



## A national survey of public awareness of the environmental impact and management of CCUS technology in China

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### Abstract

Carbon dioxide capture, utilization and geological storage (CCS/CCUS) is regarded as an important carbon emissions reduction technology response to climate change. As a key participant in a global fight against climate change, China made a promise in 2015 to cut carbon emissions per unit of GDP by 60-65 percent from 2005 levels by 2030. China is undertaking a series of actions for emissions reduction with much attention being paid to the CCUS technologies.

Though some full-chain CCS/CCUS pilot projects have operated in China, many barriers exist when stepping up to commercial applications, e.g. there are significant negative perceptions of the environmental risk of CCUS. Therefore, in order to tailor constructive training or outreach programs for public acceptance of CCUS in China, a large national survey of public perceptions of CCUS technology was conducted, focusing on people with a tertiary education. Six hundred paper-pencil questionnaires were dispatched to 22 universities/enterprises in 19 provinces and 2 municipalities with a response rate of 95%. Four themes were investigated in the questionnaire: (1) Climate change and environmental protection awareness; (2) Understanding level of CCUS technologies and other low-carbon technologies; (3) Knowledge and attitudes of potential environmental impact (positive/negative) of CCUS; (4) Attitude towards CCUS environmental management policy of China. The questionnaire is divided into two parts. After the participants completed the first part of the questionnaire, which are questions about their attitude to climate change and low-carbon technologies, especially CCUS technology, a CCUS brochure designed by ACCA21 was distributed to the participants so they could gain a general understanding of CCUS technology. The rest of the questionnaire was completed after reading the brochure.

The data statistics of the valid questionnaires show that 91.4% of the participants agreed that the earth was going through the climate change, and 74.3% were interested in low-carbon technologies, but only 3.6% had a good understanding of CCUS, while 22% had heard of it, but with limited knowledge. The data statistics from Part 2 of the questionnaire show that 80.4% of participants believed that the CCUS may help to mitigate the impacts of global warming, but the NIMBY (Not in my Backyard) phenomenon was obvious from the location-based objection to transportation and storage processes. Reasons for the NIMBY phenomenon come from their fears for health, safety and environment issues.

The participants expressed concern for the impacts of leaked CO<sub>2</sub> from transportation pipelines and storage site on local natural ecosystems and the human body. According to the survey, risk perceptions of CCUS were a significant negative predictor of acceptance. In addition, ten listed CCUS environmental management policies received extensive recognition from the participants, and about half of the participants considered that the related government departments should be responsible for environmental management as a first priority. The survey also indicates that the most trusted channels through which the survey participants obtain CCUS information are academic journals and textbooks, television, radio and newspapers, expert lectures, and brochures on CCUS demonstration projects. According to the survey of public awareness of the environmental impact and management of CCUS technology in China, CCUS technology rates well for environmental benefits, but high environmental risk perceptions of CCUS lead to a lower acceptance of this carbon emissions reduction technology. To meet the national strategy of CCUS, the government departments should play an active role in the environmental risk management, e.g. relative policies making. Furthermore, promotion of the successful operation of worldwide CCUS projects such as Sleipner, Snovit and Weyburn on television, radio and newspapers, or from expert lectures and government departments can possibly lower the perceived risk and improve the public acceptance of CCUS in China. (591 words)