



昆明快速公交

—— 实践、反思和发展策略

Practice, Review, and Strategy BRT Development in Kunming

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国际城市可持续能源发展市长论坛 Nov. 10-11, 2004 Kunming



路在何方???
Where is the way???

交通拥挤困扰现代大城市，解决交通矛盾已成为城市政府当前的一项首要任务。
Solving traffic problems is the one of the most arduous tasks for city governments currently.



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The Public Transport (PT) Planning Project between Kunming and Zurich started in 1994 and initiated “Public Transport Priority” as a principal policy for urban transport development in Kunming.

1994年开始的昆明与苏黎世公共交通规划合作，奠定了昆明“公交优先”的城市交通发展政策。



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北京路/ Beijing Rd.



人民路/ Renmin Rd.



金碧路/ Jinbi Rd.

1999年，昆明开通中国首条现代公交专用道，随后又建成2条专用道。

Kunming launched the first modern bus lane in China in 1999 and two additional bus corridors have been built.



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公交专用道/Bus lane

BRT是有效解决城市交通矛盾的先进技术

BRT is a new efficient solution to urban transportation issues.



BRT

昆明期望通过努力，建设现代BRT系统

Kunming hopes to build a demonstration BRT system in China through our concerted efforts.



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一、昆明快速BRT的实践

I. BRT in Kunming



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一、昆明快速BRT的实践

I. BRT in Kunming



1、规划建设情况

- 总长约40KM的“井”字型公交专用道路网规划
- 为城市中心区75%以上地区提供高品质的公共交通服务

1、 Planning & Construction of Bus lanes

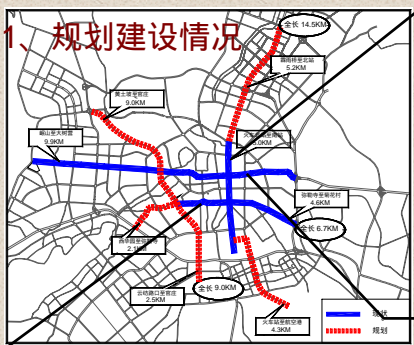
- 40 km of bus lanes planned in # shape.
- 75% service coverage rate of BRT in city center.



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一、昆明快速BRT的实践

I. BRT in Kunming



北京路专用道/ Beijing Road
 长度/ Length : 5km
 建成日期/ Date : 1994.4
 单位造价/ Unit cost : RMB 1,400,000/km

金碧路专用道/ Jinbi Road
 长度/ Length : 4.6km
 建成日期/ Date : 2003.8
 单位造价/ Unit cost : RMB 5,000,000/km

人民路专用道/ Renmin Road
 长度/ Length : 9.9km
 建成日期/ Date : 2002.7
 单位造价/ Unit cost : RMB 3,950,000/km

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一、昆明快速BRT的实践

I. BRT in Kunming

1、规划建设情况 Planning and Construction

昆明公交专用道主要技术特点 Main features of bus lane design

□ 内侧式公交专用车道

□ Center bus lanes

□ 站台设在交叉口

□ Bus stops at intersections

□ 宽大式站台

□ Wide platforms



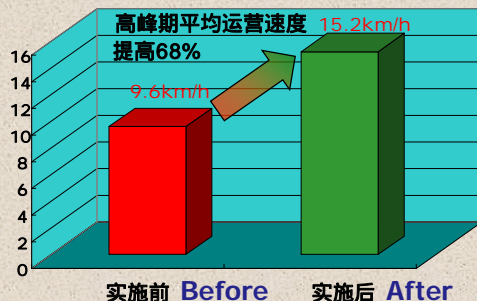
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一、昆明快速BRT的实践

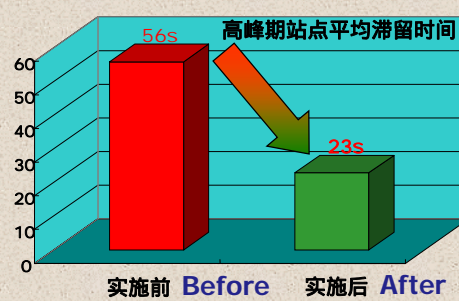
I. BRT in Kunming

2、实施效果 Results

- 中心区公交专用道车速，由9.6KM/h提高到15.2KM/h
- Bus speed in bus lane improved from 9.6KM/h to 15.2KM/h in downtown area
- 中心区公交站点停靠时间，由56秒下降到23秒
- Average wait time in downtown platforms decreased from 56s to 23s



Average bus speed in peak hours on Beijing Rd.



Average wait at downtown platforms



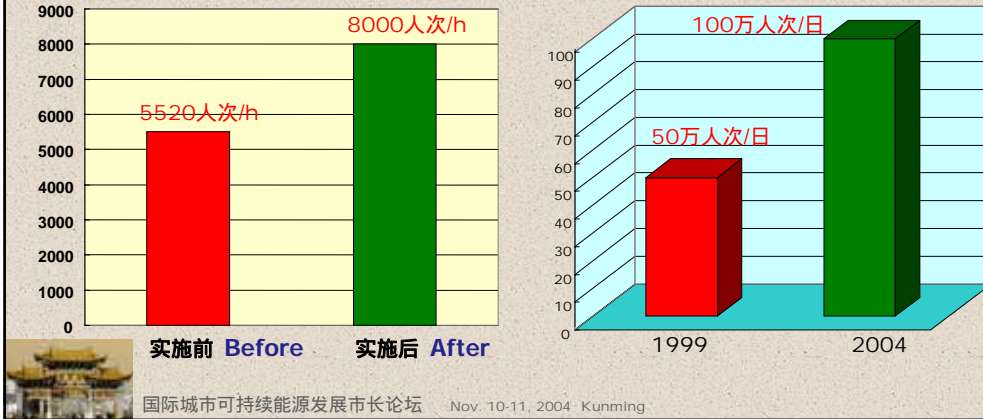
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一、昆明快速BRT的实践

I. BRT in Kunming

2、实施效果 Results

- 专用道公共交通运力增加近50%，达到8000人次/小时；
- Bus lane capacity reached 8000 passengers/h, almost a 50% increase
- 城市公交日客流量，由99年的50万人次增加到2004年的100万人次
- Passenger volume doubled from 0.5 million in 1999 to 1 million in 2004



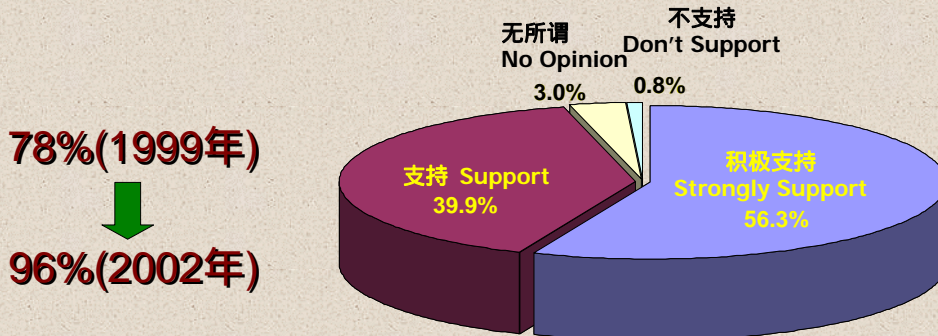
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一、昆明快速BRT的实践

I. BRT in Kunming

3、公众态度 Public Attitude

公众支持率 Public Support



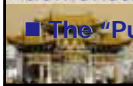
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一、昆明快速BRT的实践

I. BRT in Kunming

4、综合评价 Appraisal of Kunming's BRT

- 稀缺的城市交通时空资源得以更合理和公正的分配；
 - 公共交通运输效率和服务水平明显提高，公交营运成本降低；
 - 削减了专用道沿线的车流量，交通污染降低；
 - 改善了公众特别是低收入者的交通出行质量，体现了对人的尊重和关怀；
 - 政府的公交优先政策得到各方面的广泛接受。
- Deficient urban traffic resources i.e. time and space are more reasonably and fairly reassigned.
- Efficiency and service quality of public transit have been improved at a lower cost.
- Vehicle use decreased, resulting in a decrease in pollutants.
- The quality of public transport especially for low income groups has improved, demonstrating respect and concern for the people.
- The "Public Transport Priority" policy is widely accepted by the public.



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二、昆明快速BRT的反思

II. Review of BRT in Kunming

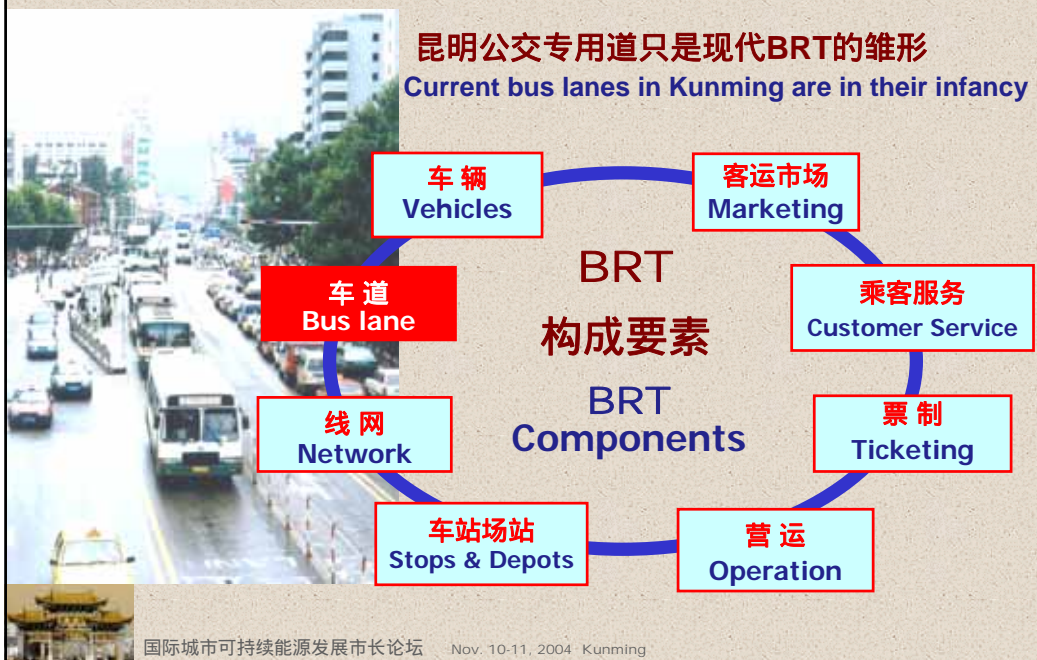


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二、昆明快速BRT的反思

II. Review of BRT in Kunming

昆明公交专用道只是现代BRT的雏形
Current bus lanes in Kunming are in their infancy



BRT 构成要素
BRT Components

- 车辆 Vehicles
- 客运市场 Marketing
- 乘客服务 Customer Service
- 票制 Ticketing
- 营运 Operation
- 车站场站 Stops & Depots
- 线网 Network
- 车道 Bus lane

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二、昆明快速BRT的反思

II. Review of BRT in Kunming



专用道能否提升形成现代BRT，将对昆明交通发展方向产生重大影响。

If current bus lanes could be upgraded to a modern BRT system, this would substantially affect the direction of urban transport development in Kunming.



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二、昆明快速BRT的反思

II. Review of BRT in Kunming

1、专用道客运效率未达到理想水平

1. Capacity is insufficient



昆明/ Kunming
8000人次/h
8000 passengers /h

BRT
20000~30000人次/h
20000~30000 passengers/h



运力不足是昆明BRT的核心问题

Insufficient capacity is the main issue for Kunming BRT development.



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二、昆明快速BRT的反思

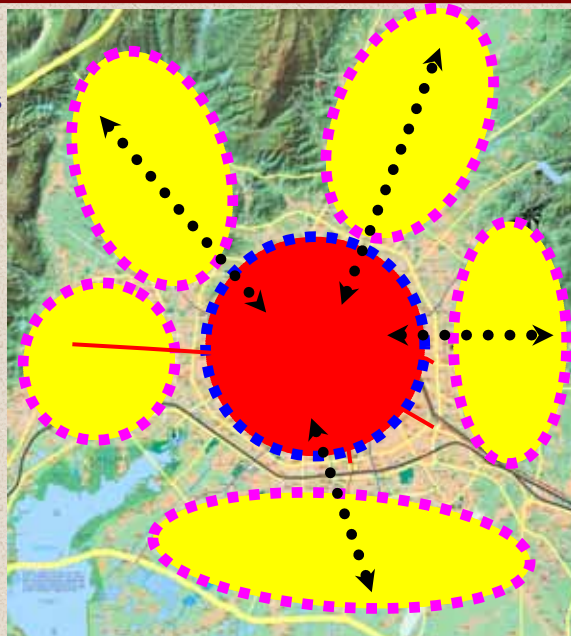
II. Review of BRT in Kunming

2、专用道总规模和覆盖率偏低

2. Overall scale and coverage rates are low

特别是联结城市中心区和
新区的放射轴线缺乏大运
量公交通道

There is a lack of high
capacity bus lanes
connecting the
downtown area to its
surrounding areas.



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二、昆明快速BRT的反思

II. Review of BRT in Kunming

3、公交服务品质不满足现代生活要求

3、The quality of public transit service does not meet modern needs



公交档次低、服务水平不够高，对市民出行缺乏良好的吸引力，不能满足现代出行需求。

Low quality bus vehicles and service level cannot attract ridership and fail to meet modern travel needs.



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二、昆明快速BRT的反思

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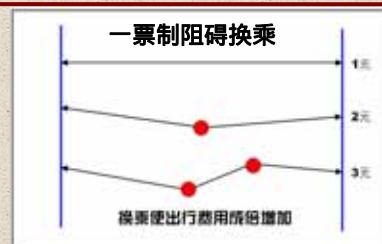
4、公共交通未整合成一个高效系统

4、Public transport has not been integrated into a highly efficient system

公交线网混乱低效

Poor efficiency bus lines network

- 缺乏大运力骨干线路
- Lack of backbone bus lines with high capacity
- 低水平垃圾线路多
- Too many low efficiency bus lines
- 一票制是公交丧失网络效率根本原因
- One ticket-one bus system hinders the efficiency of the public transport network



线网混乱低效



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三、昆明快速BRT的发展策略

III. Development Strategies for BRT in Kunming



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三、昆明快速BRT的发展策略

III. Development Strategies

建设现代BRT是昆明城市交通发展的既定方针

To develop a modern BRT system is the priority for Kunming's urban transportation development.

在美国能源基金会的资助和技术支持下，昆明市已完成《昆明快速公交系统研究》。以此为指导，昆明市将实施“快速BRT提升计划”，包括五大措施：



Thanks to the Energy Foundation for their financial and technical support, Kunming has completed the Kunming BRT System Development Study. With these guidelines, Kunming will implement a “BRT Upgrade Plan” to include these 5 main measures:



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三、昆明快速BRT的发展策略

III. Development Strategies

1、法定公交优先政策 **Legislate "Public Priority Policy"**

贯彻《建设部关于优先发展城市公共交通的意见》的精神，从立法层面确立“优先发展公共交通”的城市交通发展政策。

Carry out the public transit development policy from Ministry of Construction, and make "Public Transport Priority" the principal for the urban transport development in legislation.

全面研究和落实公交优先的各种措施及政策，为公共交通的优先发展提供良好的环境和支持。

Comprehensively implement "Public Transport Priority" related measures and policies to support the development of public transport.

加强宣传和教育，使全社会理解和支持政府的公交优先政策。

Be more proactive in public education and promoting "Public Transport Priority" to gain stronger public support and increase public awareness.



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三、昆明快速BRT的发展策略

III. Development Strategies

2、全面提升BRT设施水平 **Upgrade Overall BRT Facility**

车辆		场站	
	Vehicle		Stops and Depots
车道		票制	
	Bus lane		Ticketing
营运调度		乘客服务	
	Operation		Customer Service

BRT容量 BRT Capacity

■城区内 : BRT in City Center
12000~15000人次/h (passengers/h)

■放射线 : Radiation BRT
>20000人次/h (passengers/h)

提升品质，成为对小汽车具有竞争力客运系统。

Upgrade service quality to compete with cars.

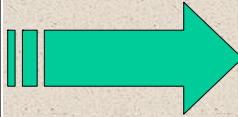
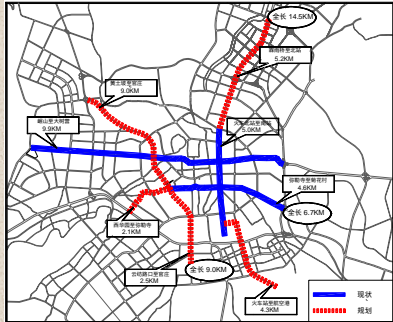


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三、昆明快速BRT的发展策略

III. Development Strategies

3、拓展BRT网络规模 Expand the BRT Network



使昆明BRT网络总长从目前的20km增加到约70KM

Expand total length of BRT network from 20KM to 70Km

建立换乘体系，将BRT与其它交通方式集成为一个完整的体系

Establish interchange system to integrate BRT and other traffic modes into a complete transport system.



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三、昆明快速BRT的发展策略

III. Development Strategies

4、优化公交线网 Optimize Bus Network

形成分级和衔接的高效体系 Develop a multi-level network

一级网：大容量骨干网络

First level: High capacity backbone lines

二级网：补充性干线网

Second Level: Secondary Main lines

三级网：客流收集与疏散系统

Third Level: Feeding routes to gather and disperse passengers



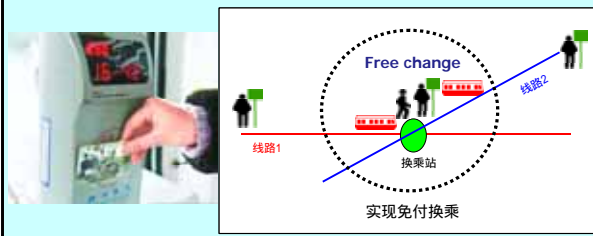
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三、昆明快速BRT的发展策略

III. Development Strategies

5、建立现代公交票制

Establish a modern ticketing system



第一阶段：公交IC卡，免付换乘

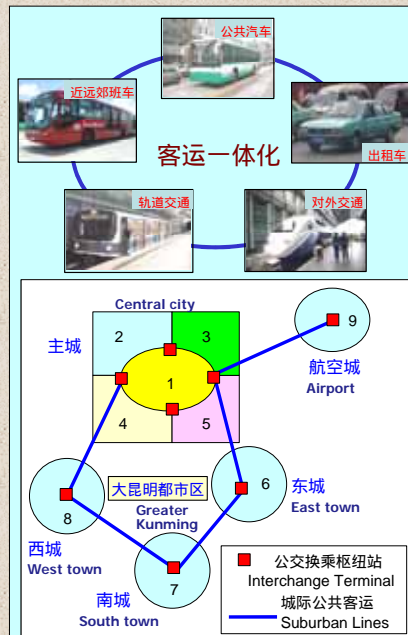
Phase I: Free ticketing exchange with IC card.

第二阶段：票制分区，多系统、多功能

Phase II: Ticketing zone for multi-modes and functions.



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结束语

昆明的公交优先实践，使政府和公众看到了解决交通矛盾的曙光。

公交专用道提升形成高品质的现代BRT系统,将能找到一种适合发展中城市、经济高效、易于实施和推广的公共交通解决方案。

“Public Transport Priority” practices in Kunming demonstrate an effective way to solve traffic problems for the government and public.

Upgrading bus lanes in Kunming to a high quality modern BRT system will create an economic, effective, and practical transportation solution for cities in developing cities like Kunming.

谢谢 Thank You

抓住发展机遇, 改善交通结构

积极推行成都快速公交系统建设

Seizing Development Opportunities to Improve the Transportation System and Promote Bus Rapid Transit in Chengdu

成都市人民政府副秘书长 张学爱

ZHANG Xue'ai
Deputy Secretary General, People's Government of Chengdu

1

一、背景 Background

通过两次OD调查, 可见近年来成都交通结构发生深刻变化, 具体如下:

Traffic structure changed tremendously

■ 步行和自行车出行方式比例下降。

Biking and Walking decreased

出行方式 Traffic Mode	2000年 (%)	1987年 (%)
步行 Walking	30.8	36.06
自行车 Bike	43.8	54.53
公交车 Bus	10.2	5.87
摩托车 Motor bike	2.6	3.54
出租车 Taxi	4.7	
汽车 Vehicle	6.0	
货车 Truck	1.9	
其他 Other	0.1	
合计 Total	100	100

2

一、背景 Background

■ 公交出行方式大幅上升，但其分担的比例仍然不高。

Bus use increased but the percentage is still very low.

■ 近年来成都市市区私人汽车增长非常快，居民出行乘汽车的比例也在迅速增加

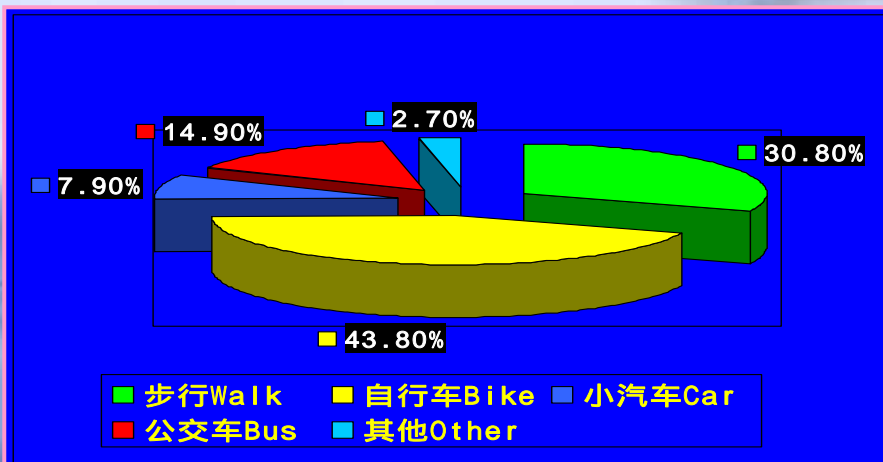
The use of cars increased rapidly.

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合计 Total	100	100

3

成都2000年居民出行结构示意图

Transportation Modes in Chengdu, 2000



成都市汽车增长量统计图 Increase in Chengdu's Vehicle Population

Vehicle Ownership from 1989 to 2003



5

《成都市畅通工程规划》实施道路改造情况 Road and Traffic Improvements

一环主要作为入城市方向转换路，重点加强路口的入城直行及左转能力
Improve the capacity of the 1st ring road as an important entry road.

尽管近年来城市道路建设特别是畅通工程成绩显著（道路面积年增长率约6%），但随着城市道路资源的枯竭，靠大量消耗资源支撑的城市交通方式将难以为继
Great achievements in urban road construction but we need new ways to develop transportation.



井字形交通疏散系统。红星路，新华路、东城根街-浆洗街、滨江路
New ways to alleviate traffic congestion. Hongxin Road, Xinhua Road, Dongchenggen Street, Jiangxi Street, Binjiang Road

二环主要作为出城方向转换路，重点加强路口的出城直行及左转能力。
Improve the capacity of the 2nd ring road as an important exit.

二、发展快速公交在成都的挑战和机遇

Opportunities and Challenges for Developing BRT in Chengdu

- 1、时代机遇：成都现在处于机动化高速发展阶段，也处于公交发展关键时期。
- 2、政策机遇：按照建设部关于优先发展城市公共交通的意见，5年内公交在城市交通出行分担比例必须达到30%，平均行使车速大于20km/h以上，准点率90%以上。这是普通公交难以达到的，这成为建设快速公交的又一机遇。
- 3、规划机遇：在新一轮城市总体规划提出构建“一主两次多核”的城市空间结构，提出以TOD模式进行土地开发，为快速公交发展创造良好机遇。

1. Opportunity: Fast transport mechanization and public transport development.

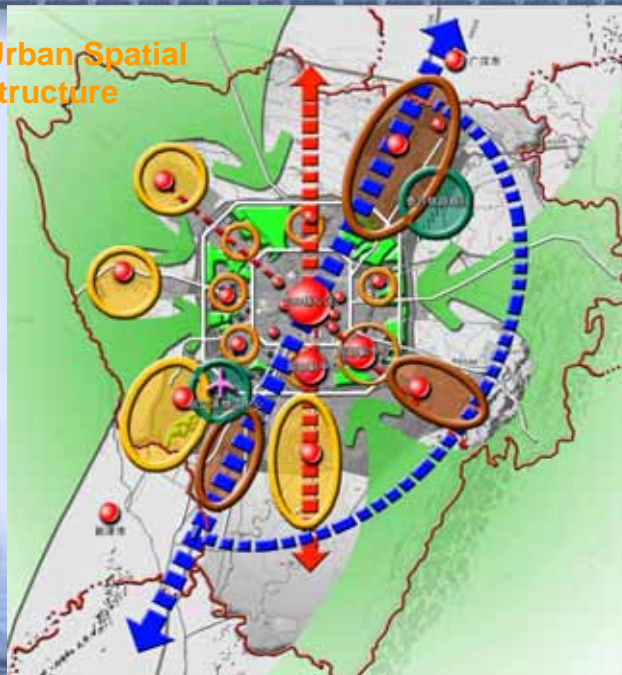
2. Policy opportunity: The Ministry of Construction made the Development of Urban Public Transport a Priority.

3. Planning opportunity: Chengdu has proposed to establish a multi-center urban spatial system which will provide new development opportunities for building BRT.

7

新一轮成都市城市总规修编的城市空间结构图

New Urban Spatial Structure



8

BRT特点一：经济性 Economics		不同交通模式技术经济比较表 Comparison of Different Modes			
系统名称内容 Content	1快速公交 BRT	2地铁 MRT	3轻轨 LRT	4有轨电车 Tram	比较 Comparison
运能(人次/小时) Capacity	20000 (60000)	50000 (70000)	20000 (30000)	10000 (15000)	1=2>3、4
运速(公里/小时) Speed	20—40	25—60	20—40	15—25	2>1、3>4
系统造价(亿元/公里) Cost	0.3—0.5	4—5	1.5—2.0	0.4—0.6	2>3>4>1
开放性 Open	可开放 Open	不可开放 NOT			2、3、4为封闭系统
配套系统 Auxiliary system	简单 Easy	复杂 Difficult			供电、车场等
城市景观影响 Impact on Landscape	没影响	没影响	影响大	影响大	网架、轨道
对道路影响 Impact on Road	不大	无	大	大	3、4有分隔作用
对其它车辆影响 Impact on Vehicles	不大	无	大	大	3、4不能满足现有桥梁净高
对净高要求 Headroom	5米	无	5.5米	5.5米	
环保性 Environment Condition	较好	好	好	好	
商业性 Business	最好	差	较差	次之	1>3、4>2
成熟性 System Stability	好	好	好	好	
维修保养 Maintenance	便利	困难	困难	次之	1>2、3、4
系统扩展 Development	易 Easy	难 Difficult	次之 Normal	次之 Normal	1>2、3、4

■ BRT特点二：适用性

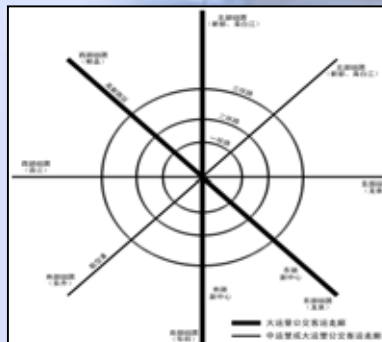
BRT Feature: Applicability

通过对未来成都公交客运走廊的分析，在800公里左右的各类运量客运走廊中：

1、大运量 (>20万人次/日) 走廊约150公里 (占20%) ——应采用地铁

Analysis of future public transport passenger corridors in Chengdu shows that among the some 800 KM passenger transport corridors in the city

1. Large transport volume (>200,000 passengers/day) corridors are around 150Km long (accounting for 20%)



■ BRT特点二：适用性

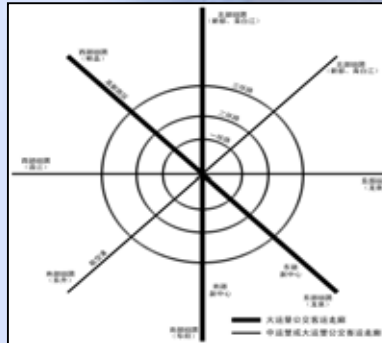
BRT Feature: Applicability

2、中运量走廊（8~20万人次/日）
约250公里（占30%）——采用快速
公交方式（BRT）完全可以满足；

3、普通巴士走廊（4~8万人次/日）
约400公里（占50%）。

2. Medium transport volume corridors
(80,000 ~ 200,000 passengers/day) are
about 250Km (accounting for 30%).

3. Ordinary bus corridors (40,000 ~ 80,000
passengers) are around 400Km
(accounting for 50%).



11

这里，中运量客运走廊的公交等级定位为中运量快速公交，系统首选快速公交系统，且该系统就运量而言有向上扩展的余地，也可向下延伸，

The first choice for medium capacity corridors is BRT. As far as transport capacity is concerned, the system can be built up or down.



可根据城市社会经济及交通状况，灵活调整，具有操作弹性，因为快速公交适宜的输送能力范围为8 ~ 30万人次/日，已达到大运量系统运量的下限。

BRT meets the needs of urban areas. Because BRT's transport capacity range is 80,000 ~ 300,000 passengers/day, it has already reached the lower limit for large transport volume systems.



三、成都市公共交通发展战略和近期建设规划 Chengdu's BRT Development Strategy and Near-term Construction Plan

■成都公共交通发展方向

Direction of Public Transport Development

建立以轨道交通和快速公交为骨干，普通地面公交为基础的先进合理的公交体系。

Building an advanced and rational public transport system with subways and BRT lines as the trunk lines and conventional public transport as feeder lines.

三、成都市公共交通发展战略和近期建设规划 Chengdu's BRT Development Strategy and Near-term Construction Plan

■成都公共交通发展方向

Direction of Public Transport Development

即在主要客流走廊上建设轨道和快速公交系统，建设与轨道和快速公交系统相衔接，覆盖整个市区的普通公交系统

Build rail and BRT systems on main passenger transport corridors and a conventional public transport system that connects rail and BRT systems and covers the entire urban area.

15

■快速公交走廊分析 Analysis for BRT Corridor

未来成都客运走廊的功能分类和分级标准如下：

Categories of future transportation corridors based on the function and capacity

- 大运量公交客运走廊：>20万人次/日；
Mass transit transportation corridor: >200,000 passengers/day;
- 中运量公交客运走廊：8~20万人次/日；
Medium volume transportation corridor: 80,000-200,000 passengers/day;
- 普通巴士客运走廊：4~8万人次/日；
Regular bus transportation corridor: 40,000-80,000 passengers/day;

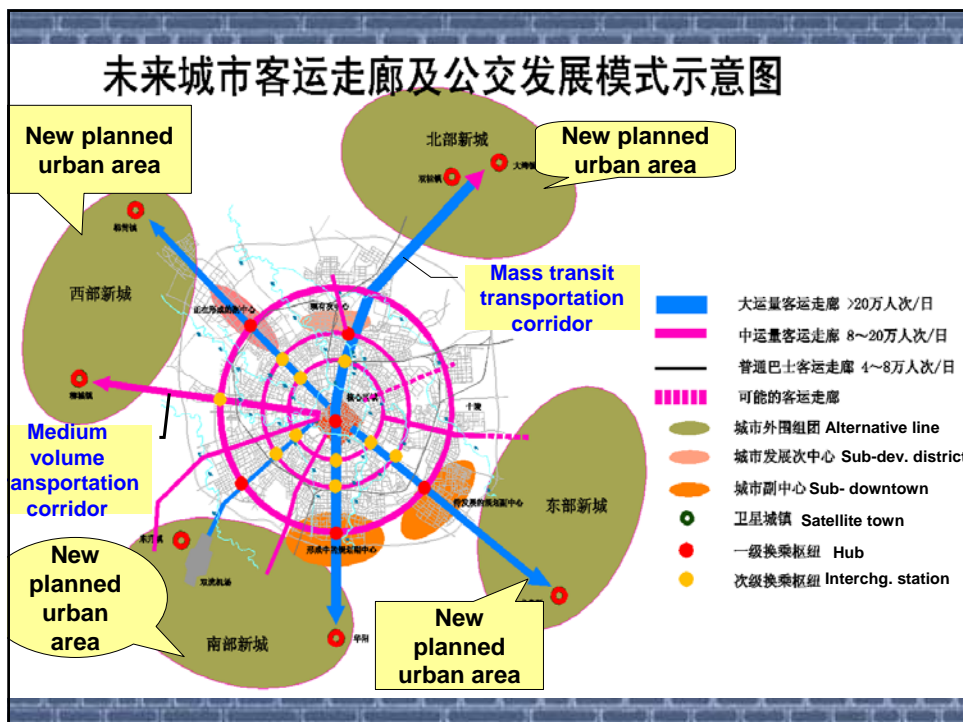
16

快速公交走廊分析 Analysis on BRT Corridor

根据对公交客运走廊的分析，成都市客运交通走廊呈“环+放射”形态分布。

Based on the analysis of public transportation corridor, In the near term, 5 BRT corridors are planned to form a preliminary BRT network featuring “Cross Axes + Ring” in Chengdu.

17



**快速公交近期建设
BRT Near-term Plan**

近期规划5条“环+十字+两区间”快速公交走廊。
“Cross Axes + Ring + Two Sections”

环状快速公交道路：
二环路
Ring: Second ring road



十字：蜀都大道、人民路--蜀都大道与人民南路道路改扩建已于今年十月实施完成，具备设置BRT基础条件。
Cross Axes : Shudu Avenue and Renmin South Road --which form the central axes of the cross, were completed in October 2004.

两区间：老成灌路、红星路
Two sectors:
Laochenggaun Road and Hongxing Road



■成都市二环路规划效果图

BRT 3-D Drawing of the 2nd Ring Road



■成都市二环路规划断面（BRT）效果图

BRT 3-D Drawing of the 2nd Ring Road

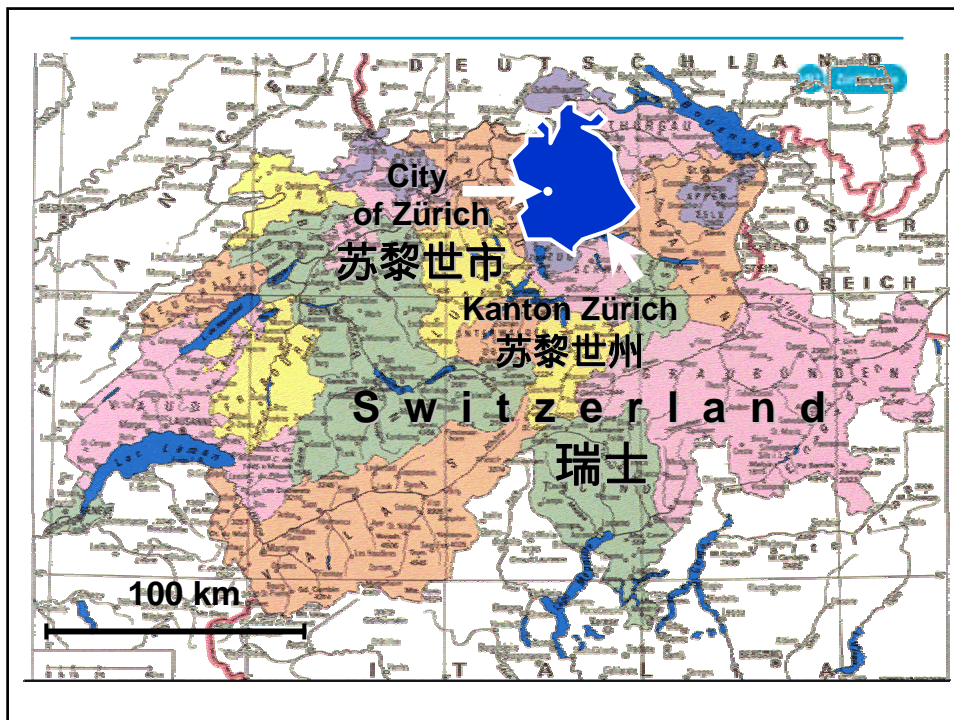




**“Zürcher Verkehrsverbund ZVV”:
Lessons Learned from 14 years of
Cooperation in Regional Transport**

**交通联合会 14 年区域
交通合作经验**

**Dr. Elmar Ledergerber
Mayor of Zurich**



业务环境

- **瑞士**
41'293 平方公里
720 万居民
17.8% 的出行里程采用公共交通
- **苏黎世州**
171 个社区
124 万居民
74.6 万工作人员
61.7 万辆轿车
39 家公共交通运营机构
23% 的出行里程采用公共交通
64% 的出行里程采用轿车

Business environment

- **Switzerland**
41,293 km²
7.2 million inhabitants
17.8% by public transport
- **Canton of Zurich**
171 communities
1.24 million inhabitant
746,000 employees
617,000 cars
39 public transport operators
23% by public transport
64% by car



1990 年以前的状况

- 41 家公共交通运营机构
- 几乎没有协作，例如铁路和地方公共汽车运营机构之间
- 没有通用的战略性市场策略
- 在苏黎世州旅行时需购买多种车/船票

Situation before 1990

- 41 public transport operators
- few co-ordination e.g. between railways and local bus operators
- no common strategic marketing
- need for multiple tickets when travelling throughout the Canton of Zurich

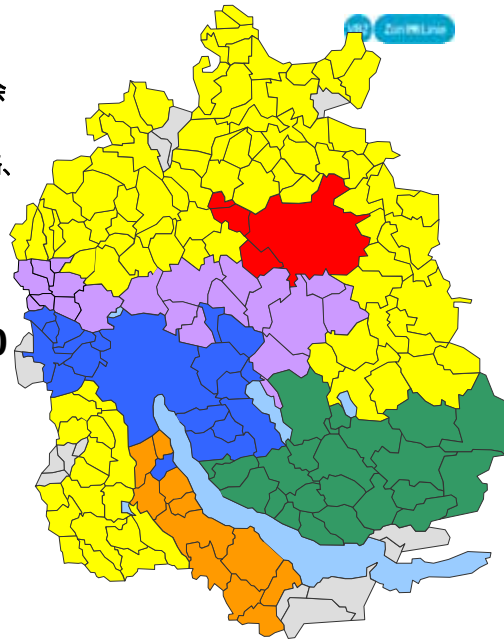


1990 年以来的组织

- 所有运营机构加入一个交通联合会
- 出台关于公共交通的新法律
- 1 个交通管理机构决定票价、战略、财务和服务
- 8 家公司承担市场责任
- 31 家地方运营机构

Organization since 1990

- All operators formed one transportation association
- New law on public transportation
- 1 transport authority decides on fares, strategy, financing, services
- 8 companies with market responsibility
- 31 local operators





Organization of Public Transport throughout the Canton of Zurich
整个苏黎世州的公共交通组织





Achievements

成就



“ I am also a ship,,

“ 我也是艘船。 ”

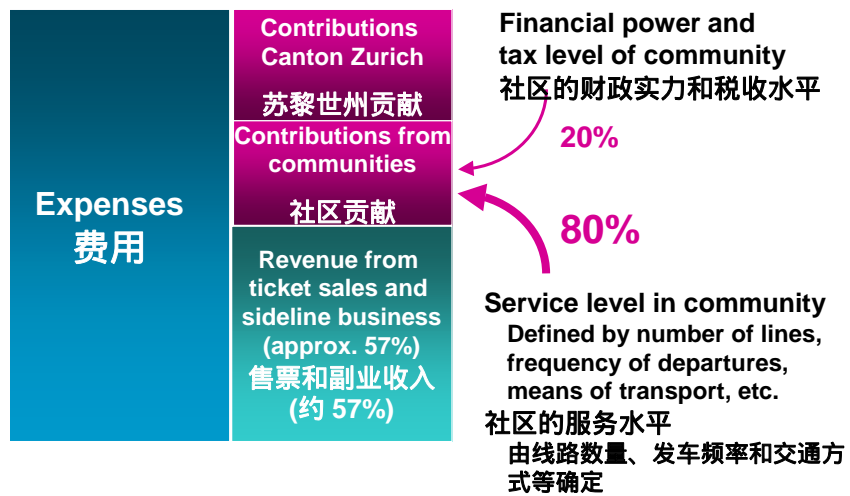
VRZ Zürcher Linie

- 整个州的服务得以协调
- 为乘客提供优化的出行链
- 基于区域的票务系统
- 公共汽车、电车、火车、渡船和缆车采用一票制
- 12 年中乘火车往返的乘客增加了 80%
- Coordination of services throughout the Canton
- Optimized travel chains for customers
- Zone-based fare system
- One ticket for bus, tram, train, boat services, funiculars...
- 80 percent more passengers on commuter trains (S-Bahn) in 12 years



Funding of Public Transport in the Canton of Zurich 苏黎世州公共交通资金

VRZ ZürichLine





学到的经验

- 要想运载更多乘客，必须为他们提供协调有序的出行链。
- 提供简单的票务系统 — 票制
- 交通联合会仍然欢迎独立的交通公司
- 需要清晰的财务制度和任务划分。
- 即使制定了财务制度，仍然需要资金
- 推动协调网络的公共利益会与个别局部利益产生冲突。
- 因此，没有政府支持就不会取得成功

Lessons Learned

- If you want more passengers, offer them coordinated travel chains.
- Offer a simple fare system - 1 ticket for everything.
- A transportation association still offers a place for independent transport companies.
- You need clear regulations for financing and a division of tasks.
- Even if financing is regulated, you still need money.
- Promoting a common interest in a coordinated network can collide with single local interests.
- Therefore, you can't succeed without political support.



欢迎乘坐 VBZZüri-Linie!
苏黎世市公共交通

Welcome aboard VBZ Züri-Linie!
Public transport in the City of Zurich

VBZ 苏黎世公共交通： 事实和数据

- 82 万乘客/天
- 1,60 万乘客公里/天
- 每天相当于绕世界两圈
- 2300 名工作人员
- 4.38 亿 CHF 费用/收益
- 365天/每天 20 小时服务，周五/周六和周六/周日夜间特别服务
- 13 条有轨电车线路
- 6 条无轨电车线路
- 47 条公共汽车线路
- 9 条小公共汽车线路
- 1 条索道
- 351 辆电车
- 246 辆公共汽车
- 675 个站点
- 165 公里轨道

VBZ Zurich Public Transport: Facts and Figures

- 820 000 passenger journeys per day
- 1.6m passenger kilometers per day
- Daily twice around the world
- 2300 employees
- 438 m CHF costs/benefits
- 365 x 20 service hours, special night services Friday / Saturday and Saturday / Sunday
- 13 tram lines
- 6 trolleybus lines
- 47 bus lines
- 9 minibus lines
- 1 funicular
- 351 trams
- 246 busses
- 675 stops
- 165 km rails



网络建设和运行的原则 (Züri-Linie 1990)

- 市内两站之间的最大步行距离为 300 米
- 可以接受的最低发车间隔：30 分钟；高峰期电车线路的发车间隔：6、7 分钟；下午 8 点后为 12 分钟
- 运行时间：早 5 点 - 凌晨 1 点；周五/周六和周六/周日提供夜车服务
- 城市内任何两站之间的运行时间最长为 1 小时
- 除高峰期外，每位乘客都有座位

Network Construction and Operation Principles (Züri-Linie 1990)

- A walking distance max. of 300m to the next stop within the city
- Lowest operation frequency tolerated: 30 minutes; frequency on tramlines during peak hours: 7,6 minutes, after 8 p.m. 12 minutes
- Operating hours 5 a.m. to 1 a.m.; continuous night-bus service in the nights Fri/Sat and Sat/Sun.
- A travelling time of max. one hour between any two stops within the city boundaries
- Except in peak hours every passenger gets a seat.

Public Transport Enhances Road Capacity 公共交通增加了道路容量



1 辆公共汽车可容纳 75 人
75 people in one bus

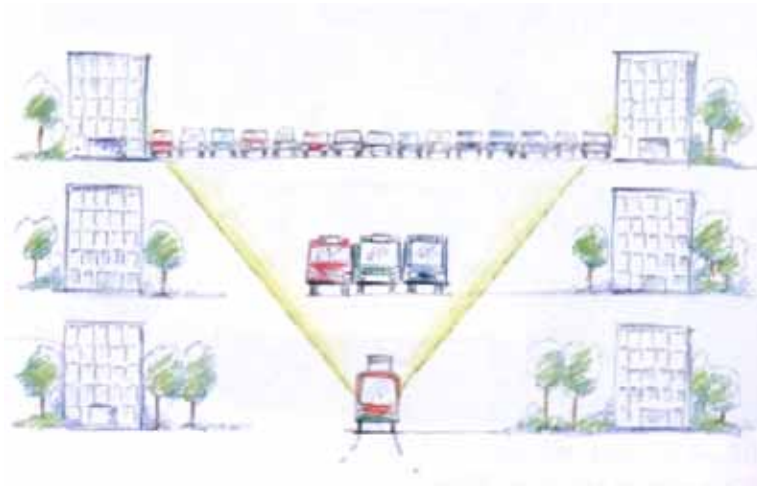
或
Or



60 辆轿车容纳 75 人
75 people in 60 cars

Public Transport is Saving Road Space 公共交通可以节省道路空间

WZ ZUM LINE



政策目标： 为公共交通提供优先权

- 目的：通过以下方式实现电车和公共汽车的畅行无阻

为电车和公共汽车保留车道

- 交通管理：
红绿灯受机动车中的传感器影响
-> 对公共交通“始终”开放绿灯
- 有效的引导和控制系统：
通过有效的部署和乘客信息将交通堵塞、技术缺陷或其它障碍造成的消极影响降至最低

- 效果：
 - 高效且有吸引力的公共交通系统
 - 交通堵塞更少，道路容量更高

Political goal: Giving Priority to Public Transportation

WZ ZUM LINE

- Aim: obstruction-free circulation of tram and bus, realized by reserved lanes for tram and bus

- Traffic management: traffic lights are influenced by transmitters in our vehicles -> “always” green lights for public transportation
- An efficient guidance and control system: Negative consequences of traffic jams, technical defects or other obstructions are minimized by efficient disposition and information of passengers.

- Effects:
 - A highly efficient and thus attractive public transportation system
 - Less traffic jams and higher road capacity



目前的项目

- 更换全部车辆 (有轨电车、公共汽车、无轨电车)
- 通过安装低地板部件对现有有轨电车进行升级 (Sänfte 是德语, 轿子的意思)
- 有轨电车网络延伸 (建设苏黎世西部有轨电车、改造电车 1 号线路) 城市内任何两站之间的运行时间最长为 1 小时
- 计划建设连接城市和机场的轻轨系统
- 新的引导和控制系统
- 为残疾人提供便利的公共交通服务
- 货运有轨电车: 引进公共货运系统

Current Programs



- Replacement of vehicle stock (tram, bus, trolley bus)
- Upgrading existing trams by fitting in a low-floor ("Sänfte" = german for sedan-chair)
- Tram network extensions ("Tram Zürich West", "Renaissance Tramlinie 1")
- Planned lightrail system connecting the city and airport (Stadtbahn Glattal)
- New guidance and control system
- Easy access to public transportation for people with disabilities
- "Cargo-Tram": introduction of a "public freight transport system"

Sustainable Urban Mobility - The Berlin Strategy
可持续发展的城市交通机动性 - 柏林战略规划



Transport Policy in Berlin

德国首都--柏林的交通政策

The German Capital



Folie 1

Sustainable Urban Mobility - The Berlin Strategy
可持续发展的城市交通机动性 - 柏林战略规划



Situation of Berlin in Europe

柏林在欧洲的状况



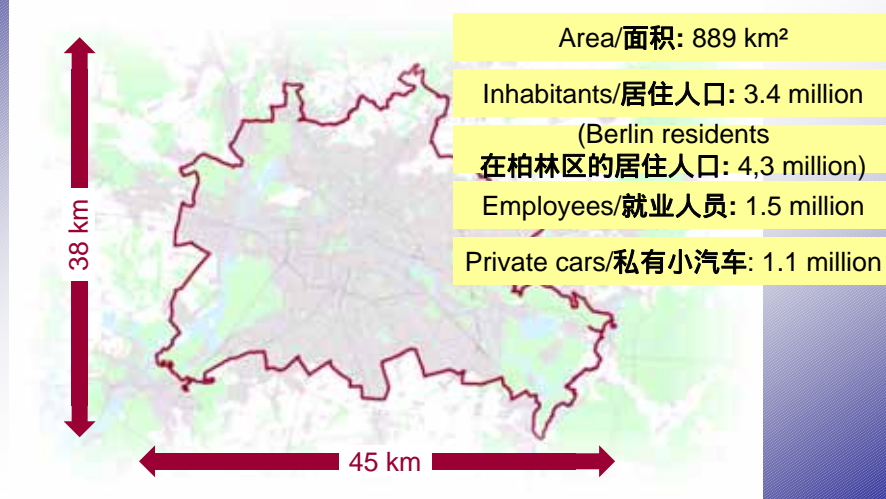
Folie 2

Sustainable Urban Mobility - The Berlin Strategy



可持续的城市交通机动性 - 柏林战略规划

Geography 地理概况



Folie 3

Sustainable Urban Mobility - The Berlin Strategy



可持续的城市交通机动性 - 柏林战略规划

Commuter Movement Berlin-Brandenburg

通勤者往返状况 柏林-布莱登堡



Folie 4

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可持续的城市交通机动性 - 柏林战略规划



Transport Companies and Traffic Systems 运输公司与交通系统



Folie 5

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可持续的城市交通机动性 - 柏林战略规划



Infrastructure Development
1990 – 2000
基础设施的发展
1990-2000

Folie 6

Transport infrastructure - network lengths in Berlin
交通基础设施-柏林交通网络的长度

Tram/轻轨: 188 km



Metro/地铁:
144 km



Bus/公共汽车: 1220 km



Regional railway/区间铁路:
260 km



Suburban railway
郊区铁路: 240 km

Organisation of Public Transport in Germany
德国的公交机构

- Level of order (State of Berlin)
• 管理层(柏林州)
- Level of coordination (p.t. management company)
• 协调层(管理公司)
- Level of operating (Transport companies)
• 运作层(运输公司)

Sustainable Urban Mobility - The Berlin Strategy 可持续的城市交通机动性 - 柏林战略规划



Folie 9

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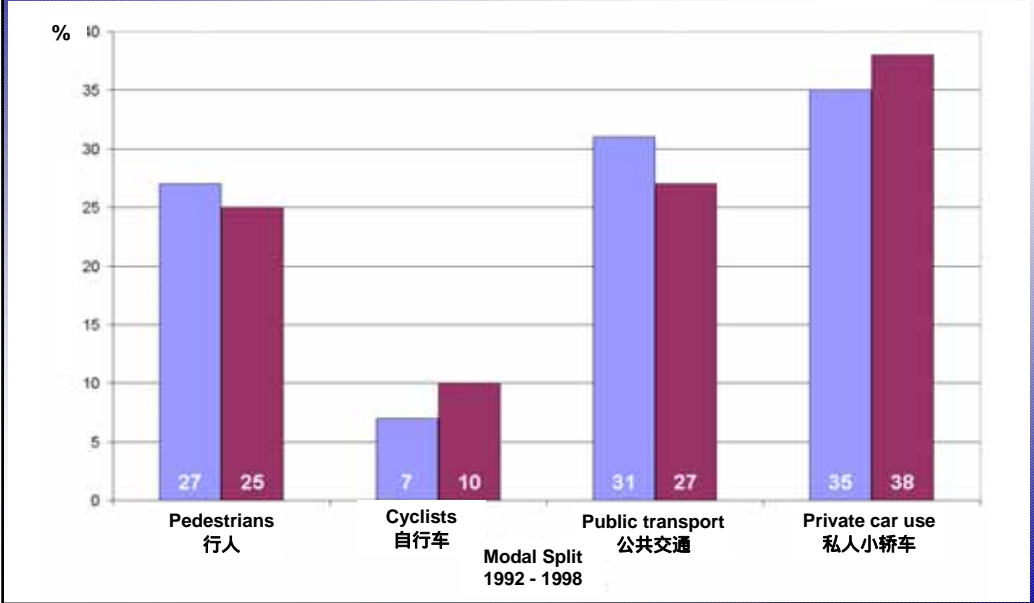
Problems of air pollution - modelled PM10 in street canyons 空气污染问题-



Red lines indicate non-attainment with EU PM10 limit value
红线表示不能达到欧盟PM10标准的地区。

Folie 10

Sustainable Urban Mobility - The Berlin Strategy
 可持续的城市交通机动性 - 柏林战略规划



Sustainable Urban Mobility - The Berlin Strategy
 可持续的城市交通机动性 - 柏林战略规划



Strategy: Avoid traffic
 战略：避免交通拥堵

Settlement structure has great influence on energy consumption

人口居住结构对能源消耗有巨大影响。

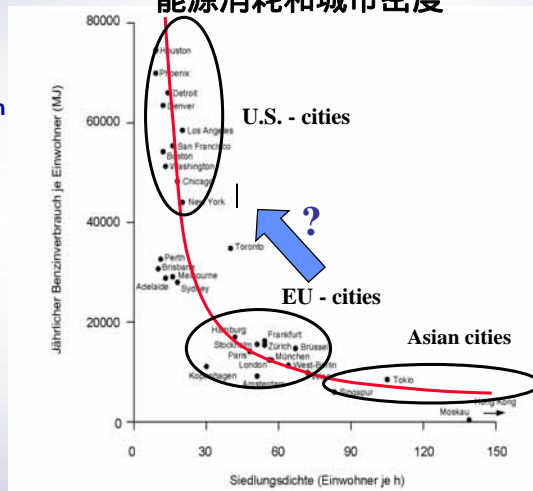
European cities consume less energy than US cities

欧洲各城市能源消耗小于美国各城市。

Yet, there is a dangerous trend of de-urbanisation and sprawl in EU cities

但是现在在欧洲各城市有了危险的非城市化和向外蔓延的趋势。

Energy Consumption and Urban Density
 能源消耗和城市密度



Newman/ Kenworthy 1989

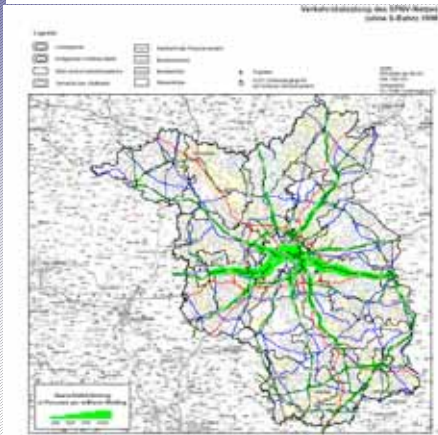
Sustainable Urban Mobility - The Berlin Strategy 可持续的城市交通机动性 - 柏林战略规划



Reducing sprawl:

Development outside Berlin along the radial railway axes

减少蔓延：沿着放射性轨道交通轴线向柏林以外发展



Folie 13

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Strategy 战略:

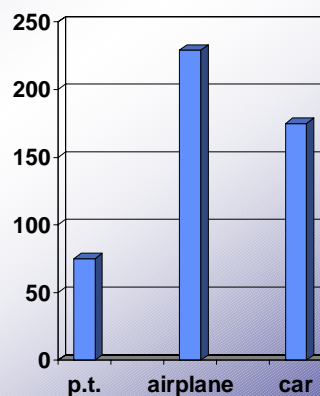
Shifting modal split

改变各交通方式的分配

Changing modal split towards public transport (p.t.) with less energy consumption
转向使用公共交通，减少能源消耗。

Specific CO₂- emissions [g / t km]

不同类型交通模式的二氧化碳排放



Folie 14

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可持续的城市交通机动性 - 柏林战略规划



Measures:
Parking management
战略的另一面：
停车管理

Folie 15

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可持续的城市交通机动性 - 柏林战略规划



Extension of Parking Management
停车管理的延伸



Existing areas 现有区域
Planned extensions 规划延伸区域

Folie 16

Sustainable Urban Mobility - The Berlin Strategy

可持续的城市交通机动性 - 柏林战略规划



Traffic 2015
Impact of parking
management
2015年实施停车
管理后的交通状况



Folie 17

Sustainable Urban Mobility - The Berlin Strategy

可持续的城市交通机动性 - 柏林战略规划



Folie 18

Sustainable Urban Mobility - The Berlin Strategy 可持续的城市交通机动性 - 柏林战略规划



Dynamic Passenger Information System (Daisy) 动态乘客信息系统



Folie 19

Sustainable Urban Mobility - The Berlin Strategy 可持续的城市交通机动性 - 柏林战略规划



**Most efficient measure:
Promotion of bicycle traffic,
“Zero emission vehicles.”**

**更有效的方法：发展自行车
交通，“零排放的机动车”。**

- **Bicycle traffic in combination
with public transport
eliminates the “speed gap”
with cars**

**自行车交通和公共交通的结
合降低了与小轿车之间的“速
度差距”。**



Folie 20

Sustainable Urban Mobility - The Berlin Strategy
可持续的城市交通机动性 - 柏林战略规划

Result Better Balance between City, Transport and Environment
结果：城市、交通和环境平衡发展



Sustainable Urban Mobility - The Berlin Strategy
可持续的城市交通机动性 - 柏林战略规划

Thank you for your attention !
谢谢！



**Congestion Pricing in the UK
- Central London and beyond**
**英国针对伦敦市中心及周边地区
道路拥堵制定的收费方案**

Dr. Rana Roy, FCILT

**International Mayors Forum
Kunming November 10-11, 2004**

**国际市长论坛
昆明市 2004 年 11 月**

**伦敦中心道路拥堵收费的做法
本身很成功
但是还没有推广到其他地区，**

**是在 英国甚至欧盟范围内的收
费改革大背景下进行的，而且
涉及到不同的部门**

**The Central London Congestion
Charge —
a success in its own right
but limited in scale**

**its true significance can only be
understood as part of the larger
context and dynamic of pricing
reform across the UK (and
across the EU) and across
several sectors**

方案：	The scheme:
时间： 07:30 am 至 18:30 pm	£5 daily charge for driving or parking between 07.00 and 18.30
范围： 伦敦中心区域（内环路）行驶或停泊的车辆	within the zone (the Inner Ring Road) supported by strong enforcement and traffic management and complemented by a much-improved service provision for buses
费率： 5 英镑	
实施条件： 严格执行交通管理； 优良的公交系统；	Importantly: underpinned by the extent and intensity of pre-existing on-street parking controls within the Inner Ring Road
技术条件： 借助早就存在的内环路内的街道停车控制系统，效果更好。	

实施结果：	Results:
<ul style="list-style-type: none"> • 道路拥堵约降低 30% (减少了 25% 该区域内的潜在收费行驶里程) • CO₂ 排放量降低约 20% (该区域内道路燃油消耗量降低 20%) • 年经济效益总值与净值分别达到 1.8 亿英镑及 5 千万英镑 • 第一年中，年总收入与净收入分别为 1.65 亿英镑和 6800 万英镑，第二年起净收入增加到 8000 至 9000 万英镑。 	<ul style="list-style-type: none"> • A reduction in congestion of around 30% (25% reduction in potentially chargeable vehicle kilometers driven within the zone) • A reduction in CO₂ emissions of 20% (20% reduction in fuel consumed by road traffic within the zone) • Annual gross and net economic benefits of £180 million and £50 million • First year gross and net revenues of £165 million and £68 million, with net revenues rising to £80-90 million from the second year onward

收费方案的最大局限：

- 到现在为止，实施范围仅限于伦敦中心区，每天适用收费的车辆只有约十万辆
- 参考数据：在纽约，收费即使只适用于 22% 进入曼哈顿的车辆，适用该收费政策的车辆就高达二十万辆。
- 模型运算中，如果在伦敦地区范围内实现对行驶及停泊的车辆最大限度的收费，结果是：每年潜在的社会效益约可达到 28 亿英镑；实际收入约可达 26 亿英镑。

The charging scheme's central limitation:

- As yet, limited in scale to Central London with the charge applying to only around 100,000 vehicles per day
- Cf. New York, where tolling applies to "only" 22% of vehicles entering Manhattan (i.e., more than 200,000 vehicles per day)
- Modelled results for optimal pricing of *both* traffic and parking for *all* of Greater London indicate potential welfare gains of around £2.8 billion per annum and revenue gains of around £2.6 billion per annum

伦敦中心区收费方案的现实意义：

- 该方案表明收费定价仅仅是个开始，
- 各地还可采取进一步的行动
- 道路拥堵收费方案可扩展到伦敦中心区以外，甚至伦敦地区以外。
- 全国范围内：2007 年前对卡车使用者收费
- 2014 年对所有道路使用者征收道路使用费，由政府牵头制订政策

The true significance of the Central London scheme:

- the demonstration that pricing works
- a trigger for further action
- locally: extension of congestion pricing beyond Central London and beyond Greater London
- nationally: user-charging for lorries by 2007
- comprehensive road-user pricing by 2014? Government committed to "lead the debate"

2014 年前对所有道路使用者收费，政府负责组织相关讨论据此，英国政府估计每年能产生 100 至 120 亿英镑的社会效益（同欧洲交通部长会议上估计的每年 110 亿英镑相一致）全欧盟范围：

参考：欧洲交通部长会议估计，如果在联合王国、法国、德国实施该方案

并进行更大的收费和税收改革，则外部征税和经济租将涵盖几个重要的部门，即交通、能源、土地使用

The larger context:

Toward comprehensive road-user pricing across the UK estimated by Government to deliver welfare gains of £10-12 billion per annum (in line with ECMT estimate of £11 billion per annum) and across the EU:

cf. ECMT estimates for UK, France and Germany and as part of a still larger programme of pricing and tax reform:

the full taxation of externalities and economic rents across several key sectors - transport, energy, land use