Climate policies in China: current development and prospective views

Jun Li

Journée de la Chaire de modélisation

17 novembre 2010

C.I.R.E.D. UNITÉ MIXTE DE RECHERCHE EHESS ET CNRS - UMR 8568

A false view: China does not care about Climate change

- Economic growth, poverty alleviation and improving people's welfare are top priorities in the policy agenda of the central government
- Environmental pollution reduction is one of policy priorities
  - 750 000 killed per year by pollution
- GHG issues have received serious attention of Chinese policymakers
  - In 2006, GHG control was included in the 11th FYP
  - In 2007, 'mitigation of and adaptation to CC' was inked in the *CCP 17th National Congress Report*
  - In 2007, National Leading Group on Climate Change was established, premier Wen Jiabao is the head (13 ministers and 8 administration directors)
  - In 2008, the politburo of CCP convened the 6th climate change programmes plenary training session
- National Climate Change Programme 2007 (outlines objectives, basic principles, key areas of actions, as well as policies and measures to address climate change for the period up to 2010.)

11th Five-Year Plan

Compulsory targets

- decrease of major pollutants (e.g. SO2) : emissions in 2010 should be 10% lower than 2005 level
- energy consumption per unit of GDP will be cut by around 20%
- water consumed per unit of industry value added will be reduced by 30%
- Forest cover reach 20% in 2010

Climate co-benefits of these policies over the 11th FYP period

- 190 million t-C reduction in 2010 compared with BaU
- 410million t-C reduction (approx Fr+Ger) compared with no intensity change

Current policies implemented are mainly energy security and resource conservation oriented

- Security of supply : oil dependency exceeded 50% in 2007
- Restricting the '*lianggao yizi*' (*high*-polluting, *high*-energy-consuming and *resource*-dependent enterprises) development
- China has already imposed export tariffs on 56 types of energy-intensive products, about 10% higher than the suggested border adjustment tax in US and EU: control of industrial specialisation
- Tax on natural resources extraction and utilization; reduction in VAT rebates for EI products export

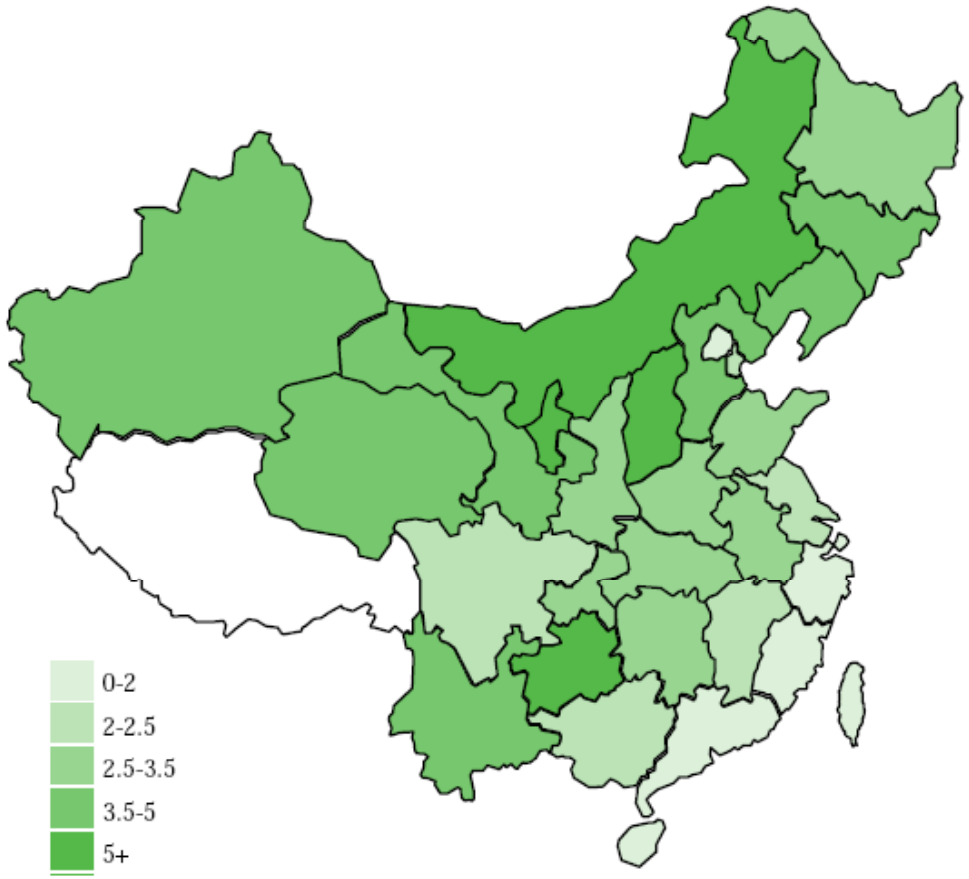
Environmental policies are primarily centralised and command-and-control

- 84 k energy-intensive and resource-wasting firms shut down (1996-2000). Plus 30 k small and inefficient firms shut down during 2001-2004, 1900 projects postponed; 2600 firms shut down in 2005.
- shutdown of 60 GW small units of inefficient power plants, 200 Mt of backward cement-producing capacity were phased out during 2006-2009
- Mandate of FGD installation in coal-fired power plants (85% of total generating capacity must be equipped by 2010)

Source: White Paper, China's Environmental Protection (1996-2005).

Pc Carbon intensity disparity across different regions

Figure 2.5 Carbon intensity in different provinces (2007)CO_2 tonnes per 10,000 yuan



Source: Data from China National Bureau of Statistics, 2008, "China Statistical Yearbook 2008", "China Energy Statistical Yearbook 2008," Beijing, China Statistics Press, adapted by Taskforce on NHDR 2009-2010, Renmin University of China.
Note: Data for Tibet were unavailable.

- Economic structure
-Technology
-Fuel type
- density
-Productivity
- development strategies

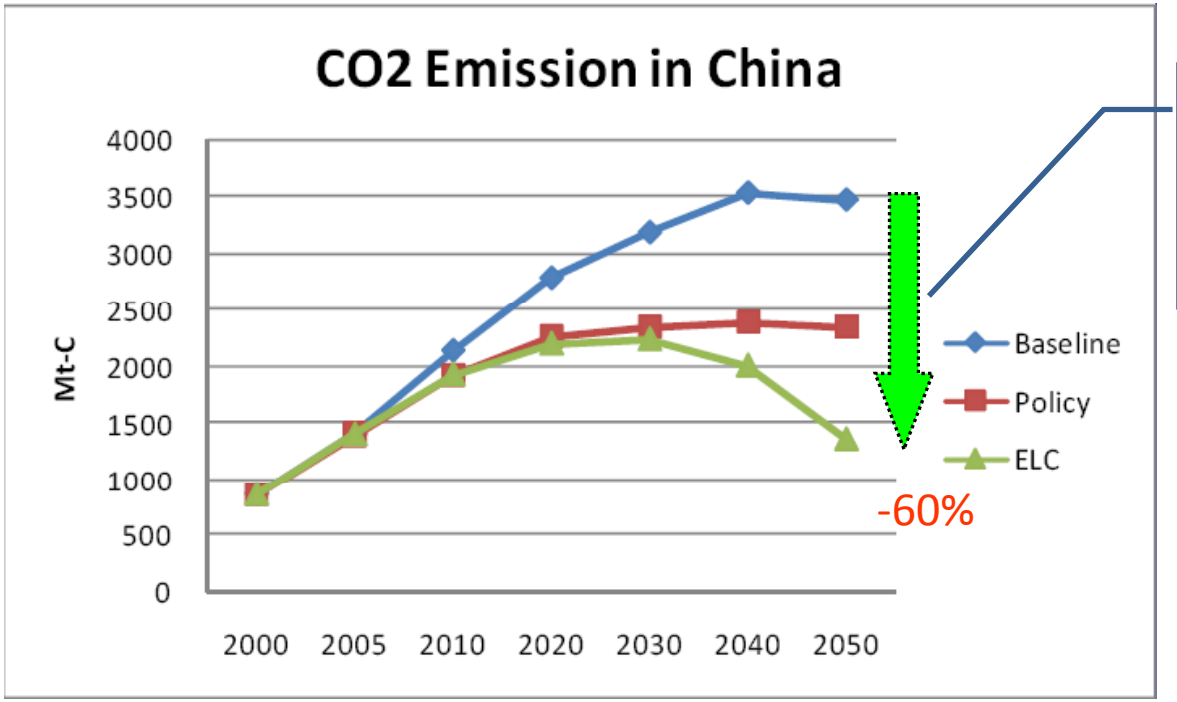
Economic convergence is a key driver to closing the carbon intensity gaps across regions

Source: China HD report 2010

Announced policies and proposals

- Announced climate goals
  - 40-45% carbon/GDP intensity reduction in 2020 relative to 2005
  - Non-fossil fuels: 15% of energy supply by 2020
  - increasing forest volume by 1.3 billion cubic meters and forest cover by 40 million hectares
- In March 2010, "promoting low-carbon economy in China" has been adopted as the 1st of 428 propositions submitted to the Standing Committee of the National People's Congress
- 8 'low carbon city/province' pilot programmes have been approved by NDRC as of August 2010
- Carbon tax (3 proposals) and Cap and trade already in pipeline and scheduled for the 12th FYP (2011-2015)

1. Results from NDRC-ERI(2009)



Emissions in ELC scenario will peak in 2030 and stabilise at 2005 level in 2050

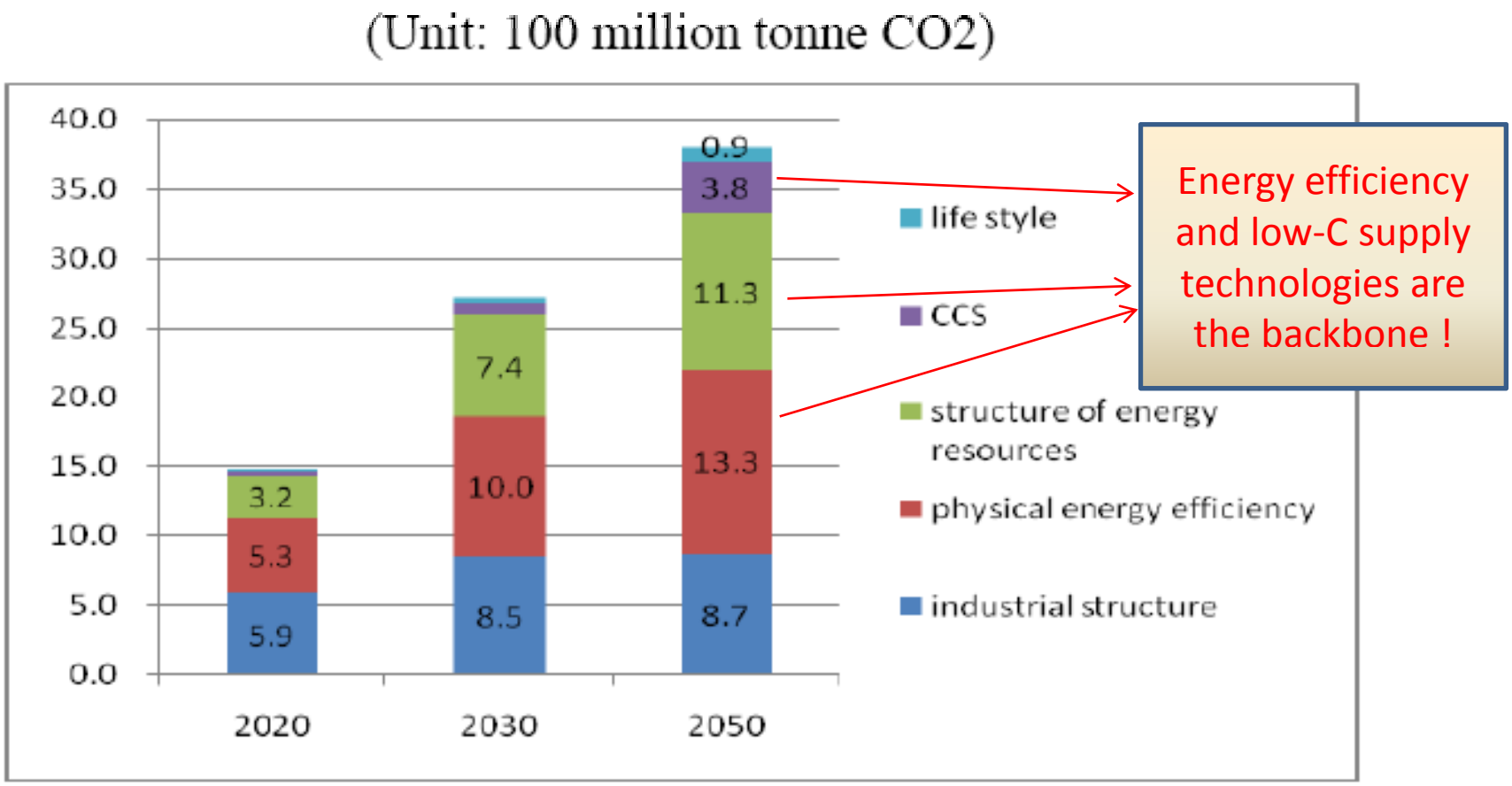
-TPES in LC scenario is reduced by 22% and 24% in 2030 and 2050, respectively

-Enhanced LC sees more than 60 % emission reduction compared with BaU in 2050

- emission in 2050 compared with 2005. BAU: +150%, Policy: +70%, LC: stabilise

-total investment required in the policy scenario is lower than BAU, whereas total investments in ELC is higher than either BAU and policy scenario

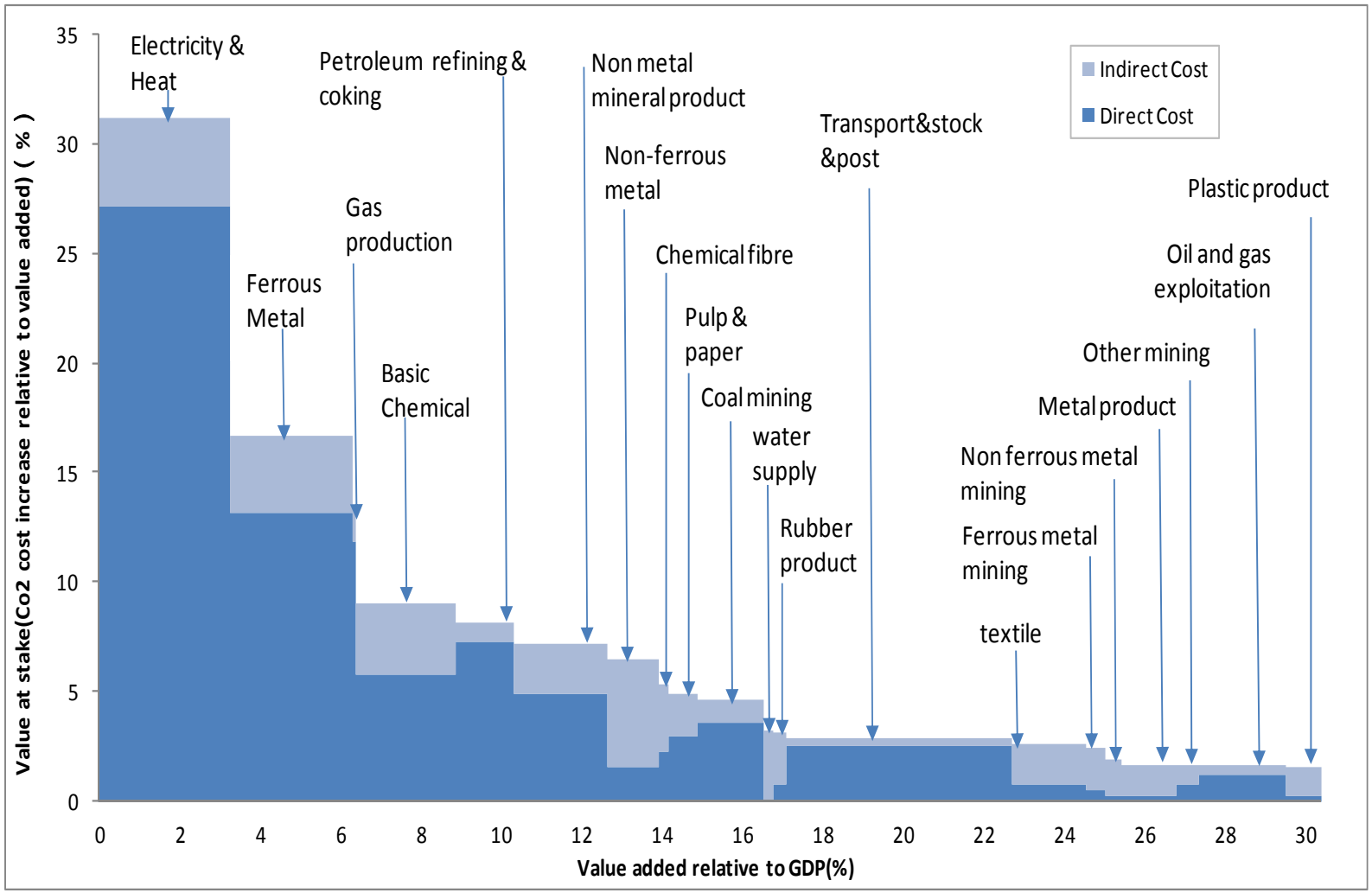
Contribution to emissions reduction under high growth low carbon scenario



2. Short-term impact of carbon tax

- Wang et al.2009 estimate the extent to which carbon tax levied on VA would affect sectoral output and economic competitiveness from the short term perspective
- With a higher carbon tax rate which is comparable to the international carbon prices, a significant part of industrial sectors would become vulnerable
- Sectors that produce 14-27% of GDP may be affected by carbon tax depending on which sectors have been considered

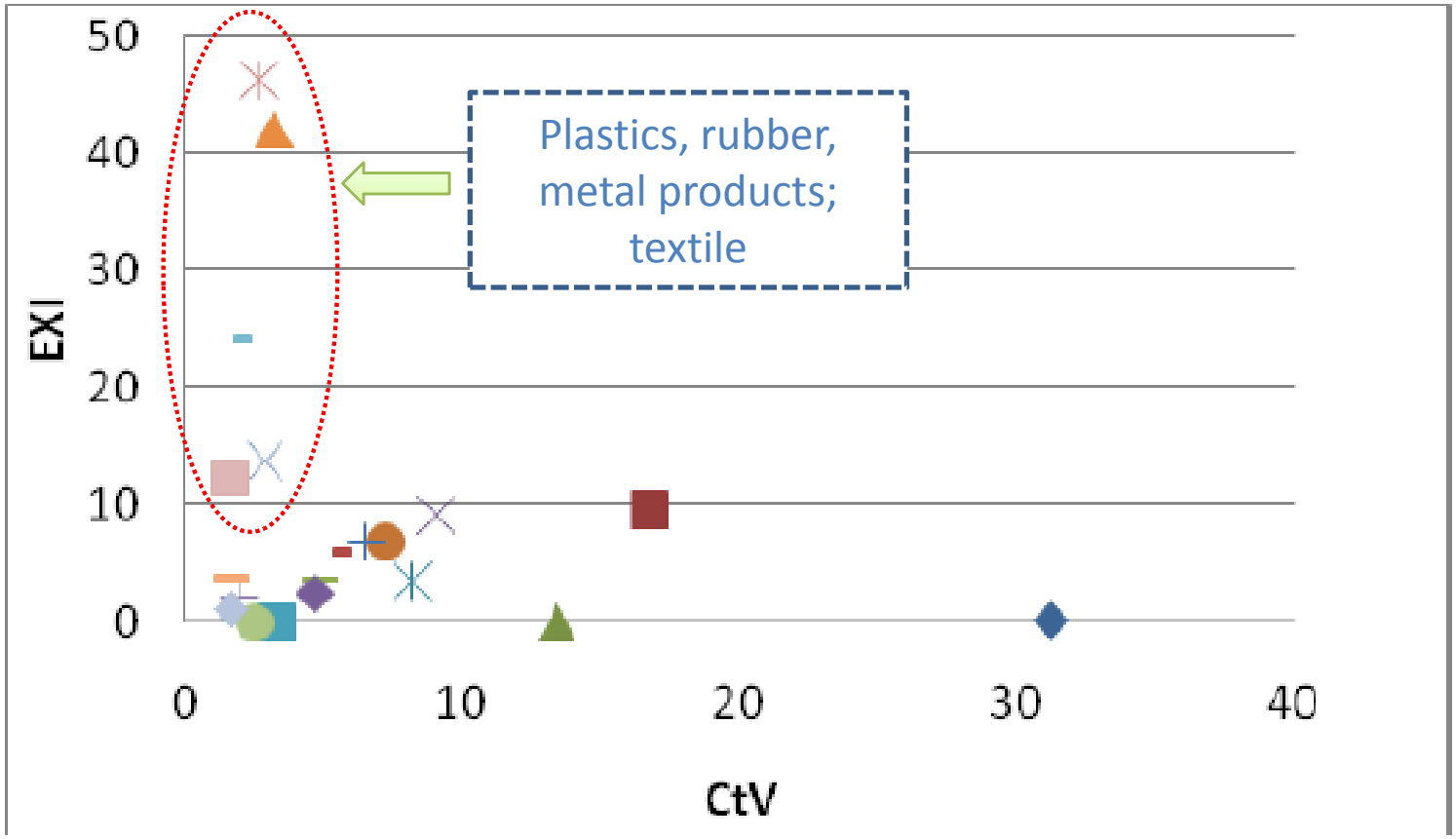
Short term sectoral impact if 100 Yuan/t CO2 (10 euro) is levied



As China's economic growth is still primarily replying upon energy intensive sectors , short-term impact of climate policy (e.g. carbon tax) may be significant

Source: Wang et al. 2010

Potentially affected export sectors



However, some low carbon-intensive sectors' competitiveness may be affected (with CtV>1.5% and EXI>10%) ; e..g Textile

3.Co-benefits of GHG mitigation

- Hidden or ancillary benefits of climate policies in China (Induce switch to cleaner fuels)
  - Public health, land use and ecosystem
  - Reduction in PM, NOx, SO_2 and as well as other environmental damages
- Climate policies would have positive impacts on economy if these co-benefits were taken into account

Hybrid (integrated) modelling exercise

- Cao et al.(2008) use a hybrid modelling approach to quantify the co-benefits of GHG mitigation in China
  - Combining a dynamic recursive CGE with a BU electricity sector model
  - Solving dual problem (maximisation of profits in TD and minimisation of costs in BU)
  - Iteration technique is used to ensure the consistency between TD and BU models
  - Intake-fraction coefficients estimated from atmospheric pollution dispersion model ; D-R function to estimate damages coupled with CVM (WTP)

- Three types of tax (revenue neutral assumption) are simulated : fuel tax, carbon tax and output tax
  - Output tax rate is set at 100% marginal damage per Yuan output
  - Fuel tax rate is set at 30% of average damage per Yuan of fuel use
  - A value-added carbon tax (based on carbon content of fuel)is set at 50 yuan/ yuan of carbon consumption

Double dividend of climate policies!

source :Cao et al. (2008)

Variable	Carbon tax		Fuel tax (average marginal damages of fuel use)		Output tax (sectoral marginal damages)	
	Effect in 1st year	*Effect in 20th year*	*Effect in 1st year*	*Effect in 20th year*	*Effect in 1st year*	*Effect in 20th year*
GDP	+0.11%	+0.56%	+0.08%	+0.55%	+0.23%	+0.91%
Consumption	-0.01%	+0.09%	-0.05%	+0.04%	+0.10%	+0.33%
Investment	+0.10%	+1.02%	+0.03%	+1.02%	+0.10%	+2.13%
Coal use	-11.34%	-2.99%	-10.6%	-5.2%	-2.33%	-0.68%
Carbon emissions	-9.37%	-2.38%	-8.2%	-3.5%	-1.98%	-0.50%
Primary particulate emissions	-5.73%	-2.49%	-5.4%	-3.6%	-2.75%	-3.08%
SO_2 emissions	-8.70%	-0.49%	-7.8%	-1.4%	-2.28%	-0.69%
NOx (transportation)	-1.76%	-1.58%	-0.72%	-0.73%	-2.99%	-6.28%
Value of health damages	-9.55%	-3.27%	-9.0%	-4.9%	-2.04%	-1.13%
Change in other tax rates	-2.63%	-2.63%	1.9%	2.4%	-7.12%	-15.19%
Reduction in damages/GDP	0.16%	0.11%	0.15%	0.15%	0.03%	0.03%
Pollution tax/Total tax revenue	2.41%	2.04%	1.7%	1.8%	7.15%	13.72%

Summary

- Even with ambitious policy targets, emissions in China will still increase over the next decades
- Need of reconciling economic development goals and climate change mitigation
- Appropriate public policies are needed to facilitate the transition to low carbon development pathways (infrastructure, social security system, health, retirement etc)

Way forward

- Comprehensive policy measures should be adopted to minimise negative impacts (carbon tax, CAT, industrial restructuring…)
- Improve energy efficiency and optimise economic structure with scaled deployment of renewable energy
- Use policy instruments to orient lifestyle, energy price reform to reflect better scarcity and externality
- Increase carbon sink by afforestation/reforestation and reduce deforestation
- China is interested in international co-operation in climate change , finance and technology transfer (e.g. NAMA scheme)
- Cancún COP and policy coherence beyond Kyoto