Building Pathways to Greener Growth: A Practitioners' Workshop

China's Practices and Challenges on Green Development

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Novotel Hotel, Bogor, Indonesia
June 3-4, 2013

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- **Progress of Sustainable/Green Development in China**
- **China's 12th Five-Year-Plan**
- **Conclusions**

Government actions: Milestone to sustainable/green development

- 1992: Sign *Rio Declaration* in the UNCSD
- 1994: Release *China's Agenda 21*
- 1996: Set sustainable development as a national strategy
- 1999: Launch key Ecological Restoration and Environmental Infrastructure programs
- 2006: Mandatory Target-Driven Strategy on energy efficiency and pollution reduction
- 2011: **Green and low-carbon development**
- 2013: Eco-civilization construction

Experience and lessons learnt during 2001-2012

- **System innovation to green transition and development**
  - **Theory: new development ideas**
  - **Policy and measures: comprehensive plans, policies and instruments**
  - **Technology: R&D, pilot and scale up**
  - **Management: integration approach, financing, business model, etc.**

Practice 1: New development idea

- 2002: New industrialization path
- 2003: Scientific development concept / balanced development: pay more attention to sustainable development
- 2004: Resource-Efficient and Environment-Friendly Society (REEFS) and Circular Economy (CE)
- 2005: Harmonious Society including man and nature relationship; Innovation-oriented country
- 2006: Energy efficiency and pollutants reduction
- 2007: Ecological civilization
- 2009: Green and Low carbon development
- 2011: Transformation of economic development pattern: green-leading in some extent

Practice 2： Comprehensive plan system and targets making

- **National Five-Year Plan (FYP): 11th FYP (2006-10)**
  - **Long-term strategy: realize the new development approach**
    - ✓ **Comprehensive instrument (legislative, administrative, economic, tech)**
    - ✓ **Growth pattern transition and structural adjustment**
    - ✓ **Innovation orientation**
  - **Mandatory targets approach: energy efficiency and pollutants reduction centered**
  - **Legally binding domestically**
- **Sectoral plan:** such as energy efficiency, renewable, pollution reduction, new energy vehicles, green industry
- **Local FYP**
- **Action plan and comprehensive implementation program**

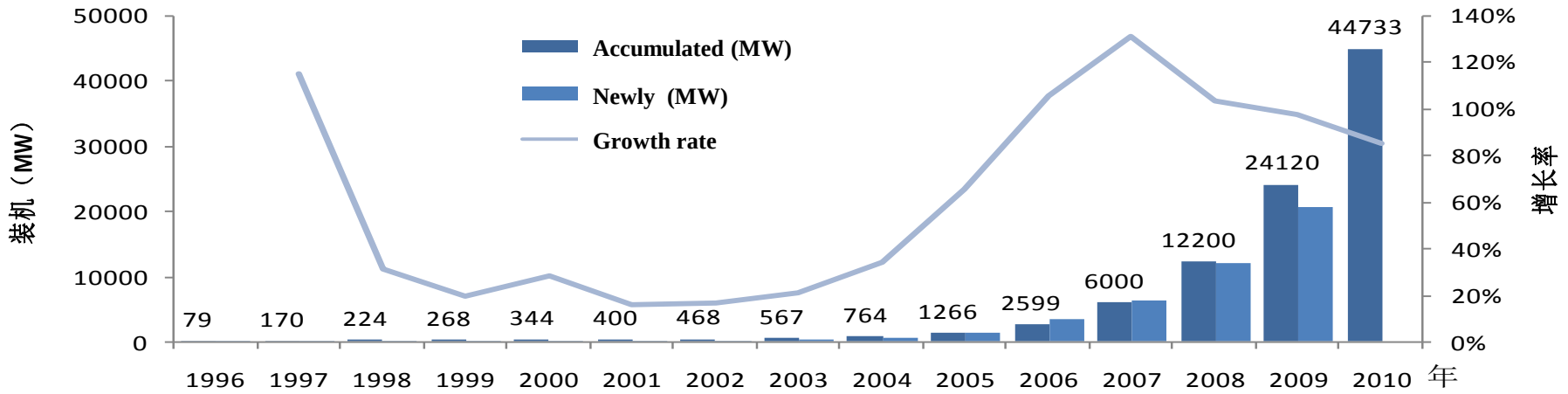
Practice 2: comprehensive measures adopted

- **Legislation framework**
  - Energy conservation law
  - Renewable energy law
  - Circular economy promotion law
  - Energy law and Climate law in progress
- **Reform of management system:**
  - establish climate management department
  - mega ministry reform
  - Governance improvement
- **Administrative measures**
  - Target-based responsible system
  - Green investment programs, etc.
- **Economic instruments: green tax, ecological compensation, etc.**

Practice 3: R& D -- wind power

- Renewable Energy Law and Supportive Policy and Regulations
- 29.6 GW in 2010 (grid-connected), annual growth rate at 94.75% in 2006-2010; No.1 installed capacity in the world
- 200 GW or more in 2020 (target: 30 GW by plan in 2007)
- 80 companies for system production, localization rate of 1.5MW at 70%

➢ high annual growth rate and potential over-capacity



Innovation and Technology Roadmap to 2050

Source: *Energy Science & Technology in China: a roadmap to 2050*,Science Press/ Springer, 2009

Practice 4: Pilot and scale up: best practice and mass application

- **Pilot first**
  - Sustainable Development Demo Zone (MOST)
  - Circular economy: province/city, park, sector, enterprise (NDRC)
  - Industrial base of new industrialization, REEF enterprise (MIIT)
  - Ecological industry park (MEP)
  - Energy and emissions inventory, low carbon development, and ETS pilot at urban and provincial levels (NDRC)
- **Mass application**
  - Ecological restoration programs
  - pollution control
  - Energy efficiency
  - Electric vehicles: BEV, Plug-in hybrid EV, Fuel Cell EV
  - Renewables: hydro, wind power, solar PV, and others

Practice 5: Management and Business Model

- Innovative financing (VC, PE, etc.)
- Industrial innovation alliance/partnership
- Business model: PPP, such as BOT, BTO, TOT, etc.
- Create a green market
- Management system reform/restructuring
- Green industry/product standards

Comprehensive outcomes achieved

- Plan targets achieved
- Awareness increase
- Capacity building, such as energy statistics, institutional arrangements, and management
- Policy package
- Tech innovation and green industry development

➢ Learning by doing

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Framework of the 12th FYP (2011-15)

- The 12th FYP outline: released
- Key and Special plans: 18
  - Green-related:
    - ✓ emerging strategic industry;
    - ✓ industrial transformation and upgrading;
    - ✓ industrial distribution and adjustment;
    - ✓ modern service industry;
    - ✓ renewable development;
    - ✓ energy conservation and pollution reduction;
    - ✓ comprehensive transport;
    - ✓ water conservancy;
    - ✓ capacity building for innovation ;
    - ✓ urbanization, information, etc.
- Sector-based plans:78
- Local FYPs

Key messages from the 12th FYP

- **Theme: scientific development / balanced development**
- **Main thread: accelerating transformation of the economic development pattern**

- ***Key points:***
  - ✓ **Combination of development and transformation**
  - ✓ **Integration of green and low-carbon concept into economic development**

- ***Green Development:***
  - ✓ **Building the Resource-Efficient and Environment-Friendly Society**
  - ✓ **Strengthening mandatory target-driven approach and march policy**

Green targets increase during 2011-15

- **Green targets: 7 types with 12 targets (11 mandatory targets)**
- **Mandatory targets:**
  - **Energy intensity, 16% ↓**
  - **Carbon intensity, 17% ↓**
  - **Share of non-fossil energy, reach at 11.4% (8.3% in 2010)**
  - **Pollutant reduction:**
    - **COD: 8%↓**
    - **SO_2: 8% ↓**
    - **NH_3-N: 10% ↓**
    - **NOx: 10% ↓**
    - ***$PM_{2.5}$: ? ↓, new target for long-term, build monitoring system first, but not in the FYP***

Green targets of the 12th FYP

- **Mandatory targets (cont'd):**
  - **Arable land: keep the area at 1.2 Bn ha.**
  - **Forrest increase:**
    - ✓ **forest cover: reached at 21.66% (20.36% in 2010)**
    - ✓ **timber stock volume: 600 Mn M^3 ↑**
  - **Water use per unit industrial value-added : 30 % ↓**
- **Predicted targets:**
  - **Agricultural irrigation coefficient: reach 0.53 (0.5 in 2010)**
- **Other targets considered:**
  - **resources productivity: 15% ↑**

Green targets of the 12th FYP

- **Renewables:**
  - **Hydro power: 290 GW**
  - **Wind: 100 GW (grid-connected; 5 GW off shore)**
  - **Solar: 21 GW**
  - **Biomass: 50 Mtce**
  - **Solar heating: accumulated at 400 Mm^2**
- **New energy vehicle:**
  - **500,000 accumulated sale in 2015 (battery electric vehicle and plug-in hybrid vehicle, ambitious)**
  - **Fuel economy: 6.9 l/100km for passenger vehicle**

Green targets in 2020

- **Mandatory targets:**
  - **Carbon intensity, 40-45% ↓(2005-2020)**
  - **Share of non-fossil energy, 15% (target in 2015: 11.4%)**
  - **Forest area: 40 Mn ha. increase (2005-2020)**
  - **Timber stock volume: 1.3 Bn m^3 increase (2005-2020)**
  - **Pollutant reduction: no target to date**

Incremental policies during the 12th FYP

- **Transformation of economic development pattern and Regulating economic growth rate at 7%**
- **Develop the emerging strategic industries, 7 at national level, 3 related to green sectors:** GDP share: around 8% in 2015, 15% in 2020
  - energy conservation and environmental industry (including circular economy)
  - renewable energy
  - energy-saving and new energy vehicles (battery, plug-in hybrid, fuel cell)
  - ***Provincial emerging strategic industries***
- **Two regulations:**
  - low-carbon product standard, labeling and certification system;
  - carbon emissions statistical and accounting system

Incremental policies during the 12th FYP

- **Control of total energy consumption rationally (Beijing and Tianjin demo for total coal consumption control)**
- **Establish carbon trade market gradually**
- **Plan of major function-oriented zoning** (optimized, prioritized, limited, and banned development) with regional policy
- **Incentive policies**
  - Financial transfer and special programs locally
  - resources tax reform
  - eco-compensation and regulation
  - environmental tax, carbon tax? (with taxation neutral)
- **Total investment estimated:** *over ￥2000 Bn RMB yuan for green*

Implementation of the 12th FYP

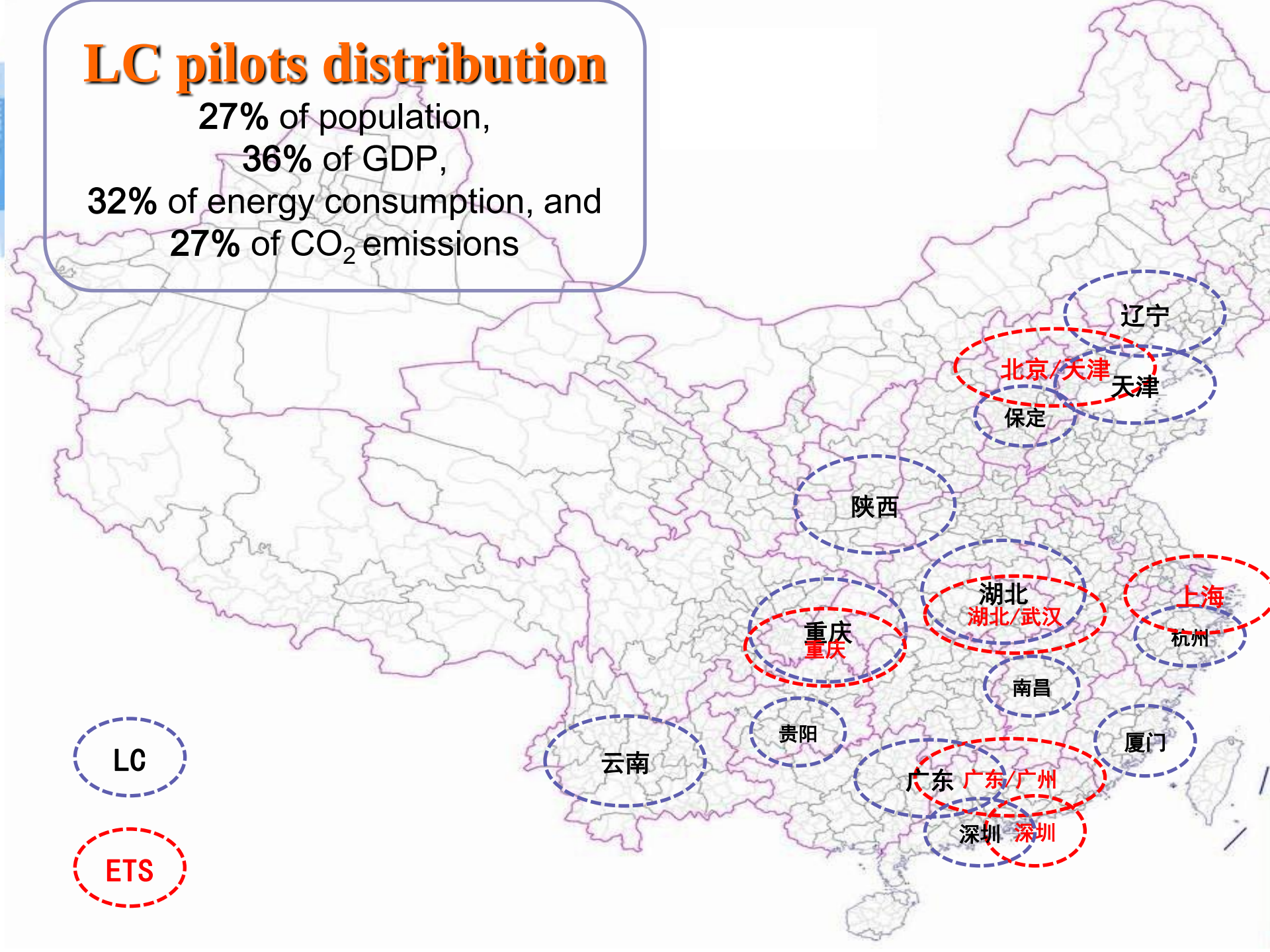
- **A comprehensive implementation program, released in August 2011** (12 aspects and target allocation by provinces)
- **Investment on R&D&D:** more than that in 11th FYP period (over ￥10 Bn yuan by national S&T plans during 2006-10)
- **Establishment of industrial innovation alliance,** such as EV, CCS
- **Setting sectoral roadmap and prioritized products and technologies**
- **International Science and Technology Cooperation Program on New and Renewable Energy** (by MOST & NDRC in 2007)

Energy Intensity Target Allocation by province

	Provinces	Energy Intensity
Type 1	Shanghai, Tianjin, Jiangsu, Zhejiang, Guangdong	18%
Tape 2	Beijing, Hebei, Liaoning, Shandong	17%
Type 3	Shanxi, Jilin, Heilongjiang, Anhui, Fujian, Henan, Hubei, Hunan, Chongqing, Sichuan, Shaanxi	16%
Type 4	Inner Mongolia, Guangxi, Guizhou, Yunnan, Gansu, Ningxia	15%
Type 5	Hainan, Xizang, Qinghai, Xinjiang	10%

LC pilots distribution

27% of population,
36% of GDP,
32% of energy consumption, and
27% of CO_2 emissions



Potential challenges, uncertainty and difficulty during the 12th FYP

- **Keeping high economic growth vs structural adjustment/development model transition**
- **Demand increase and domestic consumption stimulation due to rapid industrialization, urbanization, improvement of quality of life, and dealing with export decrease**
- **Soli issue: Sector-based plan and policy conflict**
- **Prioritizing: balance among different environmental and development targets**
- **Management with changes, dynamic planning, risk management**

Potential challenges, uncertainty and difficulty during the 12th FYP (cont'd)

- **Systematic gaps: goals, tech, fund, roadmap, capacity building like statistics, management, etc.**
- **Command and Control measures dominated but high costs, economic incentives needed**
- **Development of green emerging strategic industries**
  - over-capacity of production
  - technology roadmap, system integration, march policy package, business model, human resource, and green or lead market
  - capacity building
- **SME's involvement for eco-innovation**
- **Trade dispute: wind, solar PV, etc.**

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Conclusion

- **Political commitments:** based on respective responsibility and capacity in an equitable context
- **Diversify models of green economy development based on equity principle and indigenous conditions**
- **New global green economy order:** conflict resolution of WTO and MEA, fight with protectionism, remove trade barrier, etc.
- **Green leadership: top-down with bottom-up, better governance**
- **Legally binding targets with comprehensive instruments**

Conclusions (cont'd)

- **Systems innovation is a key to green transition: integration of targets, tech, roadmap, financial support, institutional and policy arrangements, capacity building, business model, green market development, etc.**
  - Defining eco-innovation as a system
  - Adopting comprehensive approach and realizing co-benefit in many ways
  - Setting roadmap & priorities, taking concrete actions and learning by doing with no- or low-regret first, and mass application
  - Improving local capacity for green and low-carbon planning
- **Strengthening collaboration among academies and S-S cooperation based on some key platforms such as AASSA**

Thanks for your attention!

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GGKP Workshop: Building Pathways to Greener Growth

3-4 June 2013, Bogor, Indonesia