evaluation systems*

- **Establishing Tongji’s Sustainability-oriented Criteria and Publishing the results**
  - *Establishing the criteria*
    - sustainable teaching (ESD) criteria (5)
    - sustainable scientific research criteria (5)
    - sustainable community service criteria (5)
    - green campus development criteria (5)
    - sustainable management mechanism (5)
  - *Publishing the annual report of the construction of the sustainability-oriented university at Tongji*
Envisaging the Tongji University Sustainable Development Evaluation Criteria（First Class）

- Teaching (20%)
- Scientific research (20%)
- Campus construction (20%)
- Management mechanism (20%)
- Community service (20%)
## Tongji University Sustainable Evaluation Criteria (First and Second Rate)

<table>
<thead>
<tr>
<th>1st rate criteria</th>
<th>2nd rate criteria</th>
<th>Description of the criteria and scoring</th>
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<tbody>
<tr>
<td><strong>teaching 20%</strong></td>
<td>SD courses for undergraduates</td>
<td>20 points for 50% SD-related subjects among all the courses, accumulative total to be 30 courses; 10 points for 30%-50%; 5 points for 10%-30%</td>
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<tr>
<td></td>
<td>SD courses for postgraduates</td>
<td>ibid.</td>
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<tr>
<td></td>
<td>SD courses for international students</td>
<td>20 points for 20% SD-related courses among all the those for the international students; 10 points 10%-20%; 5 points for 5%-10%</td>
</tr>
<tr>
<td></td>
<td>SD minor courses</td>
<td>20 points for 20% SD-related minor courses among all those on the campus; 10 points for 10%-20%; 5 points for 5%-10%</td>
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<tr>
<td></td>
<td>SD degree programs</td>
<td>20 points for 1 rate SD degree programs</td>
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<tr>
<td>Scientific research 20%</td>
<td>Scientific research projects on SD</td>
<td>20 points for scientific research projects on SD accounting for 20% of all the research funds of the university; 10 points for 10%-20%; 5 points for 5%-10%</td>
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<tr>
<td></td>
<td>Research papers on SD</td>
<td>20 points for the total SD-related research papers accounting for 20% of all the research papers of the university; 10 points for 10%-20%; 5 points for 5%-10%</td>
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<tr>
<td></td>
<td>International projects on SD</td>
<td>20 points for more than 10 international projects that are SD-related; 10 points for 5-10 projects; 5 points for 1-5</td>
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<tr>
<td></td>
<td>Book publications on SD</td>
<td>20 points for more than 10 book publications on SD; 10 points for 5-10; 5 points for 1-5</td>
</tr>
<tr>
<td></td>
<td>SD Reports</td>
<td>20 points for more than 10 reports on SD; 10 points for 5-10; 5 points for 1-5</td>
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<td>Campus construction</td>
<td>Green eco-planning and construction (green campus and construction)</td>
<td>10 points for planning, 5 points for new green architecture, 5 points for eco-friendly renovation of old architecture</td>
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<tr>
<td></td>
<td>Campus energy-saving and low-emission supervision system (system and regulations)</td>
<td>10 points for a supervision platform; 10 points for quota management mechanism</td>
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<td>Campus energy-saving effects (energy-saving efforts and new energy)</td>
<td>8 points for energy-saving goals reached, 5 points for water-saving goals reached; 7 points for new energy application</td>
</tr>
<tr>
<td></td>
<td>Campus eco-system (greens, water, air, management of hazardous wastes)</td>
<td>10 points for healthy environment goals reached, 5 points for management of wastes, 5 points for efficient reuse of wastes</td>
</tr>
<tr>
<td></td>
<td>Green campus culture (community and themed events)</td>
<td>10 points for established SD-related societies; 10 points for SD-related events</td>
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<td><strong>management 20%</strong></td>
<td>Academicians who are conducting SD research</td>
<td>20 points if there is such a team of academicians</td>
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<td>Decision-making management of the university involved in the strategic planning</td>
<td>20 points if there is such involvement</td>
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<td></td>
<td>Participating in the local government’s decision making process</td>
<td>20 points if there is such involvement</td>
</tr>
<tr>
<td></td>
<td>Participating in the central government’s decision making process</td>
<td>20 points if there is such involvement</td>
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<tr>
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<td>Participating in the important international organization</td>
<td>20 points if there is such involvement</td>
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<tr>
<td><strong>Community service 20%</strong></td>
<td>SD-related counseling service</td>
<td>20 points if there is such involvement</td>
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<tr>
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<td>Good SD-related channeling and system of community service</td>
<td>20 points if there is such involvement</td>
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<td>Continuous community-based service for a considerable period of time</td>
<td>20 points for 8 consecutive years of efforts; 10 points for 4-8 consecutive years; 5 years for 1-4 consecutive years</td>
</tr>
<tr>
<td></td>
<td>Awards and honors in SD-related areas</td>
<td>20 points for more than 10 times; 10 points for 5-10 times; 5 points for 1-5 times</td>
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Cooperation Leads to Success

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