Beijing Pilot ETS: Allowance Allocations, Benchmarks & Incorporation of Consumption

Tong Qing

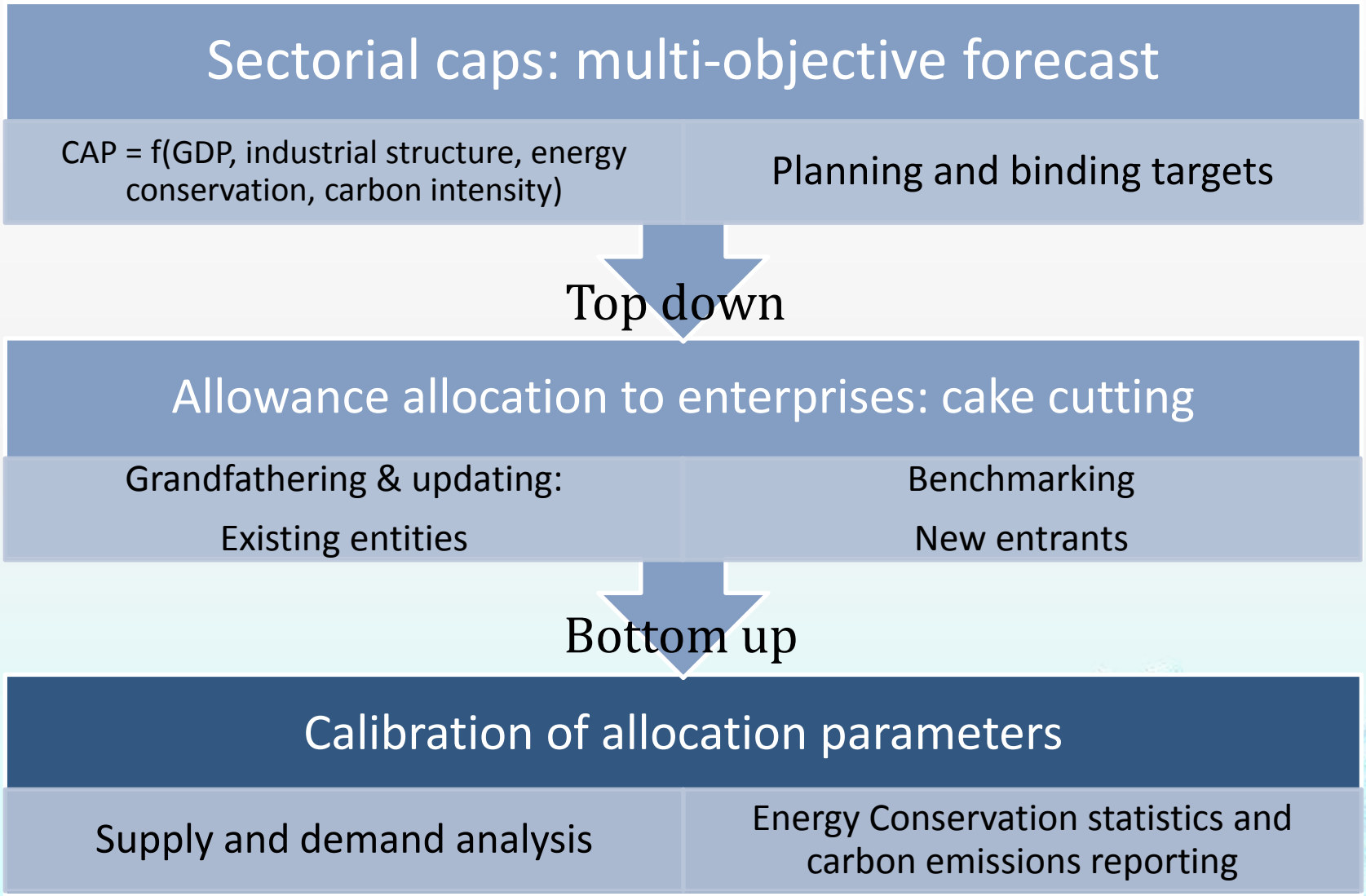
Tsinghua University

Scope & Coverage

- **GHG type:** only CO2 during Pilot Phase I (2013-2015)
- **Threshold:** **10,000** tCO2 in **enterprise** level
- **Sectors:**
  - Power and heat supply
  - Manufacture & other industries
  - Service

  } >40 sub-industries
- **Emission boundaries:**
  ① Direct emissions from energy use
  ② Indirect emissions from electricity consumption
  ③ Direct process emissions
- **Scale:**
  - 543 key emission entities
  - >40% of Beijing's total CO2 emissions (comparable calibration)

Hybrid method of BETS cap setting



12th Five-year (2011-2015) Plan: overall targets

No.	Indicators	Target values
1	Annual GDP growth rate	7.5
2	Share of service sctor in GDP	78%
3	Five year GDP energy intensity decrease rate	17%
4	Five year GDP carbon intensity decrease rate	18%
5	Share of high quality energy in total consumption • NG • new & renewable energy	80% 20% 6%
6	Industrial process emission level	2010 level

12th Five-year Plan: sectoral decompositions

Sectors	Indicators	Target values
Manufacture	Industrial added value energy intensity decrease	22%
	Total energy consumption	28 million tce
Commercial buildings	Decrease of area electric intensity	10%
	Energy saving amount	6.2 million tce
Transport, Storage and Post	Industrial added value energy intensity decrease	10%
	Total energy consumption	16 million tce
Wholesale & Retail	Industrial added value energy intensity decrease	18%
	Total energy consumption	3.2 million tce
Hotel & Restaurants	Industrial added value energy intensity decrease	18%
	Total energy consumption	2.7 million tce
Financial	Industrial added value energy intensity decrease	10%
	Total energy consumption	0.7 million tce
Public institutions	Decrease of area energy intensity	12%
	Total energy consumption	2 million tce
Heating	Decrease of area energy intensity for space heating	12%
Power	Electricity saving compared to total sales	0.3%

3 Types of free allocation methodology

- **For existing enterprises and institutions**
  - Based on historical amount (grandfathering)
  - Based on historical intensity (updating)
- **For new emissions**
  - Benchmarking

Allocation based on historical amount

- **For existing manufacturing and service enterprises (institutions)**

$$A = E * f$$

A: allowances for an enterprises (institutions)

E: annual average emissions during 2009-2012

f: Emission Control Factor (as Compliance Factor in EUETS)

Allocation based on historical intensity

- **For existing facilities of heating plants and cogeneration plants**

$$A = P * I * f$$

A: allowances for a facility

P: total heat supply / power supply from the facility in the allocation year

I: historical intensity

f: Emission Control Factor

Benchmarking Allocation

- **For new emissions**
  - New enterprises
  - New facilities of existing participant enterprises

$$N = Q * B$$

N: allowances for the new emissions

Q: activity level corresponding to the new emissions, production / output value / building area

B: industrial benchmark representing low emission intensity

Principles for benchmark setting

- Methodological Consistency:
  - foreign ETS benchmarks
  - energy efficiency benchmarks
  - different sub-industries
- Technological Advancing:
  - represents advanced carbon intensity in Beijing
- Data Reliability:
  - original data all from online direct reporting system
- Policy coordination:
  - national standards
  - local standards
  - industrial development planning

Quantitation of benchmarks (1)

- Sampling:
  - Online direct reporting system
  - All the pilot enterprises in the sub-industry
- Activity data:
  - Physical quantity (outputs, building areas……) is prioritized
  - Monetary quantity (output value or main business revenue) is alternative when physical quantity is not available

Quantitation of benchmarks (2)

For each sub-industry, 7 options of benchmark:

- B_1: weighted average carbon intensity of top 10% during 2009~2013
- B_2: weighted average carbon intensity of top 20% during 2009~2013
- B_3: weighted average carbon intensity of top 10% in 2013
- B_4 : weighted average carbon intensity of top 20% in 2013

Quantitation of benchmarks (3)

- B_5: a conversion of energy intensity benchmarks in Beijing into carbon intensity based on energy emission factors
- B_6: a conversion of national energy intensity benchmarks into carbon intensity based on energy emission factors
- B_7: a conversion of international energy intensity benchmarks into carbon intensity based on energy emission factors

Meetings of experts & work groups: confirmation of benchmarks (1 from 7) based on four principles

Published benchmarks in BETS

- 42 industrial categories
  - Power generation
  - Heat supply
  - Mining industry
  - Energy intensive manufactures: eg. manufacture of petrochemical products, manufacture of cement……
  - Light industries: eg. manufacture of automobiles, manufacture of medicines……
  - Service sector: eg. hotels, universities, large hospitals……
- 79 benchmarks for sub-categories

Limitations of Beijing's benchmarks

- Equity:
  - Benchmarks on enterprise level other than installation level, limited by energy measurement standard & accuracy
  - For some industries, activity data is monetary quantity since physical quantity is not available
  - Representativeness of samples for some industries which only cover 1~2 pilot enterprises in ETS

Applications of benchmarks in BETS

- Allocation of more than 30 enterprises' new emissions allowances
- Some enterprises refer to the benchmarks in their internal carbon emissions management

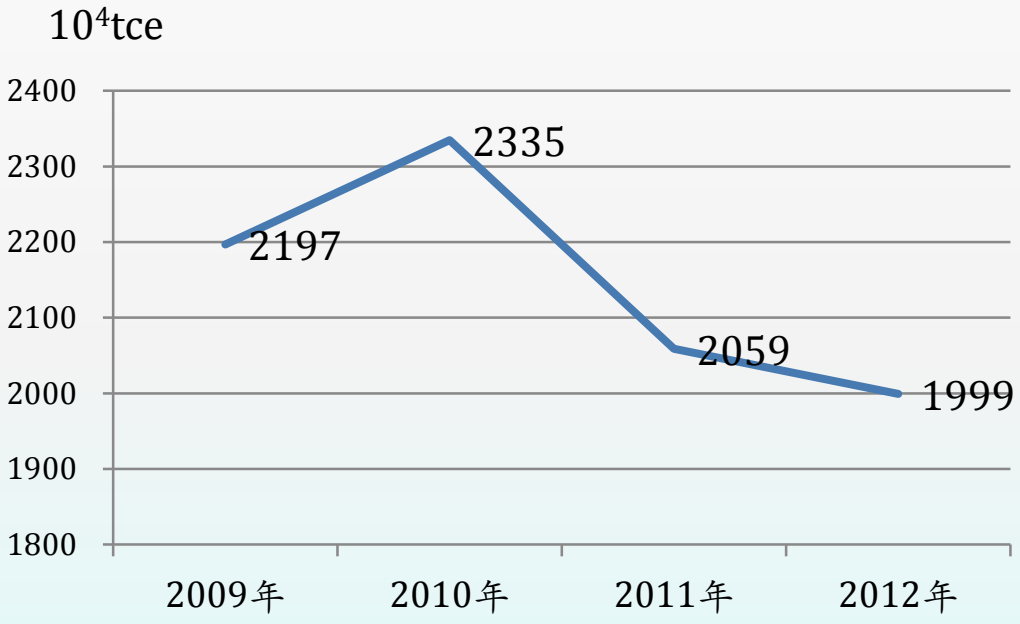
Incorporation of consumption: indirect emissions from electricity consumption

- Beijing's consumer responsibility: More than 67% of Beijing's electricity consumption is imported from power plants located in other provinces under the dispatch by North China Power Grid.
- Prevent carbon leakage from Beijing to surrounding provinces by increase the electricity import. Electricity feed-in tariff & sales price are fixed in China. Carbon cost cannot be passed through.

Share of indirect emissions from electricity consumption in typical enterprises' total emissions

Type of enterprises	share
Manufacture of petrochemical products	20%
Manufacture of automobiles	62%
Manufacture of medicines	59%
Pressing of ferrous metal	50%
Manufacture of electronic equipment	99%
Manufacture of paper products	92%
Manufacture of cement	7%
Space heating	11%

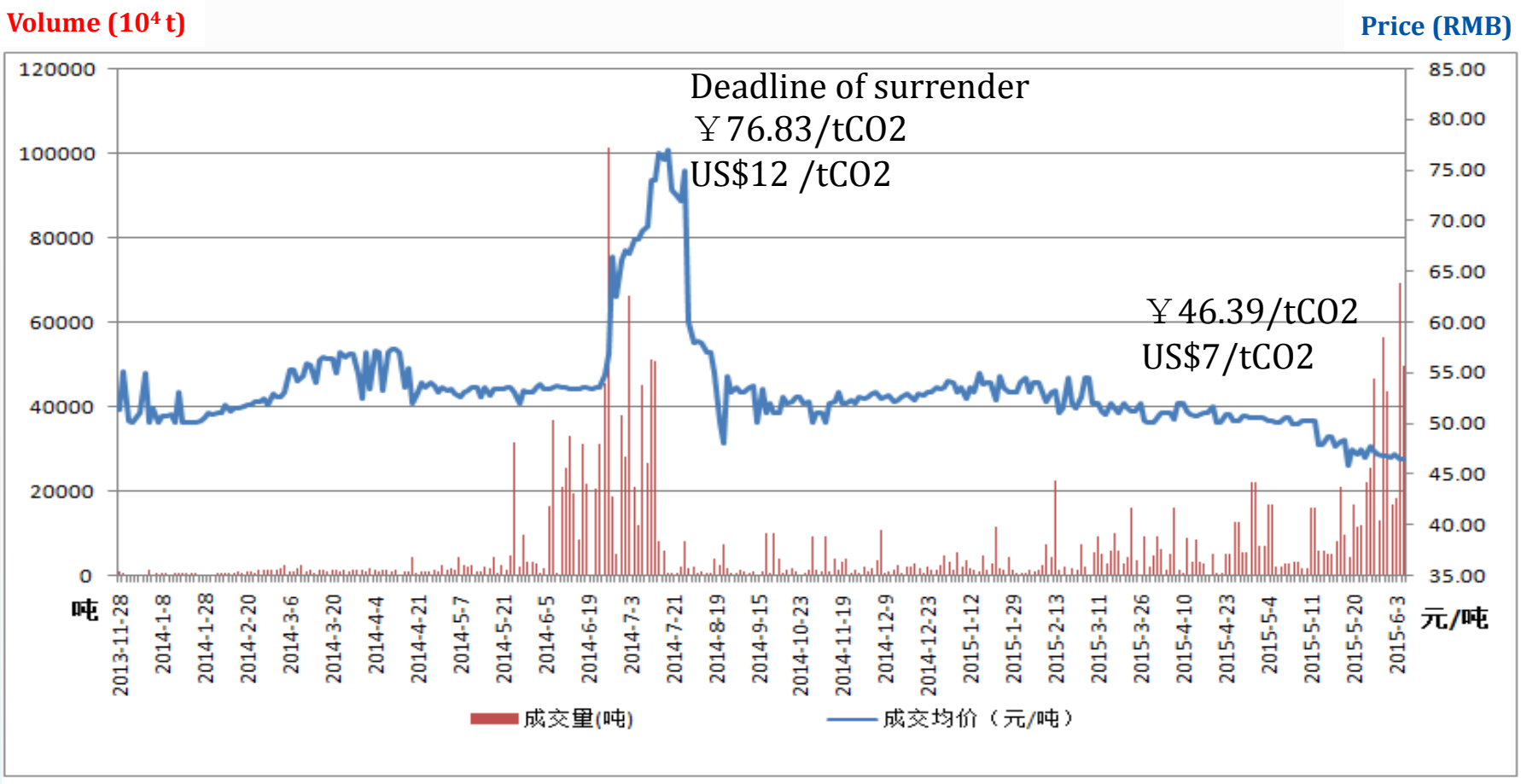
Incorporation of consumption: service sector



End-use energy consumption by industry

- After a relatively long time of industrial restructuring, the tertiary industry has dominant share in Beijing's GDP (>75%)
- End-use energy consumption by industry peaked in 2010
- It is very challenging that very few neither international experience nor data could be referred

Market status



- Accumulated volume: >2 million tCO2
- Maximum monthly volume: 1.42 million tCO2 in June, 2013
- Maximum daily volume: 560,000 tCO2 in June, 2013

Thank you!

tongqing@tsinghua.org.cn