



Science, Technology and Education News from China

Number 93 – March 2012

Please note that the previous newsletters can be downloaded from the website of the Embassy of Switzerland in China: www.eda.admin.ch/beijing¹. To subscribe/unsubscribe or send us your comments, please send an email with the corresponding subject to chenchen.liu@eda.admin.ch.

Introduction

This month's newsletter opens with an editorial on China's energy research, its priority and current international cooperation status. In science this month, physicists in China's Daya Bay successfully nailed a key neutrino measurement. Chinese Premier's *Work of the Government* Report confirmed another bumper year for Chinese Science in terms of budget infusion. In Education, Chinese universities are working hard to hire foreign professors and scientists. A 22-year-old bachelor candidate became China's youngest professor.

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¹ Please click on the blue texts to activate the hyperlinks to either email addresses or related websites.



Policies

Energy Developments in China

China has become the worldwide largest consumer of energy and producer of CO₂. From 1998 to 2009, China doubled its oil consumption, which has reached 8 million barrels/day, i.e. 9.5% of the world consumption. Despite owning the third largest reserves of coal, China has become the largest importer of coal with a yearly consumption of 3.24 billion tons. In order to sustain the economic growth with enough energy and at the same time reduce its CO₂-intensity (ratio of CO₂ emissions produced to GDP), China has been focusing on renewable energies. It aims at generating 11.4% of consumed energy from renewable energy sources by 2015 and at least 2'000 GW by 2020. In order to achieve the ambitious goals, China will double hydropower, more than double wind energy, increase by six times the biomass energy and multiply by 25 the solar energy. Since renewable energy production cannot expand fast enough to cover the raising energy need, China will also increase fossil fuel energies and nuclear but at a slower rate than renewable energy sources.

The increase of the renewable energy share in the Chinese energy consumption requires the development of new technologies. Leading in the R&D push in energy technologies are the numerous universities and the institutes of the Chinese Academy of Science (CAS). At the end of February 2012, the new Dalian National Laboratory for Clean Energy, based at the Dalian Institute of Chemical Physics in Liaoning Province, was inaugurated. The technologies developed by research institutes and the universities cover cleaner fossil fuels (clean coal, carbon capture and storage, gas turbines), renewable energy (thermo-solar, photovoltaic cells, biomass, geothermal, wave energy, wind turbines), nuclear energy, energy efficiency (industrial energy conservation, efficient grids), and clean vehicles (electrical vehicles, fuel cells, batteries).

In the international arena, China has been particularly active in starting new collaborations and fostering existing cooperative efforts in renewable energy development. The above mentioned universities and CAS institutes conduct research in the different fields, often in cooperation with foreign companies and research institutions. Additionally, in the past years China has signed institutionalized cooperation projects with several countries. With the United States it has started a research program on clean energy (US-China Clean Energy Research, CERC), which focuses on three areas: clean vehicles, coal technology, and energy efficiency. The European Union and China have founded a common research institute on renewable energy (EU-China Institute for Clean and Renewable Energy, ICARE), to which six EU and three Chinese universities contribute. The Nordic countries (Denmark, Finland, Iceland, Norway and Sweden) teamed up to cooperate with China under the "Chinese-Nordic Energy Technology Cooperation" program. Another interesting and recent example is the creation of the first Chinese energy think tank (China National Renewable Energy Center) with Danish support. The think tank will make policy suggestions about wind, biomass, solar and grid technologies.

China has put considerable emphasize on clean and renewable energies and has successfully gained certain strengths in the sector. China now has an extensive grid network thanks to its large distance between energy sources in the west and the industrial centers in the east. In wind and solar sector, China has world-leading capacity in manufacturing solar panels and wind turbines. But the key technology that China is keen on developing remains to be clean coal. The consumption of coal will continue to dominate China's energy sector in the years to come and it is of close relevant to China's society where heating depends greatly on coal. The air pollution resulted from coal heating in recent winters have spurred outcries from various media channels, especially on social media. The government is under pressure to alleviate the situation, where advanced clean coal energy is a key.



News

1. Innovation in China: From Brawn to Brian

(Economist, 10-03-2012)

THE end of cheap China is at hand. Blue-collar labour costs in Guangdong and other coastal hubs have been rising at double-digit rates for a decade. Workers in the hinterland, too, are demanding—and receiving—huge pay increases. China is no longer a place where manufacturers can go to find ultra-cheap hands. Other countries, such as Vietnam, are much cheaper. What will this mean for China and the world?

[...] China is not about to hollow out. But if it is to keep growing fast, it must become more innovative. At present Chinese innovation is a mixed bag. There are some outstanding private firms. Manufacturers operating near China's coast, whether home-grown or foreign, are adept at "process innovation"—incrementally improving the way they make things. And China's internet start-ups, such as Tencent (a social-networking service) and Alibaba (an e-commerce company), have had a genius for copying Western business models and adapting them to the Chinese market.

But innovation is about more than this. One way of defining it would be as fresh thinking that creates value people will pay for. By that measure, China is no world-beater. China's leaders know this, and are pouring billions of dollars into research and development. The current five-year plan calls for "indigenous innovation", which the government thinks it can foster by subsidizing "strategic" industries and strong-arming foreign firms to transfer intellectual property to budding national champions. That system of state capitalism worked when the aim was to copy and adapt other people's ideas in the cheapest way possible. But can new ideas truly be created by fiat? Elsewhere governments have tended to run into two problems: the state is not a good innovator, and it gets in the way of others who are. Is China really so different?

Although the Chinese government invests a fortune in research and development, too much of this cash is wasted, according to the OECD. Most of it goes into development; not enough into research. It is far too difficult for new Chinese ideas to move from the laboratory to the marketplace. And the pockets of research excellence that exist—for example, in genomics—tend to be disconnected and politicized fiefs. Meanwhile, the state's efforts to pick technology winners have been patchy. Telecoms has been a success, but electric cars have not, and subsidizing clean-energy manufacturers has had mixed results. As for trying to set up regional internet clusters, China seems committed, but so far Silicon Valley has proved far too complex and delicate a system for a bureaucrat to copy.

If the argument that the Chinese state is uniquely innovative is at best unproven, the obstacles in front of a small private-sector innovator are clear. The most obvious is piracy. China's intellectual-property laws are not bad on paper, but are enforced patchily and partially. Another problem is the way so many industries have been consolidated in the hands of favoured firms. Antitrust and competition laws are not applied vigorously to well-connected champions. State-directed banks take the Chinese people's savings and lend them at microscopic interest rates to national champions. This starves clever but unconnected firms of capital, and cheats savers, too.

Nobody expects the Chinese government to let the reins go completely, but it needs a less top-down approach that gives its citizens more space to experiment. It must let private investors risk money on ideas they think might work, and bear the consequences of failure. An obvious place to start would be to let firms build on what they already do well, such as process innovation. But the next Chinese breakthrough may actually come in an unexpected field. China was once a dazzling innovator: think of printing, paper, gunpowder and the compass. If its rulers loosen their grip a little, it could be so again.

(<http://www.economist.com/node/21549938>)

2. Chinese Universities Send Big Signals to Foreigners

(NY Times, 12-02-2012)

[...] The number of foreigners working at the law school of Peking University has increased since it was established, with Americans, Germans, British and South Korean academics. Of the nine permanent faculty, seven are foreigners.



The rise in foreign academics at the law school reflects a broader trend. As institutions in Western countries continue to suffer from budget cuts, academics looking for opportunities farther afield are finding that China is welcoming foreign professors with open arms.

Individual Chinese universities have been increasingly recruiting Western academics in recent years, but the Chinese government is also enticing foreigners with a new program that offers a range of incentives.

"We are going to see more foreign professors coming to China," said Wang Huiyao, director general of the Center for China and Globalization in Beijing.

Late last year, the Chinese government started the Thousand Foreign Experts program, which is designed to attract up to 1,000 foreign academics and entrepreneurs over the next 10 years to help improve research and innovation.

It has already attracted more than 200 applicants from countries like the United States, Japan and Germany, according to a report in February by Xinhua, China's official news agency.

The program is an extension of the Thousand Talent program, which started in 2008 as a way to attract experts, academics and entrepreneurs to China.

While 1,600 experts — more than half of them academics — came to China under that program, most were Chinese-born, said Mr. Wang, an adviser to the government on its talent policy.

Mr. Wang said the government wanted to further lift its intake of overseas experts, which led to the establishment of the latest program specifically aimed at foreigners.

Under the new program, successful candidates receive a subsidy of up to RMB one million, or nearly \$160,000, and scientific researchers can receive a research allowance worth of RMB 3-5 million.

Mr. Wang said the program, run by the State Administration of Foreign Expert Affairs in Beijing, aimed to attract academics to tenured professor positions.

He said the program was targeted at "people who have been recognized in the West, those who have a good track record."

Mr. Wang said that while there were already many foreigners working in Chinese universities, particularly top-tier schools like Peking University and Tsinghua University, he expected the new government program would accelerate the number of foreigners joining other Chinese schools.

"They are sending a big signal to all universities in China that they actively support this," Mr. Wang said.

With funding harder to come by in many Western countries, China's impressive investment in research and development is proving a draw for many Western researchers. And with China itself becoming a rapidly growing field of research for scholars, academics are moving there to further their research.

(<http://www.nytimes.com/2012/03/12/world/asia/12iht-educlde12.html?pagewanted=2&ref=china>)

3. Asian Colleges Gaining Respect, Report Finds

(NY Times, 18-02-2012)

Every year, Times Higher Education, a magazine in Britain, rates universities on the quality of their teaching and research. In 2011, it began a separate ranking based on a more nebulous criterion: a school's reputation according to the opinions of about 17,000 academics.

On March 15th, the magazine released its second World Reputation Rankings in a report that said, "The West loses ground to the East in the global index of academic prestige."

The very elite schools, which the magazine calls the "top six supergroup," are the same American and British schools that top most university rankings: Harvard in Massachusetts; the Massachusetts Institute of Technology; Cambridge in England; Stanford in California; the University of California, Berkeley; and Oxford in England. The United States dominates the list, with 44 of the top 100 universities in the world.



Japan is the only Asian nation to crack the top 20, with the University of Tokyo, also known as Todai, keeping its previous spot as No. 8, and Kyoto University squeaking in at No. 20.

[...]

The upward movement of Asian schools is seen mostly in the rankings' second tier. The National University of Singapore moved up to 23 from 27. Tsinghua University in Beijing improved its standing to 30 from 35. Peking University rose to 38 from 43, leapfrogging the University of Hong Kong, which moved up to 39 from 42.

"East Asia is consistently creeping up the rankings," Mr. Baty, the editor of the Times Higher Education Rankings said. "The notable shift is from West to East. It's subtle, but significant."

"Everyone is conscious of Asia's rising and of the increase in government funding. That contrasts with the problems we've had, with austerity measures and students rioting in Westminster," he said, referring to mass protests in London in late 2010 over rising university fees.

Tan Chorh Chuan, president of the National University of Singapore, said in a statement that the magazine's ranking of his institution was "a strong endorsement of our continued efforts to pioneer educational innovations that provide a top quality education, global student exchange and internship opportunities, as well as our cutting-edge research."

Top Asian schools seem to do better when ranked on reputation than on more solid criteria and performance. In the more conventional rankings, Todai is listed at 30 and Tsinghua at a modest 71.

"Reputation is more forward looking," Mr. Baty said about the discrepancy. "Meanwhile, our regular rankings take a long time to climb, since they depend on criteria like research and citations."

The best-regarded 100 universities are still overwhelmingly Western and Anglophone. China is the only country among the world's four major developing nations — the others are Brazil, India and Russia — to have a big presence.

Brazil is represented by one school, the University of São Paulo, which ranks among the top 70 schools. Russia and India have no schools in the top 100.

"There's a real buzz about China, but there are still problems with academic freedom, curriculum and building a culture of inquiry," Mr. Baty said. "China is producing more research, but it now needs to look at the impact of that research, and not just the quantity of papers. If you look at hard, objective indicators, China has a long way to go.

"For the Harvards and Cambridges of the world, academic freedom is very important. This is the next step for East Asia."

(<http://www.nytimes.com/2012/03/19/world/asia/asian-colleges-gaining-respect-report-finds.html?ref=china>)

4. **Physicists in China Nail a Key Neutrino Measurement**

(Science, 08-03-2012)

Elusive particles called neutrinos are the chameleons of the subatomic world. They come in three different types or "flavors" that can morph into one another as they zip along at near-light speed barely interacting with anything else. Now, physicists working at a nuclear power plant in China have made the last measurement needed to describe those "neutrino oscillations." The result completes a conceptual picture of neutrinos and paves the way for experiments that would search for an asymmetry between the behavior of neutrinos and antineutrinos and could help explain why the universe contains so much matter and so little antimatter.

"It's not just a parameter, it's a gateway," says Robert Plunkett, a physicist at Fermi National Accelerator Laboratory in Batavia, Illinois, who works on an accelerator-based neutrino experiment called MINOS.



The three flavors of neutrinos include electron neutrinos, which are born in nuclear reactions; muon neutrinos, which emerge from the decay of particles called pions; and tau neutrinos, which have been generated in particle collisions at accelerator labs. For more than a decade, researchers have known that neutrinos oscillate between these flavors. For example, electron neutrinos born in the sun morph into other flavors before they reach Earth, so that fewer electron neutrinos arrive than would otherwise be expected. Similarly, muon neutrinos created when cosmic rays strike the atmosphere also change stripes before they rain down to the ground. Those oscillations also prove that neutrinos have mass, as they can occur only if the neutrinos have different masses.

In a variety of experiments with underground detectors, particle accelerators, and reactors, researchers had measured all but one of the parameters in a theoretical scheme to describe the oscillations: the two mass differences among the three neutrinos and three abstract "mixing angles" that, crudely speaking, describe how much one flavor mixes into another. Now, the 240 physicists working with the Daya Bay Reactor Neutrino Experiment at the Daya Bay Nuclear Power Plant and two neighboring plants in Da Peng, China, have measured the last of the three mixing angles, known as θ_{13} . The team presented its results on March 8 at a seminar at the Institute of High Energy Physics of the Chinese Academy of Sciences in Beijing. [...]

The fact that θ_{13} is not zero suggests that neutrino physics will be rich in the next decade or so. For example, it implies that there could be a slight asymmetry between neutrinos and antineutrinos—called CP violation—a slight asymmetry that might help explain why the universe evolved to contain so much matter and so little antimatter. "All these CP-violating effects vanish if θ_{13} is zero," says Paul Langacker, a theorist at the Institute for Advanced Studies in Princeton, New Jersey. A measurement of zero would have been bad news for researchers in the United States, Japan, and Europe with plans to build large neutrino detectors that could probe CP violation.

The result is significant for another reason, says Jefferson lab's McKeown. "This is arguably the most important physics result ever to come out of China," he says. Chinese particle physics has arrived, it seems.

(<http://news.sciencemag.org/sciencenow/2012/03/physicists-in-china-nail-a-key.html>)

5. **Another Bumper Year for Chinese Science**

(*Science*, 05-03-2012)

Another year, another chance for scientists here to pop the champagne corks. In a draft budget released today at the opening session of the annual National People's Congress, China has earmarked RMB 32.45 (\$5.14 billion) for basic research in 2012—up 26% from last year's appropriation.

Overall, central government spending on science and technology is slated to rise 12.4%, to RMB 228.54 billion (\$36.23 billion). Scientists will also benefit from a 24% jump in funding for Project 985 and Project 211, which funnel money to elite universities.

In a 2-hour speech at the Congress, comparable to the U.S. State of the Union address, Premier Wen Jiabao dwelled primarily on China's economic health. Many economists expect growth to slow in China this year, and the central government has set humbler goals. Wen announced that the target for GDP growth in 2012 would be lowered from 8% to 7.5%. Chinese scientists are expected to do their part to fan the embers. Echoing a theme of last year's speech, Wen pledged to "more closely integrate science and technology with the economy."

The cash infusion for basic research will be divided among the National Natural Science Foundation of China, scores of "key" state laboratories, and select institutes. The exact distribution of funds is expected to become clear later this March, after the Congress and the Chinese People's Political Consultative Conference (CPPCC), together called Liang Hui, conclude.

With land reform at the top of the political agenda this year, agricultural research got a call out in Wen's speech. A whopping 53% boost in spending on agricultural S&T will mean 10.1 billion yuan (\$1.60 billion) for targets such as high-yield crops, controlling animal-borne epidemics, and improving drought



management. More delicately, the premier nodded at China's recent food safety scandals, pledging that the government would strengthen oversight of the food and drug industries.

Wen acknowledged mounting criticism of China's development model, saying, "We will show the world with our actions that China will never seek economic growth at the expense of its ecological environment and public health." The statement drew a rare round of applause from delegates. They will spend the next 10 days mulling proposals, including a CPPCC one that calls for distributing research grants more equitably. If that proposal succeeds, it could really sweeten the pot for Chinese scientists.

(<http://news.sciencemag.org/scienceinsider/2012/03/another-bumper-year-for-chinese-.html>)

6. **22 Year-old LIU Lu, China's Youngest Professor**

(CRI 21-03-2012)

The announcement by Changsha-based Central South University (CSU) that Liu Lu, a 22-year-old mathematics undergraduate student from the class of 2008 at CSU, had been appointed professor at the university has been met with doubt and criticism, cnr.cn reports.

CSU announced at a press conference in the afternoon of March 20th that Liu Lu had been appointed professor at the university, making him the youngest professor in China. Zhang Yaoxue, the head of CSU, said that the university would be a great stage for Liu Lu to develop his skills and improve himself in the academic field.

"We would like him to absorb knowledge from both China and abroad, take advantage of the great opportunities that CSU provides and dedicate himself to scientific research. We made such a decision because we want to provide excellent young people with the best facilities in order for them to realize their dreams."

Following his appointment, Liu Lu will receive 1 million yuan in rewards, half of which is intended to go towards carrying out scientific research and the other half is for improving his living conditions. CSU will also recommend Liu as a candidate for the National Youth Scheme, which has a restricted quota of 1,000 members.

However, after hearing about the press conference, a respected mathematician who wants to remain anonymous stated that the decision was ridiculous.

Tang Tao, a professor of the Mathematics Department at the Hong Kong Baptist University (HKBU), also said that the media and academic fields should put Liu Lu's appointment into perspective. Some financial rewards are necessary but anything more than that, including his newfound fame, may act as a burden upon his academic career.

Previous cases similar to that of Liu Lu also managed to arouse much debate and suspicion across China, including the news of a young government employee being given the title of director-in-chief. Some netizens criticized this decision as being irresponsible and stated that it should be avoided in the future.

Liu Lu came to fame after solving the Seetapun Enigma, a notoriously difficult mathematical problem, which was first raised by British mathematician David Seetapun. Three scholars from the Chinese Academy of Sciences appealed that Liu should undertake PhD study without having to take examinations. Liu Lu is nicknamed "little Chen Jingrun", after the most famous mathematician in China.

(http://www.china.org.cn/business/2012-02/13/content_24620587.htm)



Events (April – May 2012)

April 2012

Exhibition: Albert Einstein: 1879-1955

Date: March 2nd to June 17th
Place: Wuhan Science and Technology Museum
Contact: Embassy of Switzerland in China

23rd China International Glass Industrial Exhibition

Date: April 2nd
Place: Shanghai
Contact: Chinese Ceramic Society, CAST

3rd Reception of the St. Gallen Symposium in Beijing

Date: April 3rd
Place: Beijing
Contact: Embassy of Switzerland in China

Frontiers of Plasmonics Symposium

Date: April 7th
Place: Chengdu
Contact: Institute of Physics, CAS

The 1st International Conference on World Healthcare Informatics

Date: April 9th
Place: Beijing
Contact: Graduate University of CAS

The 11th China International Exhibition for Large Screen Display System Integration and Projector & AV Products

Date: April 10th
Place: Shanghai
Contact: Chinese Society of Electronics, CAST

The 9th IEEE International Conference on Networking, Sensing and Control

Date: April 11th
Place: Beijing
Contact: Institute of Automation, CAS

Swissnex China Lecture

Dr. Peter Jenni, former Spokesperson CERN

Date: April 11th
Place: Shanghai
Contact: www.swissnexchina.org

2012 International Conference on Advanced Manufacturing Technology and Systems

Date: April 17th to 18th
Place: Wuhan
Contact: <http://www.amts2012.org>

The 19th China International Industry Fair

Date: April 19th
Place: Chongqing
Contact: Chinese Mechanical Engineering Society

E+ Lecture

Dr. Adam Amara, ETH Zurich

Date: April 20th
Place: Wuhan
Contact: www.swissnexchina.org

2012 International Conference on Electronics, Nanomaterials and Component

Date: April 21st to 22nd
Place: Kunming
Contact: <http://www.icenc.org>

7th China Pharmaceutical R&D Summit

Date: April 23rd to 26th
Place: Shanghai
Contact: <http://www.chinapharmard.com>

E+ Lecture

Prof. Hans Rudolf Ott

Date: April 27th
Place: Wuhan
Contact: www.swissnexchina.org

May 2012

SKLRB Symposia: Frontier Reproductive Biology

Date: May 6th
Place: Beijing
Contact: Institute of Zoology, CAS

2012 China International Weighing Instrument Exhibition

Date: May 9th
Place: Nanjing



Contact: China Weighing Instrument Association

2012 China International Heavy Machinery Equipment Fair

Date: May 10th
Place: Beijing
Contact: Chinese Mechanical Engineering Society

The 16th International Symposium on Electromagnetic Launch Technology

Date: May 15th
Place: Beijing
Contact: China Electrotechnical Society, CAST

2012 International Solar Energy and PV Projects Exhibition and Solar PC Conference

Date: May 15th
Place: Shanghai
Contact: Shanghai S&T Development and Exchange Center

1st Low-Carbon City Forum-Top level design of low carbon city

Date: May 23rd
Place: Shanghai
Contact: Shanghai Advanced Research Institute, CAS

3rd International Conference on the Advances in Microfluidics and Nanofluidics

Date: May 23rd
Place: Dalian
Contact: Dalian Institute of Chemical Physics, CAS

14th International Friction & Sealing Material Technology Exchange and Product Exhibition

Date: May 23rd

Place: Xi'an

Contact: China Friction and Sealing Material Association

2012 China International Machinery and Electronics Expo

Date: May 24th
Place: Ningbo
Contact: The China Machinery Industry Federation

Swiss Day at Tongji University

Date: May 24th

Place: Shanghai

Contact: www.swissnexchina.org

2012 World Congress on Medical Physics and Biomedical Engineering

Date: May 25th
Place: Beijing
Contact: Chinese Society of Biomedical Engineering, CAST

9th International Conference on Molten Slags, Fluxes and Salts

Date: May 28th
Place: Beijing
Contact: The Chinese Society of Metals, CAST

1st International Symposium of Polymer Ecomaterials

Date: May 28th
Place: Beijing
Contact: Changchun Institute of Applied Chemistry, CAS

The 7th International Green Energy Conference

Date: May 28th
Place: Dalian
Contact: Dalian Institute of Chemical Physics