

---

--The 4<sup>th</sup> International Conference on SF<sub>6</sub> & the Environment

# SF<sub>6</sub> Production, Future Demand & Cooperation in China

---

Cui Cheng Ph.D

Energy Research Institute, NDRC,  
China

Nov.28, San Antonio, Texas

---

# Major Contents

- 1, SF<sub>6</sub> production & consumption in China
  - 2, Development of power generation
  - 3, Development of magnesium production
  - 4, Development of semiconductor production
  - 5, Cooperation for the survey
-

# 1, China's SF<sub>6</sub> Production & consumption

- →Production:
- Capacity of SF<sub>6</sub> production: 4000 tonne in 2005;
- Total SF<sub>6</sub> production amount: 2500 tonne in 2005
  - Almost 20% of demand in the world;
- Three large producers:
  - China nuclear red = 1400 tonne / year
  - Tianchen chemical of Sichuan-1000 tonne
  - Liming chemical academy-1000 tonne
- Other producers: 50-200tonne
  - Daming chemical of Gansu, 504 plant, Yinshan chemical of Sichuan, Fubang chemical of Shanghai, Kedi chemical of Feshan etc.;

---

# 1, SF<sub>6</sub> production & consumption

- → Consumption:
  - Domestic SF<sub>6</sub> consumption
    - 2000 tonne in 2005
  - Power generation sector: largest SF<sub>6</sub> emission source;
  - Five large switch manufactures
    - 250-300 tonne in 2005;
  - Breaker repair & supplement
    - 500 tonne in 2005
  - Semiconductor manufacturing
    - 150 tonne in 2005
-

---

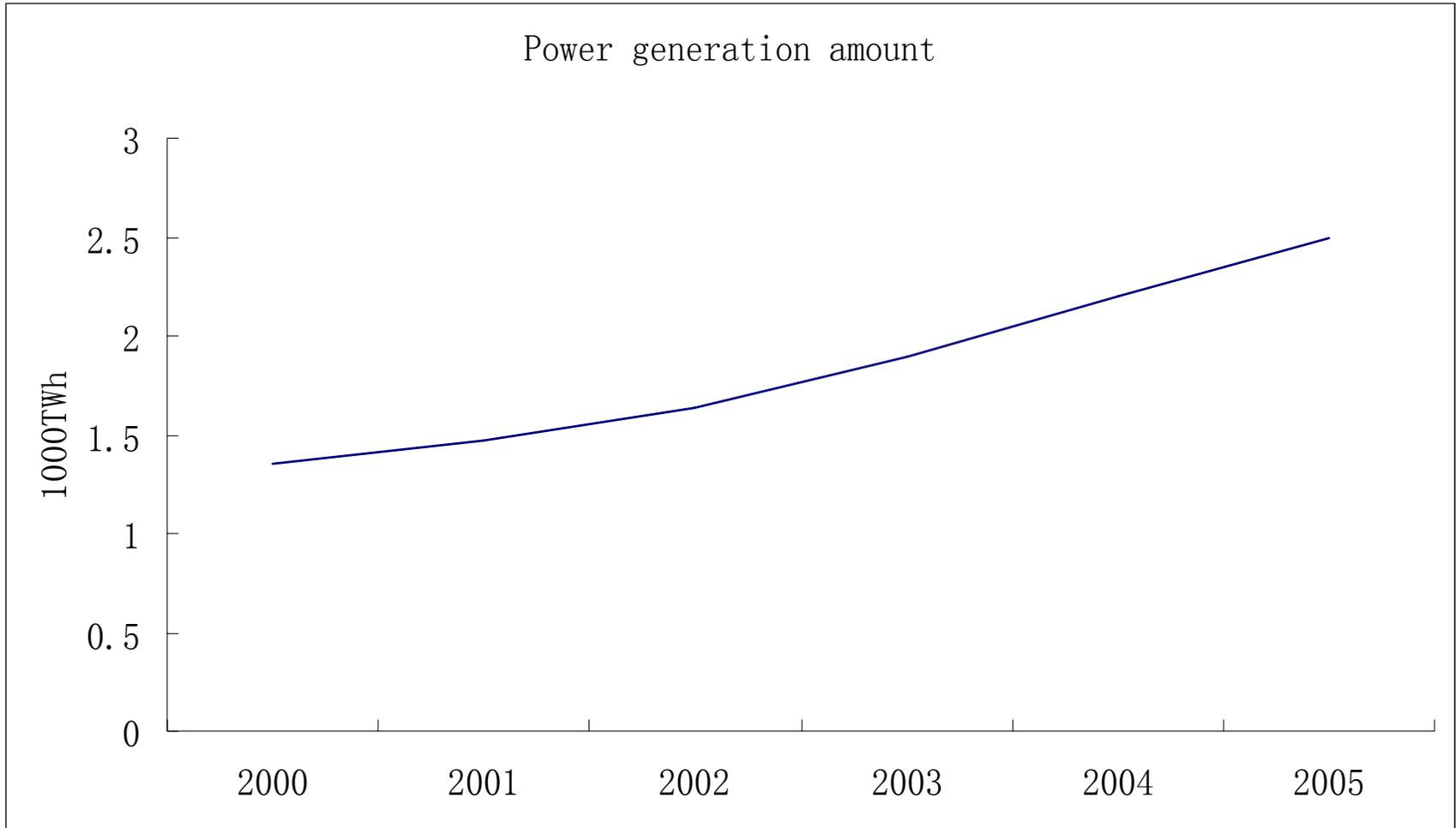
# 1, SF<sub>6</sub> production & consumption

- → Export & import:
  - Export proportion: 20% & increase in 2005;
  - Import some high purify SF<sub>6</sub> for semiconductor manufacture;
-

# 1, SF<sub>6</sub> production & consumption

- → New SF<sub>6</sub> Production Capacity:
- Liming chemical academy:
  - Increase to 2500 tonne in 2006;
- Xinxiang of Henan: 1200 tonne new capacity ,
  - Begin construction in 2005 (500 tonne in 2006);
- Yongfei chemical of Fujian:
  - 1500 tonne new capacity (500 tonne already finished in 2006);

## 2, Development of power generation



## 2, Development of power generation

- IEA Scenario: 4696 TWh in 2015 (7% increase rate), near US (4951 TWh);
- New capacity: 60 BW in 2004, 80 BW in 2005;
- Grid construction investment: 50% increase in 2006;
- Higher demand for SF6: 2006-2007, 4000-4500 tonne;
- High voltage breaker production: 45.8% with SF6 =126kv, 47% with SF6  $\geq$ 252kv in 2005;

## 2, Development of power generation (high voltage breakers in 2004)

| Voltage<br>(kv) | breaker<br>number | SF6 breaker | share rate(%) |
|-----------------|-------------------|-------------|---------------|
| 550             | 1315              | 1315        | 100           |
| 363             | 447               | 446         | 99.8          |
| 252             | 12064             | 10261       | 85.1          |
| 126             | 32816             | 23247       | 70.9          |
| 72.5            | 5809              | 3536        | 60.9          |
| Total           | 52451             | 38805       | 74            |

---

## 2, Development of power generation

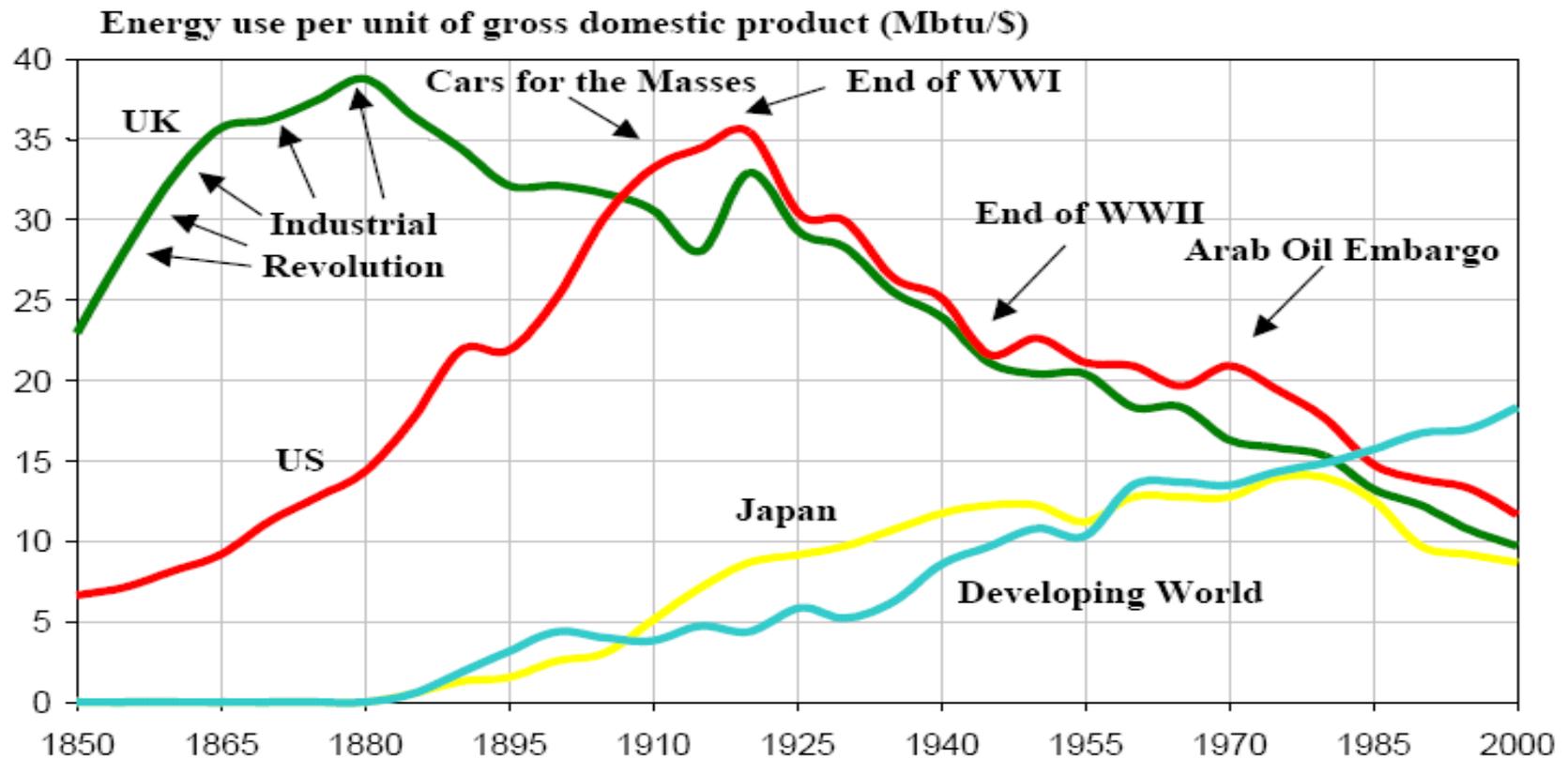
- →Key obstacles for SF6 emission control:
  - Rapid increase demand;
  - No substitute production by economically;
  - High cost for recycle SF6;
  - No financial incentive to reduce the leakage;
-

---

## 2, Development of power generation

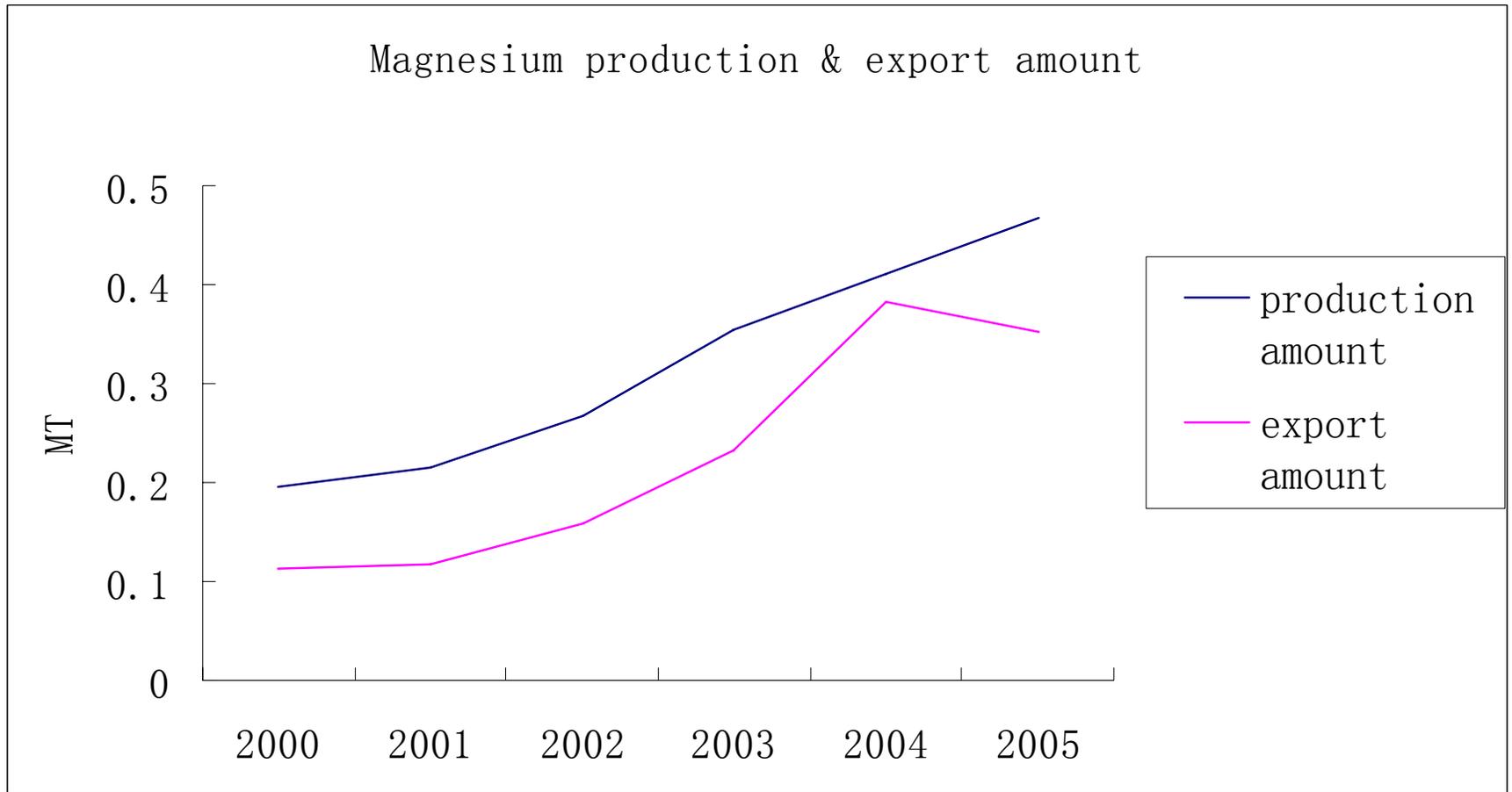
- →“The eleven five years plan”(2006-2010)
  - 7.5% GDP increase rate per year;
  - 20% decrease of energy intensity;
  - 10% decrease of main pollutant;
  - Get achievement for GHG emission control;
-

## 2, Development of power generation



Source: DOE/EIA, 2000, Skov, 2000, DOC/BEA 2001, National Academy of Engineering, 1990

# 3, Development of magnesium production



---

# 3, Development of magnesium production

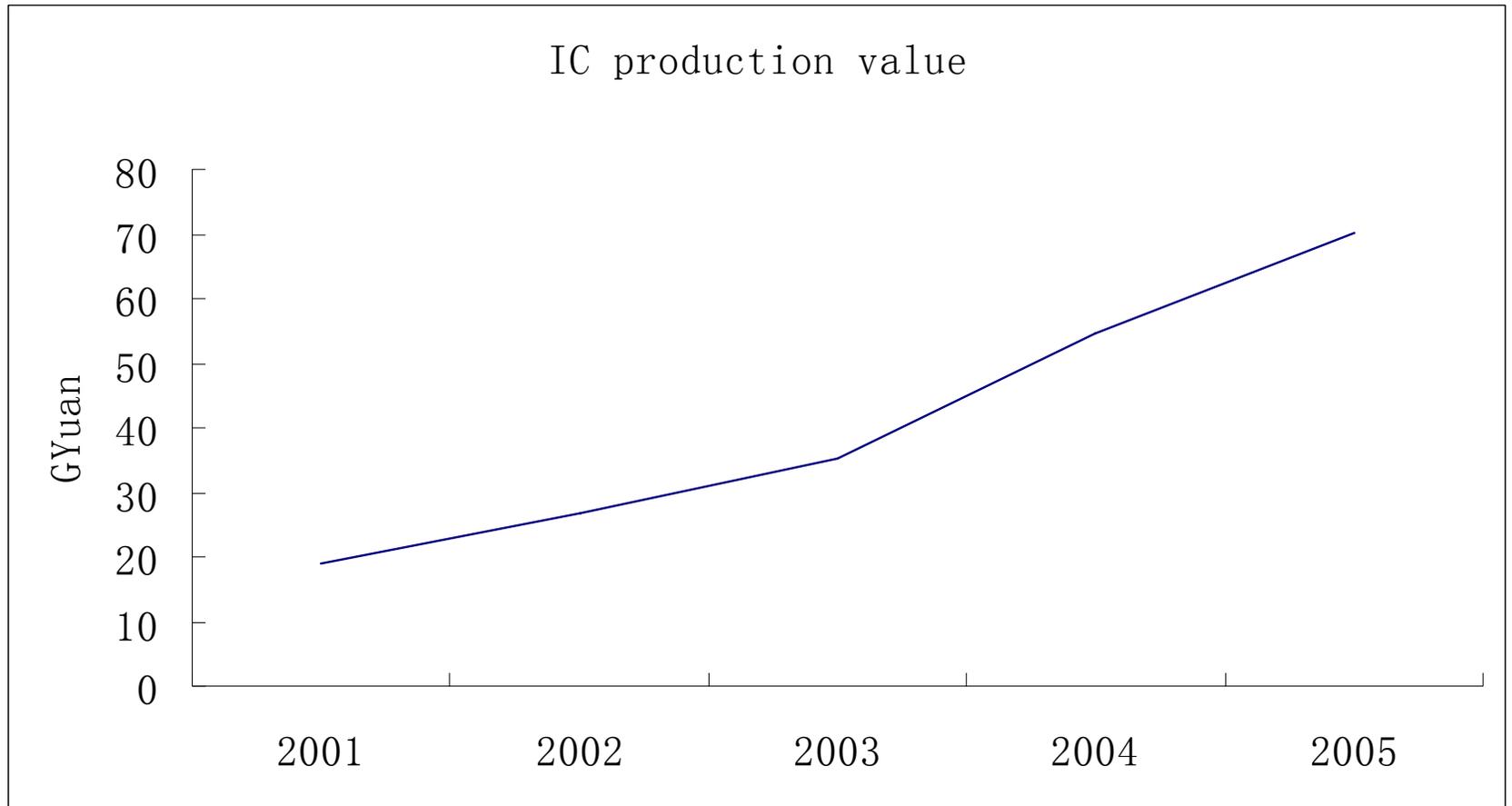
- World's largest Mg Producer
    - Total capacity = 815,700 Tonnes in 2005;
  - Total production amount: 467,600 Tonnes in 2005;
  - Export amount: 353,000 Tonnes, 75% of share rate in world market;
  - Domestic consumption amount: near 100,000 Tonnes, 25% only;
  - Shanxi province: >70% of total productions;
  - Production plants: 102 plants in 2005, 10 plants (capacity >10,000 Tonnes, 53% productions);
-

---

## 3, Development of magnesium production

- → Key obstacles for SF6 emission control:
  - Rapid increase demand;
  - Human health issues: for use the SO2;
  - No regulations to limit Magnesium export now;
-

# 4, Development of semiconductor production



---

## 4, Rapidly Growing Semiconductor Industry

- IC production import rate: 80%;
  - Semiconductor demand increase rapidly;
  - Second market in the world: after US;
  - Production line use SF<sub>6</sub>: >30 in 2005, 150 tonne SF<sub>6</sub> consumption;
  - SF<sub>6</sub> consumption in future: 400 tonne in 2010
-

---

## 4, Semiconductor Production and Policies

- → Key obstacles for SF6 emission control:
  - Rapid increase demand;
  - No substitute production by economically;
  - Difficult to recycle SF6;
  - Lack more strict environment regulations to reduce the uses and leakage;
-

---

## 5, Cooperation for the survey

- → Key obstacles for survey:
  - A lot of manufactures: breaker & magnesium;
  - A lot of consumers: grid;
  - Different technology level: for manufactures;
  - Different management kevel: for operation & maintains;
  - The statistic system not good in China: lack detail record data & information;
-

---

## 5, Cooperation for the survey

- → Activity data survey:
  - Two way together: productions & utilizations;
  - Import & export;
  - Typical survey & comprehensive estimate;
-

---

## 5, Cooperation for the survey

- → Detail way for activity data survey:
  - ERI & Guild of different sectors: combined;
  - Second national communications: combined
    - Need to estimate the emissions of SF6;
  - Sector's experts: joined together;
  - Build up the working networks;
  - Financial support;
-

---

# 5, Cooperation for the survey

- → Emission factors survey:
  - Technology & management level:
    - Different with developed countries;
    - With a grate gulf in different plants & uses;
  - Typical survey: combined;
  - IPCC default data: need used carefully;
-

---

- Thanks !

- E-mail:

- [cuicheng@amr.gov.cn](mailto:cuicheng@amr.gov.cn)

---