

# NEWSLETTER

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## SPECIAL ISSUES

### More Solar Energy for China

Chinese State Development and Reform Commission announced on March 16, 2007 that China's first national conference on solar energy utilization, co-sponsored by the State Development and Reform Commission, Ministry of Construction, and Shandong Provincial Government, will be held April 26-28, 2007 in Jinan. The meeting will summarize and share the technologies and experience on solar energy utilization, discussing the problems China is facing in the area, and making a nationwide deployment for diffusion and application.

Thanks to many-year development, China has possessed proven and mature technologies for solar water heating, solar housing, and solar stove, with an

increased application scale. As of 2006, China has developed an annual capacity of 18 million square meters for solar water heaters, with application areas amounting to 90 million square meters on a combined basis, which makes China the largest solar water heater producer and user in the world.

According to a preliminary plan published by the State Development and Reform Commission in 2005, China will raise its renewable energy from 7% to 15% by 2020, as a proportion of primary energy, with a total application area of 300 million square meters for solar water heaters, which makes an annual saving of 40 million tons of coal equivalent. China will also see an increased solar capacity up to 2 million kilowatt hours of electricity.

### Six Goals for Space Development

The Chinese State Commission of Science, Technology and Industry for National Defense recently published a space development blueprint for the 11th Five-Year period (2006-2010), with four major space projects, including manned space flight, moon probe, Hard X-ray Modulation Telescope (HXMT), and recoverable satellites for scientific experiment.

The Plan lines up six major goals for China's space development during the 11th Five-Year Plan period: 1) implement the projects of manned space flight and moon probe defined by the National Long- and Medium-Term S&T Development Planning (2006-2020); 2) develop a proprietary Hard X-ray Modulation Telescope, making China's own astronomic satellite from scratch, and conducting black-hole related studies; 3) blast off a Practice-10 recoverable scientific experiment satellite, working on microgravity and space life sciences; 4) be part of China-Russia collaborations on Mars Probe and World Space Observatory/UV, and China-France collaboration on microsatellites for investigating solar eruptions; 5) develop key technologies for space solar telescope, and conduct pre-study for the Kuafu Project, screening out scientific targets and developing key technologies; and 6) work on key technologies and conduct studies concerning space sciences.

During the 11th Five-Year period, China will focus on basic studies in three key areas, including space astronomy/solar physics, space physics/solar system probe, and microgravity/space life science.

### Solar Activities Increase Space Disasters

According to a predication made on March 13, 2007 by the Chinese National Satellite Meteorological Center, solar activities will enter a new ascending cycle starting from this summer. In the next 5 years, China will see an increased annual occurrence of space weather disasters, along with intensified solar activities.

A spokesman from the Center told reporters that solar activities will become minimum in May 2007, followed by a new activity cycle (24<sup>th</sup> cycle) that will last for 11 years. The next 5 years will be the ascending phase for the cycle, with the peak around 2012. Solar activities are the sources of space weather disasters.

It is predicted that in the next 5 years, an array of China's systems, including space, satellite, defense, telecommunication, navigation, positioning, and long distance network, will be affected by space weather disasters. Meanwhile, atmospheric and biological activities will be noticeably affected.

Meteorologists asked authorities concerned to pay more attention to the impacts of space weather disasters, in an attempt to get prepared. Efforts shall be made to intensify real-time space weather watch and predictions for China's space activities.

It is also suggested that authorities in charge of space, telecommunication, navigation, positioning, power generation, and petroleum shall strengthen their collaborations and exchanges with space weather services, in an effort to reduce the possible damages caused by space weather disasters. A domestic data based emergency service system shall also be established for the purpose.

## INTERNATIONAL COOPERATION

### Atmospheric Pollution Negative on Precipitation Confirmed

Climate change induced by air pollution has a serious impact on the rainfalls over semi-arid and hilly areas, which makes an important contributor to water shortage in some areas of the Middle East and other parts of the world, confirmed by the findings recently published by a Chinese-Israeli study. The findings, published in a recent issue of journal *Science*, says the increased pollutants and its density in the atmosphere directly contribute to the decrease of rainfalls over hilly areas, which heralds the first confirmed relationship between atmospheric pollution and rainfalls.

The study team, made up of scientists from the Hebrew University of Jerusalem, Shaan'xi Provincial Institute of Meteorology, and the Chinese Academy of Meteorological Sciences, made an in-depth study of water resources over the selected areas affected by air pollution. The team has come up with a conclusion that the major cause that triggers up the global environmental change is not a raised temperature by global climate warming, but rather by the shortage of water resources that has left some desertification areas unsuitable for human

dwelling. The importance of water resources has become increasingly noticeable in numerous areas, including the southwest part of the United States, north China, and the Middle East area. In this context, it is important to study the rainfalls over these areas, in an attempt to understand the water resources there.

### China-Korea Joint Marine Study

In the past decade, No. 1 Marine Institute, part of the Chinese State Oceanography Bureau, has fostered a laudable partnership with the Republic of Korea Institute of Marine Science, through a number of fruitful Yellow Sea projects. Deepened research activities are calling for expanded areas for research. In this context, scientists from both nations have made a joint proposal in 2005 to study ancient monsoons in East Asia, compare marine and continental climate changes in ancient times, and make predictions for future environment. The Sea of Japan, a very special offshore setting in the northwest Pacific Ocean, possesses evolutionary footprints of ancient environment and climate. The Republic of Korea provided a sediment specimen collected from the southwest part of the Sea of Japan to the Chinese side in December 2006, which started the collaboration between the two nations in studying the geological aspects of the Sea of Japan. The Korean side will invite two Chinese scientists to be part of the Sea of Japan expedition organized by the Korean side, which makes the first scientific trip of Chinese scientists to the Sea of Japan. The effort will deepen people's understanding of environmental evolutions of the rims across the Yellow Sea, East Sea, and Sea of Japan.

### China: Largest GEF Recipient

It was reported at a GEF management meeting recently held in China that the host country has enjoyed the largest share of GEF funding among the member states. As of March 2007, 48 Chinese projects have been financed by GEF, with an amount of USD 517 million. China is also part of 26 regional or global GEF initiatives. China is currently working on 34 projects, with a promised donation worth USD 380 million.

The meeting discussed a range of issues, concerning management and fund planning in general, new policies, project auditing, fund use, application procedure, and procurement flow. Role model project offices were invited to share their results and experience with the participants.

Up to date, GEF, supported by 177 member states, has promised a donation worth RMB 7.2 billion for some 1400 projects.

### World First GM Cassava

It was reported on March 8, 2007 from the source of Shanghai Institute of

Biological Science, part of the Chinese Academy of Sciences, that the world first GM cassava has made a phase progress at a pilot growing site of 2 mu(1 mu= 0.0667 hectare) in the Haikou City. The pilot project, approved by the Ministry of Agriculture Office for GM Safety, was jointly implemented by the Institute of Physiology and Ecology under CAS Shanghai Institute of Biological Science, Institute of Tropical Biological Science and Technology affiliated to the Chinese Academy of Tropical Agriculture, and the Institute of Plant Science subordinated to the Swiss Federal Institute of Technology. The pilot project was kicked off in January 2006 at an experimental base for genetically modified plants sponsored by the Chinese Academy of Tropical Agriculture in Haikou.

Researchers have obtained first-hand data on growing GM cassava in the field. A preliminary analysis shows that the GM cassava has a raised life for its leaves, which affects both the yield and preservation.

## RESEARCH AND DEVELOPMENT

### Key Technology for Ultra Thin Float Glass

In 2004, a project was initiated under the National 863 Program to develop key technologies and equipment for manufacturing ultra-thin float glass, in an attempt to support Luoyang Float Glass to establish its own float glass production line. In doing so, researchers worked out a brand new theory for melting control, which improved the existing control techniques and computer aided kiln flame calculation, ensuring a homogenous melting. They also developed a range of advanced application systems for cooling, inner quality, and cutting control. A national thin float glass making standard for liquid-crystal display application, derived from the same project, has been enforced in the country.

In 2005, another initiative was launched under the National 863 Program to develop an intelligent system for collecting and sorting ultra thin glass. The new production line has so far rolled out glass products in 1.1mm, 0.7mm, and 0.55 mm specifications, up to the quality needed by electronic industry. In October 2006, a scale production capacity was developed to manufacture 0.7mm STN glass.

### 25-inch VGA Field Emission Display

A project to develop 25-inch VGA Field Emission Display, contracted to Xiamen Huoju Fuda Display, Fuzhou University, IRICO, and TCL under the National 863 Program for the 10th five-year period, has recently achieved laudable

progresses. The 25-inch VGA Field Emission Display, rolled off from the project, has passed the field test, with a prototype resolution of 640×3×480, peak luminance 410cd/m<sup>2</sup>, contrast 1010:1, and grayscale 256.

Researchers have harvested key proprietary innovations for an array of technologies, including grayscale modulating, novel cathode/grid structure, and glass sealing at lower melting point, which laid a fine ground for developing key technologies and techniques for producing large size, high performance, and low-cost FED.

### Rice Research Cost Cut Using Molecular Markers

Scientists at the Southwest University have rolled out a patented technique to measure the cytoplasmic male sterility of rice using molecular markers. The patented technique allows the measurement of the rice of same species in places other than Hainan, which saved both time and costs.

In the past, the measurement of the cytoplasmic male sterility of rice had to be made in Hainan, which made sustainable farming activities a question, as it may take 3-4 months to complete. It now only takes 15 days to complete the measurement using biomarkers, enjoying a 100% accuracy for distinguishing a sterility line or a maintainer line, within a drastically reduced timeframe. The new technique makes a fast and accurate means for safe agricultural production.

### China's Wireless Technology Caught Attention

Nufront Software Technology (Beijing) Co. Ltd. presented a solution for ultra high speed broadband wireless network, at an IEEE802 LMSC plenary session held on March 13, 2007 in Orlando, FL. The solution, consumed 3-year efforts of Nufront, makes an enhancement to the existing WiFi 802.11a/g in three respects:

- 1) Raised speed for data transmission. Under a normal working condition, the actual data transmission speed of 802.11a/g on is 12Ms or 18 Ms. China's solution has raised the speed to 24-36 Ms, fully meeting the needs of high definition TV for wireless real-time transmission.
- 2) Easy scalability. Equipment vendor can easily make an upgrade, without calling for any new investment, if a wireless network chip supporting the new technology is used.
- 3) The new solution is fully compatible with 802.11a/g, for regular communications, causing no difficulties to normal network activities.

## Ginseng Genome Database

A study team, headed by LIU Shuying, a research fellow with the Institute of Applied Chemistry, part of the Chinese Academy of Sciences, has created the world's first Ginseng genome database. LIU and her team have long worked on a project to standardize Ginseng production and associated product development. The team screened out fine Ginseng species for diffusion, with noticeable yield increase, stable pharmaceutical properties, and lower chemical residues. The effort raises China's reputation for fine Ginsengs, which is important for export.

Thanks to 5-years painstaking efforts, the team has established a range of databases using molecular biological techniques, including Ginseng genome database, Ginseng cDNA database, Ginseng roots cDNA database, and American Ginseng roots cDNA database. Researchers also completed the sequencing of key DNA for both Chinese and American Ginsengs. In addition, they established the quality criteria and fingerprint spectrums for Ginseng, Ginseng Radix Rubra, and American Ginseng, and created a well regulated processing flow for prepared slices of American Ginseng.

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