

# Simulation Trading of National Carbon Market

November 2019

# Interaction Purposes

- Get familiar with the trading process of national carbon market via tabletop simulator
- Understand the importance of corporate carbon trading strategy -- corporate behavior of carbon asset operation and trading

# Grouping Arrangements



➤ Ten power enterprises (ten groups)

- A G      Gas-fired units
- B H      Conventional coal-fired units with the capacity of more than 300MW
- C D I J    Conventional coal-fired units with the capacity of 300MW and below
- E K      Non-conventional units fired by gangue, coal water slurry, etc.  
(including coal-fired circulating fluidized bed units)

# Internal Division of Labor of the Groups

- CEO: in charge of organization, discussion and decision-making of the general strategy
- CFO: in charge of the calculation of finance, profits, etc.
- Technology Officer: in charge of emission calculation, quota and CCER compliance submission
- Trader: onstage trader
- Risk Control Officer: ensure compliance and non-bankruptcy
- Analyst: analyze market trading behavior and price

*Note: All roles may be alternated within the enterprises each year; where the number of team members is insufficient, one staffer may hold several posts simultaneously, i.e., able person should do more work.*

# Scenario Design

- Ten groups of enterprise players are power generation enterprises eligible for the carbon trading system (emission control enterprises), which offset emissions via quota acquisition and CCER project.
  - Every "unit output" may get RMB20 in profit, and generate 1 ton of carbon dioxide emission.
  - Enterprises
    - Annual production base line = 28 unit output
    - Annual production ceiling = 30 unit output
  - Production output declared by enterprises at the beginning of the year: 30 unit output (full capacity). Enterprises will gain RMB600 in profit (production profit) and generate 30 tons of carbon dioxide (emission load).
  - Production output declared by enterprises at the beginning of the year: 28 unit output (full capacity). Enterprises will gain RMB560 in profit (production profit) and generate 28 tons of carbon dioxide (emission load).

*Note: for the convenience of calculation, the simulation uses 30 unit output, and in actual production, the output may be 30 X 1 million unit output.*

# Simulation Rules -- Emission Control Enterprises

Emission control enterprises	Description
First trading period	2019-2021 (three years)
Quota storage and validity period	Storage is allowed, but all quotas will be cancelled after the conclusion of the game (after the trading day in 2021).
Quota allocation	The <b>quotas allocated to all enterprises for free</b> will drop <b>year by year at different degrees (different initial capital of the enterprises)</b> .
Price adjustment	Competent authorities will adjust market policies when carbon price is excessively high or low.
Punishment due to the failure to fulfill quota clearing	<u>RMB25</u>
Quota clearing/annual report	<ul style="list-style-type: none"> <li>• Enterprises should declare production output before trading (this is equivalent to having completed the verification and identification of emission load);</li> <li>• Whether to make investment in CCER project (auction form, carried out in the first year, that is, 2019);</li> <li>• The quantity of CCER used for clearing is no more than <b>10% of emission of enterprises in the year</b>;</li> <li>• Quota clearing will be conducted after the trading day.</li> </ul>
Purpose of simulation trading	<ul style="list-style-type: none"> <li>• <b>Any emission control enterprise with the most funds will become the winner.</b></li> </ul>

# Overall Process of Simulation Trading (Three Years)

2019

- 1) Quota allocation
- 2) CCER project auction
- 3) Declare production output
- 4) Quota trading
- 5) Quota clearing compliance
- 6) Provide production profit

2020

- 1) Allocate quota and CCER
- 2) Declare production output
- 3) Quota/CCER trading
- 4) Quota clearing compliance
- 5) Provide production profit

2021

- 1) Allocate quota and CCER
- 2) Declare production output
- 3) Quota/CCER trading
- 4) Quota clearing compliance
- 5) Provide production profit

*Note: all quotas will be cancelled at the end of 2021 after simulation trading is concluded. Any enterprise with the most funds will become the winner.*

# Specific Process of Simulation Trading (One Year)

- Every group of enterprises will get the initial capital at the beginning of simulation;
  - All enterprises will get the first batch of free quotas issued by the government at the beginning of the year;
  - In the first year, all enterprises need to anticipate the level of tightness of quotas and quota price in the future, consider whether to buy CCER project (consider self-owned capital and participation in auction at this time, i.e., invest in CCER project);
  - At the beginning of the year, all enterprises need to declare production plan (production output) based on the volume of quotas and CCER project bought by them;
  - Then, enterprises will dispatch representatives to come in at the process of free trading;
  - At the end of the year, all enterprises will calculate emission based on the declared production output, turn in quotas to the government, and carry out clearing (compliance); otherwise, they will be subject to penalty in case of failing to fulfill on volume (punishment due to the failure to fulfill quota clearing);
  - Finally, every group of enterprises will get production profit.

*Note: for the convenience of calculation, the simulation uses 30 unit output, and in actual production, the output may be 30 X 1 million unit output.*

# Announcements

## ➤ CCER project;

- All emission control enterprises and financial institutions may independently choose whether to buy CCER project (they need to put into capital in a lump-sum); one year is necessary for the project to complete first issuance, that is, CCER emission reduction volume is just generated in 2020. CCER generated may be used to offset carbon emissions of the enterprises or replace with quotas (1 ton of CCER offsets 1 ton of carbon dioxide emission), or may be resold to other emission control enterprises.
- For example, after an enterprise buys CCER project successfully in the first year, CCER spot could be officially issued in the second year. Assuming that the enterprise produces in full capacity in the second year and has 30 tons of carbon dioxide emissions, CCER project may generate 6 tons of CCER in the second year, but the enterprise only has 27 tons of quotas up to the compliance period in the second year. The enterprise may use 3 tons of CCER in compliance in full amount (10% of carbon emissions), and the remaining 3 tons of CCER may be sold for profit.
- If the enterprise chooses to use 28 units of products, it could only use 2 CCER to offset compliance.

# Announcements

## ➤ CCER unit cost;

- $\text{CCER unit cost} = \frac{\text{project cost}}{(\text{volume issued in the second year} + \text{volume issued in the third year})}$

## ➤ Trading of secondary market;

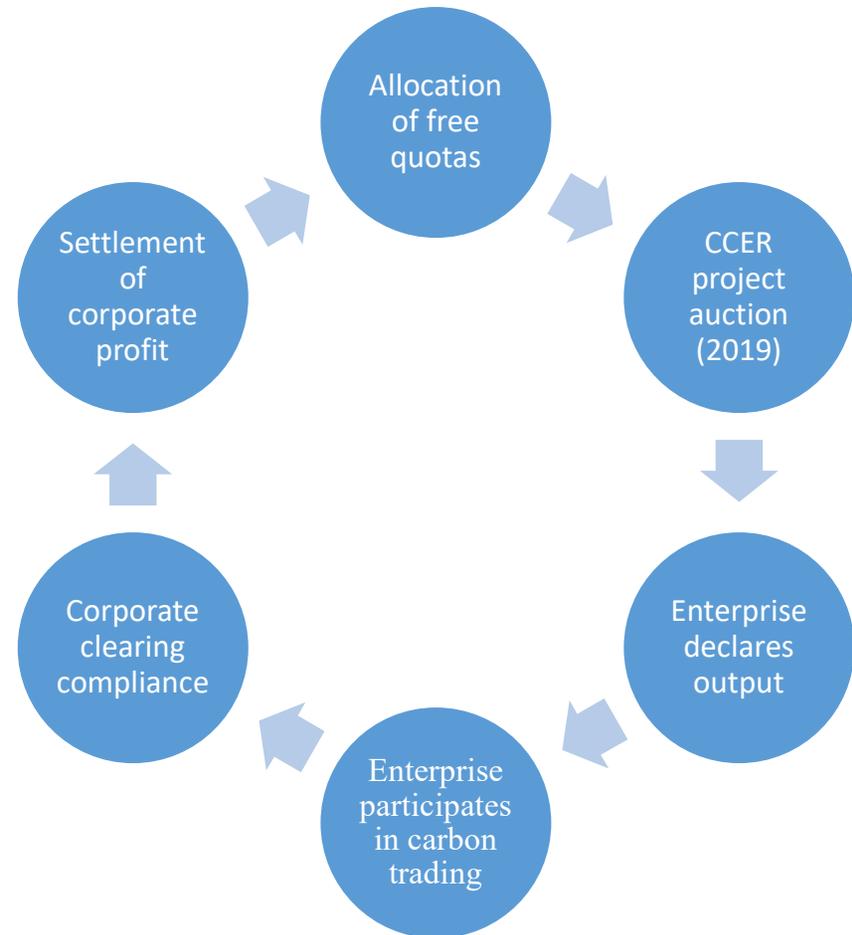
- Trading of secondary market adopts alternate quotation/bidding, and other participants could decide to buy or sell based on the price.



# **Start of Carbon Trading Simulation**

# 2019-2021

- The trading period in the first period is three years;
- The second year and the third year: CCER may be traded;
- Settlement of corporate profit at the end of the year;



# Summary of Simulation Trading

- The trading system is designed by referring to the national carbon market and the features of the industries and enterprises of all regions;
- Truly reflect quota allocation and trading behavior (speculation or compliance);
- Preliminarily understand and know the basic operation process of the national carbon market;
- Experience carbon trading process through interactive simulation, share experience and learn lessons.