China: Energy Policy Issues and Challenges to upcoming 13th Five year

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# Outline

- Energy situation
- Review on 12<sup>th</sup> 5-year
- Issues and Challenges to upcoming 13<sup>th</sup> 5-year

# Energy situation

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### China: Energy consumption and Carbon emission(BT)



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# **Energy fuels**

- Coal(BT): 1.4(2000), 37(2013)
- Oil dependecy: over 58%
- NG (BT m3): 24.5 (2000), 160(2013)



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#### Why Energy Consumption Grows Fast Economic Development GDP growthrate Energy Intensive Industry Steel: 128.5Mt (2000) \_\_\_\_\_ 700Mt(2013) Cement: 597Mt(2000) 2400Mt (2013) World Manufactory Transportation Sector Vehicle: 20 Million Commercial/Residential (Building) Sector New Building: about 2 Billion m<sup>2</sup> Heating Zone: North Yellow River South Changjiang River Cooling Facilities: 30%~40% of Peak Load Hot water supply Appliances: refrigerator, TV, lighting, … 国家发展和改革委员会能源研究所 **Energy Research Institute**

# More Challenges in the Future

- Per-capita GDP: 6000USD, very poor
- Per-capita car, building, electricity .....
- Per-capita energy consumption
  - World average level
  - ½ of EU
  - 1/4 ~ 1/5 of USA
- China dream
- Energy consumption of China will still increase

# More Challenges in the Future

- More challenges in the future
  - Energy Resource Limitation, Energy Safety
  - Environmental Pressure
    - Regional Environment
    - Global Climate Change
- China must CREATE a more sustainable pathway than Japan
  - Change Developing Pathway: "World Scientific Park" NOT "World Plant"
  - Energy Efficiency and Conservation
  - Renewable Energy
  - Low carbon (green) development

# Review on 12th 5-year: Target, Policy&Action, Achievements

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# EE &LC Target

2005-2010: Energy Intensity reduce about 20%

#### 2010-2015

Energy Intensity reduce about 16% (mandatory)

- Carbon Intensity reduce about 17% (mandatory)
- Non-fossil energy share 11.4% (mandatory)
- Energy Cap in 2015: 4 billion TCE
- China LC target: 2020 Carbon intensity reduce 40%~45% by 2005 (Int. commitment)

# Highly Priority on EE&LC

- National Principles
  - Energy resource conservation
  - Environment protection
- National leading group presided by Premier
  - Climate change and EE & waste emission reduction
  - Energy council
- Eco civilization
  - Green development
  - Recycle development
  - Low carbon development
- EE&LC performance assessment on local governments and major enterprises
  - Local governments
  - 16000 major enterprises

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# Key Policy Documents (2010-2015)

#### State Council

- GHGs emission control scheme
- Energy Efficiency and emission reduction plan
- Renewable Plan
- Energy Plan

#### Sectoral

- Industry
- Building (Commercial/Residential)
- Transportation
- Public (governmental institution)

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# law, standard & labeling

#### Laws

- Energy Conservation Law (2007)
- Renewable Energy Law (2006)
- Recycling Economics Promotion Law (2008)
- Building Energy Efficiency Act (2008)
- Public Agency Energy Efficiency Act (2008)
- Standards
  - Industry: Energy Consumption Limitation of about 30 industrial products project
  - Building
  - Commercial/Residential: Appliances
  - Vehicle
- Labeling
  - Appliances: AC, Refrigerator ...
  - Vehicle
  - Building

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# **Adjust Industrial Structure**

- Green and low carbon development:
  - Improve service sector
  - Develop industries with high tech and added-value

#### New projects

- EE Appraisal
- Environment protection Appraisal
- Existing projects
  - Enhancing technical retrofit
  - Wash-out existing energy waste Producing Capacity

### **Adjust Industrial Structure**



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# **Economic and Incentive Measure**

#### Energy Price

- Oil price (with tax)
- Electricity price (real time price, electricity price base on different industry, laddering price)
- Heating price
- RE awards price
- .....
- Taxation reduction
  - Resource saving products added-value tax
  - Enterprise in-come tax which produce or use EE technology

# **3 Economic and Incentive Measure**

#### Fiscal subsidy

- EE Special Financial Fund:
  - Central:
  - Local:
  - Ten Key Energy Conservation Programs: Boiler, motor, waste heat recovery, CHP, overall EE retrofit, BEE, green lighting, Public Agency Energy Efficiency, EE capacity building
- Awards to Energy Conservation Retrofit Projects: 240~300 Yuan RMB/ tce of energy saving capacity
- Subsidy on Residential building & heating system Energy Conservation Retrofit Projects : Envelope, heating metering
- Subsidy on Energy Efficient Products: Air conditioner, EE and RE vehicles, efficient lighting...
- Subsidy on Renewable Energy Application: Heat Pump, Solar heater/PV, Wind power …

# Market Mechanism

- Esco market: more than 3000
- Carbon trading market: 7 pilots
- Top-runner Programme

### Pilots

- Carbon trading pilots: 7 provinces and cities
- Low Carbon pilot cities: 42
- Low Carbon Industrial Parks: 55
- Low Carbon residential communities: 1000
- CCUS pilots

# **Capacity Building**

- Government agency
- EE supervision center
- EE center
- ESCO market
- The third party market
- Energy management system of enterprises
- MRV of energy and carbon emission

#### National EE week, National low carbon day

#### Achievements

# Energy Density reduce19.1% during 2005-2010 Carbon Density reduce 28% during 2005-2013



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#### Achievements

Technical achievements :

- Electricity (gce/kWh): 370 (2005), 325 (2012)
- Steel&Iron (kgce/t): 694 (2005), 598 (2012)
- Cement (kgce/t): 126 (2005), 102 (2012)

Renewable energy (2013)
Non fossil energy share 9.8% in energy mix
Wind power: 75.48 GW (No. 1 in the world)
Solar PV: 14.79 GW

# Issues and Challenges to upcoming 13th 5-year

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# General outlook on upcoming 13th 5-year

#### Domestic situation

- Double per-capita GDP during 2010-2020
- Economic structure transformation with middle growthrate
- Acceleration of urbanization
- Eco civilization and regional environment pressure
- Energy supply and consumption revolution
- Clean and low carbon energy mix
- Institutional reform
- International situation
  - 2020 GHGs targets and more pressure
  - Global macro economic situation
  - Uncercentainties of geopolitics
  - New opportunities for international cooperation

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### Energy issues to upcoming 13th Five year of China

- Targets
  - Higher than 40-45 low carbon target ?
  - Energy and carbon emission
    - Intensity target
    - Cap control ?
  - PM2.5 and other pollutants

Energy issues to upcoming 13<sup>th</sup> Five year of China

#### Demand side

- Industrial sector
- Building sector
- Transportation sector

#### Supply side

- Control coal, increase NG
- Promote renewable energy
  - Hydro, wind, solar, nuclear?
- Energy safety and international cooperation

# Energy issues to upcoming 13<sup>th</sup> Five year of China

### Policy reform

- Market
  - Energy price optimization among different fuel
  - Carbon tax, environmental tax, oil tax...
  - Carbon trading
  - Incentive policy: measure based to performance based
  - Energy market reform
- Mandatory
  - Local government
  - Enterprises
- Legislation
  - Legislation implementation and supervision
  - More punishment
  - MRV

### Energy issues to upcoming 13<sup>th</sup> Five year of China

#### Key energy technology

- Waste heat utilization (for heating or power)
- Efficient heat pump
- New energy cars
- Green building
- Green lighting
- Energy storage
- Intelligent grids
- Unconventional energy: coalbed gas, shale gas, …
- RE energy: wind, solar, biomass fuel, nuclear...

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