



# Apr.2017-Mar. 2018 Annual Report

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**UK-China(Guangdong)CCUS Centre**



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

# Milestones in Previous Year

- 9 Jun 2017 Signed Agreement with TCM, China Resources Power (CRP) South China Region and Norway Innovation.
- 14 Jun 2017 Signed MOU with Sino-Singapore Guangzhou Knowledge City Administrative Committee (SSGKC), China Energy Engineering Group Guangdong Electric Power Design Institute Co Ltd (GEDI), New Silk Road Energy Ltd (NSRE) and CO2DeepStore Ltd.
- 22 Aug 2017 Signed MOU with Guangzhou Qizhi Industrial Park Development Co., Ltd.
- 12 Sep 2017 Signed the Technical Service Contract for the Carbon Capture Test Platform with CRP Haifeng Plant and GEDI at CRP Haifeng Plant.
- 31 Oct 2017 The Carbon Capture Technology Cooperation Agreement was signed by Shell Cansolv and GEDI.
- 8~10 Nov 2017 The Centre's representatives participated in the UN Climate Change Conference COP23 in Bonn.
- 15 Jan 2018 The construction commencement ceremony for the Carbon Capture Test Platform EPC project was held at CRP Haifeng Plant.
- 14 Mar 2018 Signed MOU with CMCRI Canada.

# Message from the Centre Director

The UK-China (Guangdong) CCUS Centre is an international academic communication and industry development platform founded in December 2013. It aims to advance the national and international communication and cooperation on CCUS and near zero emission technology research and industrialisation in industry and academia.

In 2017, the Centre's CCUS demonstration project, following the guidance of Guangdong Development and Reform Committee (GDDRC) and supported by our partners, made a significant breakthrough. The China Resources Power (CRP) Haifeng Plant, Guangdong Electric Power Design Institute Co Ltd (GEDI) and the Centre signed the CRP Haifeng Plant CCTP EPC contract in September, 2017. It marks the first carbon capture test platform in coal fired power plant was officially under the implementation phase in Asia. In terms of research, the Centre also carried out some researches on the Large-scale Carbon Capture Demonstration Project, the Interlink of Carbon Capture and ETS in Guangdong funded by GDDRC's Low-Carbon Special Fund, the CCS Centre for Excellence (Guangdong) supported by the Asian Development Bank (ADB), and BHP Billiton - PKU Industry CO<sub>2</sub> Capture Research, and the Research on Carbon Capture Retrofit at Foshan Hengyi Power Plant. In international communications, the Centre conducted exchange visits and communications with the institutes from the UK, Norway and the US, and sent representatives to participate in the UNCCC in Bonn in November, 2017.

New year, new challenges! In 2018, the Centre will make further contributions to climate change technology research in China and low carbon industry development in Guangdong. The Centre will work closely with all parties to support the CCTP construction at CRP Haifeng Plant, and seek for the optimal operation mode of CCTP. The CCTP will further play its role to guide the CCUS demonstration, technological innovation and industrialisation development, as well as the research on offshore storage, and the innovation in carbon capture technologies. In addition, the Centre will apply for the provincial engineering lab for Haifeng Carbon Capture Test Platform, and develop new projects. With an open attitude and standard management, the Centre will strengthen its communication and cooperation with domestic and foreign institutions, to become an increasingly influential international platform.

Last but not least, thank you for the guidance and the support to the Centre! Wish you all the best in career, health, and everything else in the New Year!

Mr PEI Aiguo

Director of UK-China (Guangdong) CCUS Centre  
Chief Engineer of GEDI

# Acknowledgement

2017 is a remarkable year for the UK-China (Guangdong) CCUS Centre. I am delighted the Centre has achieved its initial goal in generating substantial industry interests for carbon capture, utilisation and storage in Guangdong province.

On behalf of the secretariat, I wish to express my appreciation for National Development and Reform Commission (NDRC), National Centre for Climate Change Strategy and International Cooperation (NCSC), Ministry of Sciences and Technology (MOST), Guangdong Development and Reform Commission (GDDRC), the UK, the US, Norwegian and Canadian governments, North China Electric Power University, Peking University, University of Texas at Austin, China Resources Power (CRP), Foshan Utilities, China National Offshore Oil Corporation (CNOOC), Elion Group, Test Center Mongstad (TCM), National Carbon Capture Center (NCCC), CMC Research Institutes (CMCRI), Shell Cansolv and BHP Billiton for their generous support.

We also highly appreciate the close support from the founding members Guangdong Electric Power Design Institute, University of Edinburgh, UK CCS Research Centre and Scottish CCS Centre.

Dr LIANG Xi, CFA

Secretary General of the Centre

Senior Lecturer in University of Edinburgh

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## Key Project--China Resources Power Haifeng Plant CCUS Demonstration Project

- 15 Jan 2018 the project officially commenced the construction, and is expected to be completed at the end of 2018.
- 12 Sep 2017 the China-UK (Guangdong) CCUS Centre signed the contract with China Resources Power (Haifeng) Co Ltd and Guangdong Electric Power Design Institute Co Ltd.
- April 2017 the Project started tender preparation----then bidding----tender selection---preliminary design----construction drawing design----and finally construction design.



China Resources Power Haifeng Plant Carbon Capture Test Platform is the first carbon capture demonstration project built at an-ultra supercritical coal-fired power plant in the world. By running the test platform, the Centre will assist in screening the most suitable carbon capture technologies for the power plant, and further apply it to subsequent large-scale carbon capture and storage demonstration projects, providing support for the low-carbon transformation of fossil energy in China.

The project will serve as an open testing platform for the proven technologies to find cost-reduction solutions, promote the scale-up of the innovative technologies, seek for the financial and policy supports, and lay the groundwork for the future carbon capture technology application in Asia.

# The national CCUS cooperation platform capacity-building project

In April 2016, the Centre cooperated with North China Electric Power University and National Center for Climate Change Strategy and International Cooperation to carry out the national CCUS cooperation platform capacity-building project. The project plans to set up the Beijing CCUS Promotion Centre, in order to build a national CCUS research and industry promotion centre, to establish an open CCUS technology development platform, and to provide intellectual support for China's CCUS as well as Chinese know-how for global CCUS development.

On March 31, 2017, the Centre participated in the final project meeting of the national CCUS cooperation platform capacity-building project funded by the UK Prosperity Fund (CPF) in Beijing.



Jointly published a book related to CCUS for communication with various stakeholders.



On June 18, 2016, the first preparatory work meeting of CCUS Promotion Center was held in Beijing office.



On December 9, 2016, the International Experts Seminar was held in Beijing Office.



- On June 14, 2017, witnessed by Mr. Hu Chunhua, Secretary of Guangdong Provincial Party Committee, the five-party MOU was signed by the UK-China (Guangdong) CCUS Centre, Sino-Singapore Guangzhou Knowledge City Administrative Committee, China Energy Engineering Group Guangdong Electric Power Design Institute Co Ltd, New Silk Road Energy Ltd and CO2DeepStore Ltd.
- During July 17-18, 2017, Mr. Tim Yeo, Chairman of New Silk Road Energy Ltd, visited Sino-Singapore Guangzhou Knowledge City.
- Collaborators promotes projects and technology companied locate their home at SSGKC .

The project, with an estimated total investment of £30 million, was funded by New Silk Road Energy Ltd and the UK-China (Guangdong) CCUS Centre using the International Climate Fund, as the first stage investment, as well as subsequent public financing. Currently, the Innovation Centre has identified the location of scientific research plots to the south of the Knowledge City. In the preliminary stage, the Centre will cooperate with Sino-Singapore Guangzhou Knowledge City Investment and Development Co., Ltd. to build a building of 10,000 square meters for low-carbon technology research and development, overseas energy projects investment and financing,

the introduction of British energy companies, and low carbon education.

The project will be the first International energy cooperation project situated in the knowledge city, which will play a leading role in low-carbon industry high-end development and overseas cooperation for the city or the province. In the early stages of the cooperation, the Centre will be responsible for the investment and management in the preparation phase of the Sino-British Energy and Climate Change Innovation and Financing Platform.

## Sino-British Energy and Climate Change Innovation and Financing Platform Project



•November 2017, Signed the Carbon Capture Test Cooperation Agreement with Foshan Hengyi Power Plant Co Ltd. A two year lab-scale carbon capture test will be conducted in Hengyi Power Plant using the flue gas from unit 1; and based on the test result, a proper carbon capture technology will be recommended for the Power Plant.

Appointed by Foshan Hengyi Power Plant, the Centre engaged in research, analysis, and suggesting options for carbon capture retrofit at the Hengyi power plant, in consideration of its development requirements and suggestions. It also delivered the feasibility report on Carbon Capture Retrofit at Foshan Hengyi Power Plant. Based on the report, GDCCUSC will start carbon

capture test research in collaboration with Hengyi power plant. This lab-scale carbon capture test will be part of a two-year research experiment in two mobile carbon capture units: a desulphurisation & denitrition unit, and a pre-treatment & carbon capture unit. The flue gas generated from unit 1 will be used in the experiment.

## **Prefeasibility Study on Carbon Capture Retrofit in Foshan Hengyi Coal-fired Power Plant**

## ADB Project: CCS Center for Excellence (Guangdong)

To support the development of CCUS in Guangdong, the Asian Development Bank awarded a research project to the CCS Centre for Excellence (Guangdong) to support the capacity building for a CCS Centre in Guangdong, as part of RDTA8714 project: Promoting Carbon Capture and Storage in the People's Republic of China and Indonesia.

The outcome of the project is to develop institutional capacity in Guangdong for researching and demonstrating CCS technologies, enhance capacity development in the areas of CCS technology

innovation, policy development and structure market-based financial mechanisms for CCS technology commercialization.

In 2017, the Centre completed the first draft of the 12 tasks/reports.



## BHP Billiton-PKU Industry CO<sub>2</sub> Capture Project

The BHP Billiton-Peking University Industry CO<sub>2</sub> Capture Project Business Model Study Working Package is a cooperation project jointly developed by Peking University, UK-China (Guangdong) CCUS Centre, University of Edinburgh and North China Electric Power University. It aims to establish a robust commercial model for accommodating variables such as policy settings, technology development and demand. It will focus on 3 key research areas:

1. Development of a techno-economic assessment model and perform the techno-economic assessment of CCUS for the iron and steel industry.
2. Development of a financial and business

model with the ability to test variables and undertake full sensitivity testing.

3. Analysis of a full chain 100kt/a iron and steel sector CCS-EOR project and a full chain large scale steel sector CCUS project.

Currently, finished report on Assessing the Economics of CO<sub>2</sub> Capture in China's Steel Plant.



# Kubuqi Experience and Business Model Review project

By analysing the practical experiences obtained from Elion Resources Group's diligent work in the desertification control in Kubuqi Desert, this project evaluated the feasibility of Elion in ecological restoration, ecological planting, ecological tourism and ecological photovoltaic and commercial viability, and comparative analysis of some typical cases in parts of Africa. It is supposed that Elion's successful experience from the Kubuqi business model can be used as a reference in Africa, the Middle East and other foreign desertification areas.

On September 11, 2017, in the Sustainable Land Management (SLM) Business Forum of the 13th session of the Conference of the Parties (COP13) to the United Nations Convention to Combat Desertification (UNCCD), Senior Advisor of UK-China Guangdong CCUS Centre, Chair of New Silk Road Energy Ltd and Former Chair of UK Parliament Energy and Climate Change Select Committee Mr Tim Yeo

made a speech on Sustainable Business Models and Ecological Benefits of Combating Desertification based on the report of Successful Practice of Desert Economics: Kubuqi Business Model Review, which was completed by the University of Edinburgh Business School, China International Engineering Consulting Corporation and UK-China (Guangdong) CCUS Centre.



## China Resources Power (Guangdong) Sales Co., Ltd. — Carbon Assets Advisory services project

At the end of 2017, in order to better engage in the national carbon market, the China Resources Power South China Region signed a contract for a carbon asset advisory service with UK-China (Guangdong) CCUS Centre. The Centre will provide a series of services for China Resources power, such as examining carbon inventory, carbon asset management, carbon related product policy analysis, carbon asset training and other related services.



# Our 2017

## Domestic & International Communications

- 10 May 2017 Participation in Symposium on Decarbonisation: CCUS Perspective in Steel Sector, with the purpose of studying CCUS, related technologies and applications, policy analysis and economic research.
- 9 Jun 2017 Participation in Norway-China Partnership for Low Carbon Energy Transition Conference.
- 14 Jun 2017 Participation in China(Guangdong)-U.K. Economic and Trade Cooperation Conference.
- 19~20 Jun 2017 Participation in 2<sup>nd</sup> International Workshop on Offshore Geologic CO<sub>2</sub> Storage.
- 22 Aug 2017 Signing of an MOU with Guangzhou Qizhi Industrial Park Development CO Ltd.
- 25 Aug 2017 Participation in Shanghai International CCUS Workshop hosted by Shanghai Jiaotong University, and had a detailed exchange on an Asian Development Bank project.

- 9~10 Sep 2017 Participation in the Sustainable Land Management (SLM) Business Forum at the 13th Session of the Conference of the Parties (COP13) to the UNCCD.
- 17~19 Oct 2017 Participation in China Technology Roadmap for CCUS (2017 version) Workshop in Wuhan.
- 24~29 Oct 2017 Visiting of NCCC and TCM and have detailed discussions on future corporation.
- 8~10 Nov 2017 Participation in the COP23.
- 26 Jan~2 Feb 2018 Visiting of overseas partners in U.S and Norway.
- 13~15 Mar 2018 Participation in GLOBE2018 .
- 16~18 Mar 2018 Visiting of the International CCS Knowledge Centre, SaskPower Dam and Shand CCTF - Carbon Capture Test Facility.

# Our 2017

## Colleague Snapshots



Investigation abroad trip abroad led by Mr PEI Aiguo



Visiting DOE U.S.



Dr LIANG Xi participated in COP23



Opening Ceremony of CRP Haifeng Project



Project site visit



Visiting cooperation partner



Centre's social dinner



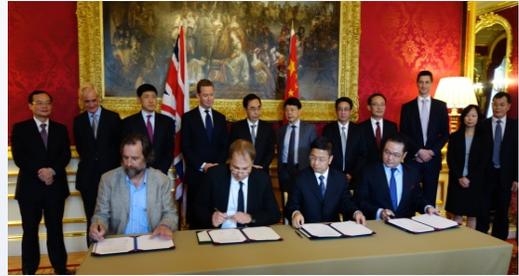
Centre's annual hiking

# Development

Guided and promoted by Guangdong Development and Reform Commission, Guangdong Electric Power Design Institute Co. Ltd of China Energy Engineering Group, Clean Fossil Energy Corporation, UK CCS Research Centre and Scottish CCS Centre jointly conducted researches on carbon capture, utilisation and storage.

On 27 September, 2013, a Memorandum of CCUS Industry and Academic Communication Promotion was signed, witnessed by Mr. ZHU Xiaodan, Governor of Guangdong Province, and Mr. Gregory Baker, Director of UK Department for

Energy and Climate Change, during the Guangdong Delegation's visit to UK.



Signing MOU

UK-China (Guangdong) CCUS Industry Promotion and Academic Collaboration Centre (UK-China (Guangdong) CCUS Centre, in short), based on a consensus memorandum, was jointly launched by all the parties that signed the Memorandum. And Guangdong CCUS Centre is the executing institute of UK-China (Guangdong) CCUS Centre, and registered in Guangdong Province, China.



Launch Ceremony



Award Ceremony

# Development



- 2018 Guangdong Offshore CCUS Project Phase I EPC starts
- 2017-2018 Research on offshore carbon storage
- 2016-2017 Feasibility study on pilot-scale carbon capture demonstration project
- 2016 The Centre formulated regulations for different departments to achieve internal controls
- 2015-2017 Feasibility study on pilot-scale carbon capture demonstration project in refinery
- 2015-2016 Assessment of CO<sub>2</sub> storage capacity and potential storage sites
- 2015 The Centre committee meeting passed the Centre's basic regulations, including authorisation, financial system and personnel management
- 2013 China Promoted by Guangdong Development and Reform Commission, UK-China CCUS Centre was launched
- 2010-2013 Guangdong carbon capture ready research funded by UK and Australia
- 2008 The first dual-language carbon capture website in China [www.captureready.com](http://www.captureready.com)
- 2007-2011 The 4-year joint CCS research between the UK Department for Trade and Industry and China's Ministry of Science & Technology
- 2006 1<sup>st</sup> CCS and CDM workshop organised by Guangdong CPPCC

## Magazine and Report



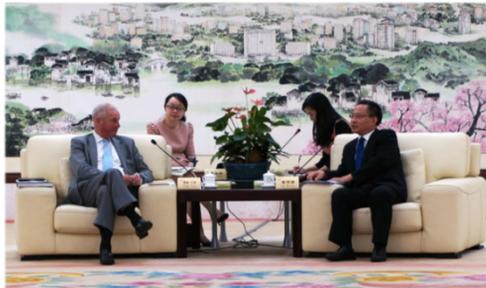
In December 2013, a pilot issue of the magazine Near Zero Emission was published. Up to March 2018, in total 9 Near Zero Emission and 12 academic reports have been published and updated online (<http://www.gdccus.org>) for the Centre's members to download and share. This successfully created an open information channel and communication platform of various near zero emission technologies and policies for all parties and promoted the communication between them.

# Domestic & International Support



UK-China (Guangdong) CCUS Centre, represented institutes in Guangdong, together with the Economic Geology Department of University of Texas at Austin, Clean Air Task Force and the US National Carbon Capture Center, signed a collaboration agreement (2015.6.22) which will support the development of integrated offshore CCUS projects in Guangdong Province, China and Texas offshore, US, including the CCTP project.

GDDRC DDG Dr WU Daowen and CRP South China GM Mr MA Li attended CO<sub>2</sub> Offshore Storage Workshop in Guangzhou (2016).



GDDRC DDG Dr LU Xiulu receives UK Parliament Energy and Climate Change Ad Hoc Committee Chair Mr Tim YEO (2015).

GDDRC DDG Dr WU Daowen receives British Consulate General to Guangzhou, Head of Energy and Climate, Mr Craig Morley and colleagues (2017).



UK-China (Guangdong) CCUS Centre, Technology Centre Mongstad, China Resources Power South China Region and Innovation Norway signed a four-party Memorandum of Understanding to further progress carbon capture (CCS) collaboration between Norwegian and Chinese companies.

UK-China (Guangdong) CCUS Centre and Carbon Management Canada Research Institutes signed an agreement to cooperate on development of CCUS.



# Supporters and Partners



**中华人民共和国国家发展和改革委员会**  
National Development and Reform Commission

**广东省发展和改革委员会**

Guangdong Provincial Development and Reform Commission



英国驻广州总领事馆



Department for  
Business, Energy  
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Guangdong CCUS Centre is the executing institute of UK-China (Guangdong) CCUS Industry Promotion and Academic Collaboration Centre, registered in China.



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