

As of 2011.08.17

Field Visit to Shenhua Group CCS Pilot Project

September 23, 2011

Project Description

Shenhua's Direct Coal Liquefaction Production Line was completed toward the end of 2008. To dispose CO₂ emitted from coal-to-liquids facilities, the Group is currently implementing a 100,000 t/y CO₂ capture and geological storage project which comprises of the following four essential aspects:

- technical research of relatively high concentration CO₂ capture
- technical research of CO₂ transportation and large-scale CO₂ storage in saline aquifers
- technical research of monitoring on CO₂ geological storage, safety evaluation, warning and response
- project demonstration of high concentration CO₂ capture technologies combined with geological storage technologies

Administrative notes

Venue: Shenhua Group CCS Project Base, Ordos, Inner Mongolia

Transportation: Beijing-Ordos charter flight, plus train/bus for other routes

Visitors: Due to limited capacity of chartered flight (available for only 36 persons), only attending ministers (with no more than 2 accompanying officials), heads of delegations (with no more than 1 accompanying official) and some VIP delegates will be invited.

Expenses of visit: The transport and catering expenses of the visit will be covered by the host.

Sign-up for visit: Please contact Mr. CHEN Fei for visit matters and dietary requirements, etc.

Mr. CHEN Fei

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Attachments

1. Tour Itinerary
2. Brief Introduction to the Shenhua Ordos Coal Liquefaction Corporation
3. Brief Introduction to the Shenhua CO₂ Capture and Geological Storage Pilot Project

Attachment 1

Tour Itinerary
(Friday, September 23, 2011)

8:00-9:30	Leaving for Capital International Airport from Beijing Hotel on arranged vehicles
9:30-10:50	Flying to Ordos City of Inner Mongolia on chartered flight, departing from Terminal 1 of Capital International Airport
11:00-11:40	Taking bus and checking in at the International Exchange Center of Shenhua Shendong Coal Group
12:00-13:00	Welcome banquet by Shenhua Group
13:00-14:00	Break
14:00-14:20	Heading for the Shenhua CCS Project
14:20-14:40	Visiting the exhibition hall of the CCS Project
14:40-15:00	Planting trees at the site of CCS Project
15:00-15:20	Leaving for the site of Shenhua Direct Coal Liquefaction Project
15:20-15:30	Watching the video of the Shenhua Direct Coal Liquefaction Project
15:30-15:45	Presentation by General Manager Zhang Yuzhuo of Shenhua Group
15:45-16:00	Free discussion
16:00-16:40	Leaving for the Ordos Airport
17:00-18:20	Flying to Beijing (Terminal 1 of Beijing Capital International Airport) on chartered flight
18:20-19:50	Heading for Beijing Hotel on arranged vehicles

Attachment 2

Brief Introduction to Shenhua Ordos Coal Liquefaction Corporation

Shenhua Ordos Coal Liquefaction Corporation is a wholly-owned subsidiary of China Shenhua Coal to Liquid and Chemical Co., Ltd under China Shenhua. Based in Ordos, the corporation adopts direct coal liquefaction process with independent IP. The corporation has become a world leader in coal liquefaction, producing petroleum and petrochemical products from coal through chemical processes.

The Shenhua direct coal liquefaction process produces diesel, naphtha and LPG through high-temperature and high-pressure hydro-upgrading reaction with the adoption of nano catalyst and H-donor solvent. The nano catalyst is jointly developed by Shenhua and China Coal Research Institute with the grant from the National High-tech Research and Development Program (863 Program).

Shenhua's Direct Coal Liquefaction Production Line is the first commercial line of the like in the world and a key project in the 10th Five-year Plan. It plays an important role in national energy strategy, industry strategy and Shenhua's development strategy. It is a national pilot project of clean coal processing and conversion, and an important way to address the issue of petroleum supply.

The Shenhua coal liquefaction project was approved by the National Development and Reform Commission in September, 2002. Phase I of the project involved capital investment of RMB15 billion Yuan, with capacity of 1 million KTPA oil. The total capacity of the complete project was 5 million KTPA oil. The successful commissioning run of the first train on December 31, 2008 had inaugurated a fruitful production record. As of July 2011, 12 times of coal injection had been completed, and the project had a cumulative total of 10,670 operating hours and produced 896,600 tons of products, including 550,000 tons of diesel, 247,500 tons of naphtha and 99,000 tons of LPG.

Attachment 3

Brief Introduction to the Shenhua CCS Pilot Project

Greenhouse gas emission is now considered to be the main cause of global warming, which has affected human survival and sustainable social development. CO₂ is one of the primary greenhouse gases. How to reduce CO₂ emission is therefore a common issue for the world to address. Reducing CO₂ emission from industrial installations is one of the most direct and the most important ways of greenhouse emission reduction.

The integrated technology to capture and permanently store CO₂ from industrial emission sources is called CO₂ capture and storage (CCS). It includes industrial facilities which separate, capture and liquefy CO₂ emitted from industrial installations, transmission pipe networks or tankers to transport captured CO₂ to the storage zone where the CO₂ is injected under pressure into the underground storage pit, and injection and safety test systems which eventually achieve permanent storage. CCS is the most promising technology that can achieve large-scale CO₂ disposal.

The technical research of the project focuses on the following areas: industrial-scale geological storage of CO₂ in deep saline aquifers which can capture 100,000 tons of CO₂ per year, and the CO₂ concentration would be increased from 87% to above 95% with CO₂ emissions capture rate topping 85%; membrane separation technology applicable to relatively high concentration of CO₂ and optimal transport mode for the demonstration project; transport simulator suitable for CO₂ storage in deep saline aquifers; anti-corrosion cement suitable for CO₂ geological storage; technologies enabling the total injection of 300,000 tons of CO₂ in the operation of CCS demonstration project.

Shenhua Group actively explored ways to cut CO₂ emissions in recent years and decided to implement the CCS Pilot Project. The Project suits the development trends of low-carbon economy and clean coal utilization both in China and across the world. The implementation of the pilot project will provide technological support for CO₂ disposal to find a new way of developing environmentally-friendly, low-carbon energy economy.