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Headline news

A Network of Regional Centers for S&T Strategic Studies Being Planned

"China is building a network of regional centers for science and technology strategic studies," Dr. WAN Gang, Vice Chair of CPPCC and Minister of Science & Technology indicated at the 30th anniversary of Chinese Academy of Science and Technology for Development (CASTED), which was presided by Dr. WAN.

WAN said "much more attention should be focused on major strategic problems in the regional innovation process, and a national network for S&T strategic studies should be put in place". He mentioned in his address that, CASTED is partnering with provincial science and technology departments, research-based universities as well as well-known companies, in a bid to better use research resources, promote interdisciplinary studies and facilitate coordination between central and regional government. By setting up the network, "the general strategic research results can be tested in different regions, local innovation experience will help decision-

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making of the central government and valuable practices can be exchanged through CASTED".

In addition to strengthening regional collaboration, CASTED should also gain an international perspective. "Globalization is not only characterized by the flow of currency, but also the integration of sci-tech achievements", said Mr. WANG Zhigang, Party Secretary and Vice Minister of Science and Technology. He wished that through the "soft power" of strategic studies, CASTED could enhance its collaboration with local and international partners and elevate China's hard power in science and technology.

Dr. WAN Gang, Vice Chair of CPPCC, Minister of Science & Technology and President of CASTED addressing the 30th Anniversary of CASTED on Dec.19,2012

(Source: www. people.com.cn , December 20, 2012)

S&T Management Information

12th FYP Bio-manufacturing Development Program Released

MOST issued Bio-manufacturing Development Program for the 12th Five-Year Plan Period (the Program) on Nov. 24, 2011. Bio-manufacturing has turned into a global emerging industry, becoming a strategic focus in world economic powers and taking on a tendency of rapid growth. Therefore, it is of vital importance for China, a country at the crossroad of economic transit and restructuring, to develop the bio-manufacturing industry.

Based on the principle of "government leading, resource sharing, indigenous innovation and cultivation," the Program aims to obtain a vantage point at the forefront of the industry, nurture new growth point, upgrade current technologies, support innovation, thus realize leapfrog development of the bio-manufacturing industry by replacing fossil resources with renewable carbon resources, replacing chemical catalyst with green and highly efficient biological catalyst, as well as elevating the traditional bio-chemical industry with modern bio-technologies.

The goal of the Program is to set up a basic innovation system for the bio-manufacturing, breakthrough a batch of key technologies, raise international competitiveness, put in place the bio-manufacturing industrial chain and enter the world rank of advantege in terms of bio-manufacturing technologies.

It is also identified that in order to fully leverage the role of bio-manufacturing sector in sustainable development, the Program will establish technology platforms and research centers for the industry, enhance the research efforts on biocatalysis, bioconversion, development of artificial life and cell factory, engineered bioprocess, etc., and make breakthroughs in such key technologies as synthetic biology, genomic breeding of micro-organisms, molecular transformation of industrial enzymes, industrial protein expression, high throughput screening of industrial micro-organisms, biorefinery and biomass transformation, biocatalysis, bioprocessing, and engineered bioprocess. At the same time, efforts will be made to develop major products and technology systems for the industry.

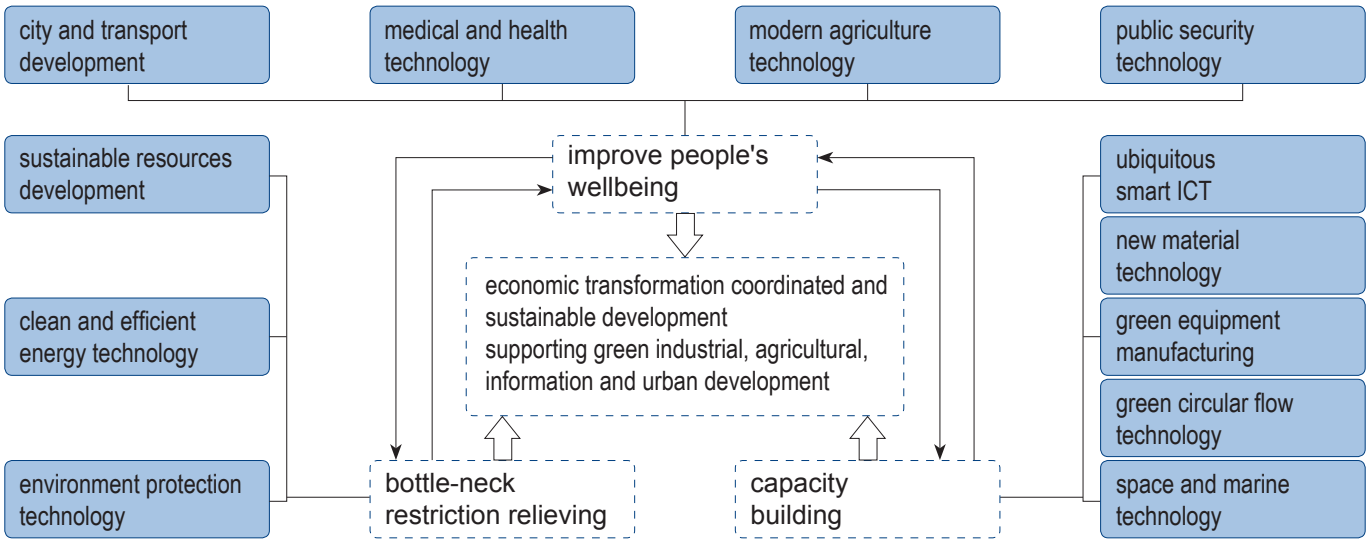
(Source: MOST, December 2, 2011)

Report on Medium- & Long-term Engineering Development Released

The "Strategic Study on China's Medium- and Long-term Engineering Development", organized by the Chinese Academy of Engineering (CAE), released its general report recently. The project tries to map out the blueprint for China's engineering advancement by 2030 so as to achieve leapfrog development and meet the requirements of socioeconomic progress.

The general report has proposed a new pathway for engineering development to support economic growth and social progress, put forward a batch of projects to upgrade China's capacity for sustainable development and national competitiveness, and list the leading engineering projects and key generic technologies in need.

The development strategy highlights 12 areas:



(Source: Science & Technology Daily, December 26, 2012)

China Launches Plan to Combat Air Pollution

China recently released *the 12th Five-year Plan for Air Pollution Prevention and Control in Key Regions*, the first of its kind in history. According to the Plan, China aims to improve its air quality during the 12th Five-year Plan period by reducing its annual average density of PM10, sulphur dioxide, nitrogen dioxide, PM2.5 by 10%, 10%, 7% and 5% respectively, and in heavily-belching Beijing-Tianjin-Hebei region, the Yangtze River Delta, and the Pearl River Delta in particular, PM2.5 by 6%. By 2015, the emission of sulphur dioxide, NOX, industrial soot and dust in key regions will be reduced by 12%, 13% and 10% respectively; efforts to fight volatile organic compounds (VOCs) will be well under way, ozone pollution brought under control, and acid rain pollution lessened; a regional joint mechanism will be in place to control air pollution, and air management capability is expected to improve markedly.

(Source: Science and Technology Daily, December 19, 2012)

IGBT Chips Reaching International Advanced level

The IGBT (Insulated Gate Bipolar Translator) chip developed by Zhuzhou CSR Times Electric Co., Ltd was accredited by experts in Changsha on Dec. 21. The chip, the first of its kind developed and produced indigenously in China, approved one to fill up the gap in the country,approved one of the most advanced in the world.

IGBT, known as the "CPU" of variable current products, is a full control voltage-driven device composed of double-pole triodes and insulated gate field effect transistors with the features of easy driving and control, high switching frequency, low voltage, high on-state current and low loss. Power semiconductors are the core of IGBT system.

CSR Corporation invested RMB1.5 billion in Zhuzhou to build China's first 8 inch production facilities, with the capacity of making 120 thousand 8 inch IGBT chips and 1 million IGBT modules. According to Vice President Liu Kean, when the new line is in operation by the end of 2013, it can raise the current output by 7 times.

After acquiring Dynex Semiconductor in 2008, CSR obtained IGBT design, manufacturing and testing technologies, and soon set up power semiconductor R&D center in the UK to focus on IGBT chips and carborundum. So far, CSR is holding technologies to make five different IGBT chips ranging 1200~6500 volts, as well as the packing, testing and using of relevant IGBT modules. The module is used on urban rail transit vehicles and high power AC drive electric vehicles with safe operation of over 500 thousand kilometers.

As the mainstream device for UMT, the 3000 volt IGBT chip has a broad perspective. Mr. Liu Youmei, member of Chinese Academy of Engineering said the technologies developed by CSR can increase the current capacity, upgrade the ability to resist latch-up and short circuit, reduce voltage, lower cost and is highly innovative.

(Source: Science & Technology Daily, December 27, 2012)

China's First R0110 Heavy-duty Gas Turbine Passes 72-hour Load Test Run Assessment

The first R0110 heavy-duty gas turbine developed by China, through the joint efforts of AVIC Shenyang Liming Aero-engine Corporation Ltd, CNOOC Shenzhen Power Company and others, with the support of 863 Program, recently completed 72-hour load test run assessment. The performance of the turbine and its design and manufacturing fulfil the project requirements, according to the assessment. Launched in October 2002, R0110 gas turbine project has combined the efforts of the industry and academia by forming a group consisting of more than 30 institutions and companies in metallurgy, machinery, electronics, aviation, and power industries, which have worked together through the whole process of the project from material development, design, test, manufacture and test operation. The success of the test run indicates China's full capability of independently developing heavy-duty gas turbines, and marks a great achievement in this field.

(Source: Ministry of Science and Technology, December 27, 2012)

Huaneng IGCC Station in Operation

On Dec. 12, 2012, Vice Minister CAO Jianlin of MOST attended the unveiling ceremony of "863 R&D Center IGCC Green Coal-fired Plant" in Tianjin and visited Huaneng IGCC demonstration plant.

IGCC, one of the worlds' cleanest coal-fired powergeneration technologies, is a key path to energy conservation, emissions reduction and climate change mitigation. Since the 8th Five-Year Plan Period, MOST has been providing sustained funding to R&D of IGCC technology. With the government support, China has developed by itself world-leading coal gasification technology---- the two-stage dry pulverized coal gasification technology and four-burner coal-water slurry gasification technology, developed by Xi'an Thermal Power Research Institute of Huaneng Group, East China University of Science and Technology and Shandong Yankuang Group respectively, are exported to the US and have become the mainstream gasification technology in the world. The Huaneng IGCC demonstration plant is a key project of 863 Program during the 11th FYP period. The completion of the plant has showcased major progress in IGCC development in China, and indicated China to become one of the four nations which can design, construct and operation IGCC plant. The success of the project will not only promote clean coal-fired power generation technologies and industry in a sustainable way, but will also greatly increase China's global influence in energy conservation, emissions reduction and climate change mitigation.

(Source: MOST, December 20, 2012)

Suzhou High-tech Park Invests 39 billion yuan in Fixed Asset in 2012

Suzhou High-tech Park is expected to contribute 10.2% to local GDP growth and 15.4% to revenue increase in 2012. Its fixed asset investment in the same year, including in key projects in 71 provinces and localities, is expected to amount to 39 billion yuan, up by 18% over the previous year.

In 2012, Suzhou High-tech Park hosted a number of $1 billion-plus projects, including Changhe Real Estate, Canadian Solar Inc. and Xuming Real Estate. Other projects like And INVT Suzhou Industrial Automation Park, Lvbao Square phase 2, PKMC, Suzhou Trimpol Specialty Lubricants Company Ltd started construction. As a result, $1 billion is expected to pour in, an increase of 11.1% over the previous year. With accelerated Industrial restructuring, the Park's emerging industry can generate 53.2% of the total output value of 5-million-annual-revenue-plus industries. Its service sector's added value as a ratio of GDP will rise by 3 percentage points, and its retail sales by 12.1%. Modern agricultural demonstration zone will cover a total area of about 1,600 hectares, or 90% of the total food-growing area. Its R&D expenditures as a percentage of local GDP is expected to hit 3.4%. Due to the Park's greater efforts in building innovation carriers, Suzhou Institute of Biomedical Engineering and Technology was incorporated as part of the Chinese Academy of Sciences (CAS), Suzhou Branch of Jiangsu Medical Instrument Testing Institute was launched, and the Institute of Geographic Science and Natural Resources, CAS, and China Institute of the Academy of Medical Technology of Russian Federation have established their presence within the Park. The construction of Industrial Technology Research Institute of Zhejiang University and Suzhou Research Institute of Communication University of China has also picked

up speed. Industry-academia collaboration has gained momentum, as seen by the conclusion of agreement to cooperate with IBM, Renmin University and Suzhou University. Filed and granted patents, and filed and granted invention patents are expected to reach 10,000, 5,500, 3,500 and 320 respectively, with invention patent applications accounting for 33% of the total. A total of 266 champions and leaders in various fields, and 23 under National Thousand Talent Program have been pooled.

(Source: www.chinahightech.com, December 25, 2012)

International Scientific and Technological Cooperation

China Joins "Towards An HIV Cure"

"Towards an HIV Cure" is a global scientific strategy developed by the International AIDS Society in 2011. Given the limitations of antiretroviral therapy and recent advances in our understanding of HIV persistence during effective treatment, the strategy is targeted at a functional cure of HIV, meaning to stop the virus from replicating and diminish the latent reservoirs where HIV hides without completely eliminating the virus from the body, and the patients can control HIV without having to take medications.

A strategic plan has been drafted by the working group to look at the basic, translational and clinical research towards a cure, and to this end, the establishment of an international research alliance or expansion of global collaboration of existing consortia is needed. China joined the strategy in 2012, and chief expert Shao Yiming of the Chinese Center for Disease Control and Prevention become a member of the scientific committee.

According to Shao, the strategy is highly conducive to international collaboration on HIV research and cross-disciplinary studies. The National Natural Science Foundation of China and the US NIH are now working together in this field. HIV cure has already been listed in China's 2013 Major S&T Projects, and will soon be included in NSFC and 973 Program.

(Source: Science & Technology Daily, December 19, 2012)

High Coverage Single Sperm Genome Mapped for the First Time by Chinese and American Scientists

Two research teams, respectively led by Li Ruiqiang from China (composed of researchers from Biodynamics Optical Imaging Center and School of Life Sciences of Peking University, and Peking Univerisity-Tsinghua Univeristy Center for Life Sciences) and Xie Xiaoliang from Harvard University, by working together, have completed high-coverage single-sperm whole-genome sequencing for the very first time, the genetic map of a single person with the highest accuracy of characterizing recombination up to now, and have concluded that the

lowering of recombination rate in the starting area of the gene is as a result of molecular mechanism instead of natural selection. This result will help explore the pattern of genetic disorders. The findings were published in *Science* on December 21.

The recombination of homologous chromosomes is an important mechanism for producing biological diversity, and the differences between siblings are exactly determined by this. Until now, due to restrictions by laboratory techniques, scientists could only estimate how frequently recombination had occurred by relying on genetic studies of population, rather than an individual.

Genetic studies of populations found that recombination rate near the gene region is lowered. This study shows that it is also true of individuals. "This shows that this phenomenon is determined by molecular mechanism instead of natural selection." Project member Li Ruiqiang said. This has resolved an issue plaguing the academia for years.

According to the findings, 5% of sperm genome is aneuploid, which will cause congenital defects. Li Ruiqiang said that by adopting the same technique, the genome recombination of other reproductive cells can also be characterized, and these findings can be important theoretic basis for the study of infertility and genetic diseases.

Stanford University researchers sequenced single sperm cell genome for the first time, which was published in *Cell* in July, 2012. What is different with this research is, the adopted MALBAC technique, invented by Xie Xiaoliang's team, improves the accuracy of recombination characterization by several times.

(Source: Science and Technology Daily, December 31, 2012)

China and Russia Join Hands in Eurasian Temperate Grassland Research

China-Russia Joint Lab on Grassland Ecosystem was launched in Hohhot, Inner Mongolia, marking a start in jointly studying Eurasian Temperate Grassland by the two countries.

The lab was jointly established by the Institute of Grassland Research of CAAS and General and Experimental Biology Institute of Siberia Branch of Russian Academy of Sciences. The Institute of Grassland Research of CAAS is China's only national-level public research institution in grassland, covering comprehensive fields ranging from grassland production and management, pasture resources and breeding, grassland ecology and monitoring, grassland engineering machinery to comprehensive grassland development.

According to Chinese grassland experts, the launch of the joint lab will serve as a platform for international collaboration on research of grassland protection and sustainable use, combine both Chinese and Russian resources for comprehensive, systematic research on Eurasian grassland. This will boost all-round, coordinated and sustained development of Chinese or even global grassland, and marks a shift toward international efforts in China's grassland research.

With its focus on the eastern edge of Eurasian temperate grassland, the lab will cover grassland resources and ecology, grassland production, human activities and grassland policy. By bringing together researchers from China, Russia and Mongolia, the lab aims to become a center of excellence for grassland in Northeast Asia. The goal is to build the lab into China's top one with a dominant role in China-Russia joint grassland research within 3 to 5 years, a highly recognized one in Asia-pacific region within 5 to 10 years, and an international one with global influence within 20 years.

(Source: Science and Technology Daily, December 27, 2012)

International Science and Technology Cooperation Base (6): Dalian Snowdragon Industrial Group Co., Ltd

Hosted by Snowdragon Beef Co., Ltd, Dalian Snowdragon International Science and Technology Cooperation Base has a R&D center of 3,000m^2, and 37 employees, 9 of whom have senior professional titles and 12 intermediate professional titles. The Base has been, jointly with research institutes in Australia and Japan, long committed to the study of whole production chain of high-grade beef cattle. It has brought in and applied technologies from abroad, and at the same time, has disseminated technologies to surrounding farms, thus translating them into productivity.

As supplementary means to conventional insemination with frozen semen, breeding techniques such as embryo engineering, in-vitro fertilization, ovum pick up, embryo transfer and hybrid combination techniques are introduced to speed up breeding, improve cattle quality and develop high-grade beef cattle with independent intellectual property rights. In fattening the cattle, efficient feed-utilizing methods such as feed processing, phase-separated fattening, disease prevention and control for scale feeding, microbial treatment of litters are adopted to ensure the quality of the ultimate products. Least cruel slaughter methods are adopted and precise beef cattle grade classification standards are developed for the first time in China, which ensures that the added value of the products are fully realized. Faeces and urine are recycled into organic fertilizer and wastewater recycling techniques are developed. A sound recycling system and industrial chain has been in place to maximum resources. A unique industrial production pattern, with the focus on beef cattle breeding, has taken shape.

The Base has been charged with various R&D programs at state, provincial and municipal levels. With its product Snowdragon beef, which fills the void of high-grade snowflake beef in China, the Base was selected as the beef provider for 2008 Beijing Olympics and 2010 Shanghai World Expo, showcasing China's beef production capability to the world.

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(Editor's Note: All news in the issue are translated from Chinese texts for your reference. They are subject to checks and changes against official release of original Chinese or English texts.)