

出國報告（出國類別：國際會議）

The Renewable Energy 2010
會議心得報告

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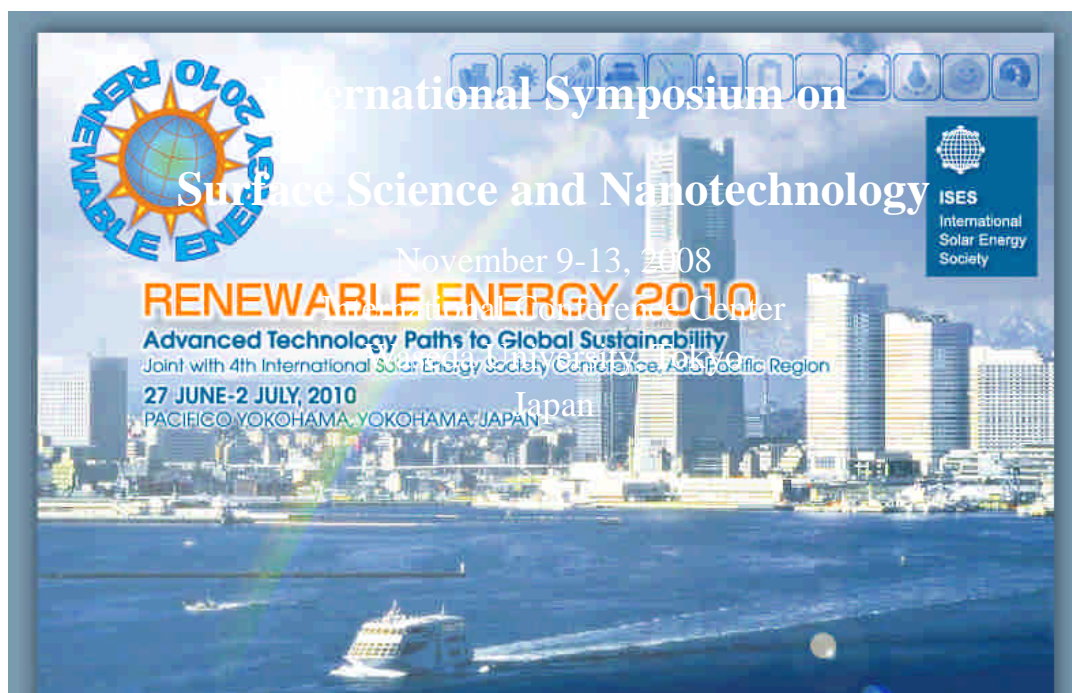
派赴國家：日本

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參加 The Renewable Energy 2010

會議心得報告



本屆大會 27/06~02/07 在日本橫濱 Pacific Yokohama 的 International Conference Center 舉行，大會主席由 Prof. Takao Kashiwagi (Professor, Tokyo Institute of Technology) 主持，Co-Chair 分別為 Kosuke Kurokawa (Professor, Tokyo Institute of Technology)，Monica Oliphant (President, International Solar Energy Society) 擔任。本會議的重要任務主要包括：

(1) Implementation of Closing Remarks committed in RE2006

Conference

In the closing session of Renewable Energy 2006 in 9 to 13th October, 2006 which was held in Makuhari messe, Japan, all participants more than 1000 specialists from 55 countries in the conference agreed the closing remarks such that “Renewable Energy can provide a sustainable solution for energy issues and global environment and it should become a major energy source toward the middle of 21st century. A real sustainable world can be achieved as our common

future by maintaining symbiotic and recycling-oriented society apart from a mass consumption economy. A longer term and consistent policies on the Renewable Energy technology are essential. There exist a number of possible technology-based solutions. We, the specialists involved in the field of renewable energy technologies today, accept this challenge and should respond. Renewable energy is the only peaceful and green energy resource anywhere on earth. This fact should inspire us to further its development and dissemination. We, the attendants here, wish to meet each other again at the next occasion of this Renewable Energy Conference in near future somewhere". Japan chairs the second international conference then.

(2) Aspect further accelerated

Compared with year 2006, global situation has been extremely changed like global warming, abnormal climate, steep energy price hike, global monetary imbalance and so on. Abatement plan for the crisis was publicized in Japan too in this fiscal year, such as "The 50% CO2 reduction by 2050", "The 21 emphasized technologies sponsored by government", "Action Plan to build low carbon society", etc. Many post-Kyoto discussion is also stimulating international discussion in round table. In such an occasion, the conference composed of renewable energy specialists, sitting together is quite significant in order for sharing the knowledge and technologies.

(3) Personnel development with technology know-how is very important

Renewable energy, supplied from or originated by solar is forever and ultimate energy as long as globe sustained. It ought to be a core of energy in 21st century. The development and education of personnel who aims the major of renewable energy technology become essential. The international conference will assist and promote such needs especially for the next and young generation in submitting such an opportunity.

(4) Flow to clean energy is common in the world

The 50% CO2 reduction in the year of 2050 needs 70-80% reduction from the current base, many authorities announced including IEA, who states that the reduction by 40% in changing to clean energy, 36% by energy efficiency and conservation, 19% by CCS is a solution of this issue. Renewable energy occupies approx.50% among the change to the clean energy. Challenge to the innovative technology development and ultimate energy efficiency are indispensable in all over the world. International conference is timely matter. Japan will devote a lot.

(5) We realize First Class International Conference

We will realize first class international conference, and also for exhibition. In addition to the presentation of papers, we plan to invite many talent specialists from overseas and domestic. In 2006, more than 20 persons were invited. This time, the cooperation with foreign embassies has been expected based on recent collaboration.

會議的議程如下：

Program

: RE2010 International Conference Oral & Poster Presentation

Oral and Poster presentations with short time discussion are the main part of the conference. Parallel session among areas is planned during the conference. All papers are presented in English.

: Plenary Session

Each plenary Session is composed of presentation by **invited speakers**, who are globally selected from each area of 12 in total.

: Official Program / Social Program

: RE2010 Workshop

RE2010 Workshops are of the official programs of RE 2010 International conference, conference registrants are able to attend

with your conference pass.

: **Special Sessions**

Special Sessions are sessions jointly opened with RE2010 International Conference. You need to register to each session in each organizer's specified way. The registration and program details will be updated in each organizer's website, linked through "Special Sessions" page.

大會安排的 Guest speeches 包括：

M. Naoshima (*Minister of Economy, Trade and Industry of Japan*)

M. Yamada (*Deputy Mayor, City of Yokohama*)

大會安排的 keynote speeches 包括：

- Toshio Yamagata (School of Science, The University of Tokyo) : Climate Change, Variation and Sustainable Green Energy
- Dr. David Renné (President, International Solar Energy Society) : **Status and Trends of Solar PV Around the World**

大會的口頭報告演講區分為 12 領域，包括：

Area I: Policy

Area II: Photovoltaic

Area III: Solar Thermal Applications

Area IV: Low Energy Architecture

Area V: Wind Energy

Area VI: Biomass

Area VII: Hydrogen & Fuel Cell

Area VIII: Ocean Energy

Area IX: Geothermal Energy

Area X: Advanced Power Systems

Area XI: Heat Utilization & Energy Efficiency

Area XII: Small Hydro, and Non-Conventional

會議議程安排得非常緊湊密集，議題也非常廣泛充實，除了有一大部分聚焦於太陽能電池之發展之外，也涵蓋風能、地質能、海洋能、氫能等，更難能可貴的是大會也安排各國針對該國再生能源推動現況及政策之報告（Country report），包括新加坡、菲律賓、泰國、越南、馬來西亞、印尼等。當然台灣也有多個單位與會做報告與交流。







以下節錄 keynote speeches 的摘要以饗讀者，當然也是本次大會重要文件：

Climate Change, Variation and Sustainable Green Energy

Toshio Yamagata

School of Science, The University of Tokyo

The outgoing long wave radiation at the top of the atmosphere decreases when the greenhouse gasses increase. To satisfy the earth radiation balance, the temperature of the troposphere must increase. This is the simplest view of the global warming and what is happening now. Because of the anthropogenic activation of the carbon cycle after the industrial revolution, we are facing the serious climate change and variation causing abnormal weather and extreme natural phenomena that endanger our life and society.

To realize a sustainable post-climate-change world, we need to develop another technological innovation to utilize renewable energy sources, in addition to the need for solid measures to secure fresh water and food. Those renewable energy sources are found in the atmosphere, biosphere and hydrosphere. Because of this, sustainability as well as availability of most of the renewable energy such as sunshine, winds, currents and waves, water flows and biomasses is closely linked to climate change and variation.

Climate “variation” refers to a situation in which, due to various internal factors, climate fluctuates significantly around the normal state from seasons to decades. On

the other hand, climate “change” refers to a situation in which the normal state changes over a longer period of time. The latter often results from some external impact on the atmospheric and oceanic system. The relation between increasing concentrations of greenhouse gasses and the rise in earth surface temperatures has become a major focal point as a problem of global warming. Since this is caused by human activity, it is a problem of climate change. The earth’s rotational orbit and the tilt of the earth’s axis fluctuate on a timescale of tens of thousands of years or more. These cause ice ages and interglacial periods due to changes in the sunlight radiation, and as such, these could also be described as climate change. The distinction between “variation” and “change” is important when considering application measures. It is climate variation, not climate change, that is directly related to the abnormal weather and extreme natural phenomena.

Initiatives aimed at predicting climate variation have been progressing rapidly in professional climate science community. We are at a level whereby the occurrence of El Niño can be predicted one or two years in advance. To develop a sustainable green energy system for the 21st century, we need to establish such a climate forecast system, which is now indispensable to human and social security.

Status and Trends of Solar PV Around the World

Dr. David Renné

President, International Solar Energy Society

Keynote Address: 30 June 2010

Solar photovoltaic technologies have made remarkable strides in efficiency, cost effectiveness and widespread applications around the world in the past 30 years. This paper will provide an overview of the current status of PV technologies and markets, and what future trends might be expected in these markets. Currently, PV is deployed as distributed off-grid systems to individual households and communities in the rural and developing world, distributed systems as part of an existing grid infrastructure, and large central solar stations connected either to a distribution or feeder line, or directly to the regional transmission grid. The latter application has recently seen a rapid growth in developed countries and regions such as the U.S., Europe, and Japan. Nevertheless, the value of off-grid and distributed PV is still very high, and these niche markets should continue to be addressed in the future.

Clearly, the solar resource is not a limiting factor in deploying PV systems around the

world. It has been estimated that installing PV arrays on just 95,000 km² of sunny land such as the Sahara or the Gobi deserts, or the deserts of the SW United States, can provide enough electricity to meet all of the world's current demand. There are a variety of factors, all of which feed back on each other, that are making PV so successful in the market place. These factors include private investment, manufacturing scale-up, product R&D, system and component cost reductions, and innovations in business practices and public policies. All of these factors work together to lead to expanded markets, which in turn stimulate further advances in the technology. However, a number of perceptions related to solar technologies still exist, such as high initial costs, the intermittency of the resource, the lack of knowledge of its use both by home owners as well as utilities, the low energy intensity of the resource (meaning that large amounts of land are needed to obtain sufficient energy to be cost effective for meeting certain load requirements), lack of local and business infrastructure, and unfavorable policies. These perceptions still lead many to believe that PV will supply little more than a small niche market for meeting our growing energy needs; however, with all of the advances in this technology, there are now many counters to these perceptions. The issue of high penetration of intermittent resources into a regional or national grid is currently being given extensive study in several countries, and the results of some of these studies will be highlighted in this talk.

心得與建議事項：

除了專業技術之交流之外，參與本會議也能了解各種再生能源之發展現況，以及各國再生能源推動現況及政策，個人覺得收穫相當豐碩，也絕對是一個值得從事能源研究，政策制定、規劃之政府人員參與的國際會議。或許是自己來自大專院校，也特別注意到大會的一個蠻有意義的Workshop主題：Actions of Universities to Seek Sustainability through Sustainable Campus Program，7月1日由東京大學教授 Arakawa主持開幕，同濟大學Prof. Tan主講：Sustainable Campus initiative in Tongji University，澳洲Prof. R. Dyball主講：Developing a campus sustainability program that integrates campus management into education for sustainability，日本東大教授K歐 Hanaki主講：Activities of sustainable campus program at University of Tokyo。

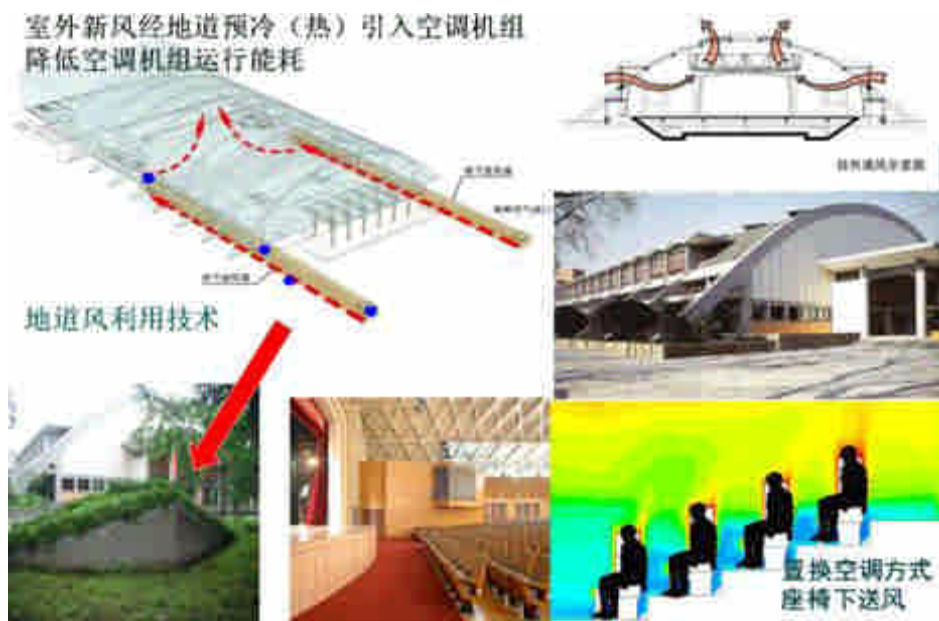
同濟大學自2003年即開始啟動校園利用再生能源計畫，計劃的成功建立在三個基石上：技術、管理、與教育（**technology, management and education**）。



學生宿舍採太陽能供應熱水



宿舍廢水處理

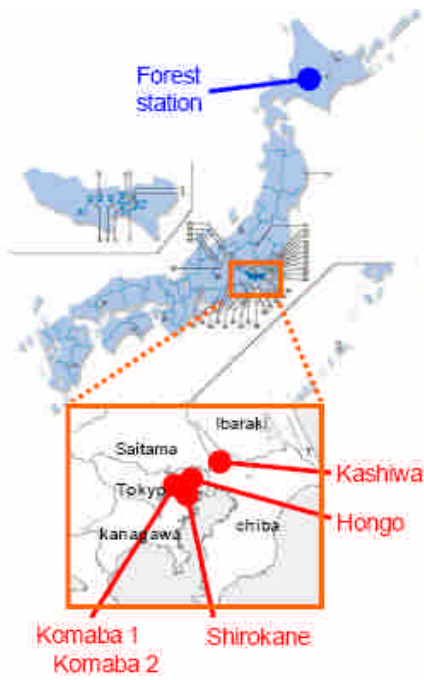


室外新空氣經地道預冷（熱）再引入空調機組，降低空調機組運轉能耗

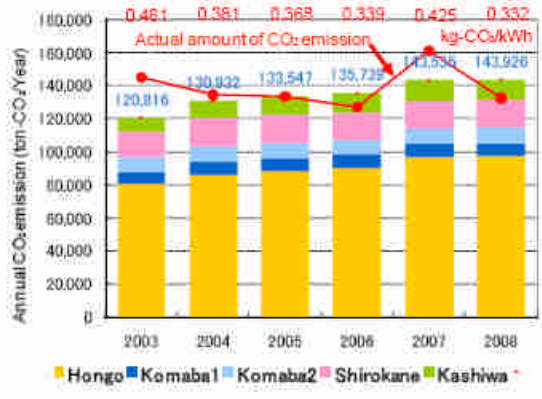
澳洲國立大學（The Australian National University）啓動校園再生能源永續發展計畫更早，在1999年即已開始，校園策略一個重要的關鍵元素及再於建立一個行動與學術活動之間強而有力的連結，使得資訊能一傳十，十傳百。

日本東大設定2012年減碳達到2006年排放量之15%為目標，學校也啓動永續校園計畫（Todai Sustainable Campus Project (TSCP)），該計畫主要包括 (1) monitoring and optimal control of demand and supply, (2) low carbon campus formation by energy saving and renewable energy production and (3) collaboration with Society。首要是執行校園內各種節能措施，小型風力發電為主要推動項目。

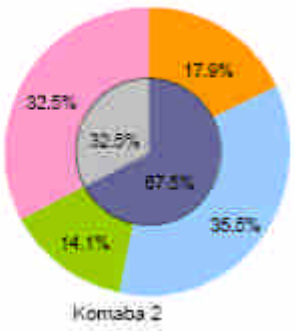
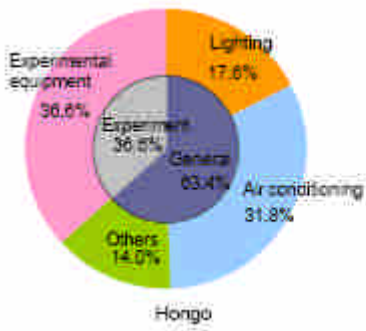
個人覺得國內各大學也應該啓動類似計畫，從大學校園帶頭做起永續校園節能減碳計畫。



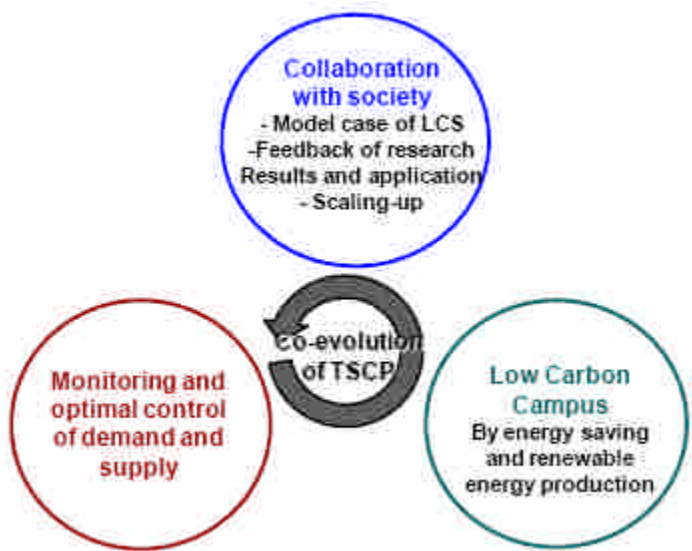
東大校區分佈



東大五個主要校區CO2減少之趨勢



電力使用的用途統計



Today Sustainable Campus Project(TSCP) 主要架構