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利用中国碳市场推动CCUS技术的机会与挑战 ◆

The Role of Carbon Market in Promoting Carbon Capture, Utilisation and Storage in China

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中英（广东）CCUS 中心
UK-China (Guangdong) CCUS Centre



北京CCUS中心

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利用中国碳市场推动 CCUS技术的机会与挑战

The Role of Carbon Market in Promoting Carbon Capture, Utilisation and Storage in China

2016年9月2日

Friday, September 2, 2016

9月2日上午，“利用中国碳市场推动CCUS技术的机会与挑战”研讨会在北京召开。此次会议由清华大学中国碳市场研究中心、国家应对气候变化战略研究和国际合作中心、北京CCUS中心（筹）、中英（广东）CCUS中心联合主办，多位政府官员、碳市场和碳捕集与封存（CCS）领域专家以及企业代表参会，讨论巴黎协议签定后碳市场在推动低碳投资中的角色，以及如何解决把CCUS纳入中国碳排放权交易体系的障碍。

On September 2nd, The Role of Carbon Market in Promoting Carbon Capture, Utilisation and Storage in China was held in Beijing. The meeting was hosted by Tsinghua University National Carbon Market Research Centre, National Centre for Climate Change Strategy and International Cooperation (NCSC), Beijing National CCUS Centre, and UK-China (Guangdong) CCUS Centre. A number of government officials, experts from carbon market and carbon capture and storage (CCS) field and business representatives attended the meeting. They discussed the role of carbon market in promoting low-carbon investment in post-Paris Agreement period, and ways to overcome obstacles of CCUS fitting into carbon emissions trading system in China.







蒋兆理先生， 国家发改委应对气候变化司副司长

Mr. Zhaoli Jiang, Deputy Director General of Department of Climate Change, National Development and Reform Commission



国家发改委气候司副司长蒋兆理在开场致辞时说道，“中国提出2030年要达峰，除了要大幅度的提高工业以及生活用能的能效之外，还需要在其他的一些领域，特别是CCS上下功夫，尽可能控制二氧化碳增长。”

“CCS在中国的发展要更多关注技术和经济可行性，也就是在发展中国家应用前景和大规模应用CCS的合理性。”蒋先生认为，如果CCS可行，对中国“十三五”、“十四五”以至2030年碳排放控制将发挥较大作用。

Mr. Zhaoli Jiang, Deputy Director General of the NDRC Climate Change Department, said in his opening remarks, "China has made promise to peak emissions in 2030. In addition to improve the energy efficiency of industry and daily life, we need to control the growth of CO₂ in some other areas, especially through CCS."

"The development of CCS in China needs more attention in technical and economic feasibility, which is the rationality of its application in developing countries as well as in large-scale." Mr. Jiang believed that if CCS is feasible, it would play a more important role in "13th Five-Year", "14th Five-Year" period and the 2030 carbon emissions control in China.

李俊峰先生， 国家应对气候变化战略研究和国际合作中心主任

Mr. Junfeng Li, Director of National Center for Climate Change Strategy and International Cooperation



国家应对气候变化战略研究和国际合作中心的李俊峰主任介绍，中国能源60%-70%是煤，即使按规划到2030年碳排放水平降到35%-40%以下，还是会有大量煤炭的使用，因此推进CCS技术对中国和全球控制温室气体排放有重要意义。

“今天，在CCUS和碳市场管理、设计方面有丰富经验的专家，讨论碳市场如何推动CCUS发展，推动发改委气候司的政策出台。政府在很积极地制定政策推动低碳和能源转型，CCUS又是一项新的技术，也符合我们创新的要求。”李主任说道。

Mr. Junfeng Li, Director of NCSC, stated that 60% to 70% of energy in China is generated by coal. Even if it would be reduced to 35% to 40% according to the national plan, the amount of coal utilization would still be huge. Thus, promoting CCS technology was significant in controlling greenhouse gas emissions in China and around the world.

“The discussion on promoting the development of the CCUS in carbon market between CCUS experts and experts in carbon market MRV could help to push forward the introduction of policy by National Development and Reform Commission. The government is actively formulating policies to promote low carbon and energy transition. CCUS is one of the new technologies that align with our innovation requirements,” said Mr. Li.

康霖先生，
英国驻华大使馆气候参赞

Mr. Neal Carlin, British Embassy Climate Counsellor



“CCUS和碳交易是未来十年中国低碳转型的重要元素，首先明年中国将建立全国碳市场，这将是一项重大举措，”英国驻华大使馆气候参赞康霖先生说，“我们看到中国的CCUS取得巨大进展，去年的巴黎峰会上，发改委也发布了中国CCUS路线图。我很荣幸英国可以帮助推动北京CCUS中心的成立，去年我们也支持了四川CCS和煤化工技术的发展，这对CCS的研究做出了很大贡献。”

“CCUS and carbon trading are important elements in the next ten years in China’s low carbon transition. Firstly, a major move in China is the establishment of a national carbon market next year,” the British Embassy Climate Counsellor Mr. Neal Carlin said, “we have witnessed the great progress of CCUS development in China. The Commission also published the Chinese CCUS Roadmap on Paris Summit last year. I am honored that the UK could help to promote the establishment of the Beijing CCUS Centre. We’ve also supported the development of CCS and coal chemical technologies in Sichuan, which made a great contribution to the research of CCS.”

贾杰明先生， 澳大利亚使馆能源与气候变化参赞 Mr. Ben Jarvis, Australian Embassy Counsellor



同为化石燃料使用大国，澳大利亚也面临着低碳能源转型的挑战。澳大利亚使馆能源与气候变化参赞贾杰明表示，CCS及碳市场是中澳两国在能源和气候变化政策方面的重要合作领域，碳市场和碳定价是支持CCS发展重要工具。

“我们跟发改委和国家气候战略中心进行合作，推出一些温室气体核算体系，以及石油和天然气、焦煤及炼油行业排放测算的方法；还和发改委、清华大学合作研究温室气体报告的体系。在碳市场设计方面，规则要明确、连贯且透明。” 贾杰明先生说，“CCS应更多关注封存，地质封存的技术数据往往由各大石油公司掌握，希望政策制定者能有更好的方法，让这些公司分享他们的数据。澳大利亚和中国还会开展进一步的紧密合作，来减少我们双边的碳依赖性。”

Similar as China as a major fossil fuel user, Australia is also facing the challenge of low carbon energy transition. The Australian Embassy Counsellor Mr. Ben Jarvis said CCS and carbon markets were important areas for cooperation between China and Australia regarding the energy and climate change policy aspects. Carbon market and carbon pricing were important tools to support the development of CCS.

“We are cooperating with the NDRC and NCSC to launch some greenhouse gas accounting system and develop the method of measuring and calculating oil and gas, coal and oil refining industry emissions. We have researched with the NDRC and Tsinghua University on greenhouse gas reporting system. With respect to the design of the carbon market, we think the rules should be clear, consistent and transparent,” Mr. Jieming Jia said, “We should pay more attention to storage. Technical data are often owned by major oil companies. I hope that policy makers can use better methods to push these companies to share their data. Australia and China will continue to work closely together to reduce our coal dependence.”

翟永平教授， 亚洲开发银行能源技术顾问

Dr. Yongping Zhai, Asian Development Bank Energy
Technology Consultant



亚洲开发银行的翟永平先生提到，作为亚行能源技术顾问，他最关注项目的普及性、减排效应以及创新性，这同样适用于CCS。亚行支持CCS技术，也支持上海和广东的CCS中心。他认为，中国有广阔的市场、完整的产业链和雄厚的科研基础，很有希望降低CCS的成本。

As Asian Development Bank Energy Technology Consultant Mr. Yongping Zhai said, he was most concerned about the project popularization, emission reduction effect and innovation. This applied to CCS as well. ADB supported CCS technology and the Shanghai and Guangdong CCS Centre for Excellence. He believed that the broad market, complete industrial chain and strong scientific foundation in China could bring hope to the reduction of CCS cost.

Tim Yeo 先生，
新丝路能源有限公司主席、
英国议会能源和气候变化特别委员会前主席
Chair of New Silk Road Energy Ltd and Former
Chairman of the UK Parliament Energy and Climate
Change Select Committee



“整个CCUS环节最重要的就是它的经济可行性，实际上通过碳定价就能直接的解决这个问题。”前英国能源与气候变化部长Tim Yeo说道。

“The most important aspect of the whole process of CCUS is its economic viability, and in fact this issue can be directly addressed through carbon pricing,” said Tim Yeo, former UK Energy and Climate Change Minister.”

Michael Grubb 教授， 英国伦敦大学学院教授、 英国天然气与电力监管委员会首席顾问

Prof. Michael Grubb, University College London Professor,
Electricity Regulatory Commission Chief Consultant



去年12月《巴黎协定》通过，为2020年后全球应对气候变化行动作出安排。

但英国伦敦大学学院教授、英国天然气与电力监管委员会首席顾问Michael Grubb教授认为，各国还没做好准备来完成协定中的具体目标，如果CCUS这类技术不能实现大规模应用，这些目标将不太可能实现。

据Grubb教授介绍，巴黎协议对市场机制方面最雄心勃勃的建议和规定是提到了一种新的转让机制。实际上，碳市场并不是完全通过市场就能支持CCS，还需要非常强有力的碳定价。如果提高消耗型技术或环境成本更高技术的价格，市场就可以选择更清洁的技术，这就是碳定价要实现的目标。

设计碳市场时，在总额交易体系下，建议设置一个价格范围，还可以根据不同行业部门制定不同价格。碳市场实际上有两个作用，一方面可以提供资金，另一方面还可以给投资者建立碳市场很可靠的信心。这将带来足够的时间和相应的资金、基础设施来推动技术的创新。

Last year in December, Paris Agreement made adjustments to climate change action after 2020.

However, the University College London professor and Electricity Regulatory Commission Chief Consultant Dr. Michael Grubb believed that countries were not ready to meet their specific goals set in the agreement. It is impossible to meet the goals if CCUS technology cannot achieve large-scale commercialization.

According to Prof. Grubb, the most ambitious proposal and regulation in the Paris Agreement on the market mechanism is a new transfer mechanism. In fact, the carbon market is not able to support the CCS entirely through the market. There is also a need for very strong carbon pricing. If the price of technologies with high environmental cost was raised, the market would be able to choose cleaner technologies, which is the goal of carbon pricing.

“In the design of the carbon market, it is recommended to set a price range in the cap-trade trading system or set different prices for different sectors. In fact, the carbon market has two functions, on one hand, it provides funding; on the other hand, it builds confidence for investors on the reliability of the carbon market. This will bring enough time and the corresponding funding and infrastructure to promote technology innovation.”

段茂盛教授， 清华大学中国碳市场研究中心主任

Prof. Maosheng Duan, Director of Tsinghua University
National Carbon Market Research Centre



在2017年全国性碳市场启动前，国内已有7个地区进行了碳交易试点。清华大学中国碳市场研究中心主任段茂盛教授介绍说，这7个碳市场的设计差异很大，比如试点城市覆盖了很多第三产业；同时还吸取了欧盟体系的经验教训，在配额分配上，使用强度法时按照企业实际的产量来分配，这也比较适用于中国国情。

对于全国碳市场的设计，目前计划采取自上而下的方法来建立一个全新的体系。在法律方面，针对全国碳市场的条例，已经纳入到2016国务院立法条例中。在设计时将对所有地区采取统一的规则。中央政府负责整个体系的设计，省级发改委负责执行相关的管理的规则，并且给予一定的灵活性。在执行方面，将综合利用各种手段来促进企业履约，比如目前正在建设全国的信用体系。

In 2017, before the kick-off of the national carbon market, there were 7 regions in China that carried out a pilot carbon trading. Prof. Maosheng Duan, the director of Tsinghua University National Carbon Market Research Centre, said that the design was different between the 7 carbon markets, such as the service industry was covered in pilot cities. At the same time, they learned the lessons from the EU system in the allocation of quotas. They used intensity method based on the enterprises' actual production for allowance allocation, which is suitable for the conditions in China.

With respect to the design of the national carbon market, the current plan was to take a top-down approach to build a new system. From legal aspect, the market regulations have been incorporated into the legislative regulations of the State Council in 2016. Uniform rules would be designed for all regions. The central government was responsible for the design of the entire system, and the provincial DRC was responsible for the implementation of the relevant management rules with flexibility. In the implementation period, comprehensive measures would be used to promote performance, such as the current construction of the national credit system.

梁希博士， 中英（广东）CCUS中心秘书长、爱丁堡大学商学院 商业与气候变化中心主任

Dr. Xi Liang, Secretary General of UK-China (Guangdong)
CCUS Centre, Director of Centre for Business and
Climate Change at University of Edinburgh Business
School



中英（广东）CCUS中心秘书长、爱丁堡大学商学院商业与气候变化中心主任梁希博士和华北电力大学教授、全球碳捕集与封存研究院中国地区代表林干果教授对广东省发改委和英国SPF支持的将CCUS纳入碳市场项目做简要介绍。

梁博士介绍道，“CCS在低碳、节能减排的六项不同技术中占据重要作用，CCS对中国而言是一项重要技术。”他分析说，CCS纳入碳市场，将给CCS行业带来很大的信心。可以考虑建立一套CCS运输、封存和利用的证书机制。要促进CCS发展，将“利用”转化为“减排”有利于调动企业的积极性。他希望碳市场能成为核心的减排机制，利用碳市场来支持CCS意义重大，但同时也要实事求是地开展工作。

Dr. Xi Liang, the Secretary General of UK-China (Guangdong) CCUS Centre and Director of Centre for Business and Climate Change at University of Edinburgh Business School, and Professor Qianguo Lin, the Global CCS Institute China representative and professor of North China Electric Power University, introduced briefly about “Including CCS in Carbon Market” project supported by Guangdong provincial DRC and the British SPF.

Dr. Liang said, “CCS has an important role in low carbon development, energy saving and emission reduction. CCS is an important technology for China.” He said, incorporating CCS into the carbon market would build confidence for the CCS industry. We could consider the establishment of a set of CCS transport and storage certificate mechanism. To promote the development of CCS, the transfer of “utilisation” to “emission reduction” could mobilize enterprise enthusiasm. He hoped that the carbon market will become the core of the emission reduction mechanism; and the use of carbon market to support CCS will be significant and realistic.

林千果教授， 华北电力大学教授、 全球碳捕集与封存研究院中国地区代表

Prof. Qianguo Lin, Global CCS China Representative,
Professor of North China Electric Power University



林教授从空间、时间以及经济性层面上概括介绍了CCS在中国的发展情况。他认为，把CCS纳入商业化发展，需要考虑几个问题：项目开发的主体、项目边界、测量和验证以及核心基础问题。CCS和CCUS纳入ETS测量和验证因不同的捕集、运输和封存技术而有不同的难度，捕集项目、运输项目比较简单，封存项目比较复杂。

他表示，把CCS纳入ETS，在管理上面中国有着相对的优越性。关于二氧化碳排放跨省流动问题，项目管理、长期风险责任问题以及测量与验证都涉及到省级管理，只有各省统一协调，才能妥善解决这些问题。（中英（广东）CCS中心）

Professor Lin introduced the development of CCS in China from the aspects of space, time and economy. He believed several issues should be considered for the integration of CCS into the commercial development: project development of the main body, the project boundaries, measurement and validation as well as the core foundation. There are different challenges for incorporating CCS and CCUS into the ETS with regards to measurement and verification because of different capture, transport and storage technologies. Capture projects and transportation projects are relatively simple while storage projects are fairly complex.

As he said, China had the relative superiority in managing the integration of CCS into ETS. Coordination between different provinces is critical to solve problems in carbon dioxide emissions migration, project management, responsibility and long-term risk measurement and verification problems.

碳金融应聚焦实体碳 减排项目提供融资便利

Carbon Finance Must Focus on Servicing Actual Emission Reduction Projects

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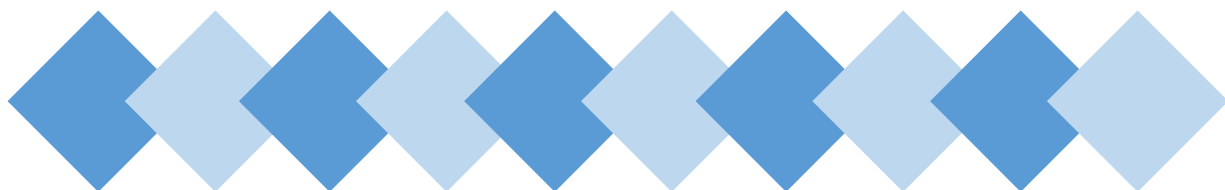
9月2日下午，清华大学国家碳市场研究中心、国家应对气候变化战略和国际合作中心、华北电力大学、北京CCUS中心（筹）、中英（广东）CCUS中心、伦敦大学学院、爱丁堡大学共同主办的碳金融国际经验座谈会在北京举行，会议围绕国际碳金融对促进减排的成效、国际经验对中国碳金融发展的启示以及中国开展碳金融工作的前景与挑战进行讨论并提出建议。

The Carbon Finance Roundtable jointly hosted by Tsinghua University National Carbon Market Research Centre, National Center for Climate Change Strategy and International Cooperation (NCSC), North China Electric Power University, Beijing CCUS Centre, University College London and University of Edinburgh was held in Beijing on September 2nd. The workshop discussed the effectiveness of emission reduction promoted by international carbon finance, the international experience on carbon finance development in China, and the prospects and challenges of carbon finance in China.



李高博士， 国家发改委气候司副司长

Dr. Gao Li, Deputy Director General of Department of
Climate Change, National Development and Reform
Commission



国家发改委气候司副司长李高博士提出，应把碳金融放到绿色金融体系中来看，目前国家重视绿色发展，金融界对于更好的服务于国家绿色发展有着强烈的意愿，所以碳金融发展的动力十足。金融机构和主管部门改革的方向应该与国家设定的低碳发展目标联系起来。

目前全国碳市场的准备工作正在进行，虽然已有几个试点，但积累的经验还不够，再加上非试点地区碳市场工作基础薄弱，所以这项工作面临着巨大挑战。李副司长认为，在建设碳市场的过程中要吸取欧盟和美国加州的经验教训，同时不忘初心，碳市场建设、碳金融创新的最终目的都是运用市场为低碳发展和降低整个社会的减排成本而服务。

Dr. Gao Li, Deputy Director General of Department of Climate Change, NDRC, stated that, "carbon finance is part of the green finance in which the national government and the finance sector are eager to explore. Thus, the development of carbon finance is fully motivated. The innovation in financial agencies and authorities should be in accordance with the low carbon development goal formulated by the government."

The initiation of the national carbon market is challenging as the 7 carbon market pilots' experience was not sufficient and carbon market basis in the non-pilot area was quite vulnerable. Dr. Li suggested that China could learn from the experiences and lessons of EU and California carbon market, and stick to the principle that the purpose of the carbon market construction and the innovation in carbon finance was to promote the development of low-carbon technology and the cost reduction of the low-carbon emission reduction by exploiting the market.

姜文诚先生， 英国大使馆一等秘书

Mr. Jonathan Farr, First Secretary of Climate Change in
British Embassy Beijing



“国务院发布绿色金融指引之后，英国大使馆也跟中国很多组织进行了紧密合作，以应对金融和融资所面临的障碍。英国的绿色投资银行也跟CDM基金进行合作，推出了中国绿色投资手册。”英国大使馆一等秘书姜文诚说，“现在需要建立一个国际性低碳倡议体系，确保资金能流向绿色低碳的项目，除此之外，还需要对项目进行评估、监测及报告。同样重要的是，政府要制定激励措施确保投资的可持续性，这样才能利用更多国内外的社会资本来进一步推动低碳转型。”

“Following the release of Green Financial Guidance by State Council, the British Embassy Beijing worked closely with many organizations in China to cope with the financing barriers. The UK Green Investment Bank jointly published the China Green Investment Handbook with China's National CDM Fund.” Mr Jonathan Farr, First Secretary of Climate Change in British Embassy Beijing, said: “an international low carbon initiative system is required to ensure the funding is used in green projects; and a system of assessment, monitoring and reporting on those projects is also needed. Last but not least, the government should make incentive policies to ensure the funding is sustainable, so as to exploit more national and international social capital to further accelerate the low carbon transition.”

潘洁博士， 爱丁堡大学荣誉研究员

Dr. Kitty Poon, Honorary Fellow of University of Edinburgh



爱丁堡大学荣誉研究员潘洁博士在主持讨论时表示，“碳金融概念涉及范围很广，包括绿色信贷、碳交易、碳期货、碳基金等产品，中国在巴黎做出更多承诺之后，准备在2017年建立全国性碳交易市场，碳减排、碳交易的发展又进入一个新的阶段。”

Dr. Kitty Poon, Honorary Fellow of University of Edinburgh, hosted the discussions and said, “carbon finance is a very broad concept, including green credit, carbon trading, carbon future, carbon fund and other financial products. After the Paris Agreement, China plans to build the national carbon market in 2017, which will be the major driver for carbon emission reduction and could lead the current carbon trading pilots to a new stage.”

梁希博士， 中英（广东）CCUS中心秘书长、 爱丁堡大学商学院商业与气候变化中心主任

Dr. Xi Liang, Secretary General of UK-China (Guangdong) CCUS Centre, Director of Centre for Business and Climate Change at University of Edinburgh Business School



爱丁堡大学商业与气候变化中心主任梁希博士介绍说，“碳金融在学术上包括碳会计、碳市场、气候政策和能源金融等多个方面。项目的融资包括三方面，即股权融资、债务融资和风险管理。”他建议碳金融围绕三个方面开展工作，首先，要用实际低碳项目做案例做示范，不谈概念，通过碳金融降低融资成本；其次，中国的企业和机构可以联合起来定义气候债券、气候股权，开发相关的支持政策，要找到实惠，不贴标签；最后，要确认和掌握一些风险管理的机会，让碳金融的融资更便利。

Dr Xi Liang, Senior Lecturer in Energy Finance and Director of Centre for Business and Climate Change in University of Edinburgh, introduced, “carbon finance includes carbon accounting, carbon market, climate policy and energy finance. Project financing includes debt financing, equity financing and risk management.” He suggested that we should learn from Dr. Gao Li’ s suggestion that carbon finance should focus on actual projects to reduce the financing cost; the Chinese government and organisations can work together to define climate bonds and climate equity, and formulate related policies in favor of financing low-carbon projects; carbon financing should also help industry in risk reduction and risk management.

段茂盛教授， 清华大学中国碳市场研究中心主任

Prof. Maosheng Dua, Director of Tsinghua University
National Carbon Market Research Centre



清华大学中国碳市场研究中心主任段茂盛提出：“要明确碳金融的概念，有清晰的程序和标准。碳金融是一个跨部门、跨行业的事情，需要两个部门深入探讨、合理分工。中国的碳交易受到了很多限制，无论从监管还是企业来说，真正参与碳金融或者享受碳金融带来的好处，意识和能力都需要提高。从技术层面来说，虽然财政部发布了一些指导意见，但是离出台合理的规则还有很长的路要走。”

Prof. Maosheng Duan, Director of Tsinghua University National Carbon Market Research Centre, pointed out, “the concept, procedures and standards of carbon finance must be clear. Carbon finance is cross-sectoral and cross-industrial, it needs in-depth discussion and reasonable division of labor between the two sectors. The carbon trading in China is largely limited; whether for regulatory or business bodies, the awareness and capability of participating in or taking advantage of carbon finance should be improved. From the technical aspect, although the Ministry of Finance has published some guidance documents, there is still a long way to go before a set of reasonable rules is released.”

孙轶颀先生， 世界自然基金会中国可持续金融项目总监

Mr. Yiting Sun, Project Director of World Wild Fund for
Nature China Sustainable Finance



“当前碳市场存在估值难、变现难、处置难、体量小的问题。要开展碳金融工作，必须做好基础性工作，即碳市场的建立和完善，碳交易制度的完善和监管，出台碳会计准则，明确碳价格。”世界自然基金会中国可持续金融项目总监孙轶颀说：“碳金融要准确的发挥其应有的作用，它的作用并不是在融资方面，碳金融会产生现金流，可以适当的降低风险；具有碳金融的项目具备很好的品质，有征信作用；而且这种项目对企业的声誉有助益。建议碳金融要配合其他金融工具发挥作用；要增加碳金融的信号作用。另外，碳金融的政府导向或公共导向作用更明显，要发挥发展性或开发性金融机构在碳市场的作用，政府也应该对碳市场价格进行调控。碳金融一定要落实到实体经济上，扩大碳金融的体量；同时考虑是否能在碳市场中运用好大的碳汇，为民造福。”

“The issues of current pilot carbon markets exist in evaluation, liquidity, and relatively small market volume. Proper groundwork is needed in order to launch carbon finance work. These include the establishment and development of a carbon market, the improvement and supervision of carbon trading system, the publishment of carbon accounting standards, the setting of carbon pricing.” as Yiting Sun, Project Director of WWF China Sustainable Finance, said, “Carbon finance should precisely play its role, but not in terms of financing. Carbon finance generates cash flow to reduce risk properly, and it will play a role to give credibility to projects since past evidence shows projects with carbon finance has a good quality and also has a positive effect on the reputation of the enterprise. It is recommended to coordinate carbon finance with other financial instruments to increase the signal function of carbon finance. In addition, the function of carbon finance on government or public guidance is more obvious, and to make development financial institutions play their roles in carbon finance, the government should also regulate the price of carbon market. Carbon finance must be implemented in real economy while expanding its volume. Meanwhile, it should also consider the possibility of using a large scale carbon sink in carbon market to benefit the people.”

Michael Grubb 教授， 英国伦敦大学学院教授、 英国天然气与电力监管委员会首席顾问

Prof. Michael Grubb, University College London Professor,
Electricity Regulatory Commission Chief Consultant



英国伦敦大学学院教授Michael Grubb先生举例说：“在英国，政府将一部分气候变化税返还给企业，提高能效和低碳创新，因此成立了碳信托来管理，从而规范企业的能源使用行为。二是成立贷款基金，借贷给企业促进他们提高能效。三是英国监管当局引入了交易市场，提高企业参与项目的信心。目前很多政府在私有领域如投资者基金、养老基金、保险基金等领域回报率很低，在碳投资领域能产生4%-5%的回报率，风险小，潜力很大，但需要好的法律框架来促进投资。决定碳市场定价时，要考虑各个利益相关方，以及什么样的定价水平能提高投资意愿。”

Prof. Michael Grubb from University College London, Electricity Regulatory Commission Chief Consultant, introduced UK policies, "the UK government would return part of the climate tax to industry to improve energy efficiency and promote low-carbon innovation, from which the Carbon Trust Fund was established to regulate the energy use in industry. On the other hand, they set up loan fund for industry to improve the energy efficiency. The current rate of return from government investment in private sector, e.g. investors funds, pension funds and insurance funds, is relatively low, while that from carbon investment can reach 4%-5% with great potential to increase. Reasonable legal framework is needed to promote this kind of investment activities. Carbon price should be set to promote investment ultimately."

Tim Yeo 先生，
新丝路能源有限公司主席、
英国议会能源和气候变化特别委员会前主席
Chair of New Silk Road Energy Ltd and Former
Chairman of the UK Parliament Energy and Climate
Change Select Committee



除了碳信托、绿色投资银行等机构做出的贡献，新丝路能源有限公司主席、英国议会能源和气候变化特别委员会前主席、前任环境和乡村事务部部长Tim Yeo先生表示：“英国的监管当局利用政策来引导建设一些有价值的基础设施。在气候金融方面，英国一直鼓励通过ETS来减少碳排放，中国可以通过学习ETS经验，促进减排交易体系的推广。碳金融还处于初期阶段，对减排的实际作用非常有限，虽然大家越来越认识到低碳商业模式的重要性，但投资者仍然是以回报率为第一目标的。政府需要进行持续不断的政策干预，确保低碳产业的吸引力；同时政策制定者需要有相应的激励措施，推动低碳模式投资，如果能做到这些，未来几年会有很大的拓展。”

In addition to Carbon Trust, Green Investment Bank and other institutions also made their contributions. Chair of New Silk Road Energy Ltd, Former Chairman of the UK Parliament Energy and Climate Change Select Committee and former UK State Minister of Environment and Countryside Mr. Tim Yeo, former Minister of UK Environment Agency, said “the UK's regulatory authorities use policy to guide the construction of some of the valuable infrastructure. In terms of climate finance, the UK has been encouraging the adoption of ETS to reduce the carbon emissions. China could learn from previous ETS experiences to promote emission reduction trading system. Carbon finance is still in the early stages and its actual role in emission reduction is very limited. Although we are increasingly aware of the importance of low-carbon business model, investors' priority is still the return they could receive. The government needs to continue the policy intervention to maintain low carbon industry's attractiveness despite policy makers might need to use the appropriate incentives to promote low-carbon investment. If this can be achieved, there will be great development in the next few years.”

唐伟珉先生， 中节能华璟碳资产管理公司副总经理

Mr. Weimin Tang, Deputy General Manager of Bright
Carbon Assets Management



中节能华璟资产管理公司副总经理唐伟珉说：“碳金融针对的对象主要有三类：一是本来就会实施的项目中包含减碳作用的项目；二是相对于当前水平有较高风险的项目，通过碳提高收益，帮助其应对风险；三是没有碳就不会进行的项目和技术。对中国的碳市场期望，一是清晰透明的政策和相对稳定的碳价，二是碳投资者的风险管理，希望中国的碳市场能够尽早推出一系列金融产品，帮助投资者更好管控风险。”

Mr. Weimin Tang, Deputy General Manager of Bright Carbon Asset Management, said “there are mainly three target project categories for carbon finance: firstly is the projects that include carbon reduction effect in its implementation; secondly is the high risk projects that need to increase revenue and reduce risk through carbon financing; the third would be projects that cannot be progressed without low carbon technologies. The carbon market expectations in China include a clear and transparent policy and relatively stable carbon price. In addition, we would expect appropriate risk management for low-carbon investors. We hope the Chinese carbon market could be launched as soon as possible with a series of financial products to help investors with better opportunities to cope with risk management.”

李晟先生， 中国科学院工程热物理研究所专家

Mr. Sheng Li, Institute of Engineering Thermophysics ,
Chinese Academy of Sciences



中国科学院工程热物理研究所专家李晟先生说：“碳交易首先要设定一个合适的门槛，其次是确定监测和计量的方法。碳的定价方面，需要通过一套机制，促进CCS技术的发展和产业的发展，从而带动技术革新。”

Mr. Sheng Li from Institute of Engineering Thermophysics, CAS, said: "suitable market access standards, monitoring and measurement methods should be developed for carbon market. Also, we need a carbon pricing system to promote CCS technical and industrial development and innovation."

潘洁博士， 爱丁堡大学荣誉研究员

Dr. Honorary Fellow of University of Edinburgh



潘洁博士总结论坛，认为中国在碳金融能力建设方面仍然有非常长的路要走，她建议未来工作考虑两个方面：金融和碳减排两个领域的关系，如何整合好；中国如何学习国外的碳金融经验，包括国外碳金融活动在国情下的适用性。

Dr. Kitty Poon concluded the workshop that there was still a long way to build up carbon finance capacity in China, and she suggested to focus further studies on two aspects: the relationship between finance discipline and carbon reduction, and secondly how should China take advantage of international experiences and lessons learned in carbon finance and whether foreign mechanisms could be adopted in the Chinese context.

中国电力市场改革可以学习 英国电力市场改革的27年经验和教训

China Could Learn from UK's 27 Years of Electricity Market Liberalization Reform

9月3日，第一届中英能源专家对话在北京举行。这次会议由华北电力大学、北京CCUS中心（筹）、伦敦大学学院、爱丁堡大学联合主办，由任职于华北电力大学兼全球碳捕集与封存研究院顾问林干果教授主持。会议议题为英国27年的电力市场自由化的经验在中国电力市场革新中的应用。

参会的人员包括英国驻华大使馆新能源及能源改革主管 Christian Romig（骆晓冀），伦敦大学学院教授、英国电力与天然气监管委员会首席顾问 Michael Grubb教授，英国前环境部长、前英国能源与气候变化委员会主席Tim Yeo先生，国家发改委能源研究所能源系统分析研究中心主任周伏秋先生，北京大学光华管理学院雷明教授，英国驻华大使馆气候变化与能源处官员谈婷婷以及众多华北电力大学知名教授。

On September 3rd, the 1st UK-China Energy Expert Dialogue was held in Beijing. This meeting is jointly hosted by the North China Electric Power University, Beijing CCUS Centre, University College London, and the University of Edinburgh. Professor at North China Electric Power University and Senior Scientist at Australia global CCS Research Institute Qianguo Lin presided over the meeting topics of "What can China learn from UK's 27 Years of Electricity Market Liberalization Reform".

The participants of this meeting included the Head of Renewable Energy and Energy Transition at UK Embassy in Beijing Mr. Christian Romig, Professor at University College London and UK Electricity and Gas Regulatory Commission Chief Consultant Dr. Michael Grubb, former Chair of Energy and Climate Change Committee of UK Parliament and former State Minister of Environment Mr. Tim Yeo, Director of Research Centre for Energy System Analysis in NDRC Energy Research Institute Mr. Fuqiu Zhou, Professor at Guanghua Management School at Peking University Dr. Ming Lei, Officer at Climate Change and Energy Section in British Embassy Beijing Ms. Serena Tan, and many well-known professors at the North China Electric Power University.

电力市场与一般消费产品差别很大，各种电力技术成本差异很大，电力市场往往有多重目标，稳定的供应、宏观能源安全、低成本、环保和低碳等因素。这次会议主要讨论了中国电力市场改革的必要性，几个面临的挑战以及探索了英国电力市场的经验学习。

英国驻华大使馆新能源和能源改革主管Christian Romig（骆晓莫）说，在中国，电力行业的现状一直是供大于求，电力供应大都来自国营企业，定量定价的模式导致电力商即便供大于求而仍旧有利润和政策的鼓励继续生产。


而英国的情况正好相反。伦敦大学学院教授、英国电力与天然气监管委员会首席顾问Michael Grubb教授分享了英国电力市场改革经验与教训，说等到2017年，英国将改良ROC系统，并最终切换到强制实行的差价合约(CfD)政策。CfD将为电力生产设定行使价，及确保最低付款。

There was huge difference between electricity market and conventional consumer market, and also between various kinds of power generation technologies. The goals of electricity market include stable supply, energy security, environmental protection, low carbon emission and affordability. The meeting mainly discussed the necessity to reform China's electricity market. Experts in energy market discussed several challenges and explored the experience of the UK electricity market reform that could be transferred to China.

The Head of Renewable Energy and Energy Transition at UK Embassy in Beijing Mr. Christian Romig said the electric power industry in China was currently oversupply. Power supply enterprises were mostly state-owned. The quantitative pricing model secured profit of power producers even in oversupply situation and encouraged them to continue their production.


However, the situation in Britain was just the opposite. Professor at University College London and the Chief Consultant at UK Electricity and Gas Regulatory Commission Dr. Michael Grubb shared reform lessons and experience of UK electricity market; he said that Britain would wait until 2017 when the modified ROC system eventually switches to contract for difference (CfDs) policy. CfDs would set the price for electricity production and ensure the minimum payment.





新丝路能源有限公司主席、英国议会能源和气候变化特别委员会前主席Tim Yeo先生从政策方面分享了英国电力市场改革历史中的几个主要决策点，但他并不认为这些决策能够在中国国情下照搬。由华北电力大学经济与管理学院教授董军教授介绍了中国新一轮电力市场改革进展与展望，几位专家讨论了英国政府所遵循的三项原则在中国国情中的利用，即环保、降低成本以及保持能源安全持续供应。Tim Yeo先生认为要同时遵循这三项以确保一个完善的电力市场，但保证能源安全持续供应比其他两项更为重要。这一观点也获得其他专家的赞同，并且Tim Yeo先生相信中国应加强在能源效率上的投资。

Mr. Tim Yeo, Chair of New Silk Road Energy Ltd and former Chairman of the UK Parliament Energy and Climate Change Select Committee, shared critical policy changes in UK's electricity market history. However, he did not believe that these decisions can be simply copied in China's market under specific national conditions. Chaired by Professor at North China Electric Power University Prof. Jun Dong, several experts discussed the application of the three principles that are followed by the British government in China: environmental protection, costs reduction and energy security. Mr. Tim Yeo said these three principles must be followed at the same time to ensure a perfect electricity market. If he had to choose, continuous and secure energy supply would be more important than the other two. His remark was endorsed by other experts, and Mr. Yeo also believed that China should strengthen its investment in improving energy efficiency.





中英 (广东) CCUS 中心

UK-China (Guangdong) CCUS Centre



北京CCUS中心

2009年, 中国国务院提出2020年温室气体排放行动目标, 并在2010年把广东省列为低碳试点省份。英国能源与气候变化部与广东省发展及改革委员会在广东省省长朱小丹的见证下于2013年9月在伦敦签订了推动低碳合作的联合声明, 以深化双方合作, 其中强调了开展碳捕集与封存 (CCS) 合作的重要性。2013年12月18日中英 (广东) 碳捕集、利用与封存产业促进与学术交流中心, 即中英 (广东) CCUS中心正式成立。中心致力于推动大型CCUS项目的示范, 应对人类面临的温室气体排放的挑战, 为中国面对的雾霾、水污染的问题提供国际合作平台, 催化清洁化石能源技术产业化, 以及培养相关专业人才。

In 2009, China's State Council proposed its 2020 goal for greenhouse gas emissions, and then in 2010 made Guangdong a low carbon pilot province. Guangdong has made remarkable achievements in greenhouse gas emission control to which the UK-China low carbon cooperation has contributed significantly. In September 2013 the UK Department of Energy and Climate Change (DECC) signed a joint statement in London with the Guangdong Development and Reform Commission, witnessed by governor Zhu Xiaodan of Guangdong Province, to strengthen low carbon cooperation. The joint statement highlights the importance of collaborating in Carbon Capture and Storage (CCS). Supported by the Guangdong and UK governments, the UK-China (Guangdong) Carbon Capture, Utilisation and Storage Industry Promotion and Academic Collaboration Centre (the "Centre") was officially founded on December 18th, 2013. The Centre is committed to promoting the demonstration of large-scale CCUS projects to tackle greenhouse gas emissions. At the same time, the Centre will also provide an international collaboration platform for solutions to other local pollution problems (such as haze, water pollution) caused by coal utilization, and to accelerate the industrialization for clean fossil energy technologies and to train qualified professionals.

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中英 (广东) CCUS中心, 中国能建集团广东省电力设计研究院D区2楼, 广东省广州市科学城天丰路1号
UK-China (Guangdong) CCUS Centre, 2nd Floor, Zone D, Guangdong Electric Power Design Institute,
No.1 Tianfeng Road, Guangzhou, Guangdong, China