Double accolade for stunning architecture at The University of Nottingham Ningbo, China

A stunning new landmark building at The University of Nottingham has won international recognition for sustainable design — scooping two awards on different sides of the world.

The Centre for Sustainable Energy Technologies (CSET), at The University of Nottingham Ningbo, China, took first prize in a competition recognising the best in sustainable construction at an international property event in Cannes.

CSET beat competing buildings from all over the world to win the 'Green Buildings' category at MIPIM, the world's premier property convention. CSET is a research centre focusing on the new and renewable energy systems that will play a key part in sustainable development and the fight against climate change.

The accolade comes in the same week as another award for CSET — this one announced in Beijing, China. The building was named as the 'Best environmental design' in the 2009 Space Awards, a competition that rewards the very best in innovative, eco-friendly design in the People's Republic.

Designed by Mario Cucinella Architects (MCA) — a specialist Italian practice which only does 'green' design — CSET uses innovative technologies within building design and is a landmark collaborative project between the UK and China addressing some of the major issues affecting sustainable development in China. As well as being a centre for excellence for research and teaching, CSET is also playing a key role in the Virtual Academy for Sustainable Cities outlined in a 2008 agreement between Prime Minister Gordon Brown and the Chinese Premier Wen Jiabao.

CSET provides laboratory, office and seminar accommodation and was designed as an exemplar building, to minimise its environmental impact by being zero carbon and generating all of its energy requirements from renewable sources. The University of Nottingham, Ningbo, opened in 2005 and now has more than 3,700 students.

In the final of the MIPIM Awards 'Green Building' category, the judging panel — headed by Peter Goodacre, President of the Royal Institute of Chartered Surveyors (UK) — whittled down all the original entries to a shortlist of three. CSET was in good company in the Green Buildings category competing against BDP Manchester Studio in Manchester and Elm Park Mixed-Use Development in Dublin. The awards were announced on March 12, 2009.

Professor Alan Dodson, Pro-Vice-Chancellor for Infrastructure, said: "This is very welcome recognition, by the global property community, of the University's commitment to sustainability both in its research endeavours and in its infrastructure development projects. The CSET building is on our Chinese campus where it gives prominence to our efforts to meaningfully engage on the sustainability agenda with the world's fastest growing economy."

Chris Jagger, Director of Estate Management, attended the gala awards ceremony with Mario Cucinella, principal of MCA, to receive the award. Mr Jagger said: "Winning this award is a fantastic achievement for the University. CSET is well deserving of the Green Buildings award from our peers. The MIPIM awards are prestigious international awards and highly regarded throughout the world. I'd like to congratulate everyone involved in the project and thank them all for their hard work and dedication that contributed to our success."

Professor David Greenaway, Vice-Chancellor of The University of Nottingham, said: "We are proud of our pioneering record in green architecture and winning such an important award for a building in China is symbolically very important. I am delighted."

The Space Award for 'Best Environmental Design', announced on March 5, 2009 in Beijing, was collected by Professor Jo Darkwa, Director of CSET, and Ms Annegret Brandau, Lecturer in Architectural Technology.

The University of Nottingham is at the forefront of sustainable construction in the UK as well — March 11 2009 saw the official opening of Phase II of the Jubilee Campus, a £30m development that has transformed a former brownfield site with three landmark new buildings that build on the University's commitment to modern, sustainable design.

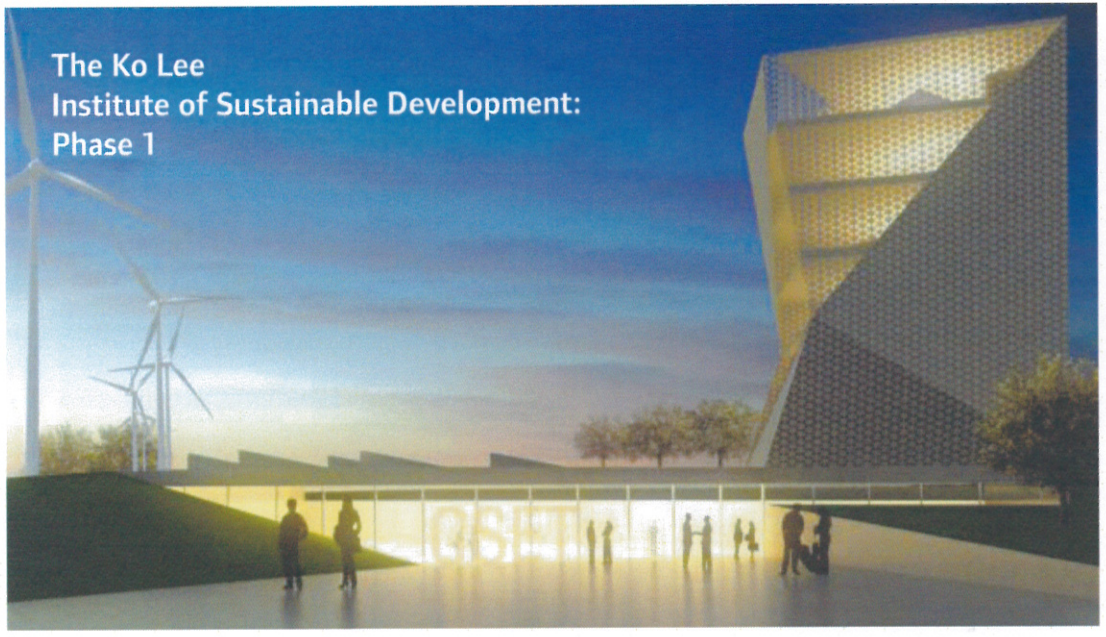
The Ko Lee Institute of Sustainable Development
高莉可持续发展研究所

The University of Nottingham Ningbo, China

The Centre for Sustainable Energy Technologies
可持续能源技术研究中心

Opening - 20th September 2008
落成典礼-2008年9月20日

The Ko Lee Institute of Sustainable Development: Phase 1



The Centre for Sustainable Energy Technologies

INTRODUCTION
介绍

The formal opening of the Centre for Sustainable Energy Technologies building is a landmark collaborative project between the United Kingdom and China towards addressing some of the major issues affecting sustainable development in China. As well as being a centre for excellence for research and teaching, CSET will also play a key role in the proposed Virtual Academy for Sustainable Cities outlined in the Memorandum of Understanding signed in January 2008 by the UK Prime Minister Gordon Brown and the Chinese Premier Wen Jiabao.

可持续能源技术研究中心楼的落成是英国和中国为解决影响中国可持续发展的一些主要问题的地标性合作项目。该中心精于科研与教学，并将在由英国戈登·布朗首相和中国温家宝总理于2008年1月签署的可持续发展城市高等学术团体的理解备忘录下，发挥关键的作用。

The Centre for Sustainable Energy Technologies building
可持续能源技术研究中心楼

The new building will provide laboratory, office and seminar accommodation and has been designed to serve as an exemplar building, demonstrating state-of-the-art techniques for environmentally responsible, sustainable construction and energy efficient internal environmental control. It has been designed to minimize its environmental impact by promoting energy efficiency, generating its own energy from renewable sources, and using locally available materials with low embodied energy wherever possible.

新楼中设置实验室、办公室、研讨教室，是一座典范楼，展示环境责任、可持续建筑和节能内部环境控制等前沿技术。该中心通过使用节能技术，使用较少能源利用当地的材料，并把可再生能源转换为自己的能源，最低限度减少对环境的影响。

The main function of the building is to provide a specialist research laboratory for staff and post-graduate students within the new Centre for Sustainable Energy Technologies. The focus of research will be new and renewable energy systems and components for both domestic (housing) and non-domestic (commercial and public) buildings. The building will provide a facility for developing and testing the new technologies in collaboration with local and international industrial partners.

该楼的主要功能是为新的可持续能源技术研究中心的员工和研究生提供一个专业研究实验室。研究重点是新的可再生能源系统和民用及商务公共建筑的材料。该楼将提供设施，与当地以及国际工业伙伴合作，开发、测试的新技术。

Linked to the laboratory facilities, will be a workshop for fabrication of experimental rigs etc., and the development of new components. The tower incorporates a research studio/teaching room, a resource room, as well as offices, meeting rooms and permanent display space. The exhibition space will provide a platform for communicating the latest developments in sustainable energy and construction technologies, both regionally in China and internationally.

和实验室设备相关的研讨会将举行，探讨试验设备的生产和新材料的开发。该楼包括一个教研室、一间资料室、若干办公室、会议室和永久展示区。展示区将展出国内外可持续能源和建筑技术的最新发展。

Low Carbon Design – Environmental Design Strategy
低炭设计–环境设计战略

The CSET building has been designed to respond to diurnal and seasonal variations in ambient conditions by means of a five-point environmental design strategy:
可持续能源技术研究中心通过五个环境设计战略，根据周日和季节的变化做出调整：

High Performance Envelope 高性能围护结构
Exposed Thermal Mass 暴露的蓄热体
Daylight & Solar Control 日光及太阳光控制
Natural Ventilation to Tower 塔楼的自然通风
Piped Ventilation to Laboratory & Workshop 实验室和加工间的管道通风

In this way, the building is designed to minimise the need for additional energy for heating, cooling and ventilation. In fact, the residual heating, cooling and ventilation load is estimated to be so low that this residual load, plus demand for electrical power for computing, lighting etc will be met from renewable energy sources, including:
通过上述方式，该楼将最低限度减少对用作加热、冷却和通风的额外能源的需求。事实上，民用的加热、冷却和通风的耗能量非常低，所以其他的需求，包括计算机、照明等的用电都可以利用可再生能源转化如：

Ground Source Heat Pump地源热泵
Solar Absorption Cooling太阳能吸收制冷
Photovoltaic Panels光电板

The spaces within the building have been configured to support a number of different heating, cooling and ventilation strategies, as a demonstration of alternatives to conventional heating and cooling systems. Renewable and sustainable energy technologies provide the residual heating and cooling requirements, while energy for power and artificial lighting requirements will primarily be met from the large photovoltaic array located to the south of the building. Other renewable energy technologies include solar thermal collectors (linked to a vapour absorption cooling system), a ground-source heat pump (linked to heating/cooling coils within the floor slabs), and wind turbine (for experimental/demonstration purposes).
该楼的空间设计后用来支持一系列不同的加热、冷却和通风技术，演示对于传统加热和冷却系统的转变。可再生和柯持续能源技术提供了民用的加热和冷却功能，而电器和照明的能源来自大楼南侧的巨大的太阳能板。其他可再生能源技术包括太阳能热收集器（和蒸汽吸收冷却系统连接）、地热泵（和地板间的加热和冷却圈连接）、风车（试验/演示用途）。

The building is an outstanding example of contemporary architecture, embodying the aspirations of the researchers and staff who will occupy it, in demonstrating the contribution that sustainable energy technologies can make to the low carbon economy of the future.
该楼是一座为人瞩目的当代建筑，符合即将进驻的研究者和员工的期待，证明可持续能源技术将为未来的低碳经济做出贡献。

Environmental & Energy Performance

The design intention of the building is that it will not require conventional heating and cooling systems and that the residual energy requirement will be met by renewable energy sources, thus minimising its carbon footprint. It has also been designed to respond to the diurnal and seasonal variation in the climate of Ningbo, to minimize heating requirement in winter and cooling in summer, and to promote natural ventilation in spring and autumn when environmental conditions allow. The building is therefore well insulated, incorporates high thermal capacitance internal floors and walls, and a ventilated glazed south façade.
该楼的设计计划是不使用传统的加热和冷却系统，并且民用的能源需求由可再生资源满足，最低限度降低碳排量。它也可以对宁波气候中的周日和季节变化做出调整，在春秋两季环境条件允许的条件下提倡自然通风。所以该楼的绝缘性能良好，装有高热电容的内墙和地板，和一面通风上釉的南侧幕墙。

Heating加热

In the cold period, the only additional heat required will be to pre-heat ventilation air, and (when it is very cold outside) to raise internal surface temperatures. To this end the south façade helps to passively pre-heat ventilation air supplied by natural convection to teaching rooms, offices and meeting rooms. Air supplied (by fans) to the workshop and laboratory is pre-heated via tubes in the ground. A reversible ground source heat pump will also be utilised to provide 'top-up' heating through coils embedded in the soffit of the concrete floors.
在寒冷的时候，唯一需要额外加热的是预热通风扇，（当室外非常寒冷的时候）提高内表温度。南侧幕墙帮助被动预热通过教室、办公室和会议室的自然对流空气。研讨室和实验室的空气通过地下管道预热（通过电扇流动）。一台可逆地热泵将通过水泥楼层拱腹中的线圈提供上升热空气。

Cooling冷却

In summer, the high performance envelope and the thermal capacitance of the exposed concrete surfaces internally, will generally keep the interior cool. The only additional cooling required will be to pre-cool the ventilation air and (when very hot outside) to reduce the surface temperatures. To this end, air supplied to the workshop and laboratory is passively pre-cooled via the ground tubes and then dehumidified and cooled by an air handling unit located in the basement. Air supplied to the tower is dehumidified and mechanically cooled by an air handling unit located at the roof top , then introduced to the top of the lightwell, falling down to each level, from which it is exhausted by the naturally ventilated façade. The solar collectors would provide the absorption package chiller with the required energy to deliver cooling to the two air handling units. . In addition the reversible ground source heat pump will provide cooling to the ceiling of the concrete floors.

夏季，高绝缘楼宇结构和水泥内层热电容将保持室内凉爽。唯一的额外冷却需求是预冷流通空气，（当时室外非常炎热）降低表层温度。提供给研讨室和实验室的空气已经通过地下管道预冷，并祛湿，通过屋顶的空气处理器机械冷却，然后通往顶部，下沉到每层，然后被自然通风幕墙消耗。太阳光收集器将提供吸收冷却装置，把冷却功能传递给两个空气处理器。另外，可逆地热泵将为屋顶水泥层提供冷却功能。

Ventilation通风

During the mid-seasons (Spring and Autumn), natural ventilation is promoted in most spaces, controlled automatically by means of vent opening gear within the perimeter glazing. During the summer, when it is both hot and humid, it is necessary to de-humidify and cool the supply air, and the electrical power for this is provided by the photovoltaic system.

在春秋两季，通过通风孔开启装置，自然通风被自动控制并应用到绝大多数地方。在炎热潮湿的夏季，太阳能板系统将开启电源起到祛湿和给空气降温的作用。

Lighting照明

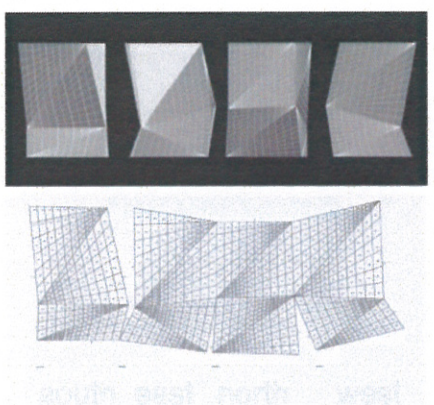
The building has been designed to exploit daylighting as far as possible, while avoiding glare and solar heat gain. This reduces the amount of time for which artificial lighting is required. The Photovoltaic (PV) Solar system will be used to provide artificial lighting and small power for office equipment such as computers, fax machines, etc. During the peak period of sunshine enough power shall be produced from the PV system to run other equipment such as the lift and the mechanical ventilation and chilled water systems. In the event of extra power not being utilised, it shall be stored in batteries or transferred to the nearby sport centre.

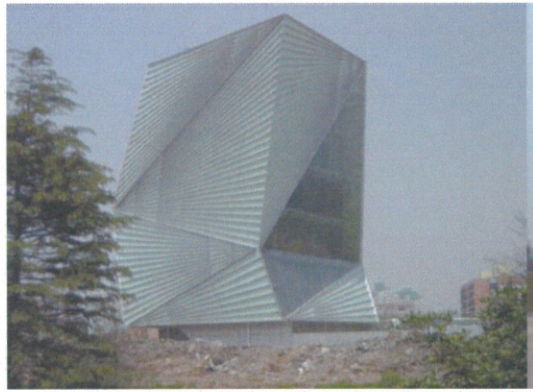
该楼将尽可能利用日光照明，避免再次使用太阳能。这将减少人工照明的时间。太阳能板系统将提供人工照明和办公设备如电脑、传真机等的用电。在太阳光最强的时候，太阳能板可以产生足够的能源，使其他设备如电梯、机械通风和冷却水系统运转。如果有额外能源未被使用，还可以将它们储藏在电池里或传输给附近的体育中心使用。

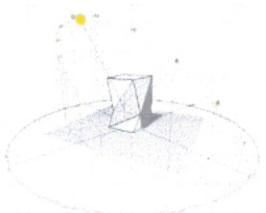
Building Management System楼宇管理系统

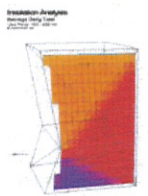
The building is equipped with a management system dedicated to the electrical and mechanical plants for optimizing electrical loads and reducing energy consumption. The system will allow centralisation of controls and signals of the building's technological equipments. The installed software will allow commands to be sent automatically to all field actuators and equipments

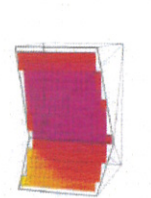
该楼配有一个管理系统，用于合理分配电力并减少能源消耗。这是一个中央控制系统，该楼的技术仪器均有各自的信号。控制系统的软件将把命令自动传递到各个仪器。

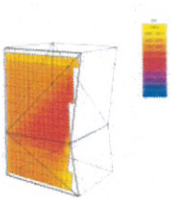


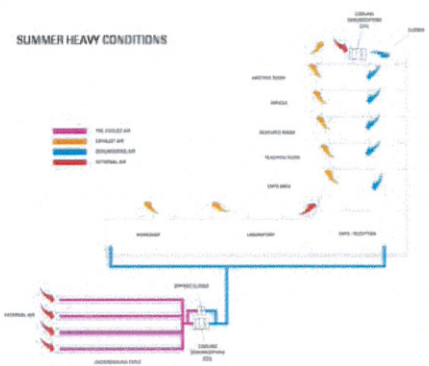


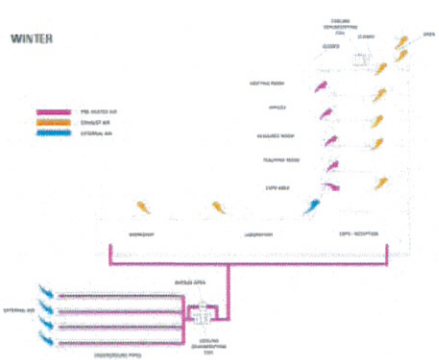












Research, Teaching and Learning at the Centre for Sustainable Energy Technologies.
可持续能源技术研究中心的科研与教学

The new Centre is positioned to be at the leading edge of a programme of research, teaching & learning in the field of sustainable urban development. This arises from the international reputation of many of the staff based at the School of the Built Environment at the University of Nottingham, in the fields of building technology, renewable energy, sustainable architecture and urbanism.
考虑到英国诺丁汉大学建筑环境学院在建筑技术、可再生能源、可持续建筑和城市化领域的众多员工的国际声望，新的研究中心将在可持续城市发展领域进行一系列前沿的科研和教学活动。

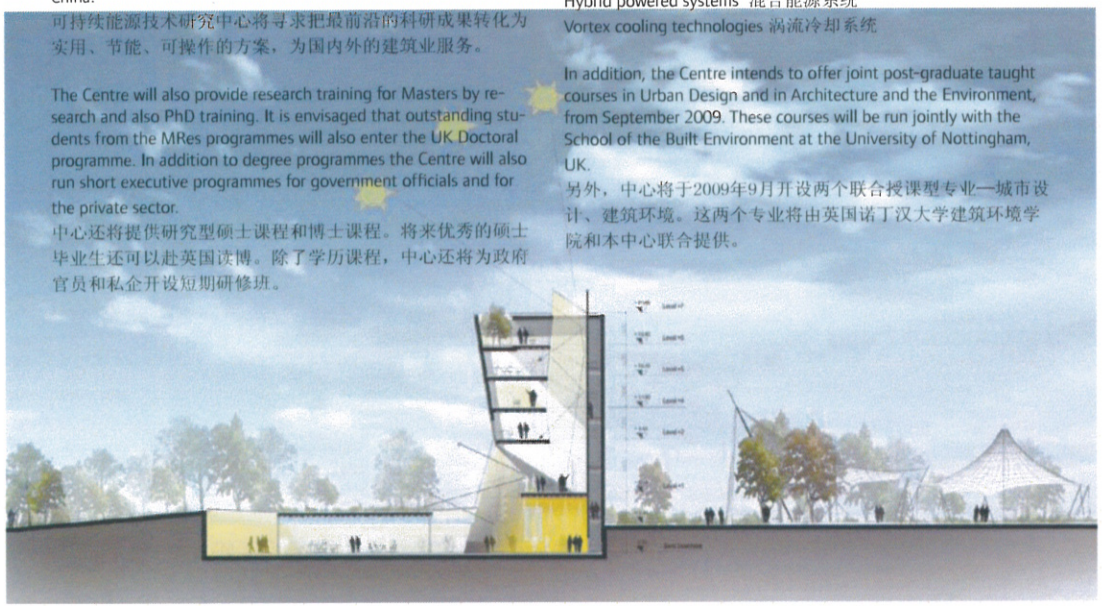
In this way, the Centre for Sustainable Energy Technologies seeks to translate cutting edge research into practical, energy efficient, affordable solutions for domestic and non domestic construction in China.
可持续能源技术研究中心将寻求把最前沿的科研成果转化为实用、节能、可操作的方案，为国内外的建筑业服务。

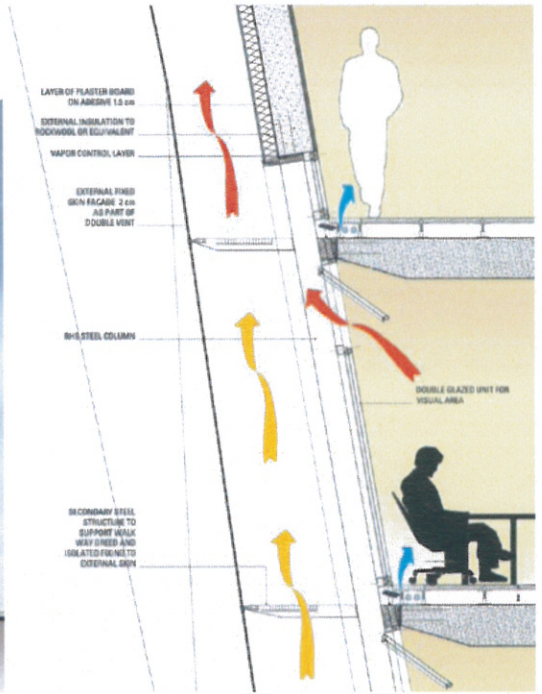
The Centre will also provide research training for Masters by research and also PhD training. It is envisaged that outstanding students from the MRes programmes will also enter the UK Doctoral programme. In addition to degree programmes the Centre will also run short executive programmes for government officials and for the private sector.
中心还将提供研究型硕士课程和博士课程。将来优秀的硕士毕业生还可以赴英国读博。除了学历课程，中心还将为政府官员和私企开设短期研修班。

The Centre will be used to carry out postgraduate research training (MSc, PhD and possibly a Taught masters later on) on topics including:
中心开设的研究型硕士课程和博士课程（有可能开设授课型硕士课程）的专业包括：

Solar-powered air conditioning systems 太阳能驱动空调系统
Wind energy technologies 风能技术
Fuel cells 燃料电池
Biomass 生物质
Hydrogen generation and storage 制氢与储氢技术
Thermal energy storage systems 储热系统
Geothermal Heat pumps 地热热泵
Glazing technologies 玻璃装配技术
Renewable energy integrated systems 可持续能源集成系统
Combined heat and power systems 热电联产系统
Solar tracking systems 太阳能跟踪系统
Hybrid powered systems 混合能源系统
Vortex cooling technologies 涡流冷却系统

In addition, the Centre intends to offer joint post-graduate taught courses in Urban Design and in Architecture and the Environment, from September 2009. These courses will be run jointly with the School of the Built Environment at the University of Nottingham, UK.
另外，中心将于2009年9月开设两个联合授课型专业—城市设计、建筑环境。这两个专业将由英国诺丁汉大学建筑环境学院和本中心联合提供。





Current Courses
目前专业

The Centre currently offers the following undergraduate and postgraduate courses/programme:
中心目前提供以下本科和研究生专业：

PhD Programme in Sustainable Energy/Building Technologies
可持续能源与建筑技术博士学位

The aim is to set up a PhD programme in Sustainable Energy/Building Technologies at the Centre for Sustainable Energy Technologies, Ningbo, China. The PhD programme will allow the pooling of additional expertise and resources available at the Centre to enable training of students in the field of sustainable/building technologies. The PhD programme requires candidates to carry out research projects at the Centre jointly with School of the Built Environment, University of Nottingham. There is no requirement for candidates to attend taught courses, but they may wish to attend some of the modules given by the Centre. In this PhD programme, the candidates at the Centre will register for a full-time PhD degree at University of Nottingham. The minimum duration of the PhD programme is 3 years. Candidates are required to spend 1.5 years at Nottingham and 1.5 years at Ningbo. The students will be jointly supervised by staff from the School of the Built Environment and the Centre.
我们的目标是在宁波的可持续能源技术研究中心建立可持续能源与建筑技术博士学位。博士学位的开设将给中心增添更多实力进行可持续建筑技术领域的培训。博士生须和英国诺丁汉大学建筑环境学院联合开展科研项目，不要求学生参加课堂学习，但是学生可以参加中心开设的课程。本中心的学生将在英国诺丁汉大学注册全日制博士学位，学制最少是三年，并要求学生在英国诺丁汉大学学习一年半时间、宁波一年半时间。来自中心和建筑环境学院的博士生导师将共同指导学生。

BEng in Architectural Environmental Engineering
建筑环境与设备工程学士学位

The full-time, four-year degree course in Architectural Environment Engineering is taught by staff from the Centre and the School of the Built Environment, University of Nottingham. Design constitutes an important part of each year of the course and close industrial links are used to their full advantage. Teaching is carried out through lectures, seminars, studio exercises, laboratories and project work. Assessment is based on formal examination (open and closed book) and various types of coursework: laboratory reports, design, computing assignments, individual and group project work and verbal presentations.
The programme requires students to stay in China for 2 years and in the UK for the remaining 2 years.
全日制四年的建筑环境与设备工程学位课程的教师来自中心和英国诺丁汉大学建筑环境学院。设计是每年课程的重要组成部分，与工业界的紧密联系增强了该专业的优势。教学通过讲座、研讨、操作练习、实验和项目等展开。通过正式考试（开卷和闭卷）、各种类型作业：实验报告、设计、计算作业、个人和小组项目、口头陈述等进行评估。
专业要求学生前两年在中国，后两年在英国。

MSc Renewable Energy and Architecture
可再生能源与建筑学理学硕士学位

This course is structured to accommodate the interests of both architectural students and students from an engineering or scientific background. Core modules provide an introduction to the systems that may be used to tap natural energy resources and demonstrate how these may be incorporated into the design of buildings. Architectural students then have opportunity to explore these in design based studio modules, while engineering students pursue technical based modules. By taking a multi-disciplinary approach to teaching the subject, the course aims to engender greater understanding and respect between two key disciplines.
该课程适合于对建筑学感兴趣的学生同时又有理工科的背景。核心课程介绍开采自然能源资源的系统并演示如何把这些融入建筑设计。建筑学学生有机会通过以设计为基础的操作课进行探讨，工程学学生将学习以技术为基础的课程。通过多学科教授的方法，该专业致力于进一步加深和理解这两个关键学科。

MSc Energy Conversion and Management
能源转换与管理理学硕士学位

The full-time 1 year MSc award in Energy Conversion and Management is taught by academic staff from the Centre and School of the Built Environment, University of Nottingham. Teaching is carried out through lectures, seminars, laboratories and research project work. Assessment is mainly based on formal examination (open and closed book) and various types of coursework: laboratory reports, computing assignments, individual and group project work and verbal presentations. The assessment concludes with an individual piece of research presented in the form of a final dissertation during the summer period.
全日制一年的能源转换与管理理学硕士学位课程的教师来自中心和英国诺丁汉大学建筑环境学院。教学通过讲座、研讨、实验和科研项目等展开。主要通过正式考试（开卷和闭卷）、各种类型作业：实验报告、计算作业、个人和小组项目、口头陈述等进行评估。评估还包括暑假里以个人研究形式完成的最后论文。

MSc Sustainable Building Technology
可持续建筑技术理学硕士学位

The full-time 1 year MSc award in Sustainable Building Technology is taught by academic staff from the Centre and School of the Built Environment, University of Nottingham. This one year full-time course has a modular structure during which candidates must collect a total 180 credits in order to obtain a Master of Science (MSc) degree. 120 credits of taught modules will be studied at the School of Built Environment (Nottingham University Park Campus UK), and a 60 credit dissertation research project will be completed at the Centre for Sustainable Energy Technologies (Ningbo Campus, China)
This programme currently requires students to stay in the UK for 8 months (Autumn and Spring Semester) and in China for 4 months (Summer Semester).
全日制一年的可持续建筑技术理学硕士学位课程的教师来自中心和英国诺丁汉大学建筑环境学院。学生必须修满180个学分才可以获得理学硕士学位，其中在建筑环境学院（英国诺丁汉大学主校区）修120个课堂学分，在可持续能源技术研究中心（宁波诺丁汉大学）修60个论文科研项目学分。
课程要求学生在英国学习8个月（秋季和春季），在中国4个学期（夏季）。

mario cucinella architects

MC A

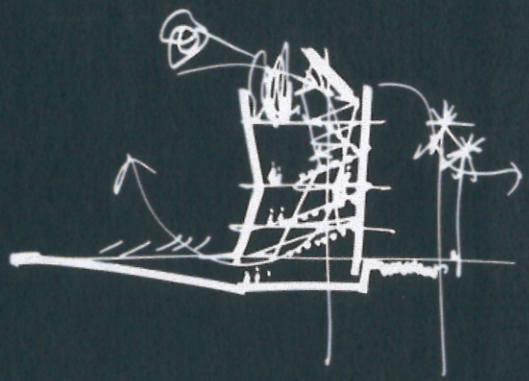
- Mario Cucinella
- Elizabeth Francis
- Angelo Agostini (project architect)
- David Hirsch

Environmental strategies:
- Debora Venturi
- Maria Cristina Garavelli

Engineering Consultants

Structures:
- Luca Turrini, Bologna, Italy

Mechanical & Electrical:
- TiFs Engineering, Padua, Italy



For further information regarding the Centre for Sustainable Energy Technologies, University of Nottingham, Ningbo Campus, please contact:
如需进一步了解宁波诺丁汉大学可持续能源技术研究中心，请联系：

Professor Jo Darkwa,
乔大宽教授
Director, Centre for Sustainable Energy Technologies (CSET)
可持续能源技术研究中心主任
Email: jo.darkwa@nottingham.edu.cn
邮箱

The University of Nottingham