

# 城市交通发展体制与机制

## Urban Transportation Planning & Development Process

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# 全球城市人口 Global Urban Population.. 1950

美国城市人口1亿

United States  
101M

中国城市人口6千4百万

China  
64M

印度城市人口6千3百万

India  
63M

## Urban Population

Greater than 75%

50% - 75%

25% - 50%

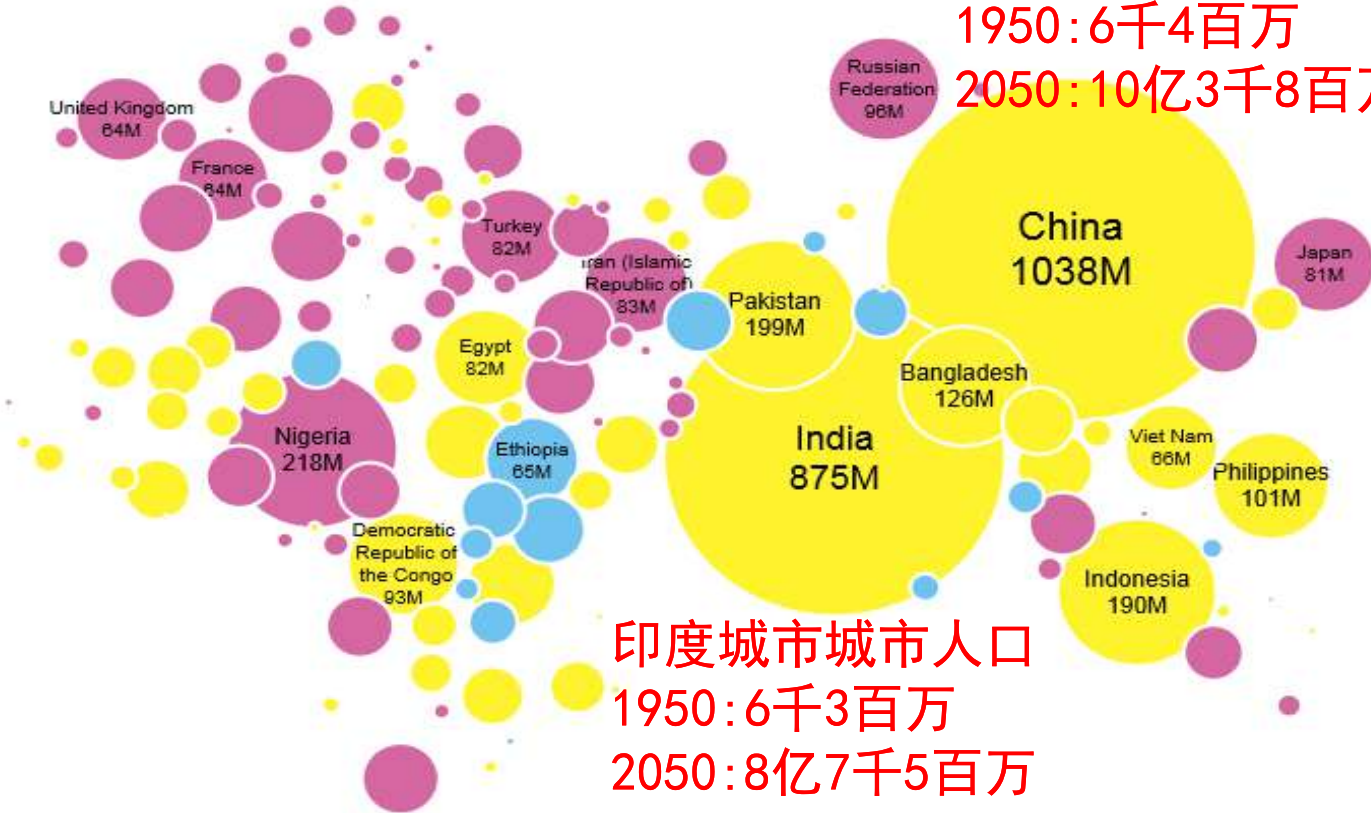
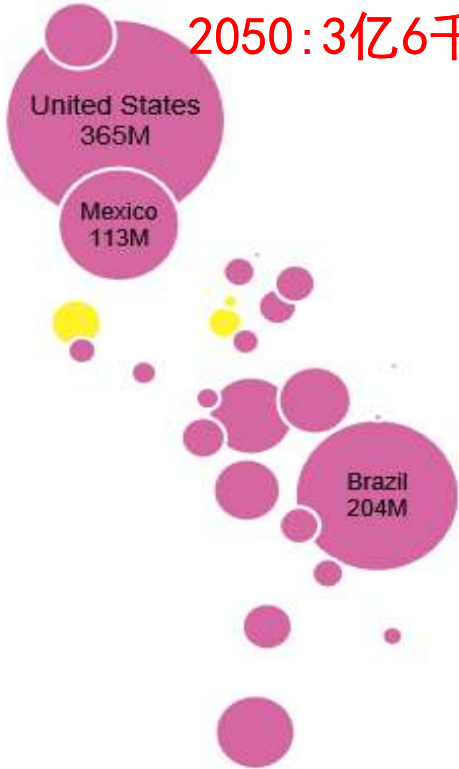
Less than 25%



# 全球城市人口 Global Urban Population.. 2050

美国城市人口  
1950: 1亿  
2050: 3亿6千万

中国城市人口  
1950: 6千4百万  
2050: 10亿3千8百万



印度城市人口  
1950: 6千3百万  
2050: 8亿7千5百万

## Urban Population

Greater than 75%

50% - 75%

25% - 50%

Less than 25%



英国城市化进程从 20% 到 40% 花了120年

United Kingdom took 120 years to urbanization from 20% to 40%



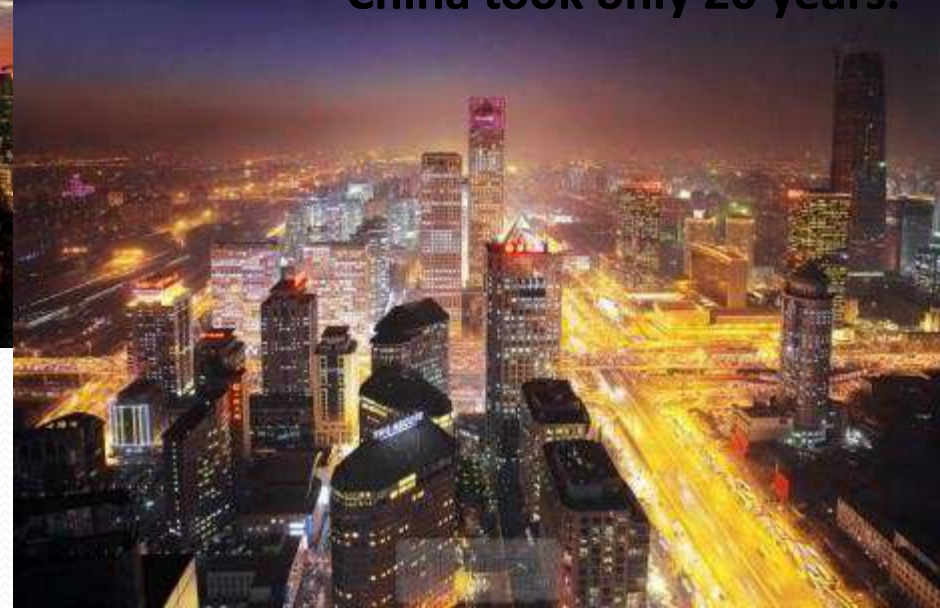
美国花了80年

United states took 80 years.



中国只花了20年

China took only 20 years.



中国正以每天消失100个村子的速度，快步进入城镇化  
China is moving toward urbanization with a speed of disappearing  
100 villages per day



到2025年，中国将建造5万座高楼，相当于10个纽约市。

By 2025, China will build 40 billion square meters floor space, 50,000 high rise buildings, equivalent to 10 New York Cities.

CHINA

40

billion square meters of floor space needed over the next two decades



or the area of Switzerland



# 到2030年，中国将有170个城市需要地铁系统

By 2030, 170 Chinese cities need a subway system. China will build 28,000 km subway and 5 billion square meters roadway.



Beijing Subway No 1 Line  
北京地鐵一号线



Beijing Subway No 4 Line  
北京地鐵四惠地铁站

# 中国车辆保有量快速成长

## Car Ownership Grows Rapidly

### 2003年的数据：

- 中国车辆保有总数预估将从2003年的2400万辆成长到2010年的5700万辆及2020年的1.3亿辆。
- 2003年中国的空气污染量有79%来自移动污染源。

### 2003 Data：

- Car ownership was forecasted to grow from 24M in 2003 to 57M in 2010 and 130M in 2020.
- 79% of the air pollution came from mobile sources.





# 中国车辆保有量快速成长

## Car Ownership Grows Rapidly

到2013年底：

- 全国机动车数量突破**2.5亿辆**，汽车保有量达**1.37亿辆**（比预测提早了7年），是2003年汽车保有量的5.7倍。
- 机动车驾驶人近**2.8亿人**。共有31个城市的汽车数量超过100万辆，8个城市汽车数量超过200万辆，北京市汽车超过500万辆。

### 2013 Data

- Car ownership 137M, 7 years earlier than forecasted and 5.7 times over car ownership in 2003.
- 280M licensed drivers in China.
- 31 cities have more than 1M cars. 8 cities have cars more than 2M. Beijing have more than 5M cars.



# 中国车辆保有量快速成长

## Car Ownership Grows Rapidly

➤ 私家车年成长率达到20%。比较2013年每千人机动车辆数，中国110辆只有美国近800辆的14%，还有非常大的成长空间。汽车尾气将会在导致严重空气污染上扮演更重要的角色。

➤ Car annual growth rate reaches 20% in China.

➤ 2013: cars/1000 persons 110 in China vs. 800 in US. (only 14%) There is much more room for the growth. Car emissions will play a more critical role in air pollution.

	每千人汽车数 cars/1000pp		总汽车数 Total Vehicles	
	中国 China	美国 US	中国 China	美国 US
1960	0.38辆	411辆	0.002亿辆	0.74亿辆
2002	16辆	812辆	0.205亿辆	2.34亿辆
2008	38辆	841辆	0.496亿辆	2.48亿辆
2009	47辆	802辆	0.680亿辆	2.39亿辆
2010	58辆	797辆	0.780亿辆	2.39亿辆
2011	83辆		1.060亿辆	
2012	89辆		1.200亿辆	
2013	110辆		1.370亿辆	
2030	269辆	849	3.900亿辆?	3.14亿辆
			4.500亿辆?	
			12.000亿辆?	



# 全球化和城市化测试了城市的极限

Globalization and Urbanization test the limitation of cities

- 持续的全球化和城市化已经测试了城市的医疗卫生、电力、安全和运输基础设施的极限
- The continuous increase in globalization and urbanization has tested the limits of city's health, power, security, and transportation infrastructure.



# 都市圈面临的挑战与因应策略

成长将决定一个城市的未来

## Challenges & Strategies

Growth will determine the future of a city

经济活动的成长

Economic  
Growth

出行的成长

Travel Growth

居住需求的成长

Growth of  
Residential Demand

人口的成长

Population Growth

尾尾气排放的成长

Emissions Growth

工作的成长

Employment Growth

拥堵的成长

Congestion Growth

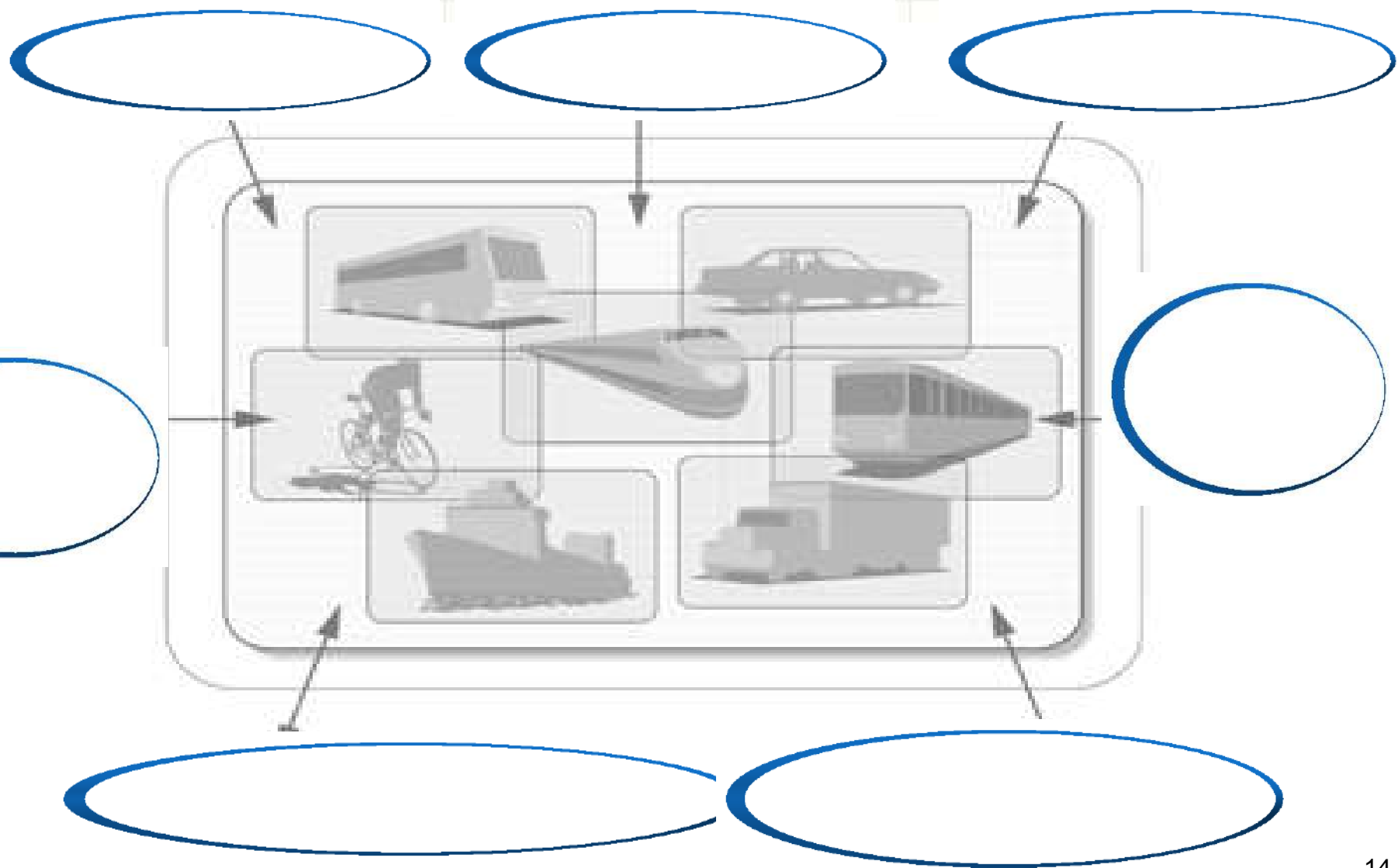


问题是，我们如何能够满足预测的成长？

The problem is how we could address the forecasted growth?



# 交通及其他社会目标的关联



# Regional Development in the U.S.

## The Benefits of Regional Planning

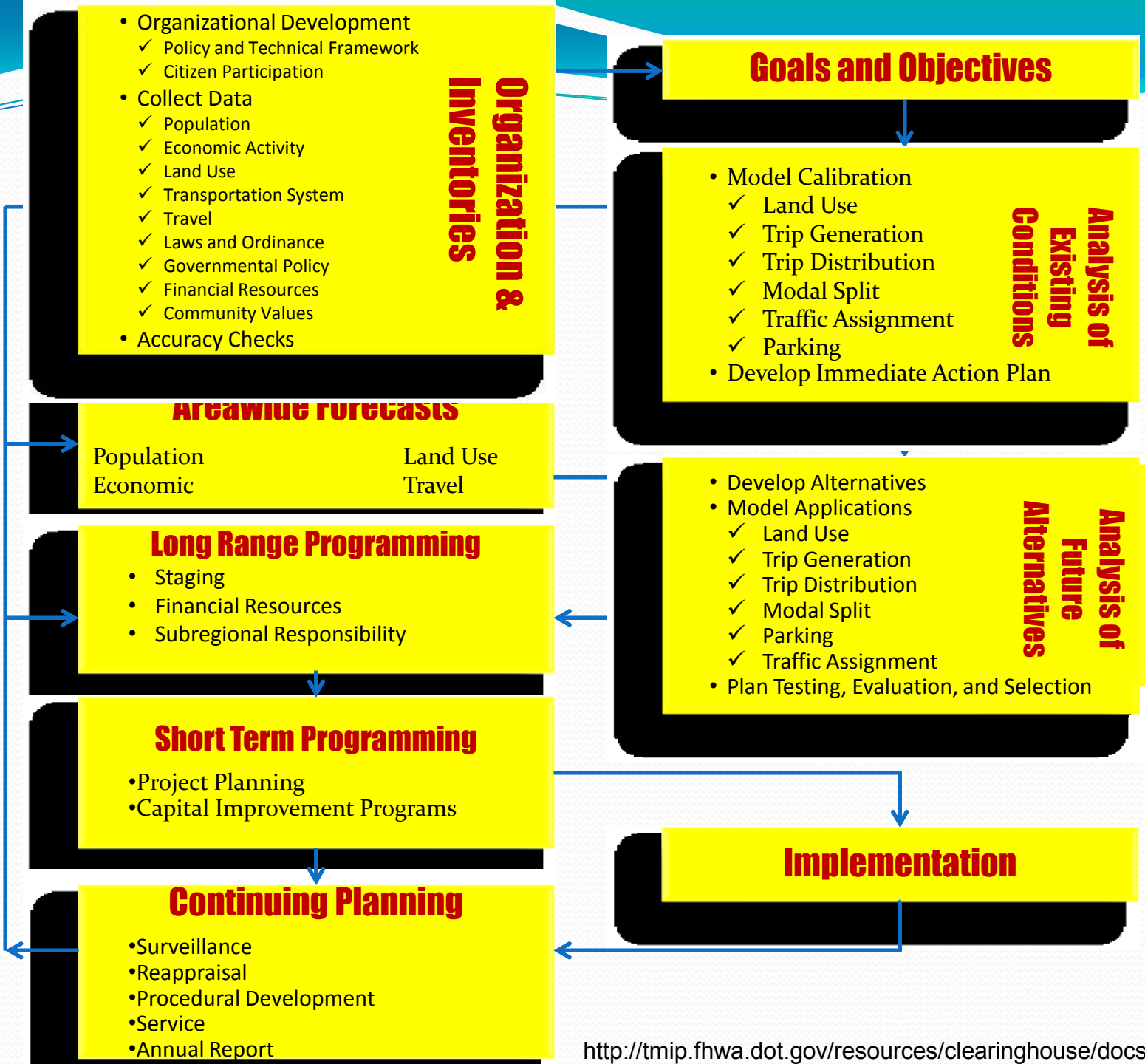
### 美国区域发展背景.. 区域规划的好处

- 許多區域性的問題(如空氣品質、交通運輸、洪水、經濟發展等)只有從區域的角度才能有效地規劃治理
- 經濟規模
- 共享基礎建設
- 經濟發展
- 生活品質



- Many regional issues (such as air quality, transportation, flood, economic development, etc.) can only be effectively planned and governed from a regional perspective.
- Economies of scale
- Sharing Infrastructure
- Economic development
- Quality of Life

# The Continuing Urban Transportation Planning Process



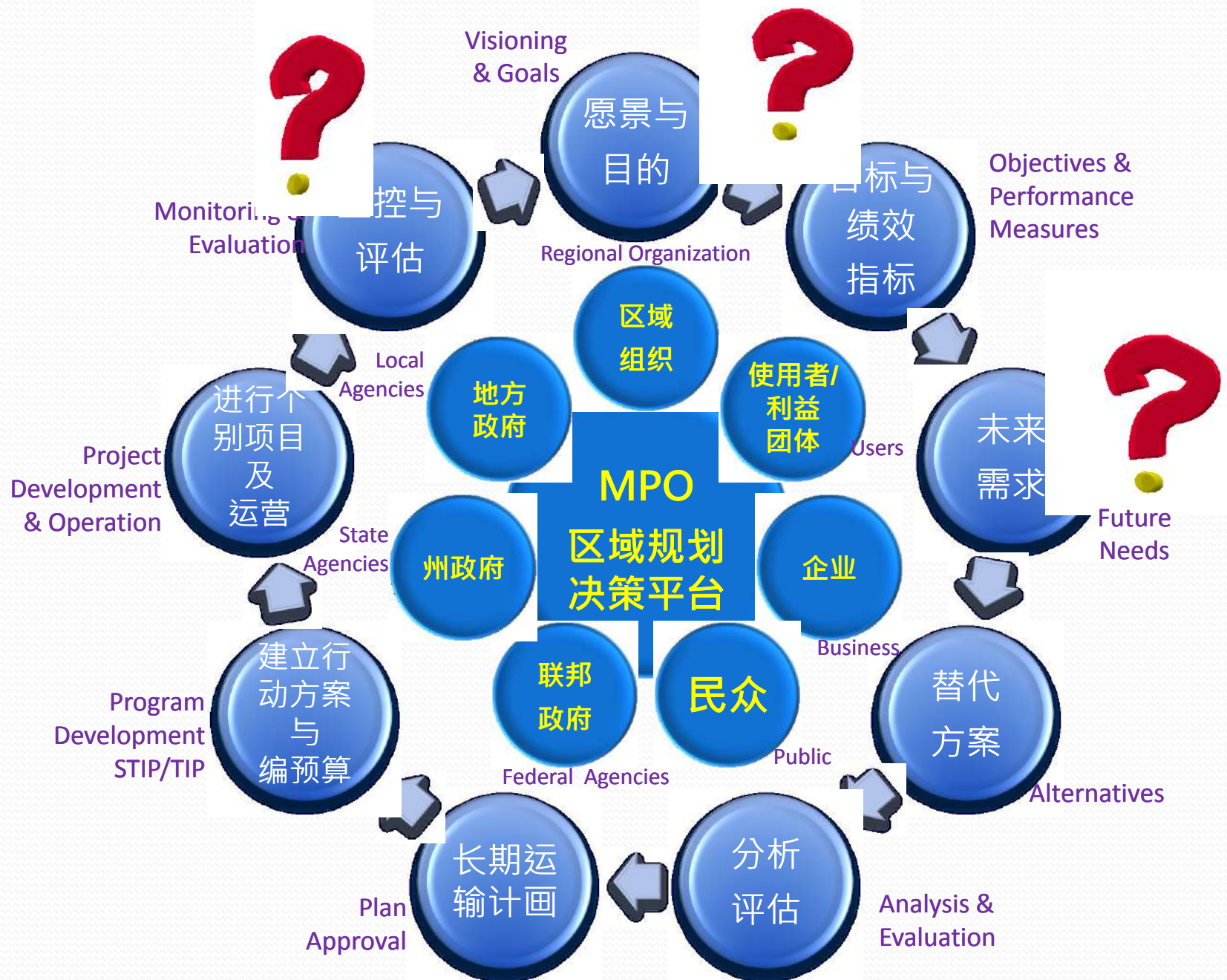


# 连续性的都市圈交通规划程序



# Regional Planning Decision-Making Process

## 区域规划决策程序



# Metropolitan Planning Organization

## MPO 都市圈规划组织

- A transportation policy-making and planning body with representatives of local, state & federal government and transportation authorities . MPO is a platform for **continuing, comprehensive, and cooperative**, or “**3-C**” transportation planning and decision-making process in the U.S.
- 一个由联邦，州及地方政府和交通部门代表组成的交通决策与规划组织。 一个接受美国联邦资金补助，执行合乎**持续的,全面的,合作的**规划原则的城市规划平台。



# 都市圈规划组织背景 MPO Background

- 都市圈规划组织(MPO)是依据美国联邦法23 第134条款,为超过 50,000人的都市化地区规划并计划交通基础设施实施方案
- Metropolitan planning organizations (MPOs) are regional agencies charged under 23 US Code § 134 to plan and program transportation infrastructure in urban areas with more than 50,000 people.
- MPO 建立于都市化地区 (UZAs),它的范围由每十年一次的人口普查决定。都市化地区内的所有的土地面积,连同未来二十年所有预计将成为城市化的土地,必须纳入MPO规划区域。截至2009年, 484都市化地区内有385个法定MPO。
- MPOs are established for urbanized areas (UZAs), which are defined by the Census Bureau after each decennial Census. All of the land area inside a UZA—along with all land are projected to become urbanized in the next twenty years—must be included in the planning area of an MPO. An MPO is not required for each UZA. As of 2009, 385 MPOs have been designated for 484 UZAs.

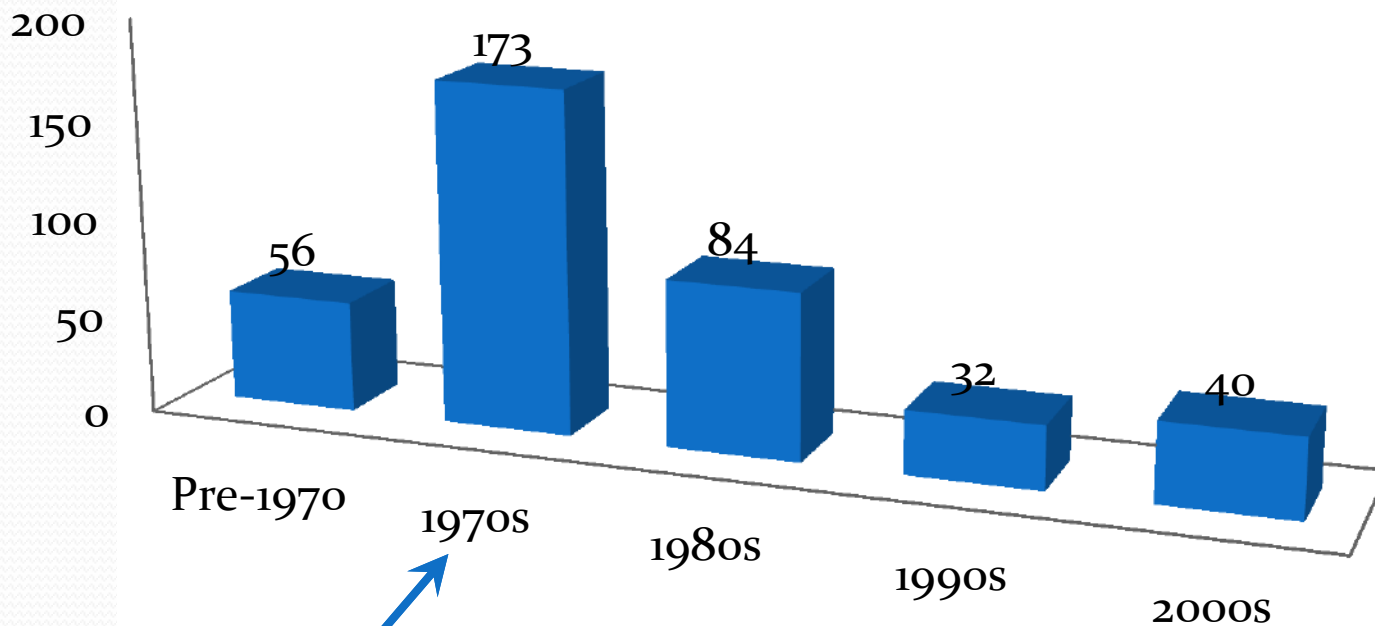


# 都市圈规划组织背景 MPO Background

- 依据美国人口普查局1950年普查开始使用的定义,美国的城市化地区在是指由至少有**每平方英里1000名居民(386.1人/平方公里)** 人口密度连续的普查街廓组群,与任何围绕着这一核心具有密度至少**每平方英里500居民(193.1人/平方公里)**的普查街廓组群。
- 城市化地区的划定,**不考虑政治上的边界**。
- Urban areas in the United States are defined by the U.S. Census Bureau as contiguous census block groups with a population density of at least **1,000 inhabitants per square mile (386.1 /km<sup>2</sup>)** with any census block groups around this core having a density of at least **500 inhabitants per square mile (193.1 /km<sup>2</sup>)**.
- Urban areas are delineated without regard to political boundaries.



# 都市圈规划组织背景 MPO Background



■ Number of MPOs formed in different time period

1973 Federal Aid Assistant Act



## 都市圈规划组织法规要求的文件

MPO接受联邦资金来执行合乎**持续的,全面的,合作的,或3C规划原则的规划程序**。MPO的核心工作是通过五至七个法规要求的文件。

1. **都市圈运输计划或长期运输计划 (MTP,RTP或LRTP)**指导本地区至少在未来二十年的愿景。
2. **统一规划工作方案(UPWP)**描述MPO的规划预算。
3. **交通改善实施方案(TIP)** 包括一系列在五年内兴建的工程项目。

MPOs receive federal funds to perform a planning process that **is continuing, comprehensive, and cooperative, or "3-C."** At the core of MPO operations are the adoption of five to seven documents required by statute.

1. Metropolitan Transportation Plan (MTP), Regional Transportation Plan (RTP), or Long Range Transportation Plan (LRTP). .. includes long term and short term strategies and actions to develop a multimodal transportation which can move people and goods effectively
2. Unified Planning Work Program includes planning work, supportive planning research, and a public participation plan
3. Transportation Improvement Program (TIP) includes a series of projects with workable funds to implement in the next five years.



# Metropolitan Planning Organization: Required Documents

## 都市圈规划组织法规要求的文件

根据联邦法律,有些MPO还需要执行其他的任务。

- 在200,000人以上的都市化地区必须完成一个**壅堵管理程序/系统(CMP或CMS)**。
- 在不符合空气质量标准地区内的MPO也必须执行RTP 及TIP的**空气质量达标分析**。MPO也可能需要执行其它由州法规定的工作。
- MPO也可能需要执行其它由州法规定的工作。

Some MPOs are required to perform additional tasks under federal law.

- MPOs in urbanized areas with 200,000 people or more must complete a **Congestion Management Process/System (CMP or CMS)**.
- MPOs within areas that do not meet air quality standards must perform **conformity analyses** to accompany their MTP and TIP. Additional duties may be assigned to an MPO by state statute.
- MPO may also implement other work required by State law.





# Five Core Functions of a MPO

## 都市圈规划组织的五个核心功能

- **Establish a setting** 建立一套公平有效的都市圈决策机制: Establish and manage a fair and impartial setting for effective regional decision making in the metropolitan area.
- **Evaluate alternatives** 评估都市圈可选择的方案: Evaluate transportation alternatives, scaled to the size and complexity of the region, to the nature of its transportation issues, and to the realistically available options. (These evaluations are included in the Unified Planning Work Program or UPWP).
- **Maintain a Long-Range Transportation Plan (LRTP)** 维持一个都市圈长期运输计划: Develop and update a long-range transportation plan for the metropolitan area covering a planning horizon of at least twenty years that fosters (1) mobility and access for people and goods, (2) efficient system performance and preservation, and (3) quality of life.
- **Develop a Transportation Improvement Program (TIP)** 建立一个都市圈交通工程改善计划: Develop a program based on the long-range transportation plan and designed to serve the area's goals, using spending, regulating, operating, management, and financial tools.
- **Involve the public** 公众参与: Involve the general public and all the significantly affected sub-groups in the four essential functions listed above.



# MPO Governance

## MPO治理: 都市圈规划组织结构



# MPO Board or Policy Committee

## MPO治理：董事会或政策委员会

- 是MPO的最高决策部门,包括地方政府民选或任命官员、不同运具的代表、州政府代表(交通厅及环保厅)、以及不具投票权的委员,如联邦交通部不同部门代表及商会。
- 除了少数例外(如奥瑞冈州波特兰市),并非由选举选出。
- 联邦法并没有规定MPO董事会的组成、非投票成员、顾问委员会、及董事会成员的投票权力。
- MPO Board is the decision-making body of a MPO, comprised of **elected or appointed government officials, representatives of different modes, State government representatives, and non-voting members**, such as Federal agencies and Chamber of commerce.
- Other than a few exceptions (Portland, OR) the Board members are not elected.
- Federal law does not require the composition of MPO Board, non-voting members, Advisory Board, and voting powers of the Board members.



# New York Metropolitan Transportation Council

## 纽约都市圈规划委员会 .. 组织结构

- 由纽约州州长于1982年指定为纽约都会区的MPO
- 董事会由的民选或政府机构负责人组成



- 九个具投票权:五个郊区县, 纽约市都市规划局及交通局, 纽约州交通厅, 都会区大众运输总公司
- 及七个无投票权:港埠管理局, 联邦、纽约州及新泽西州交通机构

### 九个官方的常设咨询委员会

- 社经预测工作组
- 自行车及行人工作组
- 货物运输工作组
- 都会区旅行机动力网络
- 长岛渡轮联合组织
- 运输增强计划工作组
- 智能运输系统工作组
- 安全咨询工作小组
- 清洁技术合作组织
- 机动力咨询委员会

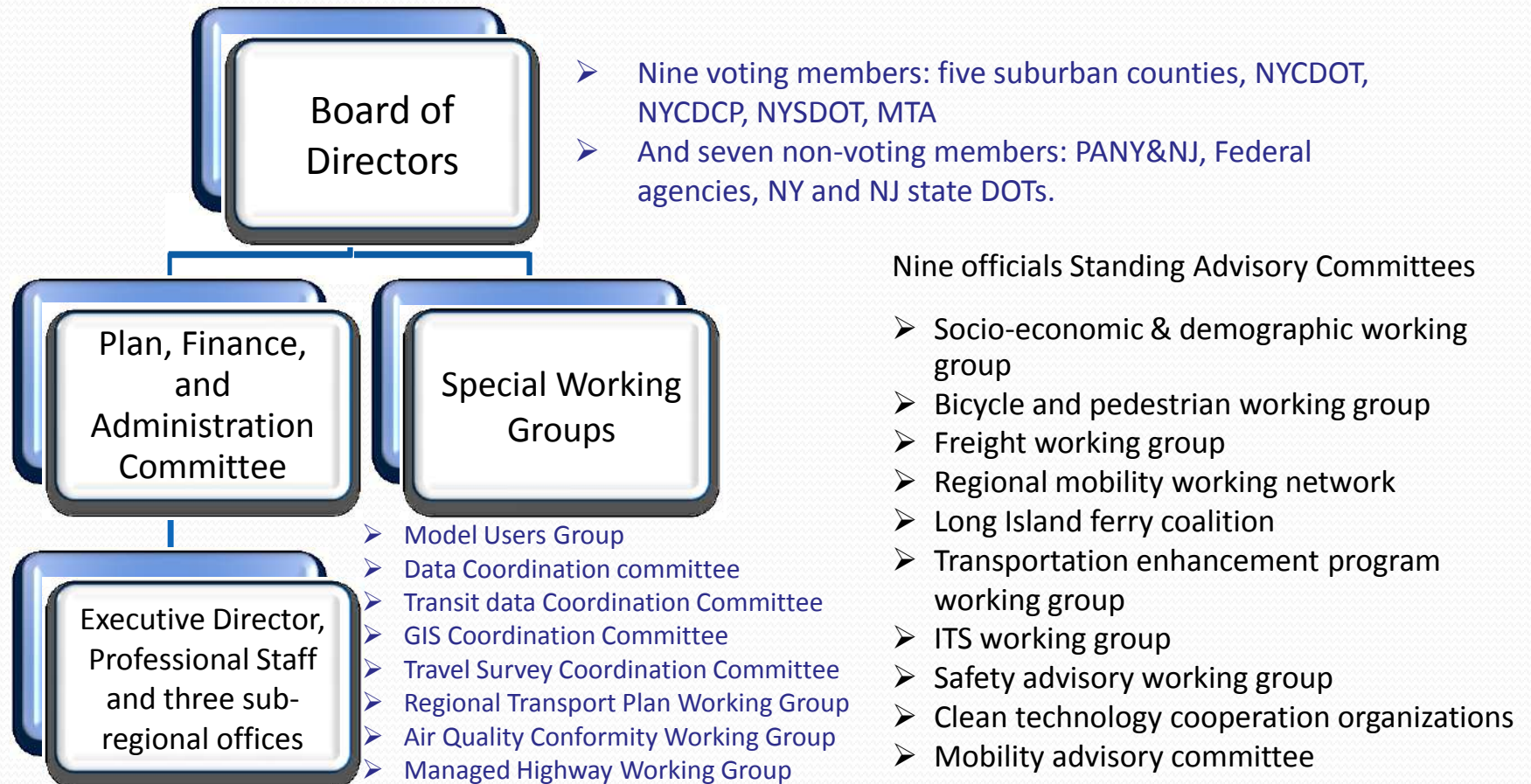
- ### 特殊工作委员会
- 交通模型用户会议
  - 交通数据协调委员会
  - 大众运输数据协调委员会
  - GIS协调委员会
  - 交通调查协调委员会
  - 区域运输计划工作组
  - 空气质量达标工作组
  - 管理道路用途工作组



# New York Metro Transportation Council .. Organization Structure

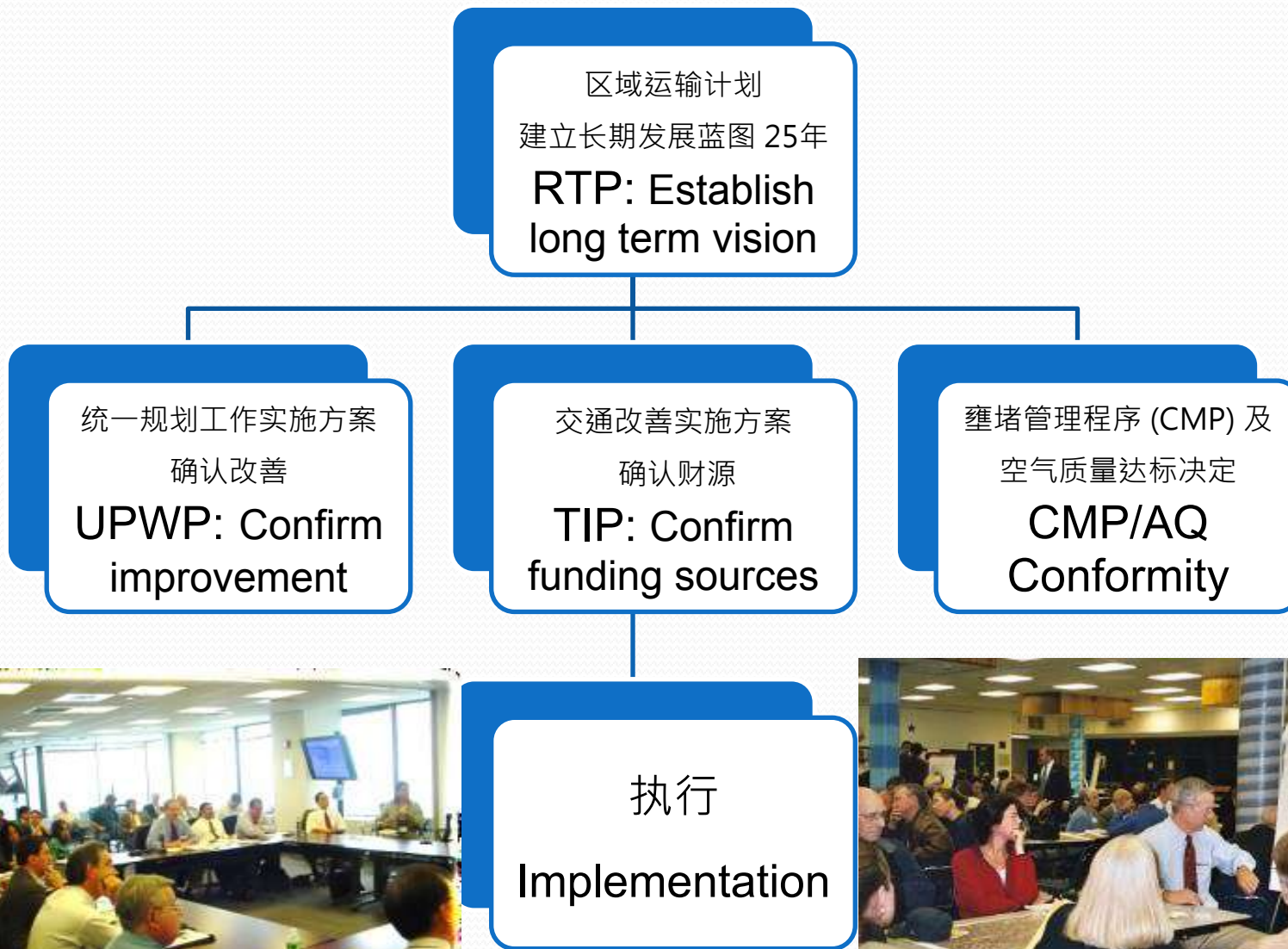
## 纽约都市圈规划委员会 .. 组织结构

- Designated by NYS Governor in 1982 as the MPO for the NY Metropolitan area.
- Board of Directors is made up of elected or appointed government officials.



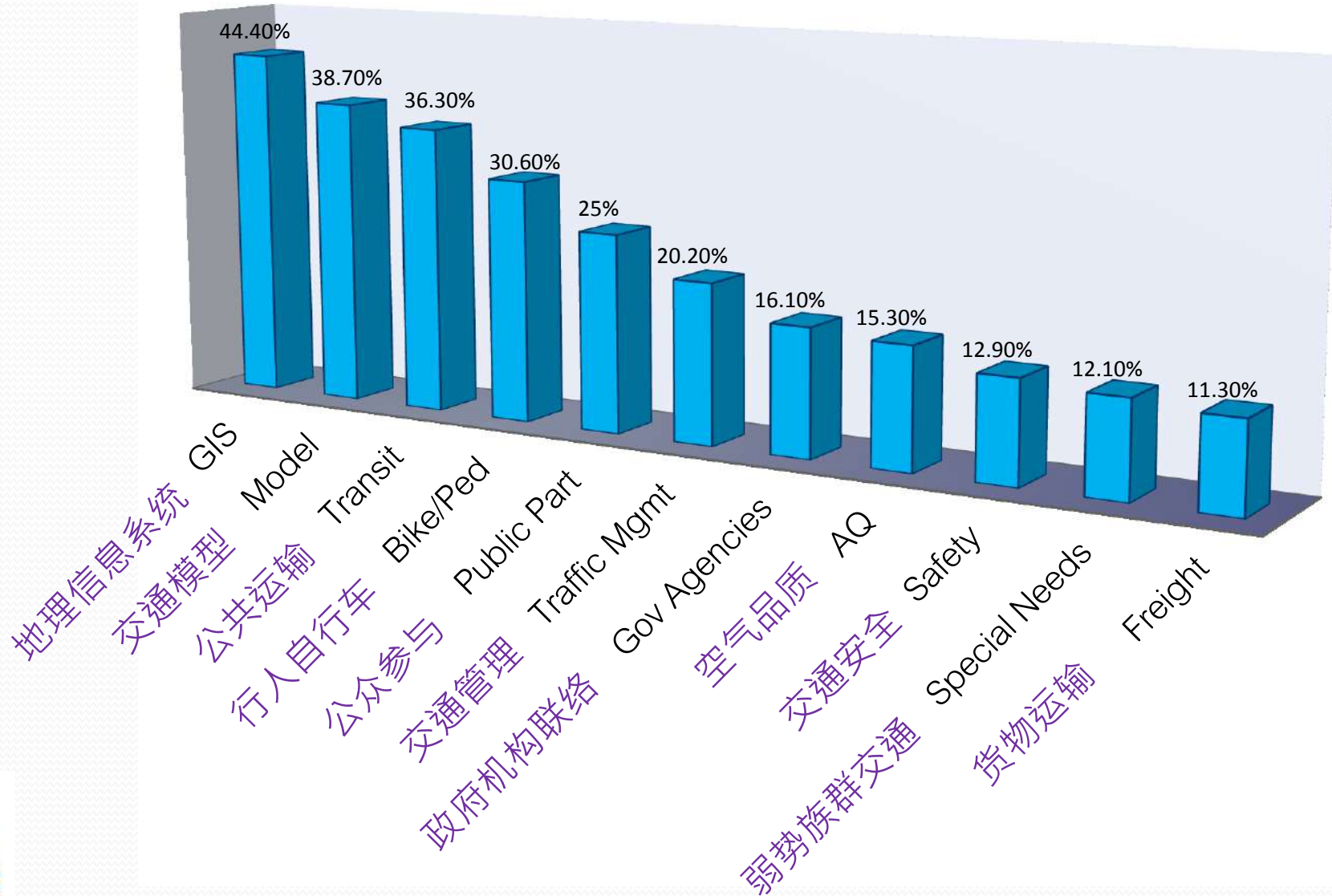
# New York Metropolitan Transportation Council .. Planning Process

## 纽约都市圈规划委员会 .. 规划程序



# MPO Governance: Special Tasks

## MPO 治理 .. 人力资源与专门业务



# MPO Major Planning Issues: Air Quality

## MPO 主要规划议题 .. 空气品质

How do we solve the traffic congestion while improving air quality?

我们如何在解决交通拥挤的同时，改善空气质量？





# MPO Major Planning Issues: Air Quality

## MPO 主要规划议题 .. 空气品质

- Transportation conformity is a way to ensure that Federal funding and approval are given to those transportation activities that are consistent with air quality goals.
- 运输达标程序是一种确保联邦资金和批准给予那些与空气质量目标一致的运输活动方式。
- It ensures that these transportation activities do not worsen air quality or interfere with the "purpose" of the SIP, which is to meet the NAAQS.
- 它确保这些运输建设活动不会恶化空气质量。



# Transportation Conformity & Pollutants

## 运输达标规划程序 及 污染物

运输达标规划程序应用於  
四项空气污染物

- 臭氧
- 一氧化碳
- 二氧化氮
- 可吸入颗粒物

Transportation conformity applies  
to the following criteria pollutants:

- ◆ Ozone,
- ◆ Carbon monoxide (CO),
- ◆ Nitrogen dioxide (NO<sub>2</sub>),  
and
- ◆ Particles with an  
aerodynamic diameter less  
than or equal to 10 microns  
(PM-10).



# CAA Requirements

## 美国洁净空气法案的要求

根据美国洁净空法案，区域运输计画(RTP)、运输改善方案(TIP)以及个别项目不能：

- 产生新的空气质量标准违规；
- 增加现有违规的发生频率或是严重性；或是
- 延误达到国家空气质量标准。

According to the CAA, transportation plans, programs, and projects cannot:

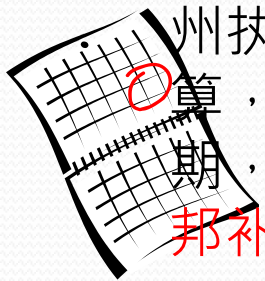
- Create new NAAQS violations;
- Increase the frequency or severity of existing NAAQS violations; or
- Delay attainment of the NAAQS.



# Transportation Conformity Requirements

## 运输达标规划程序的要求

- 每隔三年，每一未达标准的地区必须展示其移动污染源的目前及未来年的空气污染分析都合乎州执行计划的**污染预算**。
- 空气污染分析必须使用环保署的**空气污染模式**及**最佳可得到的交通数据**(车辆行车里程，车速，车种混合比例等)。
- 任何地区不能展示能够合乎州执行计划的空气污染预算，则进入『**权利中止**』期，同时**大部分该地区的联邦补助款也停止拨款**。
- Every three years each maintenance area must demonstrate **“CONFORMITY”** by showing that the mobile sources meet the SIP budget for the current and future analysis years
- The analysis must use the EPA Emissions model and the best transportation data (VMTs, speeds, vehicle mix, etc.) available
- An area not able to demonstrate conformity goes into “LAPSE” and **most federal money stops**



# Lessons Learned , Opportunities & Challenges 城市交通发展的机遇与挑战..美国经验总结

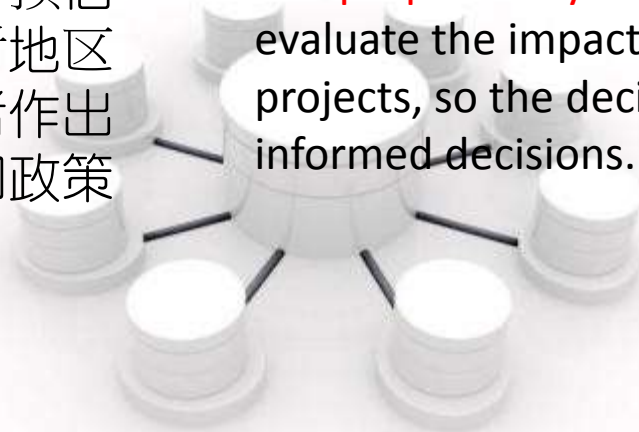
- 一个全面性、合作性、连续性 (comprehensive, cooperative and continuing (3-C) planning process)的规划程序对一个城市的整体城市发展是否有利?
- 道理很简单，如何执行才是真正的挑战！
- Is a comprehensive, cooperative, continuity (3-C) planning process favorable for the integrated transportation planning of urban development in China?
- The reason is simple, how to 额 implement is a real challenge!



# Lessons Learned , Opportunities & Challenges 城市交通发展的机遇与挑战..美国经验总结

- 从区域(城市化地区)规划的角度，评估可选择的改善方案；
- 持一个区域性长期运输计画以及一个区域性交通工程改善执行方案以达到区域共享愿景；
- 建立区域交通规划及决策信息中心；
- 使用现代化的分析工具及社经、交通需求预测模型，预估各种政策、计画和专案对地区交通的衝击，可使决策者作出对涉及到运输系统投资和政策较理性(知情)的决定。

- Select improvement alternatives from a **regional planning perspective**.
- Maintain a **regional long range transportation plan** and a **transportation improvement program** to achieve regional shared visions.
- Establish a **regional data center** for transportation planning and decision-making.
- **Use proper analytical tools** to forecast and evaluate the impacts of policies and projects, so the decision-makers can make informed decisions.



# Lessons Learned , Opportunities & Challenges 城市交通发展的机遇与挑战..美国经验总结

- 缜密的长期规划：对未来的社经发展，就业结构，人口增长，人口年龄结构，家庭组成，交通需求量，运具选择等因素应有充分及合理的预估；
  - 对未来的发展作出全面的佈局，并利用交通与土地使用的互动，积极地引导发展；
  - 协调个别地区的规划及交通投资计划，配合都市圈的策略发展目标。
- **Careful long-term planning**: the future socio-economic development, employment structure, population growth, age structure, household composition, travel demand, mode choice and other factors should be adequate and reasonable estimates;
  - **Utilize the interaction between transportation and land use**, to actively guide the development;
  - **Coordination of sub-region's planning and transport investment projects**, to comply with the regional development strategies and goals.



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- 交通建设对空气污染的影响做一个定期总体性的分析；
- 地区智慧运输系统区域架构及整合战略之制定与定期修正；
- 地区交通规划、管理及工程人才系统性训练；
- 公众参与程序：包括一般公众和所有被交通政策与建设显著影响的群体；
- 团队协作，注重程序。



- Analyze the impacts of transportation investment and policies on air quality, GUG and energy consumption;
- Develop and update regularly ITS Regional Architecture and strategies;
- Systematic capacity building for planners, engineers and administrative professionals;
- Public participation : involve public and all the groups that are impacted by transportation policies and programs;
- Team work & collaboration. Focus on process.



# Questions ? 问题 ? 建议 ?



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