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Green Cities*

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**Development strategies of low carbon
economy and urban ecology in
Guangdong Province**

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About GIEC

- ❖ Key Laboratory of Renewable Energy and Gas Hydrate of CAS
- ❖ Key Laboratory of New and Renewable Energy of Guangdong Province
- ❖ Natural Gas and hydrate Research Center of CAS
- ❖ Biomass Energy Engineering Technology R&D Center of Guangdong Province
- ❖ CDM Research Center of Guangdong Province
- ❖ Renewable energy Synthesize Technology International Research Center of the Ministry of Science of Technology



GIEC, CAS



About ESRC

- A leading policy think tank for provincial- and regional-level decision makers
- A reliable partner to conduct international cooperation
- Host the Guangdong CDM Center
- Host the South China Climate Change Network



3 major research directions

- Research on energy policy and economics;
Evaluation of energy-economic and policy measures
- Energy plan and energy development strategies;
- Evaluation of sustainable energy technologies,
Improved LCA approach;
- Research on technology diffusion and
industrialization of preferential energy technologies;
- Countermeasures on climate change;
- CDM capacity building;
- Low-carbon development energy roadmap
- Reduction potential of GHG emission



About ESRC

Research Projects:

Evaluation of sustainable energy technologies:

- Sino-US Cooperation Project: U.S.-Chinese Cooperation on Electricity from Renewable, 2009
- CSEP Project: The policy recommendation for promoting the industrialization of biomass energy technologies based on life cycle assessment, 2010
- A Joint Sino-Belgium project on energy savings in buildings by combined dynamic thermal simulations and energy management systems, 2008-2009
- World Bank Project: Consultant to Lifecycle Assessment of Power Generation Technologies from Selected Agriculture and Forestry Biomass, 2009

Research on energy security and climate change :

- UK SPF project: Guangdong - China's pilot province in exploring a shift to low carbon economy. 2009/04-2011/03;
- WWF project: The Low Carbon City Initiative- Guangzhou city. 2007;
- SCCNETWORK Project: Build the South China Climate Change Network, 2009

Research on energy strategic planning:

- The Economic and Trade Commission of Guangzhou Metropolitan: The renewable energy development strategy for the Guangzhou Metropolitan Government. 2008
- Sino-US Cooperation Project: US and China: A transformative energy collaboration.2008
- The Economic and Trade Commission of Guangdong Province : Capability building for energy audit and designing of the Guangdong energy efficiency indicators in industry sector, 2007-2008
- Chinese Academy of Science: The roadmap of energy science and technology development to 2050 in China. 2007
- Guangdong Science and Technology Department: Guangdong Key Science and Technology Special Projects - --Renewable Energy and Energy Efficiency Sector. 2007



Low Carbon Practice in Guangdong ---from provincial level

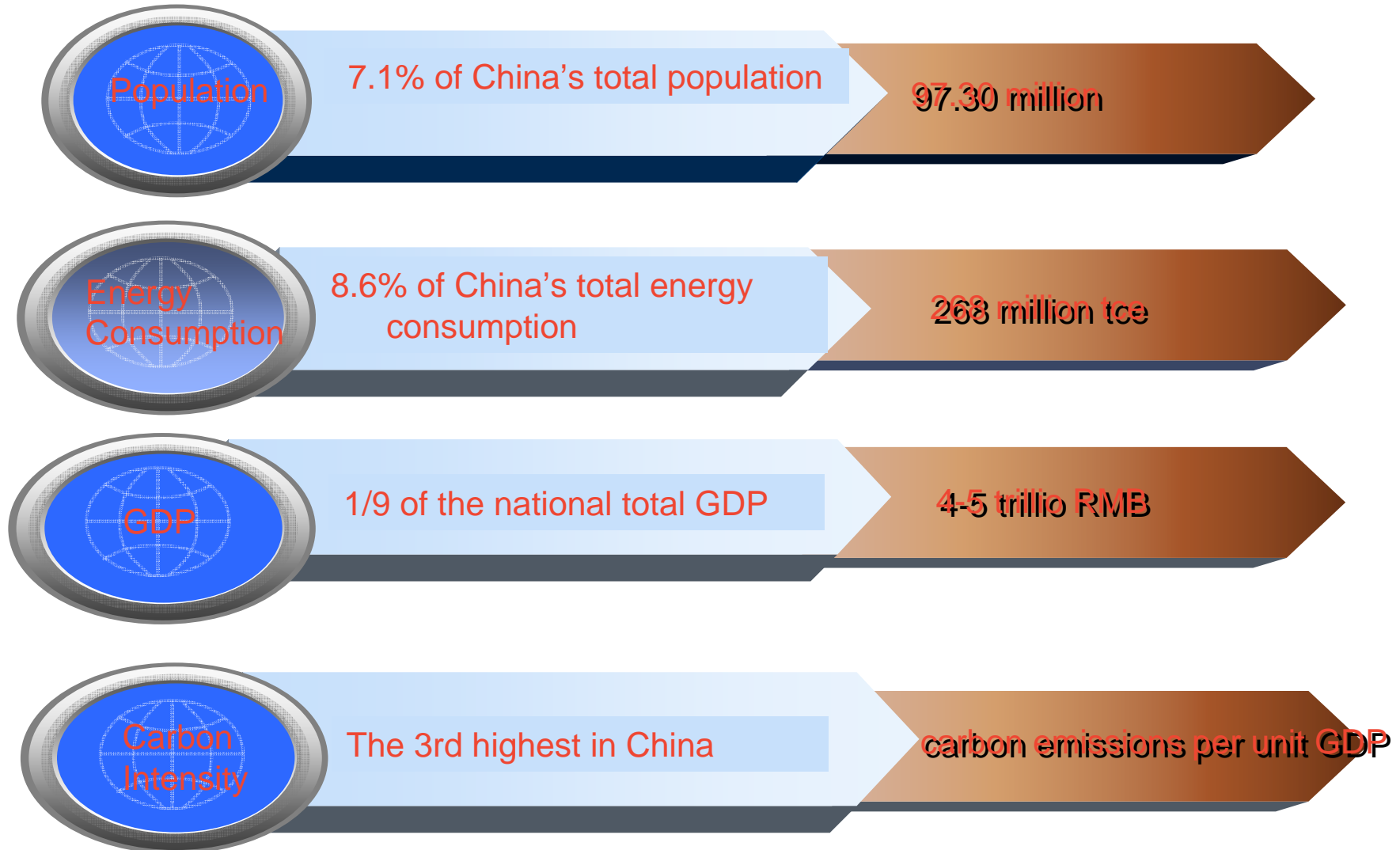
China's low carbon development goals are to be achieved through efforts at the provincial level. Pilot areas including eight cities and five pilot provinces, including Guangdong, Liaoning, Hubei, Shaanxi and Yunnan

- November, 2010, Guangdong Party Secretary Mr. Wang Yang and Governor Mr. Huang Huahua announced the Guangdong's initiative to pilot low carbon development in China.
- Tasks and demand:
 - Conducting GHG inventory and forecasts by sectors;
 - low-carbon development planning for the pilot province;
 - Allocation and evaluation of carbon intensity reduction target;
 - carbon trade and market mechanisms;
 - Demonstration cities: Guangzhou, Shenzhen, Zhuhai, Shaoguan、 Heyuan etc.
 - Demonstration Zones: Henqing, Sino-Singapore Guangzhou Knowledge City (GKC), Dong Ao Island, etc.





About Guangdong---National low-carbon pilot province





planning methodology for Guangdong

The methodology:

- GHG Inventory and forecasting
- Sectoral-based Scenarios analysis---emission reduction potentials by sectors
- Low carbon technology catalog --- by sectors
- Preferential technological options
- Micro-economic analysis to quantify cost-benefits and co-benefits of options
- Comparison with the target
- Developing the technological roadmap and policy roadmap
- Actions to be taken in the near term and long term
- Recommendations to the decision-makers



Guangdong Low-Carbon Development Technology Roadmap

(Power Sector as example)

In “12th Five Year” period

产业升级或结构调整
Industrial upgrading
or structure
adjustment

- 大力发展核电 develop nuclear power
- 关停小火电 close down small fire power plants
- 发展陆上风电 develop on-shore wind power
- 支持IGCC示范 support IGCC demonstration projects

能效措施
Energy efficient
measures

- 采用超超临界火力发电技术
using ultra-supercritical thermal power technology
- 实施节能改造，实行节能调度
Implement energy saving reconstruction and dispatch
- 推动需求侧管理
promote management of demand-side

政策措施
Policy measures

- 对可再生能源发电实施补贴
Provide subsidies for renewable energy
- 实施峰谷差别电价
Implement differential prices for peak and off-peak time
- 试行国内碳交易 Propose national carbon trading

其它
Others

- 加强可再生能源发电及电网技术研发
Strengthen power generation of renewable energy and promote grid technology research
- 加强专业人才培养 Training of professionals
- 推动新能源发电产业发展
Promote the development of new energy power generation industry

In “13th Five Year” period

- 大力发展核电 develop nuclear power
- 开发海上风电 exploit off-shore wind power
- 发展太阳能发电 develop solar power
- 在火电厂试点CCS，IGCC-CCS
carry out CCS and IGCC-CCS trial projects in fire power plants

- 建设智能电网
Construct smart grids
- 强化需求侧管理
Enhance management of demand-side

- 征收碳税 Carbon Tax
- 国内碳交易 National carbon trading





Guangdong Low-Carbon Development Technology Roadmap

(Transportation Sector as example)

Supported by

In “12th Five Year” period

产业升级或结构调整
Industrial upgrading
or structure
adjustment

- 加快发展铁路和水路运输 Accelerate rail and water transport
- 发展快速公交和轨道交通组合的城市交通优化体系
Develop optimized urban transit system
- 推进交通能源的清洁能源替代，如LPG、LNG等
Promote clean energy , such as LPG & LNG

能效措施
Energy efficient
measures

- 提高准入标准，加速淘汰能耗高、排放超标的老旧交通工具
Eliminate transports with low energy efficient
- 提高燃油效率，降低运输工具单位能耗
Increase fuel efficient to decrease unit energy consumption
- 专业化管理，提高载运率、客座率和运输周转能力
Management specialization to increase load and capability of freight
- 加大混合动力、电动车等节油新技术的开发力度
Enhance the development of hybrid, electric cars and other fuel-saving technologies

政策措施
Policy measures

- 分流部分公路客运，大力发展公共交通
Enhance the Development of public transportations to distribute passengers
- 加强基础设施建设，为交通工具的升级换代做准备
Enhance the construction of infrastructure to prepare the upgrading of transportations
- 对新能源交通工具的购买用户实施补贴
Implement transport subsidies for buying new energy transportations

其它
Others

- 加强驾驶员的技术培训和节能减排意识的培养
The cultivation of energy saving awareness
- 引导运输企业向规模化、集约化经营方向发展
Guide to large-scale and more intensive development of transportation to more

In “13th Five Year” period

- 提高铁路和水路运输比例
Increase the proportion of rail and water transportation
- 优先发展公共交通，加快快速公交和轨道交通建设
Give priority to the development of public transport and speed up construction of rapid transit system
- 提高新能源和替代燃料交通工具的市场份额
Increase market share of transportations with alternative energy

- 采用节能型交通工具，提高燃油效率，降低运输工具单位能耗
Utilize energy saving transports to increase fuel efficiency
- 智能化管理，提高综合交通运输系统效率
Increase integrated efficiency of transports through intelligent management
- 提高混合动力、燃料电池等节油新技术的经济性，实现商业化使用
Achieve the commercialization of hybrid and fuel cell technologies

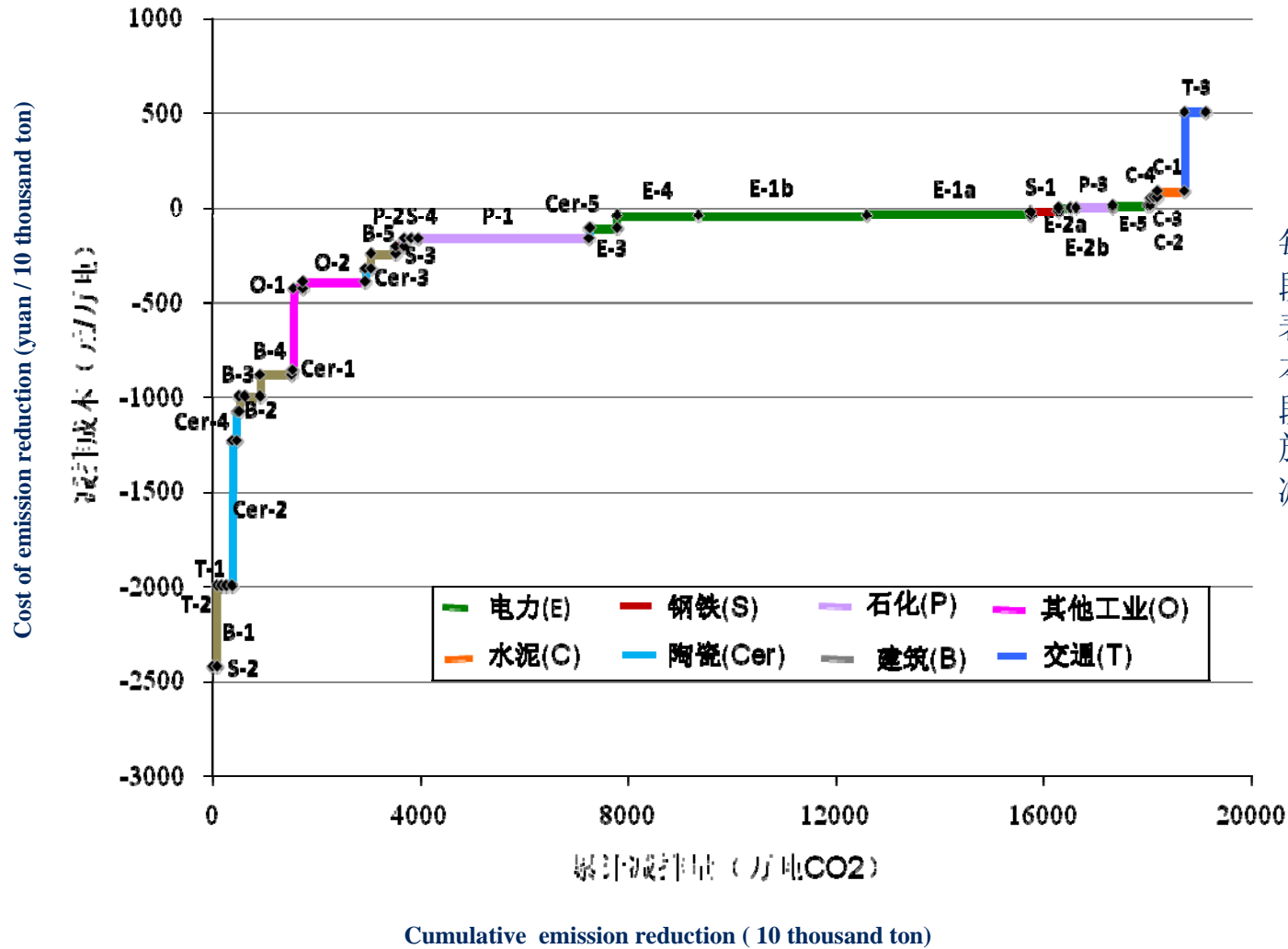
- 大力发展公共交通
Enhance the development of public transportation
- 加强交通基础设施建设，完善交通系统
Enhance the construction of infrastructure and improve the transport system
- 对新能源和节能交通工具继续实施补贴
continue subsidize purchasing of new energy transportations
- 征收能源税或碳税
Energy tax and carbon tax

- 建立现代物流体系
Establish modern logistic system





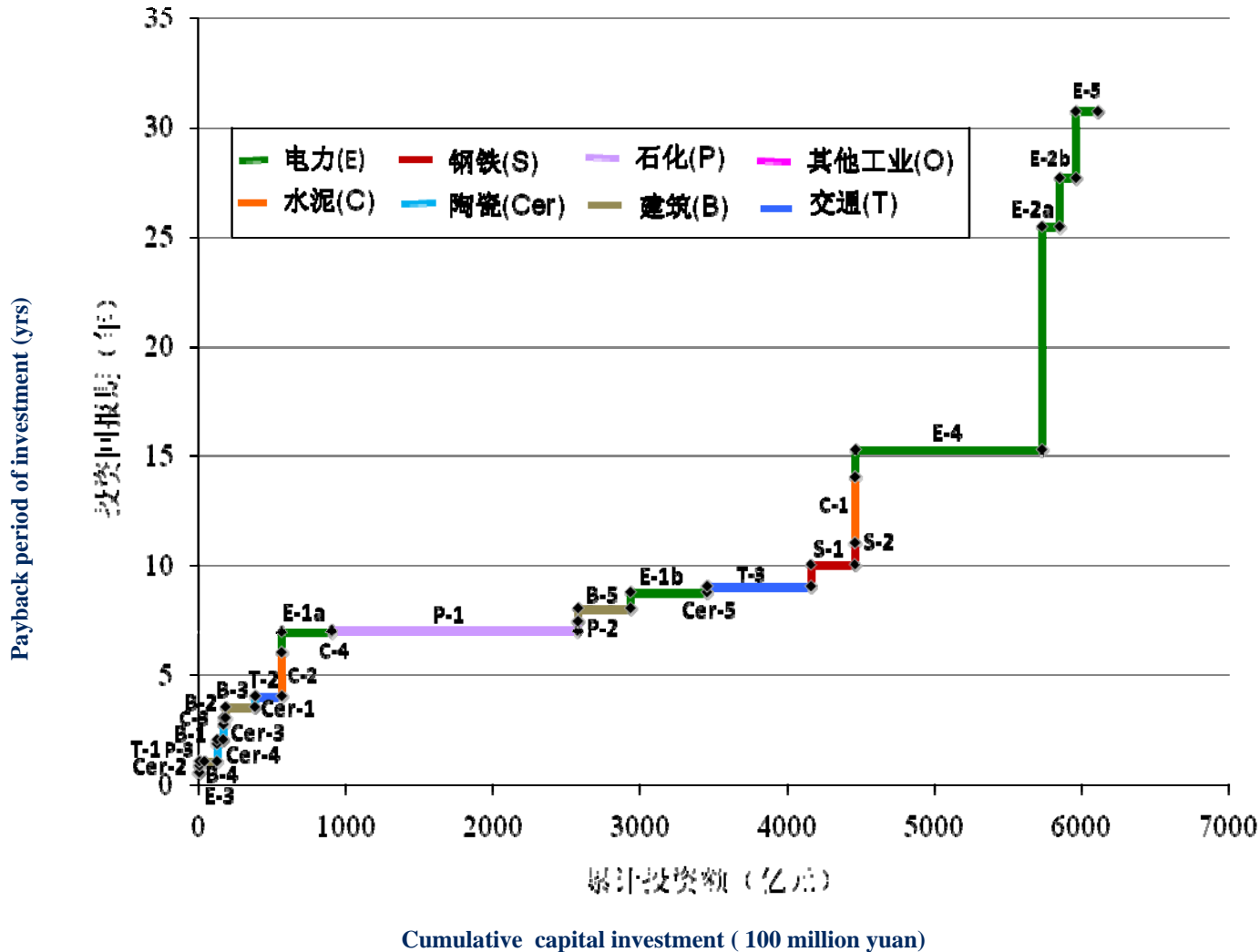
Cost-benefit analysis of key options for GD LCD



每条线段（横向线段）对应的纵坐标表示措施的减排成本，线段（纵向线段）的长度表示措施在2015年产生的减排量。



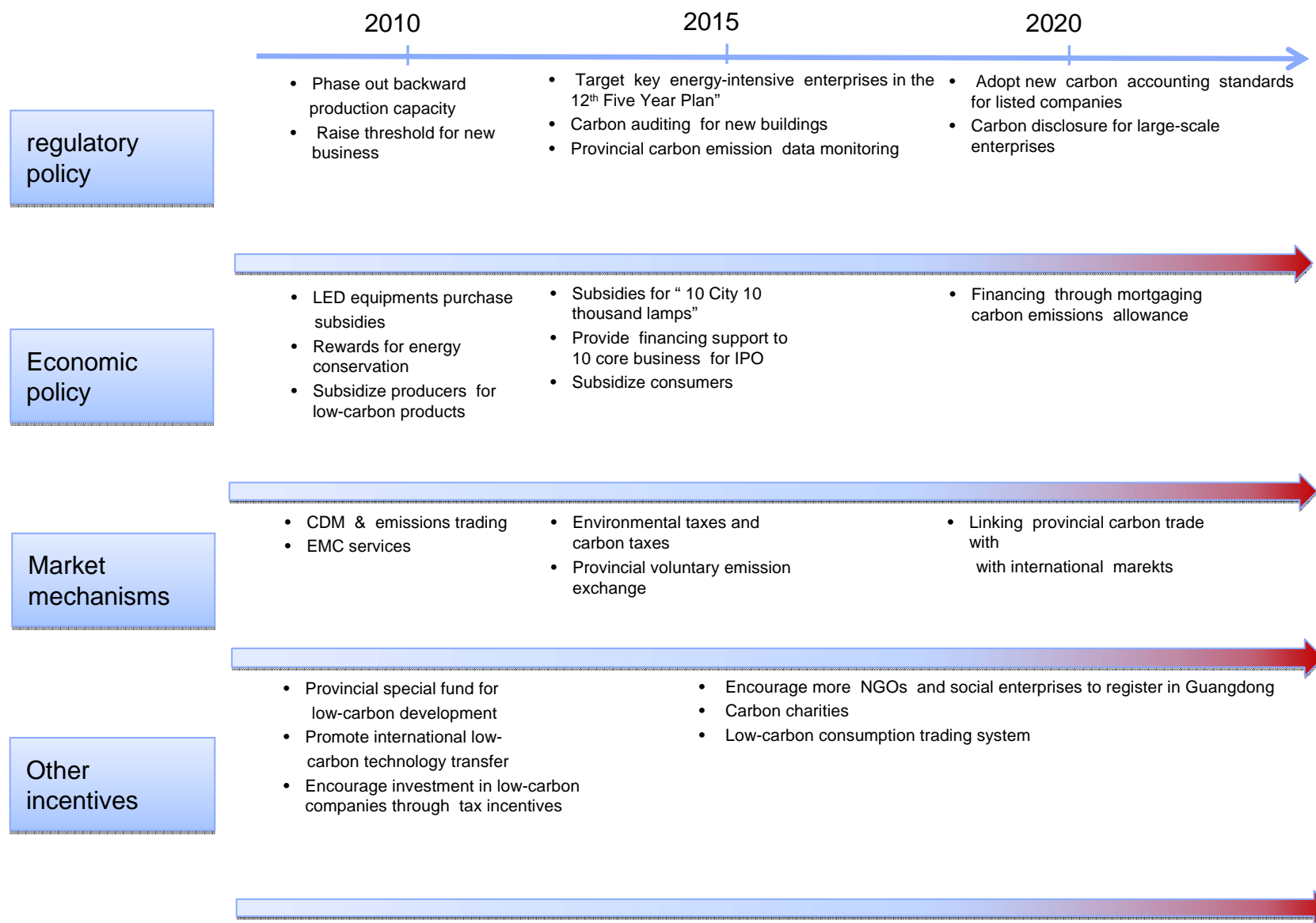
Cost-benefit analysis of key options for GD LCD



每条线段（横向线段）的对应的纵坐标表示措施的投资回报周期，线段（纵向线段）的长度表示措施的投资大小。

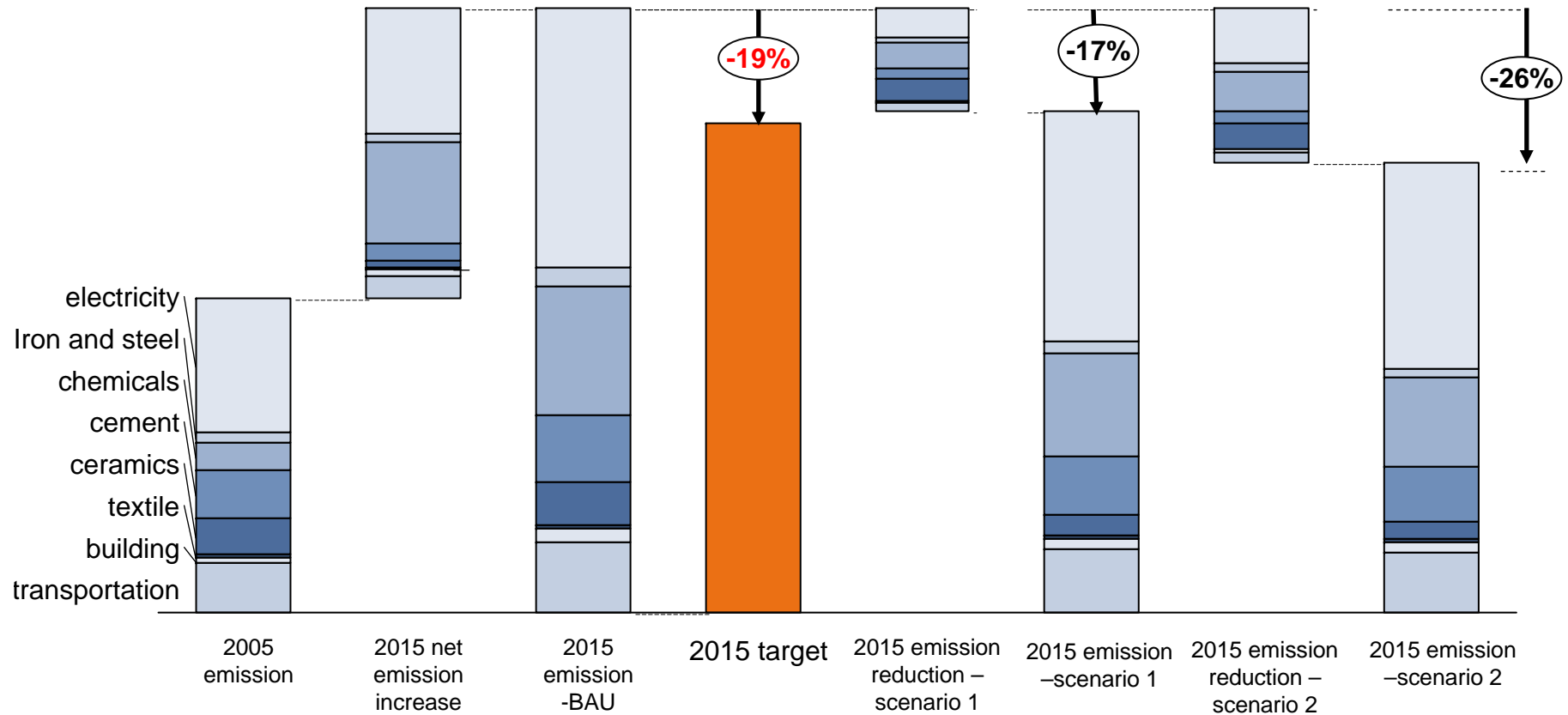


Guangdong Low-Carbon Development Policy Roadmap





Comparison of the emission reduction potentials in energy-intensity sectors and the target in Guangdong





ideas of joint activities to promote eco-efficiency at the city level

- 1. Building and strengthening the partnership among cities at the national and regional levels**
- 2. Exchange methodologies of producing low carbon development plan; Training and workshop on GHG inventory & forecast, data collection, sectoral categorization, policy options, stakeholders' engagement etc.**
- 3. Identifying the low carbon technologies transfer mechanism and financial support mechanism as well. promoting science and technology cooperations**
- 4. Increasing and better coordinating actions on the reduction of carbon emissions in and around the area, encouraging the reduction of emissions from industrial sectors and transportation and building sectors**



动感亚洲,感动世界
Invigorate Asia,
Spark the World

Thank You

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