

## Development of Strategy and Pathways to Establish A Low Carbon Economy in Suzhou

转变经济增长方式，发展低碳经济：  
探讨苏州低碳城市发展模式

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## 报告结构

### Report Structure

一、苏州市能源消耗与碳排放现状评估

二、高耗能行业情景预测分析

三、低碳发展技术方案与政策建议

I. Energy consumption and calculation of carbon emissions evaluation

II. Scenario analysis of high energy consuming industries

III. Low carbon development technology portfolio and policy recommendations

### 苏州市低碳发展模式研究 (背景) 1

#### Study Background: Low carbon development pattern of Suzhou (1)

- 发展低碳经济的重点之一是建设低碳城市，目前国内多个低碳城市的试点工作已经逐步展开。
- 目前关于低碳经济的研究多集中于低碳模式、发展低碳经济对应对气候变化的作用的探讨，关于如何在城市层面发展低碳经济、构建低碳城市的建设尚不多见，关于低碳城市的建设大多仍停留在理念、概念层面。

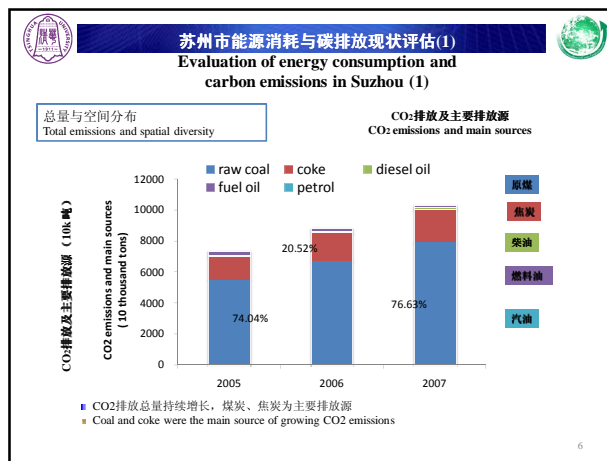
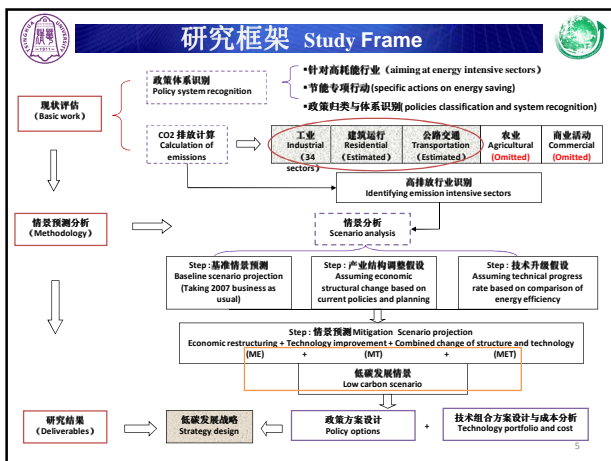
- Many pilot projects in domestic low carbon cities have been carried out.
- Studies on low carbon economies focus increasingly on low carbon consumption and low-carbon economic development.
- However, there are only a few studies which have looked into how exactly to develop and build a low carbon economy in cities. There are only ideas and concepts in this field.

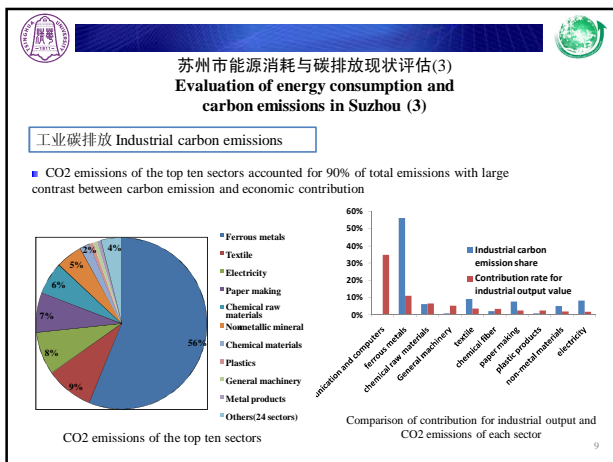
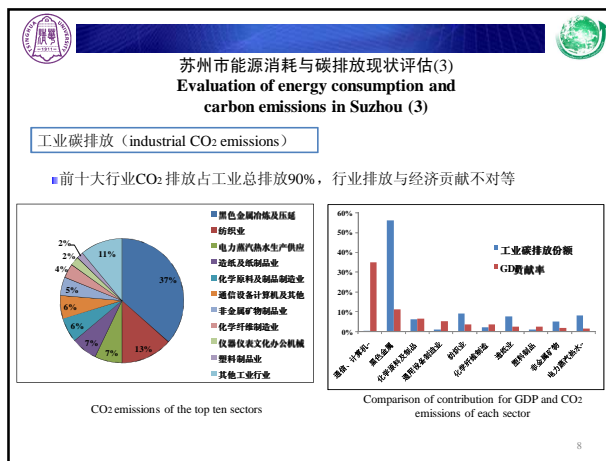
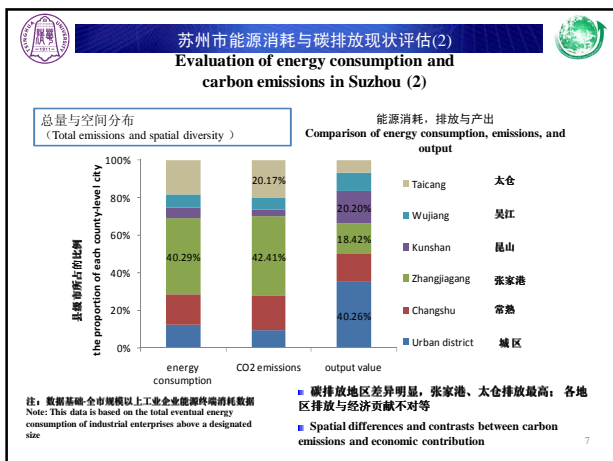
### 苏州市低碳发展模式研究 (背景) 2

#### Study Background: Low carbon development pattern of Suzhou (2)

- 随着能源消费的高速增长，资源制约加剧、能源瓶颈突显等问题在很大程度上制约着苏州的经济发展，发展低碳经济是提升核心竞争力的新举措。
- 苏州作为循环经济试点城市之一，在资源、环境与经济协调发展方面取得了一些研究成果，具备较好的低碳经济发展基础。以苏州市作为低碳经济发展研究的基地，具有重要的战略意义，将与其他城市的低碳发展提供借鉴，为中国的低碳经济发展打下良好的基础。

- As energy consumption increases, resource limitations obstruct economic growth. Low carbon development is the new path to economic competitiveness.
- As a "Recycling Economy" pilot city, Suzhou has achieved some success in researching the coordinated development of environment and economy, and has a solid foundation for developing a low carbon economy.
- Suzhou is a reference for low carbon economic development studies, can guide other cities' low-carbon development schemes, and can lay a foundation for China's low-carbon economic development.





### 苏州市能源消耗与碳排放现状评估 2

#### Evaluation of current energy consumption and carbon emissions in Suzhou 2

**交通运输业碳排放 CO<sub>2</sub> emissions of transportation**

$m_j = \sum (N_{i,j} \cdot S_{i,j} \cdot e_{i,j})$  (燃料消耗量-机动车保有量×平均行驶里程×平均燃料经济性)

■ 客车能耗与排放占50%以上, 该结果进一步验证, 因车型结构采用近似拆分的方式, 对结果影响较大  
■ The energy consumption and emissions of passenger vehicles account for over 50%, but this figure requires further research as the adoption of approximate dismemberment methods according to vehicle structure will have a large impact on the result.

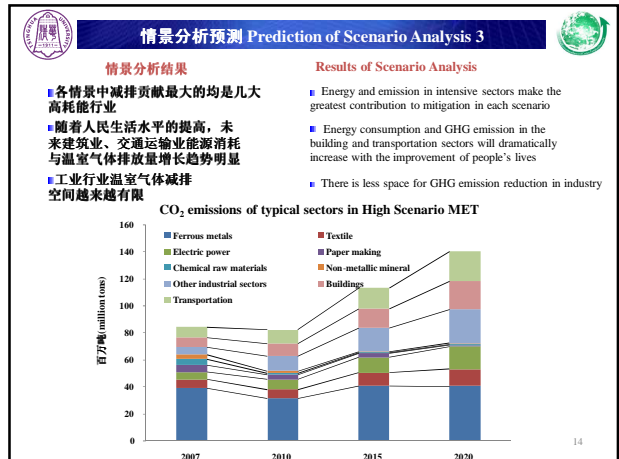
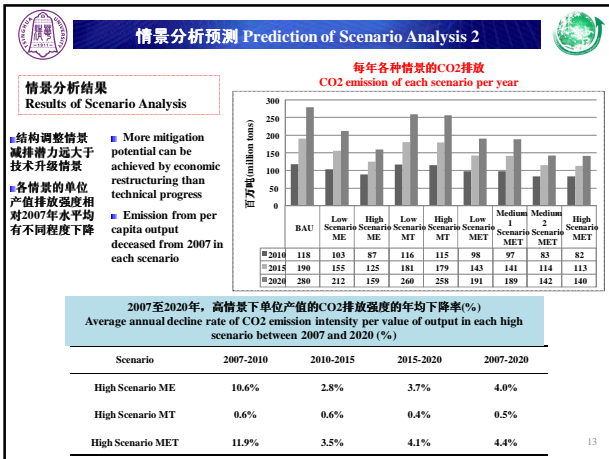
车型 Vehicle type	重货 Heavy Truck		中货 Regular Truck		轻货 Pick-up Truck		微货 Mini-truck		大客 Bus	
燃料 Fuel	汽油 Petrol	柴油 Diesel oil	汽油 Petrol	柴油 Diesel oil	汽油 Petrol	柴油 Diesel	汽油 Petrol	柴油 Diesel oil	汽油 Petrol	柴油 Diesel oil
油耗 (万吨) Oil consumption (million tons)	0.26	16.21	5.54	10.03	3.18	5.98	0.28	0.01	0.96	13.37
CO <sub>2</sub> 排放 (万吨) CO <sub>2</sub> emission (million tons)	0.82	51.70	17.36	32.00	9.97	19.08	0.88	0.03	3.01	42.65

### 情景分析预测 Prediction of Scenario Analysis 1

**行业选取 (Sector selection)**  
■ 因其他行业排放、政策等数据资料欠缺, 情景分析仅选取工业行业、公路交通运输业、建筑业。  
■ Only the industrial sector due to a lack of relevant information in other sectors.

**主要假设 (Main assumptions)**  
■ 工业行业中细分行业的选取原则:  
- 温室气体排放量大的行业;  
- 工业产值比重大的行业;  
- 苏州市产业结构调整中涉及的主要行业

变量 Variable	基准情景 Baseline scenario	结构调整情景 Structural adjustment scenario	技术升级情景 Technology upgrading scenario	结构技术综合调整情景 Aggregate adjustment scenario of structure technology
经济增长率 Economic growth rate	12% (2007-2010) 10% (2010-2015) 8% (2015-2020)	同基准情景 Same as the baseline scenario	同基准情景 Same as the baseline scenario	同基准情景 Same as the baseline scenario
产业结构 Industrial structure	维持2007年结构不变 Maintain 2007 structure	根据政策规划变化 Change based on the policy planning	不变 Unchanging	根据政策规划变化 Change based on the policy planning
技术水平 Technology level	维持2007年排放强度不变	不变	排放强度下降	排放强度下降



### 技术方案 Technology Portfolio

典型行业关键技术识别 Key technology identification in typical sectors

Mitigation technology options for typical sectors and abatement potential in 2020 High Scenario MT

行业	BAU emissions (Mt)	Abatement potential (Mt)	Contribution for abatement potential (%)	Technology portfolio	Technical progress rate (%)
钢铁	129	10	47	高炉顶余压发电技术 焦炉干熄焦背压发电技术 高炉喷煤富氧技术 燃气-蒸汽联合循环发电技术	8
电力	20.8	4.5	9	支持鼓励热电联产和综合利用余热发电技术, 提高资源利用效率 推广清洁能源发电技术 发展太阳能、生物质能等可再生能源发电	10.4
纺织业	18.7	1.9	21	推广凝结水回收技术, 加强高温烟气及可燃气余热回收利用 推广污泥焚烧发电、垃圾焚烧发电工程项目 气流染色技术 印染业自动调浆技术和系统	21.8
造纸业	17.4	2.3	10	蒸汽管网的改造, 实行热电联产提高热效率	13
化工	14	1.08	9	AC交流电机变频调速技术 大规模离子交换膜脱盐生产工艺	14.4

### 技术方案 Technology Portfolio

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Ferrous metals	129	10	47	Top Pressure Recovery; Coke Dry Quenching; Pulverized Coal Injection; Gas-Steam Combined Cycle Power Plant	8
Electric power	20.8	4.5	9	Combined heat and power generation BCC+CCS Clean coal power generation technology Solar, biomass, geothermal energy utilization	10.4
Textile	18.7	1.9	21	Waste heat utilization Refuse burning power generation Air flow dyeing Automatic color mixing system	21.8
Paper making	17.4	2.3	10	Stream pipeline transformation, combined heat and power generation; Paper recycling	13

### 现有政策体系识别 Currently Existing Policy System

政策种类	节能减排相关政策内容
命令控制	政府令、法规、条例 规定淘汰对象、指标; 规定节能降耗目标; 开展重点耗能企业能源审计工作; 节能目标责任评价考核; 节能监测计划
	统计、考核、与监测
	许可证
	能耗标准 新建项目必须达到行业能耗国际或国内先进水平
	常规污染物排放标准 温室气体排放标准 其他标准和规范 设定行业准入条件
经济政策	补贴 节能贴息; 节能扶持项目; 财政补贴高效照明产品
	价格杠杆 差别电价
	费税减免/增加 节能与减排项目奖励; 能源效率提升项目
	信贷支持 节能与减排项目奖励; 能源效率提升项目
	加速折旧 财政激励 节能奖励办法 节能专项资金
市场政策	专项科研基金 节能专项资金
	排放交易 建立强制采购节能制度
其他	引导节能中社会组织发展; 鼓励合同能源管理; 提供项目支持
激励鼓励政策	节能宣传周活动; 节能减排全民行动实施方案; “能效之星”计划

### 现有政策体系识别 Currently Existing Policy System

Policy Category	Relevant energy-saving and emission reduction content
Control Orders	Directives, regulations, and rules Stipulate obsolete objects and targets; stipulate an energy saving and consumption reduction goal
	Statistics, assessments, and supervision Carry out the energy auditing work of key energy consumption enterprises; evaluates and assesses the responsibilities of the energy saving goals; energy saving monitoring plan
	License New projects must attain standard levels of international industrial energy consumption or the domestic advanced level
	Energy consumption standard Conventional pollutant emission standards GHG emission standards Other standards and criterion Set up the industrial entry criteria
	Allowance Discount for energy saving; supports projects for energy saving; fiscal subsidies for highly efficient lighting products
Economic policy	Lever of price Discriminatory electricity pricing
	Tax reduction /incentive
	Credit aid Energy saving & recycling economy projects and projects of promoting "Energy Efficiency Loan"
	Accelerated depreciation
	Financial motivation Special research fund Special fund for energy saving
Marketing policy	Emission trade
	Government procurement Establish a compulsory system of purchasing energy saving products Others Instruct the development of energy saving intermediary organizations; encourage Energy Performance Contracting; provide project support
Encouraging Policy	Promote activity of energy saving promotion work; nationwide energy saving and emission reduction implementation plan; "Energy-Efficiency Star" plan
Free consulting or service provided by the government	Training of energy resource managers of key energy consumption units; exhibition and introduction of energy saving products and technologies.

### 政策方案与建议 Policy Options (1)

**现有政策扩展**  
规划战略

- 低碳经济发展战略
- 合理的城市规划、土地规划、城市交通规划

**财税政策**

- 控制好能源价格杠杆，通过调整能源价格来实现能源节约和能源替代
- 提高能源产品的资源税率
- 减少对高耗能行业的补贴和税收优惠
- 对热电联产等项目税收优惠
- 对节能设备实施加速折旧
- 针对合同能源管理的激励政策

**Extend selection of existing policies**

**Planning Strategy**

- Low carbon economic development strategy
- Reasonable development planning for city construction, land utilization, and transportation

**Fiscal Policy**

- Control energy price leverage, actualize energy conservation and energy substitution by adjusting energy prices
- Increase resource tax rate on energy products
- Reduce subsidies and tax preferences for high energy consuming sectors
- Introduce tax preferences for cogeneration and other items
- Accelerate the depreciation of energy-efficient equipment pricing
- Incentives for contract energy management

### 政策方案与建议 Policy Options (2)

**现有政策扩展**

**标准规范**

- 制定高耗能工业行业能效标准，开展能效对标活动
- 探讨建立符合地方特殊性的建筑节能标准与规范

**结构调整**

- 调整经济结构，优先发展服务业，提高第三产业比重
- 优化工业产业结构，限制高耗能、高排放产业发展，大力发展高新技术产业

**Extend selection of existing policies**

**Standards and Codes**

- Develop energy efficiency standards for energy-intensive industries; Launch energy efficiency benchmarking.
- Establish standards and codes for energy conservation of buildings suitable for local applications

**Structural Adjustment**

- Adjust economic structure, give priority to the development of service industry, increase the percentage of tertiary industry.
- Optimize the structure of industry, restrict the development of energy-intensive, high emission industry, strive to develop high-tech industry.

### 政策方案与建议 Policy Options (3)

**现有政策扩展**

**自愿协议**

- 继续推广“能效之星”活动，与低碳发展相结合，倡导企业碳减排类自愿协议

**宣传教育**

- 加强宣传教育，倡导低碳生活方式与消费模式。
- 普及碳汇知识，鼓励全社会积极参与植树造林。

**Extend selection of existing policies**

**Voluntary Agreement**

- Launch 'Energy Star' project integrated with low carbon development, encourage enterprises to sign voluntary agreements on carbon reduction

**Information Distribution & Education**

- Reinforce information distribution and education, encourage low carbon life style.
- Educate the public on carbon sinks, encourage the public to participate in tree planting.

### 政策方案与建议 Policy Options (4)

**新政策方案探讨**

- 编制企业碳排放计算清单指南，开展企业碳排放审计
  - 能源审计-碳排放审计-技术需求-减排措施
- 成立节能基金或碳基金公司
  - 致力于低碳技术的开发，为企业制定减排方案，低碳信息咨询
- 探讨建立区域间碳排放交易体系
  - 空间分布的差异性-减排目标-市场机制运作
- 开展“碳中和”环保行动
  - 减排经济成本-支付给企业或其他机构-技术应用或环保行动

**New policy options**

- Compile guide and launch auditing of enterprises' carbon emission
  - Energy auditing, carbon emission auditing, technology demands, measures for emission reduction
- Establish energy conservation fund or carbon fund company
  - Focus on low carbon technology R&D, solutions for enterprises' emission reduction, consulting on low carbon information
- Establish inter-regional carbon emission trade system
  - Diversity of spatial distribution, emission reduction target, operation by market mechanism
- Launch 'Carbon Neutral' project
  - Economic cost of emission reduction, pay enterprises or other organizations, technology application or environmental protection

