



气候变化对中国就业的影响 — “中国低碳发展与绿色就业实证研究”

Key Findings of “Low Carbon Development & Green Jobs in China”

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基本概念：低碳发展

Key Concept: Low Carbon Development

- **To achieve low carbon development :**
 - improve energy structure
 - increase energy efficiency
 - achieve low carbon industry structure
- **Indicators to measure low carbon development**
 - carbon emission level (consumption of fossil fuel energy)
 - energy efficiency or carbon productivity
(energy consumption per GDP or carbon emissions per GDP)



基本概念：绿色就业 & 低碳就业

Key Concept: Green Employment & Low Carbon Employment

- **Green Jobs**

jobs that can reduce the environmental impact of enterprises and economic sectors, ultimately to levels that are sustainable

(ILO)

- **Low carbon employment(clean jobs)**

jobs that can promote enterprises and economic sectors to reduce consumption of fossil fuel and carbon emission so as to mitigate climate change



基本概念：直接就业 & 间接就业

Key Concept: Direct Employment & Indirect Employment

- **Direct Employment Effect**

employment related to the increase in the output of goods for
a specific sector.

- **Indirect Employment Effect**

employment related to an increase in the input of goods from the suppliers of that sector, with a rippling effect through the supply chain.

- **Induced Employment Effect**

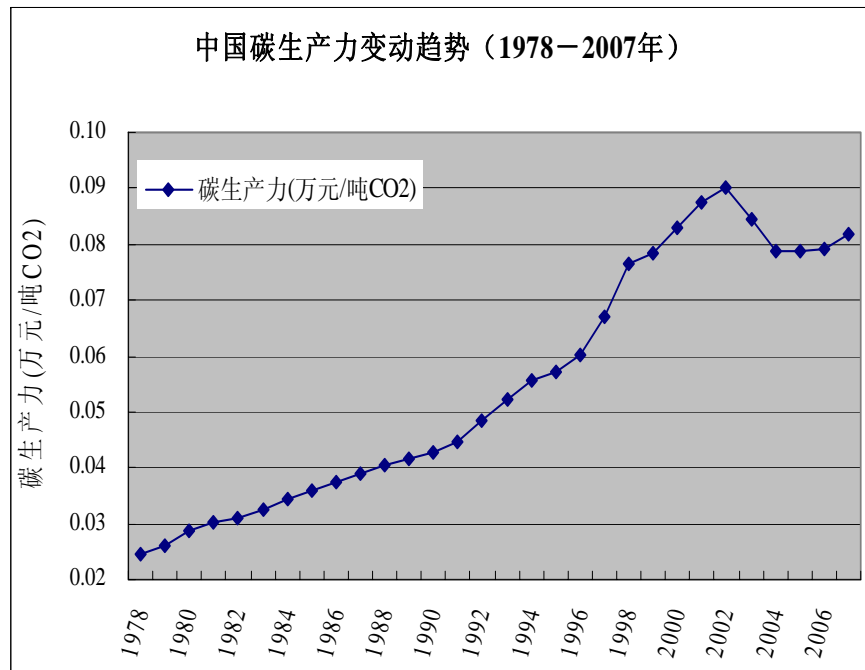
as a result of these supply chain effects and an increase in income in the economy, employment related to the spending of that increased income.



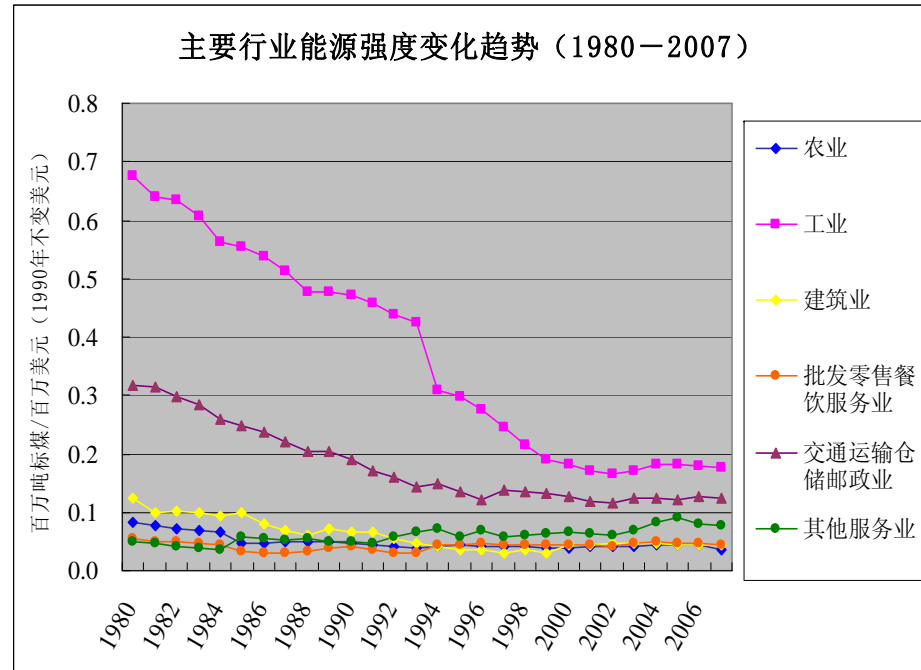
实证研究：宏观分析

Empirical Evidence: A Macro-economic Analysis

中国碳生产力及主要行业能源强度的变动趋势



**Carbon productivity in China
from 1978~2007**



**Energy intensity in Major industries
in China (1980~2007)**



中国主要行业的碳就业率比较

Comparison of Carbon Employment Rate of Major Sectors

行 业 Sector	碳就业率(人/吨CO ₂) Carbon Employment Rate (Jobs per tons of CO ₂)
总 计 Total	0.56
第一产业（农林牧渔业） (Primary Industry)	28.58
第二产业 (Secondary Industry)	0.14
工业 basic industry	0.08
采矿业 mining	0.08
制造业 manufacturing	0.15
电力、燃气及水的生产和供应业 Power, gas, water production & supply	0.01
建筑业 construction	12.25
第三产业 (Tertiary industry)	15.67
交通运输、仓储和邮政业 Transport, storage and post	4.02
批发和零售、住宿和餐饮业 Retail, wholesale, lodging and catering	11.26
其他服务业 other service industries	27.77



中国低碳发展的总体趋势

General Trend of China's Low Carbon Development

“It is indicated by the study that Low carbon development generally have positive employment effect in China.”

Primary Industry

- have advantage in carbon employment rate;
- need to explore potential green employment in eco-agriculture and forestry.

Tertiary Industry

- higher carbon productivity and carbon employment rate;
- promote the development of technical service industry for optimizing the economic structure.

Secondary Industry

- high output with high energy consumption;
- should follow the LCD policy to improve energy efficiency and pay attention to the un-employment issue.



实证研究：主要行业绿色就业潜力分析

Empirical Evidence: Green Jobs in Major Sector

林业部门

Forestry Sector

- Forest is the largest carbon sink and the most economical carbon absorber.
- Researches found that many kinds of forestry initiatives dealing with climate change, such as *afforestation*, *forest management* and *development of forest tourism*, can create a large number of green jobs.
- Studies have shown that between 2005 and 2020, forestry may create more than **25.7 million** decent and temporary jobs.



实证研究：主要行业绿色就业潜力分析

Empirical Evidence: Green Jobs in Major Sector

电力部门

Power Sector

- Power Sectors has made significant progress in dealing climate change and reduce energy consumption.
 - The close of inefficient small-scale thermal power units will reduce the corresponding employment positions, the total employment loss are about 0.8 million
 - Desulphurization projects in thermal power sector, would create about 1.08 million related green employment
 - Green energy would increase about 4.4 million new jobs
- Generally speaking, power sectors should pay attention on training and employment transformation in achieving for low carbon power structure.



实证研究：主要行业绿色就业潜力分析

Empirical Evidence: Green Jobs in Major Sector

钢铁行业

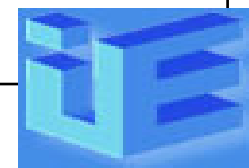
Iron and Steel Industry

- Iron and steel industry is a key sector of emission reduction due to its energy-intensity.
- During 2007 to 2011, Iron & Steel industry would **lose about 0.19 to 0.2 million** job opportunities
 - to reach production phase-out target in 12th Five Year Plan, iron and steel industry would possibly **lose 0.4 million jobs**;
 - by promoting and adopting advanced energy-saving emission reduction technologies, it would **create green jobs over 0.2 million**.
- To promote employment in scrap steel recycle industry, pay attention on the internal employment transfer and training.



中国主要行业实施低碳发展的总体就业效应（单位：千人）
Overall employment effect of low-carbon development strategies in key sectors
(1,000 person)

行业 Sector	子行业 Sub-sector	直接就业效应 Direct Effect	间接就业效应 Indirect Effect	小计 sub-total
林业 Forestry (2005~2020)	造林和再造林 Afforestation	7,600	11,085	18,685
	可持续森林管理 Forest Management	188	61	249
	森林旅游 Forest tourism	3,154	3,616	6,770
电力行业 Power Industry (2005~2020)	火电 coal-fired	251	29	279
	风电 wind power	848	2309	3,157
	太阳能 Solar power generation	50	1,237	1,287
基础工业 Basic Industry	钢铁行业 Iron&Steel (2007~2011)	-200	—	-200
总 计 Total		30,759		



实证研究：绿色投资

Empirical Evidence: Green Investment

- Among the 4-trillion Economic Stimulus Package, climate change related “green investment” accounts for at least 15% of the total investment.
- It found that green investment would **create at least 5.3 million** green job opportunities accumulatively.



中国“绿色投资”的就业效应（千人）

Employment Effect of China's Green Investment (1000 person)

绿色投资领域 (Green Investment Areas)		直接就业 (Direct Employment)	间接就业 (Indirect Employment)	小计 (Total)
节能减排和生态建设 (Energy Saving, Emissions Reduction and Ecological-construction)		56.7	151.7	208.4
产业结构调整和技术改造 (Structural adjustment & Technological Renovation)	产出拉动型情景 (Output-pull)	71.6	151.2	222.8
	就业拉动型情景 (Employment-pull)	92	141.9	233.9
农村民生工程（沼气池） (Projects concerning the Well-being of Rural Residents)		26.3	63.6	89.9
总 计 (Total)		175	357.2	532.2



主要结论

Key Findings

- **Positive Employment Promotion Effect:**
LCD would create more than 30 million direct and indirect green jobs during 2005 to 2020 in China.
- **Industrial Chain effect:**
Major sectors can not only create green jobs in itself but more jobs through supply chain by output expansion.
- **Development Effect:**
Low carbon investment would promote economic increase in the long run by improving the energy efficiency, reducing enterprises cost of inputs and increasing household income.



政策建议

Policy & Recommendations

- Actively promote low-carbon development and introduce policies for green employment promotion
- Develop the low-carbon service industry and optimize the Industrial Structure
- Encouraging green investments with creating green jobs as a priority
- Pay special attention to decent employment in creating green jobs
- Carry out some pilot programs and extend to other areas, synergy polices implementation



谢 谢!

Thanks for your attention!

