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## CDM Development Status and Potential in South China/Guangdong Province

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# Outline

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1. CDM Development Policy Framework in China
2. CDM Development Potential in China
3. CDM Projects in Guangdong Province
4. CDM Potential and Barrier analysis in EE
5. GIEC CDM Achievements





## 1 CDM Development Policy in China

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- ◆ Government Support: DNA, CDM Regulation, CDM Capacity Building.
  - ◆ Market Participation: CER Buyer, CDM consultant, Awareness Raising of Project Owner.
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## China's CDM Rules

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**DNA established:** Office of National Coordination Committee on Climate Change,  
National Development and Reform Commission. The board will review

- ◆ Participation requirements
  - ◆ PDD
  - ◆ CERs price ( RMB ERPA)
  - ◆ Issues related to funds and technology transfer
  - ◆ Sustainable development effects of the project
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# 1 China's CDM Rules

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◆ **General Rules:** Measures for Operation and Management of Clean Development Mechanism Projects in China, Oct, 2005.

◆ **CDM Priorities:** energy efficiency improvement, new and renewable energy, recovery and utilization of methane and coal bed methane

◆ **Project owner:** shall be wholly China-owned or China controlled enterprises

◆ **Benefits from the transfer of CERs as management fees:**

HFC23: 65%

N<sub>2</sub>O : 30%

Others : 2%

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## CDM Capacity Building in China

- ◆ *EU-China Partnership in CDM Implementation*
- ◆ *ADB, MOST, Opportunities for the CDM in the Energy Sector*
- ◆ *UNF CDM Capacity Building Project*
- ◆ *Japan, Feasibility study of the CDM in China's electricity sector*
- ◆ *China-Canada Co-operation Project on Climate Change*
- ◆ *WB, Country Study on CDM Methodology and its Application*
- ◆ *Italy, Denmark, Germany etc*

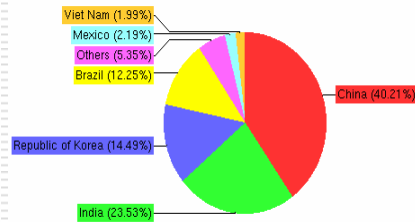
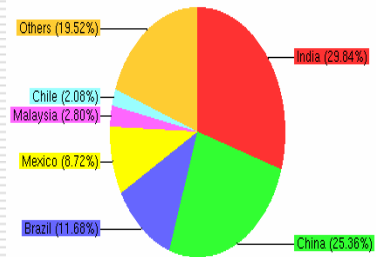


## CDM Development Comparison of China and other countries



Total 1250 Projects Until 05/12/2008

Total Annual CER: 225,549,383

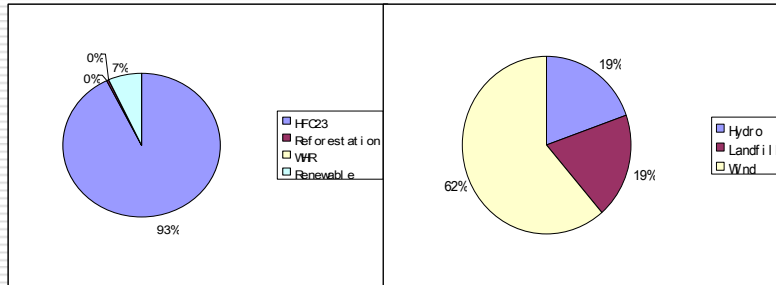




## CDM Projects in China by Source

**Registered CDM Projects by EB: 317**

**Approved CDM Projects by DNA: 1701**



317 Projects Registered with total annual CER  
90,690,343 ,  
Among which renewable energy project CER accounts  
for 7%.

CER from wind power among renewable energy  
Projects account for 62%.



## 2 CDM Development Potential in China

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### Global CER Market : WB

- ❑ Annex 1 GHG emission reduction Demand:5 ~ 5.5 billion tons CO<sub>2</sub>e ( 2008 - 2012 )
  - ❑ Among which , 50% emission reduction domestic , 2.5 billion CO<sub>2</sub>e ( CDM、JI、ET )
  - ❑ By 2012 , 1~1.5 billion tons CDM JI
  - ❑ About 3 -5 billion dollars CDM from China
  - ❑ If we grasp the opportunities,CDM will bring about 15 -25 billion dollars investment.
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## 2 CDM Development Potential in China----- Hydropower

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- Exploitable hydro resources 400 million KW.
  - Up to date the total installed capacity amounts to 100 millions kw, among which small hydropower 28.50 million kw
  - Chinese target to develop hydropower:
    - 2010 160 million kw
    - 2020 300 million kw
  - Supposing 10% newly built hydropower could be developed as CDM, by the end of 2010
    - 6000MW hydropower
    - Equivalent to 400 Yuzaikou Hydropower projects ( Registered)
    - Annual 16 millions tCO<sub>2</sub> CER
-



## 2 CDM Development Potential in China----- Wind

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- The potential wind resources
    - inlands ( 10 meter high ) : about 250 million kw
    - offshore : 750 million kw
  - Wind development target :
    - 2010 : 5 million kw
    - 2020 : 30 million kw
    - 08 - 10 the newly built wind farms will amount to 3 million kw
  - Supposing all the newly built wind project will be developed as CDM
    - About 3000MW installed capacity
    - Equivalent to 110 Huitexile wind farms( registered)
    - Annual 6 million tCO<sub>2</sub> CER
-



## 2 CDM Development Potential in China----- Other renewable

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- **08-10** other renewable energy generation project
    - Solar power generation: 10 thousand kw
    - Geothermal: 10 thousand kw
    - Ocean : 5 thousand kw
    - Biomass power : 40 feasibility study
  
  - The total potential will
    - 2010 : 37 million CERs
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## 2 CDM Development Potential in China----- landfill methane collection

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- Annual municipal landfill 150 million tons with annual growth 8%.
  - Currently 650 landfill projects with average disposal 260 thousand/a.
  - Supposing 10% landfill will be supplied facilities to collect methane and developed as CDM
    - 60 Landfill CDM projects
    - Annual 3.5-10.5 million tCO<sub>2</sub> CER
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## 2 CDM Development Potential in China----- waste incineration

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- Municipal waste incineration power generation projects
  - Average capacity : 10-50 MW
  - 08-12 20 projects are under feasibility study
  - Annual CER 2.5 million tons
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## 2 CDM Development Potential in China----- EE improvement

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Target set in National Middle-Long term plans for energy conservation

- By 2010 energy consumption per 10 thousand Yuan GDP (Based on 1990 level) will drop from 2.68tce in 2002 to 2.25t standard coal.
  - By 2020 energy consumption per 10 thousand Yuan GDP (Based on 1990 level) will drop to 1.54 tce.
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## 2 CDM Development Potential in China----- EE improvement

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- **Energy conservation potential in electric industry**
    - 2010 the coal consumption will be 360 gce/kWh , resulting in 33 million tce and 80 million tco2 annually
    - 5 million NG-based power generation projects: total emission reduction 6 million tCO2 annually
    - CHP , CER 2 - 4 millions CO2 annually
  - **Energy conservation potential in Iron and steel industry**
    - TRT, CDQ technology will be employed to reduce energy consumption of annual 2.66 million tce , resulting in annual CER of 6.6 million tce.
  - **energy conservation potential in cement industry**
    - By 2010 , 30 0 waste heat recovery power generation projects will be built ,resulting in 3 million tce and 7.5 million CER annually.
    - The total CER for the above three industries could be 100 million CO2e/a.
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### 3 CDM projects in Guangdong Province

The pioneering province to conduct open and reform policy in China.

- located in the southern part of the south China Sea, encompassing a total 179,766 square kilometers
- Total population of 94 million
- 2007 GDP 3060 billion RMB ,account for 12.5 % total national GDP.
- 2006 primary energy consumption 152 million tce, accounting for 6.17% of national energy consumption.







### 3 CDM projects in Guangdong Province-wind

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The rich wind resources abundant in East and West part of Guangdong coastal area, the exploitable wind resources could amount to 5.5—6.0 million kw, with the expected annual electricity of 10-12 billion kwh.

By the end of 2007, 471 wind turbines have been built with the total installed capacity of 287.39 thousand kw, ranking eleventh province in China.

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### 3 CDM projects in Guangdong Province-EE

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Guangdong faces great challenge to shift to low carbon economy during its path to industrialization.

National campaign : energy conservation campaign target set by central government, Guangdong 16% drop , It is expected that by the end of 2010, 70 -100 million tce, resulting in 150 million tCO<sub>2</sub>e.





### 3 CDM projects in Guangdong Province

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Waste heat recovery power generation projects could be good potential CDM project in Guangdong, where many energy-intensive industries will have to change its energy utilization model, including cement industry, iron and steel, ceramic industry.

- iron and steel industry: Shaoguan plant plan to install 2 15MW CDQ, one 10MW TRT。 Zhujiang plant plan 10MW electric furnace WHR project. 200 thousand tCO<sub>2</sub>e
  - Cement: newly built dry production lines to install 80MW WHR, 400 thousand tCO<sub>2</sub>e
  - Chemical plant: at least 5 Sulfuric acid plant, 30MW WHR could be installed.
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## 3 CDM projects in Guangdong Province

### Ceramic industry

- 2006 annual output: about 4000 million square meter in China, Guangdong 2000 - 2300 million square meter .
- The energy consumption in Guangdong: 6 kg ce/m<sup>2</sup> , about 12 million tce will be needed to produce ceramic in Guangdong
- Compared to the advanced technology, the EE potential is very large, amount to 6 million tce reduction

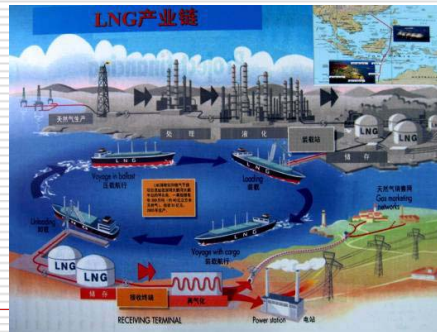


表 1 我国建筑陶瓷能耗与国际先进水平的差距

|      | 计量单位                   | 先进国家      | 中国        |
|------|------------------------|-----------|-----------|
| 烧成热耗 | KJ/kg                  | 1255~4186 | 2930~6279 |
| 综合能耗 | Kg 标煤 / m <sup>2</sup> | 0.77~6.42 | 2.5~15    |

### 3 CDM projects in Guangdong Province

Replacement coal with LNG in power plant will result in emission reduction, Australian LNG will be imported to Guangdong





### 3 CDM projects in Guangdong Province

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Biogas and waste water methane recovery power generation projects





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### 3 CDM Projects in Guangdong

Foshan ( Ceramic 、 Stainless )

Meizhou ( Hydropower )

Jieyang ( rural biogas project )

Shaoguan ( CDQ , TRT )

Guangzhou ( CBD CHP )

Taishan ( wind resources assessment )

Xinhui ( 2\*150MW flue gas heat recovery power generation )

Jiangmen ( energy conservation grid transformer )

Huidong ( 120MW wind projects feasibility study )

Boluo ( Landfill )

Foshan (Biodiesel)



300tons/day Energy Self-Supported MSW Integrated Utilization plant



## 4 CDM Potential and Barrier analysis in EE

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- ◆ Methodology is very important to develop potential CDM projects
  - ◆ Each individual EE project has small CER output
  - ◆ Different project owner
  - ◆ Different regions, difficult to monitor
  - ◆ Programmatic CDM project tool could be one alternative, more clear
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## 4 CDM Potential and Barrier analysis in EE

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- ◆ [AM0017 Steam system efficiency improvements by replacing steam traps and returning condensate --- Version 2](#)
  - ◆ [AM0018 Steam optimization systems --- Version 1.1](#)
  - ◆ [AM0020 Baseline methodology for water pumping efficiency improvements --- Version 2](#)
  - ◆ [AM0024 Methodology for greenhouse gas reductions through waste heat recovery and utilization for power generation at cement plants --- Version 2](#)
  - ◆ [AM0030 PFC emission reductions from anode effect mitigation at primary aluminium smelting facilities --- Version 2](#)
  - ◆ [AM0031 Methodology for Bus Rapid Transit Projects --- Version 1](#)
  - ◆ [AM0035 SF6 Emission Reductions in Electrical Grids --- Version 1](#)
  - ◆ [AM0036 Fuel switch from fossil fuels to biomass residues in boilers for heat generation --- Version 2](#)
  - ◆ [AM0044 Energy efficiency improvement projects: boiler rehabilitation or replacement in industrial and district heating sectors --- Version 1](#)
  - ◆ [AM0046 Distribution of efficient light bulbs to households --- Version 2](#)
  - ◆ [AM0048 New cogeneration facilities supplying electricity and/or steam to multiple customers and displacing grid/off-grid steam and electricity generation with more carbon-intensive fuels --- Version 2](#)
  - ◆ [AM0054 Energy efficiency improvement of a boiler by introducing oil/water emulsion technology --- Version 2](#)
  - ◆ [AM0055 Baseline and Monitoring Methodology for the recovery and utilization of waste gas in refinery facilities --- Version 1.1](#)
  - ◆ [AM0056 Efficiency improvement by boiler replacement or rehabilitation and optional fuel switch in fossil fuel-fired steam boiler](#)
  - ◆ [AM0060 Power saving through replacement by energy efficient chillers --- Version 1](#)
  - ◆ [AM0061 Methodology for rehabilitation and/or energy efficiency improvement in existing power plants --- Version 1](#)
  - ◆ [AM0062 Energy efficiency improvements of a power plant through retrofitting turbines --- Version 1](#)
  - ◆ [AM0066 GHG emission reductions through waste heat utilisation for pre-heating of raw materials in sponge iron manufacturing process --- Version 1](#)
  - ◆ [AM0067 Methodology for installation of energy efficient transformers in a power distribution grid --- Version 1](#)
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## 4 CDM Potential and Barrier analysis in EE

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- ◆ [ACM0003 Emissions reduction through partial substitution of fossil fuels with alternative fuels or less carbon intensive fuels in cement manufacture --- Version 7](#)
  - ◆ [ACM0005 Consolidated Methodology for Increasing the Blend in Cement Production --- Version 4](#)
  - ◆ [ACM0009 Consolidated methodology for industrial fuel switching from coal or petroleum fuels to natural gas --- Version 3](#)
  - ◆ [ACM0011 Consolidated baseline methodology for fuel switching from coal and/or petroleum fuels to natural gas in existing power plants for electricity generation --- Version 2](#)
  - ◆ [ACM0012 Consolidated baseline methodology for GHG emission reductions for waste gas or waste heat or waste pressure based energy system" --- Version 2](#)
  - ◆ [ACM0015 Consolidated baseline and monitoring methodology for project activities using alternative raw materials that do not contain carbonates for clinker manufacturing in cement kilns --- Version 1](#)
  - ◆ [AMS-II.A Supply side energy efficiency improvements – transmission and distribution](#)
  - ◆ [AMS-II.B Supply side energy efficiency improvements – generation](#)
  - ◆ [AMS-II.C Demand-side energy efficiency activities for specific technologies](#)
  - ◆ [AMS-II.D Energy efficiency and fuel switching measures for industrial facilities](#)
  - ◆ [AMS-II.E Energy efficiency and fuel switching measures for buildings](#)
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## 5. Introduction to GIEC

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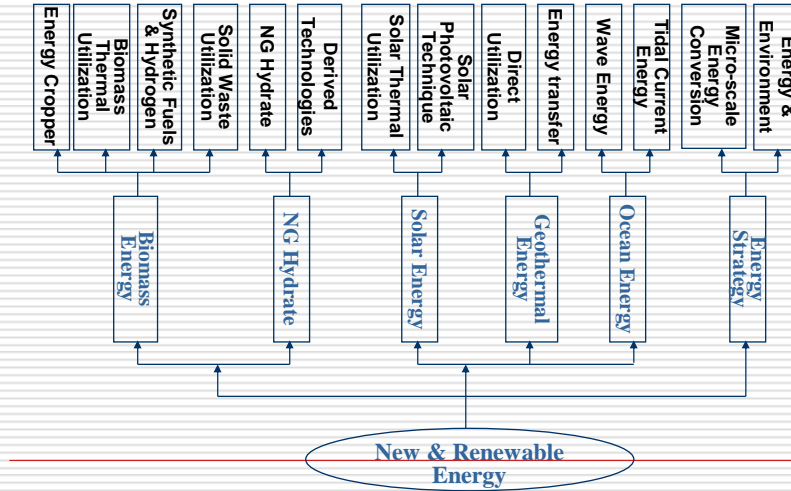
## History of GIEC

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- ❑ Founded in 1978, the Chinese Academy of Sciences
  - ❑ 1998, the institute was determined as the base institute of high technology R&D of Chinese academy of sciences
  - ❑ June 2001, GIEC entered into the [pilot project of knowledge innovation program\(KIP\)](#)
  - ❑ state-run high-tech institute in the field of clean energy engineering science. Biomass, solar energy. Ocean energy, natural gas hydrate etc.
  - ☞ Extensive international co-operation and academic exchange, with Japan, the United States, European Community, Egypt, Hong Kong, Taiwan.
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## R&D Fields of GIEC





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## Energy Strategy Research Center

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**Think tanker:** national research organization conducting comprehensive studies on China's energy issues , provide policy advise to centre government and local government.

**Market bridge:** technology assessment and technology transfer, help to finance project using CDM mechanism.

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## Energy Strategy Research Center

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### Energy planning and policy advisor

- Consultancy on strategy of energy technical-line
- Consultancy on energy development plan in regional level
- Development of new methodology related to strategy research

### Energy process assessment and optimization

- Life-cycle Assessment
- Energy Auditing
- Design of EE indicators

### Climate change and low carbon

- Consultancy on CDM projects
    - Develop cooperation with EU on research & business of CDM
    - Initiate action to promote CDM project development in co-operation with industries and government
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## Energy Strategy Research Center

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### Energy planning and policy advisor

We offer specialist skills in renewable energy sector policy development. We have a sound knowledge of the GB energy market and deliver expert advice to Government departments and the Regulator on deploying a more efficient framework to support renewable energy. This includes the development of financial and fiscal support measures to support the deployment of renewable technologies and the strengthening of market mechanisms to foster renewable development and EE improvement

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## Energy Strategy Research Center

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Energy planning and policy advisor ----Experiences  
Example

Chinese Energy Strategy Study on Middle-Long Term Petroleum  
Complement and Replacement: Biomass Energy Part. CAS  
Chinese Energy Sustainable Development Major Issue Study, CAS  
Research on Renewable Energy Scale-up Technical Approach and  
Development Strategy , MOST  
Technology Prospect in 20 years, Renewable Energy Part  
Strategy research on penetration of energy conservation  
technologies utilizing CDM instrument, Guangdong SETC  
Roadmap of renewable energy development in Guangzhou  
Municipal area, Guangzhou SETC  
China-US partnership to promote large scale renewable energy  
development, consultancy project  
China-EU energy policy development: Synergy Programme, EC



## Energy Strategy Research Center

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### Energy process assessment and optimization

Study on the theory and methodology of rational arrangement and utilization of energy resources including key energy conservation strategy and energy conservation planning, as well as policy and measures for promoting energy saving and energy efficiency.

Assist government agencies to design and implement energy saving projects and programs. Provide guidelines to assess energy saving projects and auditing.

We conduct assessment of different technologies based on life circle assessment method and work out objective advise to clients

Predict energy demand and supply in one given area and give optimization of its energy planning.

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## Energy Strategy Research Center

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Energy process assessment and optimization ---  
Experiences

Lifecycle Assessment of Power Generation Technologies from  
Selected Agriculture and Forestry Biomass , World Bank

The evaluation Index System of Energy Conservation and the  
Management Mechanism of Energy Efficiency.2006,SETC

A Joint Sino-Belgium project on energy savings in buildings by  
combined dynamic thermal simulations and energy management  
systems , MOST and Belgium

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## Energy Strategy Research Center

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### Climate Change and low carbon

Raising public awareness on climate change and low carbon economy

Conduct research on China and Guangdong local strategy to adapt the global climate change and low carbon economy shift.

Mechanism design on how to effectively promote the emission trading programme in Guangdong regional area .

Help Guangdong enterprise to develop CDM project to get more financing.

Formulate institutional policy to develop low carbon society in Guangdong in areas like building, transport, industries.



## Energy Strategy Research Center

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### Climate Change and low carbon---Experiences

Sustainable Energy Technology at Work: Thematic Promotion of Energy Efficiency and Energy Saving Technologies in the Carbon Markets EU FP7

Strategy research on penetration of energy conservation technologies utilizing CDM instrument , Guangdong DRC

CDM capacity building programme in south china , DEG, GTZ

EU-China partnership in CDM implementation, EU Synergy

China-Netherlands CDM Promotion Programme.

Low carbon demonstration city in Guangzhou, WWF

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## **Our experience in CDM field**

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- ☞ **CDM Capacity building from 2003.**
  - ☞ **2003.6-2005.8 EU Synergy Programme: EU-China CDM partnership in implementation of CDM Projects. ERI, Germany, Italy, the Netherlands etc.**
  - ☞ **2003-2004 CDM Capacity building with Sichuan University, DEG, TUV, Germany.**
  - ☞ **2005, CDM Project financing and UK's mission workshop organized by GIEC, General consulate of British in Guangzhou etc.**
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## Our experience in CDM field

**Launching of Guangdong CDM Centre 01/18/2008**



## **Our experience in CDM field**

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- Jinan Iron and steel plant BOG and COG for combine cycle power project ( 2.77 million tco2e , EB approved )
  - Jiangsu Rudong 24MW biomass power project ( 102,863t DNA Approved)
  - Guangdong Zhanjiang 49.5MW wind projects ( 97,836 t,EB Request for registration)
  - Jiangsu Dongli 120 MW wind farms ( 135 thousand tco2e , PDD developed )
  - Jiangsu Julong Cement WHR ( 6 3 thousand tco2e、 developing )
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## Our experience in CDM field





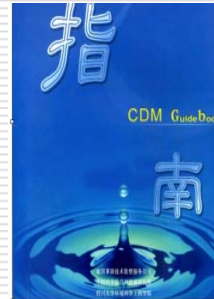
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## Our experience in CDM field

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Act as independent CDM consultant, we provide services to

- One Iron & Steel Plant
- One Cement Plant
- One direct biomass combustion power generation plant





**Thanks for Your Attention !**

**Look forward to any  
further cooperation in  
CDM.**



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