可持续发展的深圳实践
Practice of Sustainable Development in Shenzhen

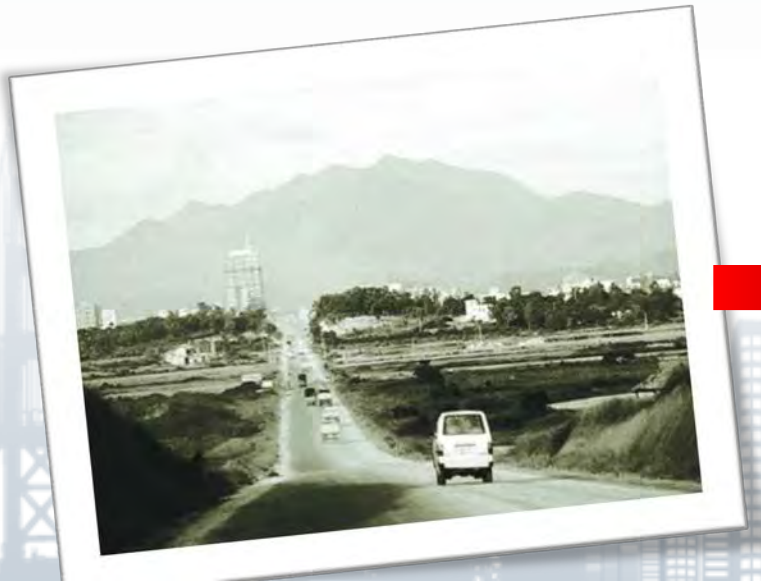
2019.7

中国·深圳 Shenzhen • China

深圳，最年轻的特大都市
Shenzhen, the youngest megacity in China

1979年设市，1980年成立经济特区，现为国家副省级计划单列城市。

Shenzhen municipality was established in 1979, and then turned to be a Special Economic Zone in 1980, now is the national sub provincial plan city.



中国·深圳 Shenzhen • China

深圳创造了世界工业化、城镇化、现代化史上的奇迹
Shenzhen staged a miracle in global industrialization, urbanization and modernization.

2018年: 常住人口1303万人，平均年龄32.5岁
GDP24221.98亿元，人均GDP19.3万元

At the end of 2018: Permanent population 13.03 million; Average age 32.5; GDP 24221.98 billion ; Per capita GDP 193 thousand.

（一）绿色低碳整体格局基本建成The overall pattern of green and low carbon development has basically been completed

- 充分利用特区立法权优势，率先出台地方性法规和政府规章，形成一套较为完善的促进低碳发展的法规体系

Make full use of the advantages of legislative power to first introduce local laws and government regulations, so that a set of perfect legal system that promotes low carbon development will be formed.

- 坚持紧凑型城市规划、组团式布局和低冲击开发

Stick to compact city planning, group layout and low impact development.


345天！这是2018年，深圳空气质量优良天数！
345 days! The number of days with good air quality in Shenzhen in 2018!
深圳蓝、深圳绿，已成为这座城市的靓丽名片!
“Shenzhen Blue” and “Shenzhen Green” have become the city’s name card.

（二）产业转型绿色效应显著The Green effect of Industrial Transformation is remarkable

- 产业低碳转型不断深化。2018年战略性新兴产业增加值达到9155.18亿元,增加值占GDP比重超过37.8%，初步测算,可拉低全市碳排放强度下降1/5左右。

Deepen the low carbon transformation of the industry continues. In 2018, the added value of strategic emerging industries reached 915.518 billion yuan, accounting for more than 37.8% of GDP. Preliminary calculations have shown that the intensity of carbon emissions in the city will be reduced by about 1 / 5。

- 服务业发展能级不断提升。围绕提升经济发展质量和有效降低碳排放水平，2018年服务业占GDP比重达到58.8%，产业低碳化发展趋势更加明显。

Increase the development level of service industry. Focusing on improving the quality of economic development and effectively reducing carbon emissions, the proportion of service industries in GDP reached 58.8% in 2018, and the trend of low-carbon industry development is even more obvious.

- 传统产业低碳化转型持续增强，先进制造业占规模以上工业增加值比重达到72.1%。

Continued to increase the transformation of low carbonation in traditional industries and the advanced manufacturing industry accounts for 72.1% of the industrial added value above the scale.

（三）清洁能源技术水平不断提升Continues to improve Clean energy technology

累计新建节能环保低碳领域工程实验室、重点实验室、公共技术服务平台等各类研发平台236个。创新成果不断涌现，节能环保低碳领域形成科技成果占全市科技成果登记总量的13.%。

A total of 236 research and development platforms. In the past two years, Shenzhen has formed scientific and technological achievements in energy conservation, environmental protection and low carbon fields, accounting for 13% of the total registered scientific and technological achievements of the city.

（四）绿色交通、绿色建筑遍布城市Green traffic, green buildings all over the city

- 公共交通管理水平和运行效率不断提升，建立富有竞争力的公共交通体系，建成和在建轨道交通560.8公里，运营里程达286公里，线网规模进入全球前十。公交机动化分担率提升至60%。

It has 560.8 kilometers of rail transit completed or under construction; the operating mileage reaches 286 kilometers. The scale of the network has entered the top ten in the world. The share of public transport motorization increased to 60%, reaching the level of large cities in Europe and America.

（四）绿色交通、绿色建筑遍布城市Green traffic, green buildings all over the city

- 累计推广新能源汽车推广新能源汽车超过22万辆，居全国前列，公交大巴、出租车实现纯电动化。

More than 220,000 new energy vehicles are running on the roads, ranking the top in the country. Buses and taxis in the city have been fully electrified.

- 新建民用建筑100%执行绿色建筑标准。新增绿色建筑面积1600万平方米，绿色建筑面积累计超过8900万平方米。

All newly-built civil buildings have fully adopted standards for green building. The city's green building area has reached 16 million square meters, the total area of green building is more than 89 million square meters.

（五）国际合作成果丰硕 Fruitful achievements of international cooperation

积极参与低碳发展国际合作。在联合国气候变化大会等国际会议上介绍我市应对气候变化成效和碳排放权交易经验。成为率先加入C40城市气候领导联盟的内地城市，并两次获得C40气候领导联盟城市奖。与美国、英国、荷兰、比利时等国签署了低碳城市建设合作协议。

Actively participate in national low carbon development international cooperation. Became the first mainland city to join the C40 Climate leadership Alliance and twice won the C40 Climate leadership Alliance cities Award. Shenzhen has signed cooperation agreements with the United States, the United Kingdom, the Netherlands, Belgium and other countries for the construction of low carbon cities.

（六）深圳能源-环境-经济现状分析 Analysis of Energy-Environment-Economy in Shenzhen

深圳$PM_{2.5}$年均浓度已由2004年的70微克/立方米以上，下降至2017年的27微克/立方米、2018年的26微克/立方米。2018年全市环境空气质量指数达到优、良的天数占全年监测有效天数的94.5%；全年灰霾天数20天，比上年减少2天。

The annual average concentration of PM 2.5 in Shenzhen has decreased from 70 mcg/m^3 in 2004 to 27 mcg/m^3 in 2017 and 26 mcg/m^3 in 2018. In 2018, 94.5% of the effective days of monitoring throughout the year reached the level of “Good” and “Moderate” in the Air Quality Index (AQI); and there are 20 days with heavy daze weather, a decrease of 2 days compared to the previous year.

2018年深圳市空气质量级别天数

Number of days with different AQI of Shenzhen in 2018

2018年全市环境空气六项污染物负荷系数

Load coefficient of six pollutants in the air of Shenzhen in 2018

图片来源:2018年度深圳市环境状况公报

Source: Shenzhen Environment Bulletin Release in 2018

前期行动 V.S. 新目标、新挑战 Preliminary action V.S. New goals and new challenges

能源与低碳 Energy and Low-Carbon

全国首个C40城市气候领导联盟成员城市
First member of China's C40 Urban Climate Leadership Alliance
绿色建筑总面积达5320万平方米，位居全国前列
The total area of green buildings reached 53.2 million square meters, ranking in the forefront of the country.
全球新能源汽车推广规模最大的城市之一
One of the cities with the largest promotion scale of new energy vehicles in the world
全国首个碳交易市场，成交量、额位居全国前列
The first carbon trading market in China, ranking top in the turnovers and business transactions

作为国家低碳先锋城市，探索率先实现碳排放达峰
As a national low-carbon pioneer city, Shenzhen will strive to realize the carbon emission peak

大气质量提升 Improvement in the Atmospheric Quality

实施“深圳蓝”可持续计划，落实工地扬尘治理7个100%等减排、控烟新举措
Implement "Shenzhen Blue" Sustainable Plan and carry out 7 new measures in the dust control at construction sites, including 100% reducing emissions and controlling smoke.
推广国VI标准车用燃油，淘汰老旧车约13万
Promote National Standard VI vehicle fuel and eliminate about 130,000 old vehicles.
新推广新能源汽车、新型智能全封闭式泥头车，基本实现出租车纯电动化。 Promote new energy vehicles and new intelligent total enclosed type of dump trucks, and basically realize the promotion of pure electric taxis.

2020年实现全市PM2.5低于25微克/立方米，空气质量达到欧盟标准
By 2020, Shenzhen will strive to ensure the average concentration of PM 2.5 lower than 25 mcg/m3, with its air quality meeting the EU standards.

转型升级和高质量增长 Transformation and upgrading and High-quality Growth

2018年先进制造业增加值增长12%，打造以高端制造业为核心的实体经济发展模式The added value of advanced manufacturing industry in Shenzhen increased by 12% in 2018, and it has developed a physical economic model with high-end manufacturing as the core.
高新技术产业发展成为全国的一面旗帜，经济发展有速度、有质量、有效益 The development of high-tech industry in Shenzhen has become a banner of the whole country, with high speed, high quality and high efficiency
我国新兴产业规模最大、集聚性最强的城市，新兴产业增加值占GDP比重超过40%。
Shenzhen has become a city with the largest scale of emerging industries and the strongest agglomeration in China, with the added value of emerging industries accounting for over 40% of emerging industries.

打造资源节约和环境友好的空间格局、产业结构、生产方式，实现绿色低碳循环发展
Shenzhen will strive to construct a resource-saving and environment-friendly spatial pattern, industrial structure and production mode to achieve green and low-carbon cycle development

三个关键问题 Three Key Issues

（1）温室气体与大气污染物排放的协同控制？

Coordinated control of greenhouse gas and atmospheric pollutant emissions?

（2）产业转型升级与环境质量提升？

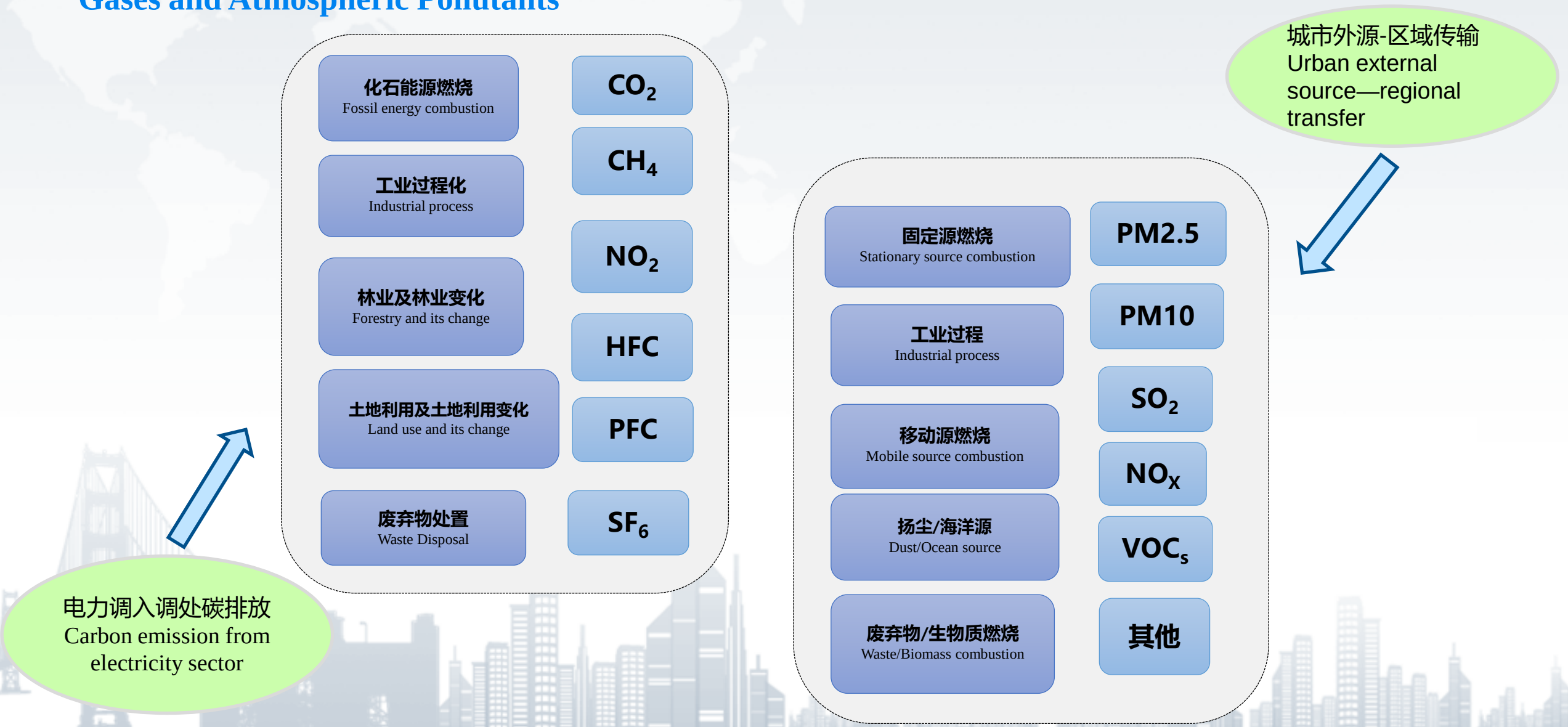
Industrial transformation and upgrading and improvement in the environmental quality?

（3）城市行动与跨区域协同治理？

Urban mobility and cross-regional collaborative governance?

（七）协同治理与共赢发展–温室气体与大气污染物协同治理

Collaborative governance and win-win development——Collaborative Treatment of Greenhouse Gases and Atmospheric Pollutants



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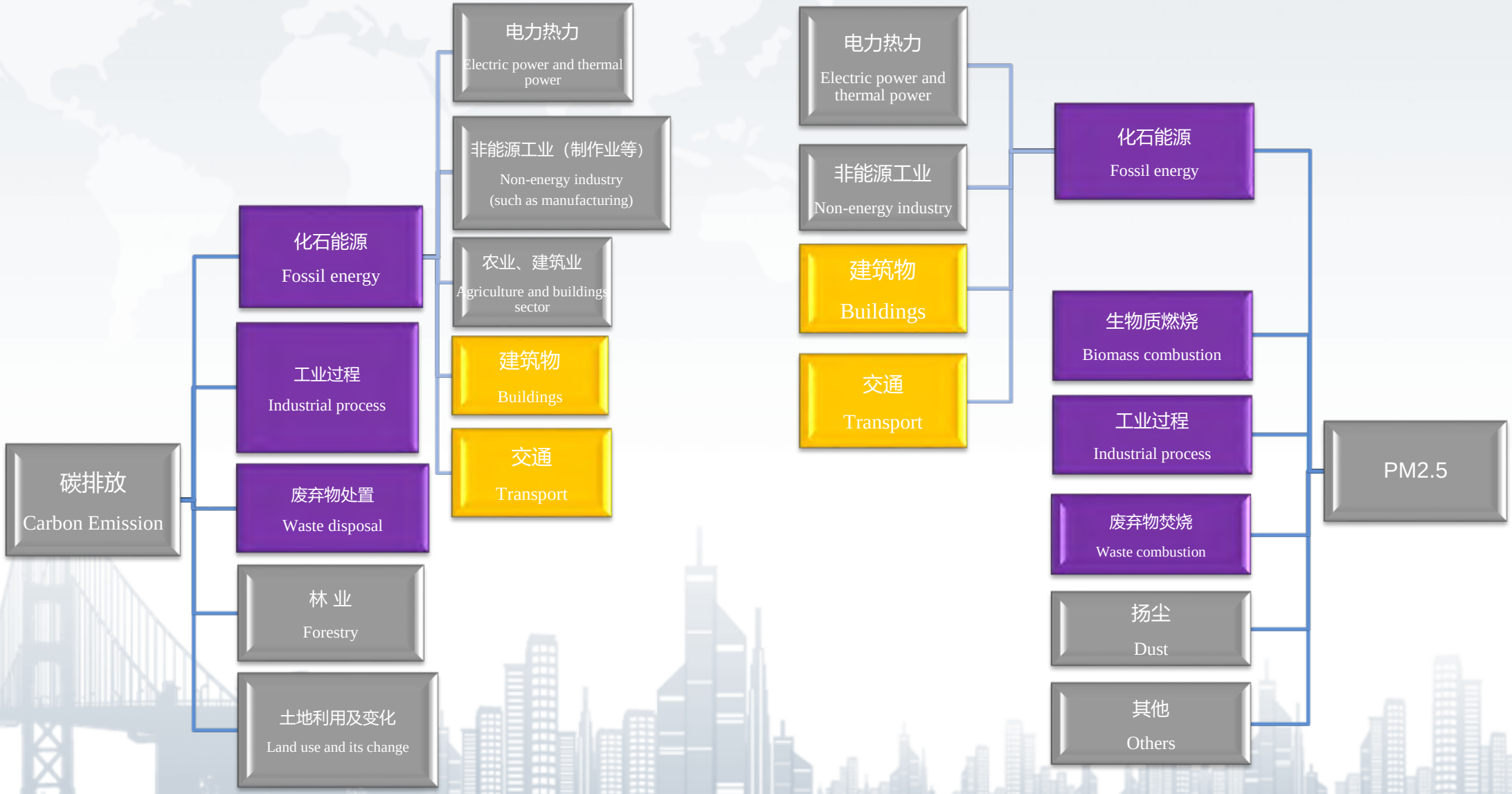

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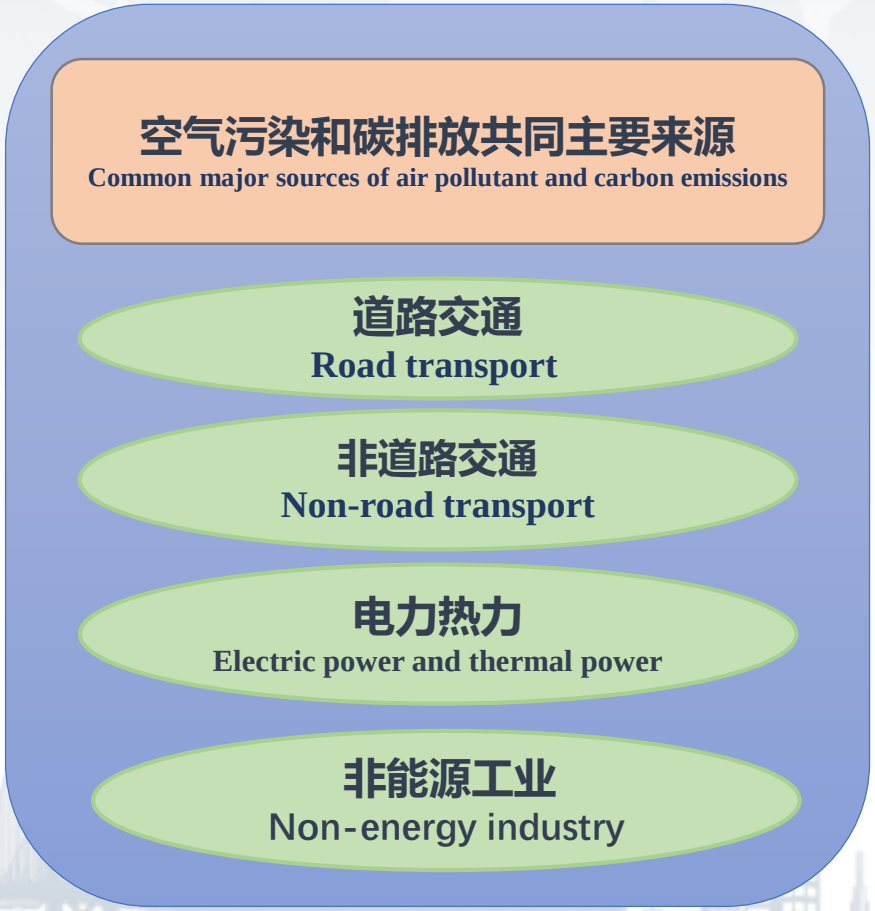
碳排放和$PM_{2.5}$均只针对深圳本地源，碳排放包含六种主要温室气体，$PM_{2.5}$包括本地源的一次排放和二次转化生成。
Carbon emissions and PM2.5 are only for local sources in Shenzhen. Among them, carbon emissions include six main greenhouse gases, and PM2.5 includes primary emissions and secondary conversion from local sources.



“同根同源”分析 Analysis of common roots	碳排放占比 Proportion of carbon emissions	PM2.5占比 Proportion of PM 2.5
道路交通 Road Transport	49%	41%
非道路交通 Non-road Transport	12%	11%
电力热力 Electric power and thermal power	23%	8%
非能源工业 Non-energy industry	3%	15%
小计 Total	87%	75%

碳排放：建筑物、废弃物处置10.2%
Carbon emissions: buildings and waste disposal accounting for 10.2%

空气污染物排放：扬尘12%
Air pollutant emissions: dust accounting for 12%

（七）协同治理与共赢发展—温室气体与大气污染物协同治理

Collaborative governance and win-win development——Collaborative Treatment of Greenhouse Gases and Atmospheric Pollutants

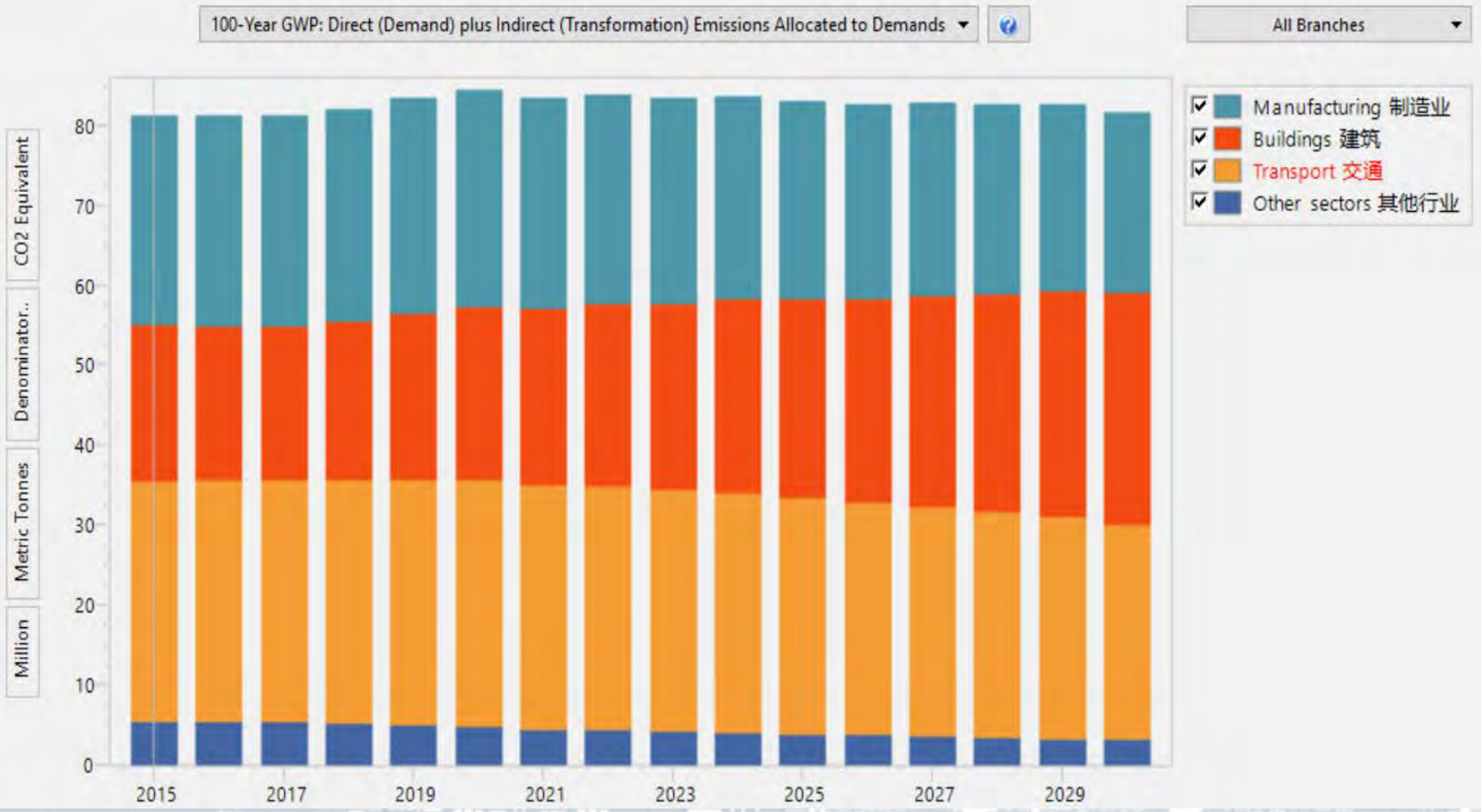
大类划分Division of major categories	技术/措施门类划分Division of techniques/measures	技术/措施具体名称 Name of specific technique/measure
需求管理类措施 Demand Management Measures	抑制需求总量增长 Restrain the growth of total demand	汽车尾号限行 Tail number limited
		提高停车收费 Raise parking fees
		道路拥挤收费 Road congestion charging system
		推广低排放区 Promote low emission areas
	调整需求结构 Adjust demand structure	轨道交通发展(计入间接排放) Develop rail transit (calculated as indirect emission)
		BRT
		常规公交 Bus transit
		建设慢性网络 Promote low emission areas construct slow transport network
		绿色出行和自愿停驶 Green travel and volunteer driving and parking
结构调整措施 Structural adjustment measures	道路货运燃油经济性提高和新能源汽车 New energy vehicles of road freight transport with high fuel economy	货车油改气 Modified truck with gas as its fuel rather than oil
		混合动力货车 Hybrid truck
		高效燃油货车 High fuel-efficiency truck
	道路公共客运新能源汽车 New energy vehicles of public road passenger transport	纯电动公交车(计入间接排放) Pure Electric Bus (calculated as indirect emission)
		混合动力公交车 Hybrid bus
		纯电动出租车(计入间接排放) Pure electric taxi (calculated as indirect emission)
		电动车分时租赁(计入间接排放)Time-share rental electric vehicle(calculated as indirect emission)
	私家车新能源汽车 Private new energy vehicles	纯电动私家车(计入间接排放)Pure electric private vehicle(calculated as indirect emission)
节能与能效技术类措施 Technical measures of energy saving and energy efficiency	轨道交通节能和能效提高 Rail transit with great energy-saving ability and high energy efficiency	TVF风机开启控制 Opening control of TVF fan
		区间隧道照明 Interval tunnel lighting
		车站小系统 Small station system
		车站大系统 Large station system
		其他地铁管理节能措施 Other energy-saving measures for metro management
		车站公共区照明 Lighting in the public areas of the station
		空调通风变频、水系统变频节能实验改造 Energy Saving Reform of Frequency Conversion of Air Conditioning Ventilation and Water System
		车站试用LED灯具 Use of LED lamps at stations
		地铁列车变频空调节能实验项目 Energy Saving Test Project of Frequency Conversion Air Conditioning for Metro Trains
		车客室照明系统LED灯具 Purchase of LED Lamps for the lighting in the passenger room
		照明系统节能升级改造 Energy-saving upgrading of lighting system
		调整运行方式改善功率因数 Adjust operation mode and improve power factor
		加装无功补偿装置 Install reactive power compensation device
		取消段、场内电客车热备 Cancel section and on-site tram hot standby
		自动化集成系统维护工作站改造 Reform the maintenance workstation of automation integrated system

（七）协同治理与共赢发展—温室气体与大气污染物协同治理

Collaborative governance and win-win development——Collaborative Treatment of Greenhouse Gases and Atmospheric Pollutants

从能源消费侧来看，制造业和交通碳排放将在2020年达峰，建筑碳排放仍将持续增长（包含直接和电力间接排放）

On the energy consumption side, carbon emissions in the sectors of manufacturing and transport will reach its peak in 2020, while carbon emissions in the buildings sector will continue to grow (including direct plus indirect electricity emissions).

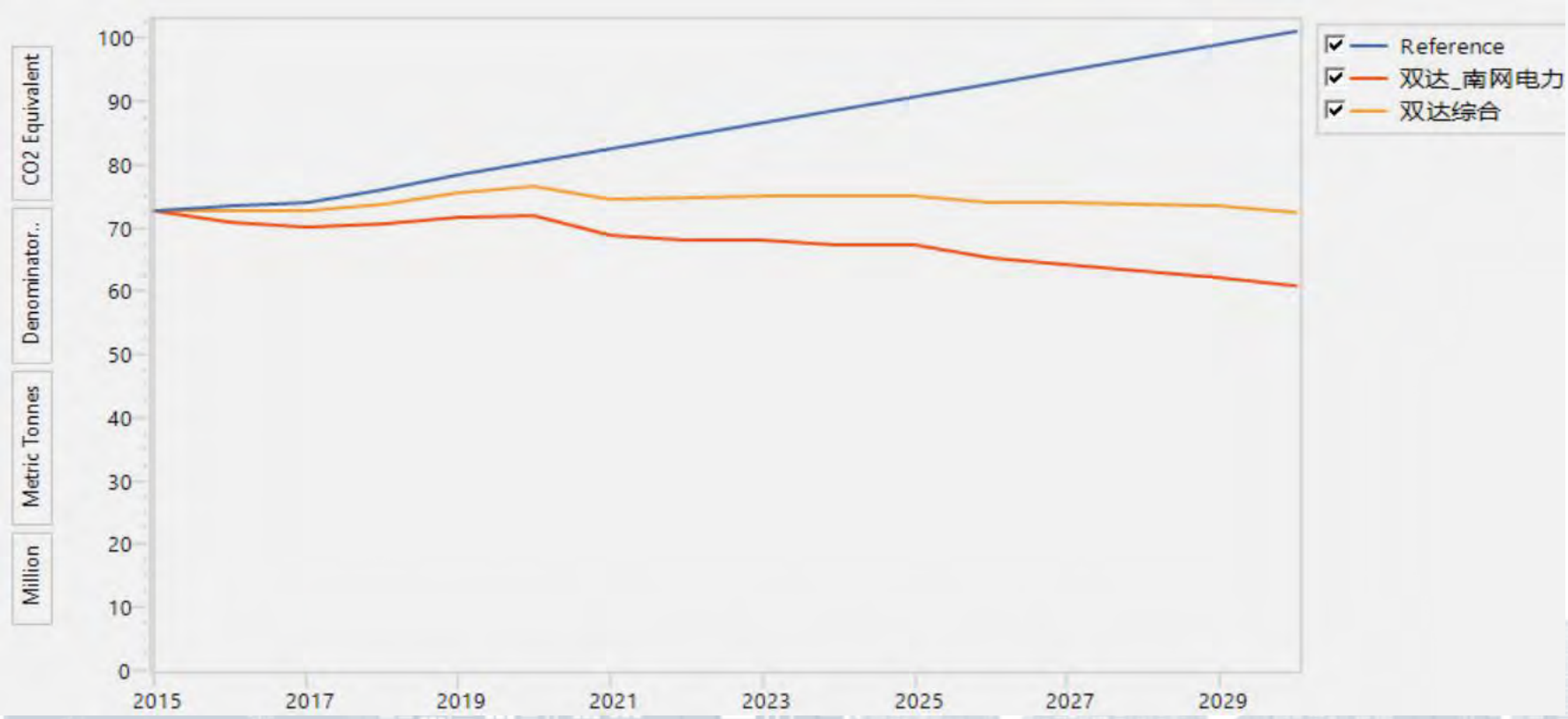


（七）协同治理与共赢发展– 跨区域协同治理

Collaborative governance and win-win development ——cross-regional collaborative governance

- 如果引入跨区域协同治理，假设南方电网清洁、可再生能源占比上升，电力间接碳排放系数降低，显著有助于达峰后推动碳排放下降
- If introducing cross-regional collaborative governance, assuming that the proportion of clean and renewable energy in the South Power Grid increases and the indirect carbon emission coefficient of electricity decreases, it would significantly contribute to the reduction of carbon emissions after the peak.

- 由于50%左右的$PM_{2.5}$来源于跨区域传输，粤港澳区域协同的空气污染治理，尤其是航运、道路交通等领域，显著有助于深圳提升空气质量
- Due to the fact that about 50% of PM2.5 comes from trans-regional transmission, the collaborative control of air pollution among Guangdong, Hong Kong and Macao, especially in shipping, road traffic and other fields, will contribute significantly to the improvement of air quality in Shenzhen.



（八）探索与思考新路径 Exploration and Consideration of New Paths

温室气体与大气污染物减排具有显著的协同效应

The emission reduction of greenhouse gases and atmospheric pollutants has significant synergistic effect.

迫切要求我们从多污染物协同控制角度，统筹部署、系统规划，利用协同效应低成本减排

It is urgent to coordinate deployment and system planning from the perspective of multi-pollutant coordinated control, and to use synergistic effect to reduce emissions at low cost.

需求管理类和结构调整类措施具有较强的协同减排效应，部分末端治理或技术类措施成本高、且协同减排效应并不显著

Management and structural adjustment measures should have strong synergistic emission reduction effect, while some end-treatment or technical measures have high cost without significant synergistic emission reduction effect.

迫切需要加强需求管理和源头控制，加强管理部门之间的合作与信息共享，推进能源结构、出行结构、货运结构等优化调整

It is urgent to intensify demand management and source control, strengthen cooperation and information sharing among management departments, and promote the optimization and adjustment of energy structure, traffic configuration and freight transport structure.

产业结构转型升级有助于提高碳要素效率，降低温室气体和大气污染物排放

Industrial transformation and Upgrading is conductive to improving the efficiency of carbon factors and reducing greenhouse gas as well as atmospheric pollutant emissions.

目前分析仅局限于行业、子行业之间，未来迫切需要加强对行业内部转型升级的减排效应分析

At present, the analysis is confined to the industry and sub-industry. It is urgent to strengthen the analysis of emission reduction effect of transformation and upgrading within the industry in the future.

跨区域协同治理（例如南网电源结构更加低碳化、区域总体大气污染物浓度降低）有助于深圳降低碳排放和提升空气质量

Cross-regional collaborative governance (e.g. lower carbonization of power supply structure in South Grid and lower concentration of regional total atmospheric pollutants) is conductive to reducing carbon emissions and improve air quality in Shenzhen.

迫切需求通过体制机制创新、数据共享、区域总体规划布局等方式，加强跨区域环境协同治理

It is urgent to strengthen the collaborative governance of cross-regional environment through institutional mechanism innovation, data sharing, regional overall planning and layout and other means.

第七届深圳国际低碳城论坛
欢迎您！
主题：粤港澳大湾区绿色发展新机遇 新挑战 新动能
时间：2019年8月29-30日
会议地点：中国•深圳

Welcome to the 7th Shenzhen International Low carbon City Forum
Time：On August 29th-30th
venue：Shenzhen, China
Theme: Guangdong-Hong Kong-Macao Greater Bay Area Green Development : New Opportunities, New Challenges, New Engines

深圳国际低碳城论坛Shenzhen International Low Carbon City Forum

往期嘉宾

Past Guests

深圳将始终坚持走绿色发展之路，不断加强与世界各国城市的务实合作，共同为实现人类社会可持续发展做出不懈努力！

Shenzhen will always adhere to the path of green development, strengthen practical cooperation with cities around the world and make unremitting efforts to achieve sustainable development of human society.

THE END

谢谢 Thanks

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