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# NEWSLETTER

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## SPECIAL ISSUES

### China Promotes Desalination Industry

According to a document released recently by the Chinese State Council to gear up the development of seawater desalination industry in the country, China will secure a desalination capacity of 2.2-2.6 million cubic meters of seawater a day in 2015. At the same time, Chinese made raw materials and equipment will take up 70% of the total used in the well-functioned desalination industry chain, with the key technology, equipment, and materials R&D and manufacturing capabilities reaching an internationally advanced level.

The document says the development of desalination industry should focus on the following aspects: 1) strengthen the R&D of key technology and equipment; 2) raise the engineering and technological capabilities; 3) establish multiple desalination bases; 4) form up an industrial desalination alliance; 5) stage seawater desalination demonstration projects; 6) build seawater desalination demonstration cities; 7) promote the use of desalinated water; and 8) perfect a desalination standard system.

China embarked on the seawater desalination R&D in the 1950s. During the 11<sup>th</sup> Five-year period (2006-2010), the seawater desalination industry saw a rapid development, along with a range of pilot projects. In 2005, China issued a special planning for seawater utilization. As of the end of 2011, China has developed a seawater handling capacity of 660,000m<sup>3</sup>/day, or 13 times the capacity registered in 2005. Thanks to years of research and experiment, China has mastered core desalination technologies, including reverse osmosis and low-temperature multi-effects. China is now able to manufacture a desalination device able to handle 10,000 tons of seawater a day, a low-temperature multi-effect desalination unit for a daily capacity of 12,500 cubic meters, and a reverse osmosis desalination unit at a daily capacity of 10,000 cubic meters, with their major technical and economic indicators reaching an internationally advanced level.

## Most Stringent Water Resources Management

HU Siyi, Chinese Vice-Minister of Water Resources, recently highlighted the major points in a document recently released by the State Council to practice a most stringent water management system. HU said the system focuses on "three red lines" and "four systems". The three red lines include a red line that defines water resources development and utilization, under which the total water that can be used by the entire country has to be confined to 700 billion cubic meters in 2030, a red line for water efficiency that will raise China's water use efficiency to an internationally advanced level in 2030, or specifically 40 cubic meters of water consumption for RMB 10,000 industrial added value, and 0.6 for cropland irrigation water efficiency, and a red line for wastewater that makes the major pollutants into the rivers and lakes part of the pollution bearing capacity of functional waters, in a bid to raise the water quality compliance rate to 95%. The "four systems" are meant for total water control, water use efficiency control, functional waters' pollutants control, and water resources management appraisal.

To achieve the goals, the document further aligns a range of phase targets for both 12<sup>th</sup> Five-year period (2011-2015) and 2020: the total water used be confined to 635 billion cubic meters in 2015; 30% down of the water consumed for RMB 10,000 industrial added value, compared with 2010; a raised cropland irrigation water efficiency to 0.53; and a raised water quality compliance rate to 60% or above for major rivers and lakes.

In 2020, the total water use will be confined to 670 billion cubic meters; the water

consumed for RMB 10,000 industrial added value will be reduced to less than 65 cubic meters, a further raised cropland irrigation water efficiency to 0.55; and a further raised water quality compliance rate to 80% or above for major rivers and lakes, with all urban source water quality reaching the desired standard.

## Blueprint for Internet of Things

Chinese Ministry of Industry and Information Technology recently released an internet-of-things plan for the 12<sup>th</sup> Five-year period (2011-2015), which predicts that China will form up an industrial internet-of-things chain in 2015 that enjoys the presence of 100 backbone enterprises in 10 major industrial areas.

According to the plan, China will focus on core technology R&D and associated industrialization, key standards, industrial chain, and major applications demonstration and promotion, so as to build an internet-of-things industry in 2015 that is innovative, applicable, coordinated, safe, and controllable.

During the 12<sup>th</sup> five-year period, China will enhance the capacity building of a national sensor network demonstration park in Wuxi, spurring up the nationwide development of internet-of-things industry. In the eastern, central and western parts of the country, major cities will be made an industrial area for the development of internet-of-things, from a high starting point. Meanwhile, a range of sectors, including agriculture, automobile, electric power, petroleum, chemicals, optical manufacturing, home lighting, and marine ports, will be encouraged to use internet-of-things technology and associated services.

Incomplete statistics shows that China reached a market scale of internet-of-things worth RMB 200 billion in 2010.

## INTERNATIONAL COOPERATION

### BGS Sits Its European Center in Denmark

Beijing Genomics Institute (Shenzhen) inaugurated on February 10, 2012 its European center at the Bioscience Park in Copenhagen. Jointly funded by Beijing Genomics Institute (Shenzhen), the Danish National High Technology Foundation, the University of Copenhagen, Denmark University of Science and Technology, Aarhus University, and Aalborg University with an amount of 170 million Danish kroner, or RMB 190 million, the center will be built on an area of 1,200 square meters, equipped with 10 sets of second-generation high-throughput gene sequencing machines. The center is staged for the collaborations in the coming three years between European and Chinese research

institutes in the field of genetics, including a national genome project and a cancer etiology project initiated by Denmark.

The center will provide world-class expertise and infrastructures for genomics, proteomics, and bio-informatics research activities in Europe, promoting the collaboration between BGS and Danish research institutes on an advanced platform that will also benefit scientific collaborations between China and Europe.

The center will mainly work on two major projects in the near future: 1) new viruses identification, and patented commercial vaccines; and 2) establish a genetic variation database, including the Danish population, laying a groundwork for studying the genetic part of common diseases.

## RESEARCH AND DEVELOPMENT

### Key Equipment for Deep Scientific Drilling

DONG Shuwen, Chinese Academy of Geological Sciences vice-president, told reporters that China has mastered the key technologies that can be used to make a proprietary seismic prospecting and electromagnetic detection system, including magnetic core materials and low-frequency weak signal detection, along with an induction wideband magnetic sensor prototype that enjoys a performance similar to an overseas product.

The special project, staged to develop the proprietary UAV aeromagnetic detection system, has landed major phase results for low magnetic unmanned aerial vehicle making, high reliability automatic navigation system, helium optical pumping air magnetometer, and superconducting aviation magnetometer data pre-processing system.

The project, in collaboration with other partners, has rolled out China's first 10,000-meter continental scientific drilling rig enjoying an internationally advanced capability. The rig will be delivered to the Daqing Oilfield at the end of the month, for a joint international continental scientific drilling program (ICDP), where a scientific drilling, jointly financed by China Geological Survey Bureau and the National Deep Exploration Program, will be conducted at two sites in the Songliao Basin, to a planned depth up to 6600 m.

The project has also established an integrated platform made up of three-dimensional geological target models, working on both imported and self-developed systems, in an attempt to keep abreast with its overseas counterparts.

### Robot Walking on Antarctic Ice Sheets

The nearly two-month trial has fine-tuned the Chinese made roaming robot to pass a 30-kilometer autonomous walking test on Antarctic ice sheets, the first of its kind made by a Chinese robot.

The robot, weighing half a ton, can be operating under an extreme temperature as low as -40 °C. The robot in orange color looks more like an off-road jeep, with a body being designed with a suspension chassis, also like an off-road car. Its four wheels are replaced by triangular caterpillars to enhance its walking capability on ice and snow. It comes with an automated driving system, capable of ice and snow terrain identification and assessment, GPS navigation, and autopiloting.

researchers have made a range of tests to see the performance of robot's moving mechanisms, ice probing radar, and long-distance autonomous walk from last December 9 to this February 5, on ice-covered areas near the Zhongshan Station and the inland staging area. The robot is designed to conduct an autonomous scientific investigation over an area of about 60,000 square kilometers across the Amery ice shelf. In this context, the 30-km autonomous walking made this time only makes a beginning.

## NEWS BRIEFS

### National S&T Awards Honored





A conferring ceremony was held on February 14, 2011 to give the country's top science award to physicist XIE Jialin (right), and architect WU Liangyong (left). The laureates, both members of the Chinese Academy of Sciences (Wu is also a member of the Chinese Academy of Engineering), were each awarded the National Top Scientific and Technological Award. On the same day, three Japanese scientists and one scientist from Germany, France, Britain, the United States, and Australia, were honored with a People's Republic of China International Scientific and Technological Cooperation Award for 2011.

## OBS Recovered from Antarctic Waters



China's 28<sup>th</sup> Antarctic expedition team successfully recovered at 7:00 February 13<sup>th</sup>, 2012 two seabed seismometers (OBS) deployed two months ago at the Prydz Bay where the Chinese Zhongshan Station sits. A preliminary analysis of the recovered OBS indicates that the instruments worked smoothly on the ocean floor, with the data showing clear seismic signals.

### Shenzhou IX to Launch This Year

China plans to send three astronauts into space this year, aboard a spacecraft named Shenzhou IX designed to rendezvous and dock with Tiangong-1, further testing the docking technologies applied so far, a spokesman for China's manned space program said recently.

According to the mission plan, the spacecraft Shenzhou IX will be launched sometime between June and August this year to rendezvous and dock with Tiangong-1, an orbiting spacecraft. Once the docking is complete, astronauts will enter Tiangong-1, living there and conducting scientific experiments, before returning to the ground. Tiangong-1 is now ready to accommodate the astronauts, as confirmed by a comprehensive assessment of the onboard engineering systems.

The Shenzhou IX spacecraft and its carrier rocket, the CZII-F, have been assembled and

are undergoing final checks. Astronauts have been trained, and the launch site, landing sites, and control/communication systems have been working smoothly for the launch.

## Largest Single Hydropower Capacity

It is reported from China Three Gorges Corporation that its hydropower stations group at the Jinsha River downstream have been in a full-fledged development. For example, a hydropower station at Xiangjiaba has passed water storage checks in both Yunnan and Sichuan provinces, which allows the station's generators to be put into operation within the year. The Xiangjiaba Hydropower Station is designed with a single-unit capacity of 800,000 kilowatts, the largest single-unit installed capacity in the world. Three Gorges Group General Manager CHEN Fei said the dam at the station has risen to a height of 364 meters, with the diversion gap being backfilled. The site behind the dam has progressed from civil works to electromechanical works, with the underground site at the right bank working on generator installation.

The Xiangjiaba Hydropower Station is located at the Jinsha River, a junction linking Sichuan and Yunnan provinces, rich in water resources. The station plans to install eight 800,000 kilowatts generating units, including the 2 what will be put into operation this year. Once all completed, the generating units are expected to hit an annual capacity of 30.7 billion kWh.

## Joint Venture for Marine Survey Boat

The State Oceanic Administration No. 2 Institute of Oceanography and Zhejiang Taihe Shipping have recently kicked off the joint construction of a 4,000-ton ocean-going research vessel in Wenzhou. The vessel is an integrated platform for multi-disciplinary applications, assisted by multiple functions and diverse technical means, desirable for interdisciplinary deep-sea marine investigations of ocean dynamic environment, geological environment, ecology environment, and deep-sea extreme environment. Enjoying an integrated marine environment observation, detection, sampling, and on-site analysis capability, the vessel will become a moving platform for deep-sea and marine scientific research and high-tech R&D laboratory.

The vessel will be equipped with two sets of full-time steering oar electric propulsion system, a dynamic positioning system, and an integrated navigation positioning system, allowing a displacement of 4,400 tons, and an endurance of 12,000 nautical miles. The boat is also equipped with a dry laboratory, a wet laboratory, and a data processing center, along with a range of world-class survey equipment, including deep-water multi-beam system, single beam 10,000-meter depth sounder, and split beam system, and advanced deck operation equipment, such as varieties of winches with different capabilities.

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