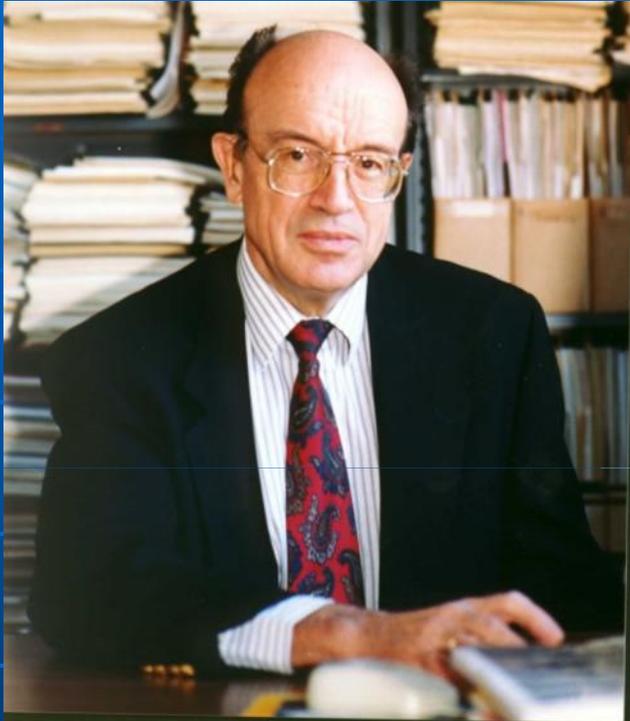


*Capacity Building Program
for Young Professionals*



**The Role of Transportation
Engineers and Planners in
Creating Livable and
Sustainable Cities**

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**Buenos Aires, Argentina
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The Role of Transportation Engineers and Planners in Creating Livable and Sustainable Cities

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Abstract

The 20th Century witnessed revolutionary developments in transportation technology with major impacts on the development, form and character of rapidly growing cities. Progress in increasing mobility has brought many benefits as well as serious problems, particularly in deterioration of livability and sustainability.

An overview of several stages of transportation/city relationships will be followed by a review of transportation modes and their characteristics. Serious problems of traffic congestion and methods for achieving a balanced transportation system, particularly between private cars and public transportation (bus, rail, automated modes), will be defined. Valuable lessons from successes and mistakes will be described and illustrated by examples from many world cities and different countries. Great need for better understanding of the complex problems of urban transportation will be emphasized. The final focus will be on a brief review of methods for achieving more efficient and sustainable solutions and balanced transportation.

PRESENTATION OUTLINE

- 1. Present Condition of Transportation: Progress and Problems**
- 2. Development of Transportation and Cities in the 20th/21st Century**
- 3. The Family of Urban Transportation Modes Today**
- 4. Intermodal Balanced Transit System**
- 5. Implementing Optimal Balance among Modes**
- 6. Examples of Success: Singapore, West European and Some North American Cities**
- 7. Conclusions: Lessons for the Future**

1. PRESENT CONDITION OF URBAN TRANSPORTATION: PROGRESS AND PROBLEMS

Present transportation systems:

- **Very high mobility for population**
- **Great economic and lifestyle benefits**

Serious problems remain:

- **Quality of service, speed and reliability are often unsatisfactory**
- **Inequities and serious problems of auto dependency and neglected other modes: public transit, walking, bicycling**
- **Transportation produces negative impacts on cities and their livability or quality of life**

1. PRESENT CONDITIONS (cont.)

The congested conditions result in “The Collision of Cities and Cars.”

The common problems:

- **Inefficient and unreliable travel, time lost in congestion**
- **Large highways and parking garages damage urban environment**
- **Many urban areas are unfriendly for pedestrians and human activities. This diverts trips to automobiles, creating a “vicious circle”**
- **Environmental deterioration: air pollution, noise, accidents**
- **Long-range negative impacts on city’s Quality of Life or Livability, as well as Sustainability**

1. PRESENT CONDITIONS (cont.)

In review, transportation problems vary among cities, towns and rural areas, and their solutions must be different; however, the problems common for many countries are:

- Overdependence on automobiles – “Auto dependency”**
- Highway congestion is a chronic and increasing phenomenon**
- Transit systems are inadequately financed**
- Pedestrians are neglected, deteriorating livability of cities: their economic viability, social and environmental conditions.**

Present trends lead to aggravating conditions in the long run:

- Environmental deterioration and global warming**
- Lack of sustainability**
- Increasing energy consumption**

2. DEVELOPMENT OF TRANSPORTATION AND CITIES IN THE 20TH/21ST CENTURY

- The twentieth century started with rapid growth of cities and industrialization
- Around 1900, mechanical transportation was just introduced
- Initially “Walking Cities” were upgraded by the invention of electric transit (public transportation)
- Between 1900 and 1950 development of “Transit Cities:”
 - Extensive transit services on streets
 - Independent, high-performance systems - metro or rapid transit

2. DEVELOPMENTS IN THE 20TH/21ST CENTURY (cont.)

- In the USA from 1930, and other countries from 1950:

- Creation of “Automobile Cities”
- Maximum growth of highways during the 1950-70 period

- The field of Traffic Engineering was developed

- Cities which focused on automobile-truck and highways while neglecting transit and pedestrians created major problems:

- Congestion
- Excessive highway and parking construction
- Non-auto users have become second-class citizens

- Today, cities with largest motorway/Autobahn systems have most severe congestion, deteriorated environment and quality of life.

Building of “Auto-Based Cities” and Their Serious Problems



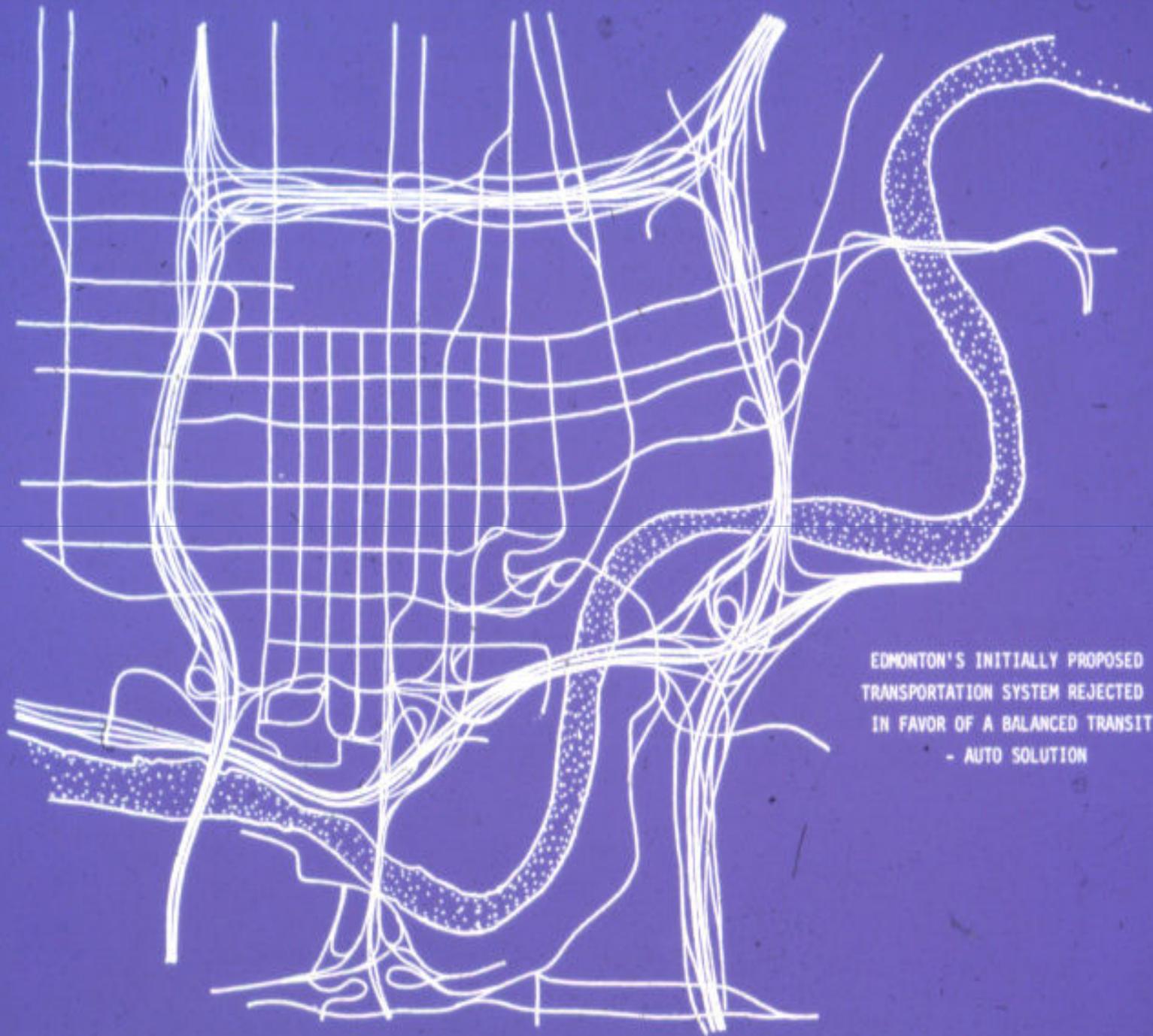










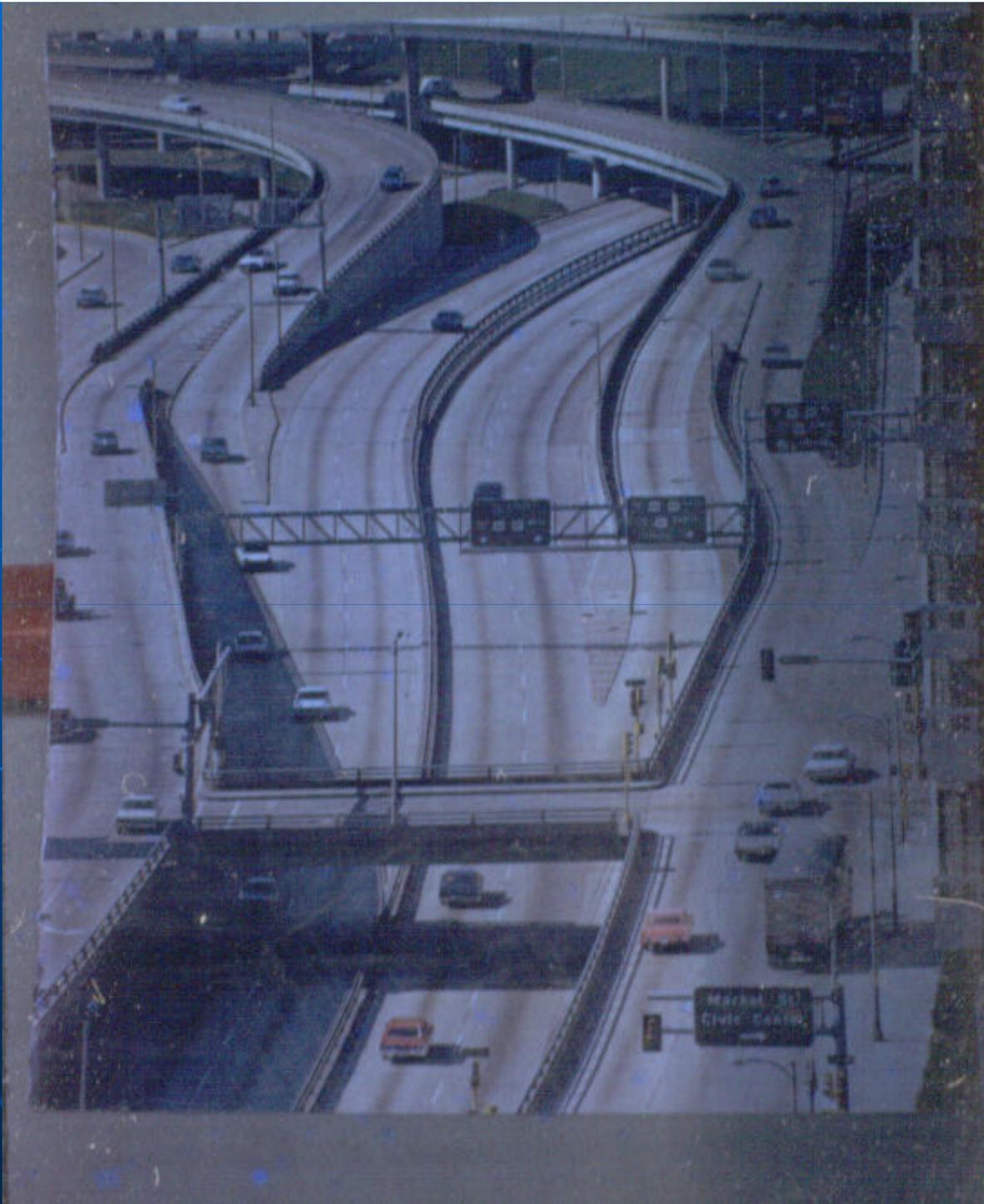


EDMONTON'S INITIALLY PROPOSED
TRANSPORTATION SYSTEM REJECTED
IN FAVOR OF A BALANCED TRANSIT
- AUTO SOLUTION























2. DEVELOPMENTS IN THE 20th/21st CENTURY (cont.)

- Studies of urban transportation policies suggest:

- Relationship of cities and transportation is very complex
- For its planning, “Systems Approach” is necessary
- There is a need to recognize quality of life or “livability”

- Since the 1970’s concentrate on developing “Intermodal Cities:”

- Large cities relying on a number of coordinated modes
- More travel choices
- Improved efficiency, comfort, safety and reliability
- Reduction of negative environmental impacts
- Refocus on human scale activities

3. THE FAMILY OF URBAN TRANSPORTATION

MODES TODAY

Intermodal cities rely on many modes of transport - each one has its strengths and limitations. The family of modes includes:

- **Street / road system with automobiles, trucks, bicycles:**
 - **Basic network in every city**
 - **Two major social benefits: convenience and ubiquity**
 - **Traffic engineering and ITS becoming more important**
- **Walking:**
 - **Optimal mode for high density travel**
 - **Environmentally friendly**
 - **Key component of urban “livability”**

3. THE FAMILY OF MODES (cont.)

- **Bus transit:**
 - **Lowest investment cost mode of public transit**
 - **Does not compete easily with private auto**
 - **Upgrading to Bus Rapid Transit intensified**
- **Tramway and Light Rail Transit - LRT:**
 - **Built in medium and large cities (20 new systems in North America, many in Europe)**
 - **Filling the gap: higher performance than bus, less expensive than metro**
 - **Many innovations in recent decades**
 - **Many diverse applications**
- **Automated Guided Transit - AGT**

3. THE FAMILY OF MODES (cont.)

- **Metro or Rail Rapid Transit:**
 - **Highest capacity – lowest land and energy consumption**
 - **Very effective in large urban areas**
 - **Speed and reliability make it competitive with private car**
- **Regional Rail**
- **Taxis, minibuses, jitneys**

Review of the Family of Transit Modes

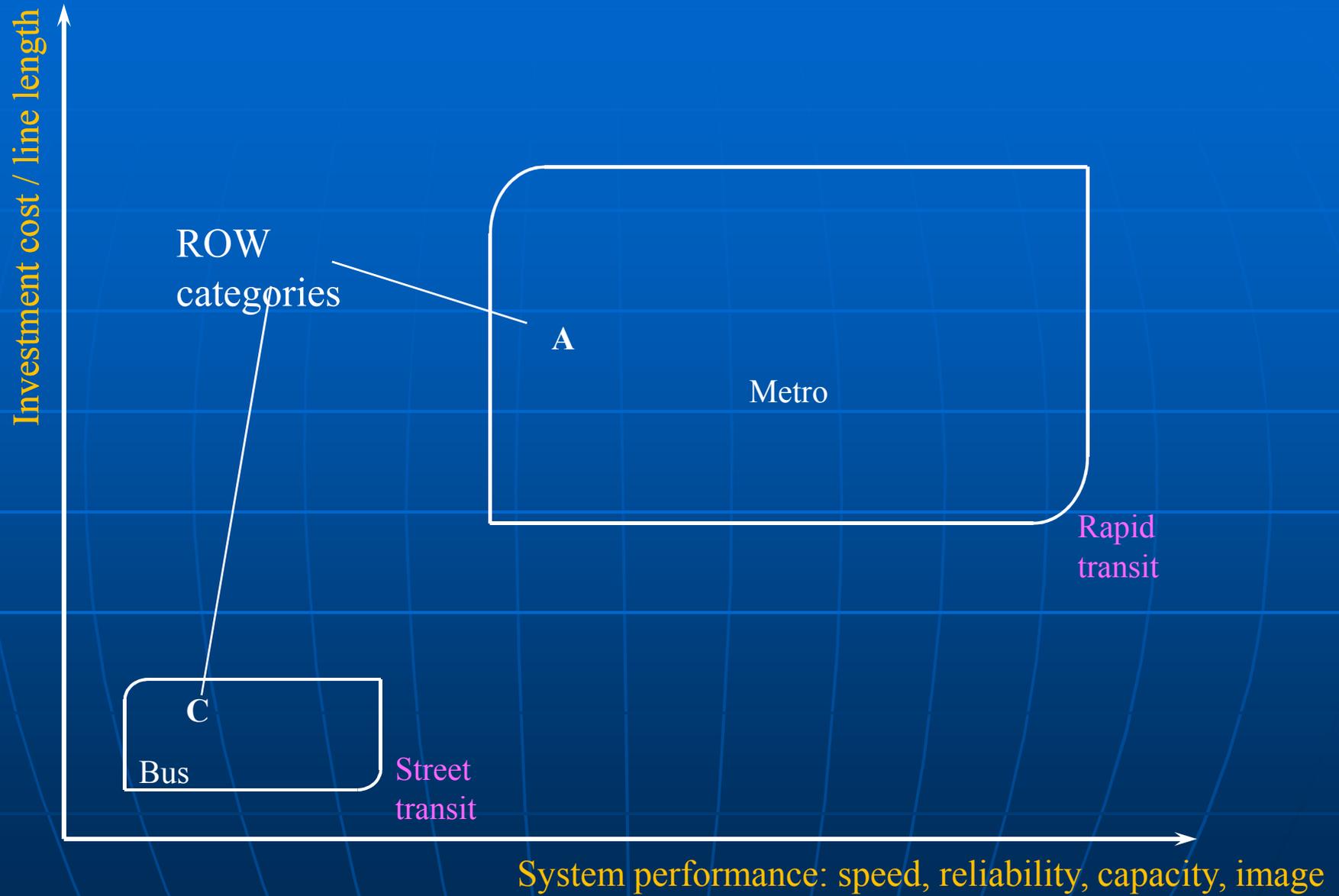
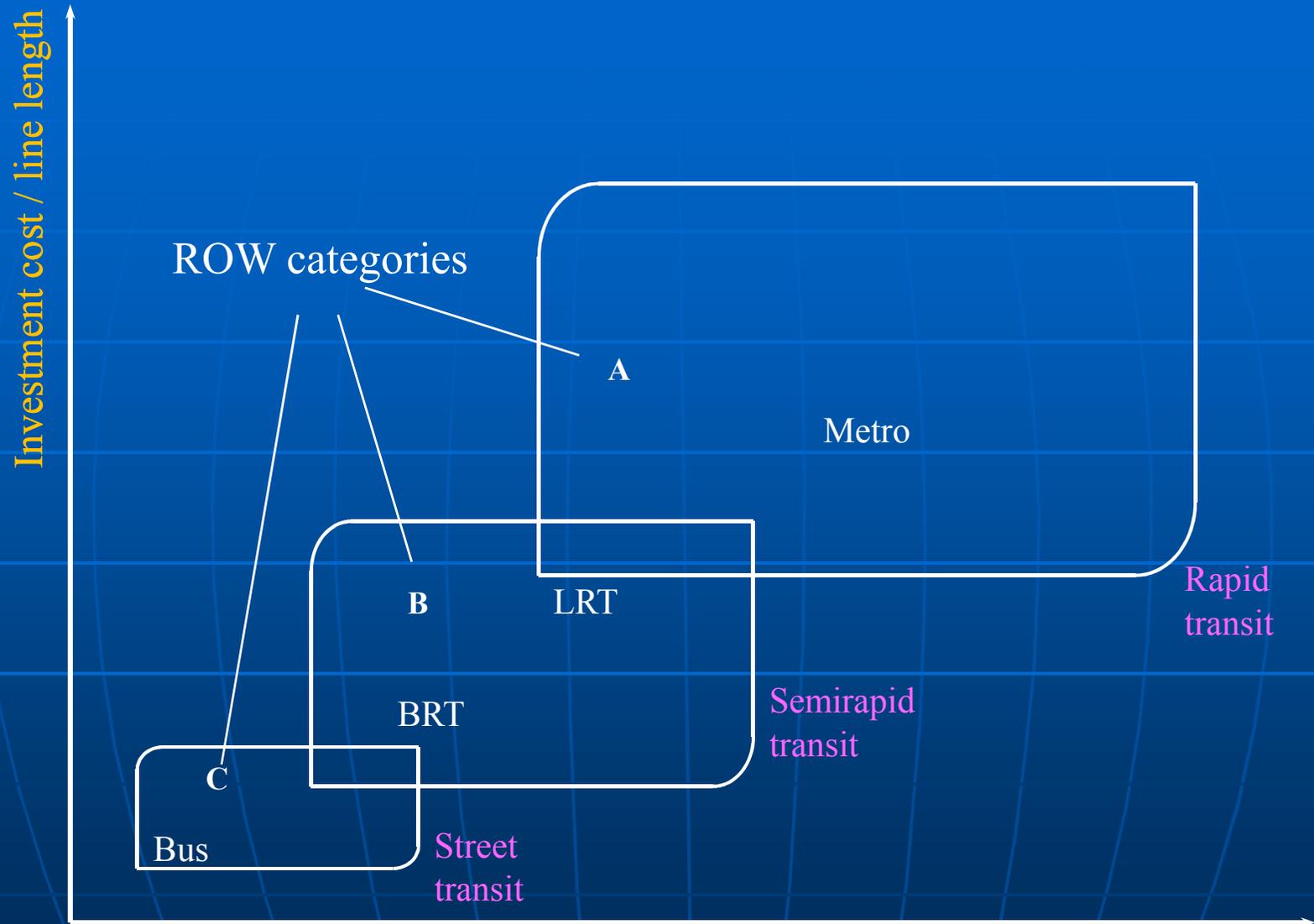


Figure 1. Bipolarized transit – bus and metro (Buenos Aires, Chicago)



System performance: speed, reliability, capacity, image

Figure 2. Intermediate systems “filling the gap” between street transit and metros









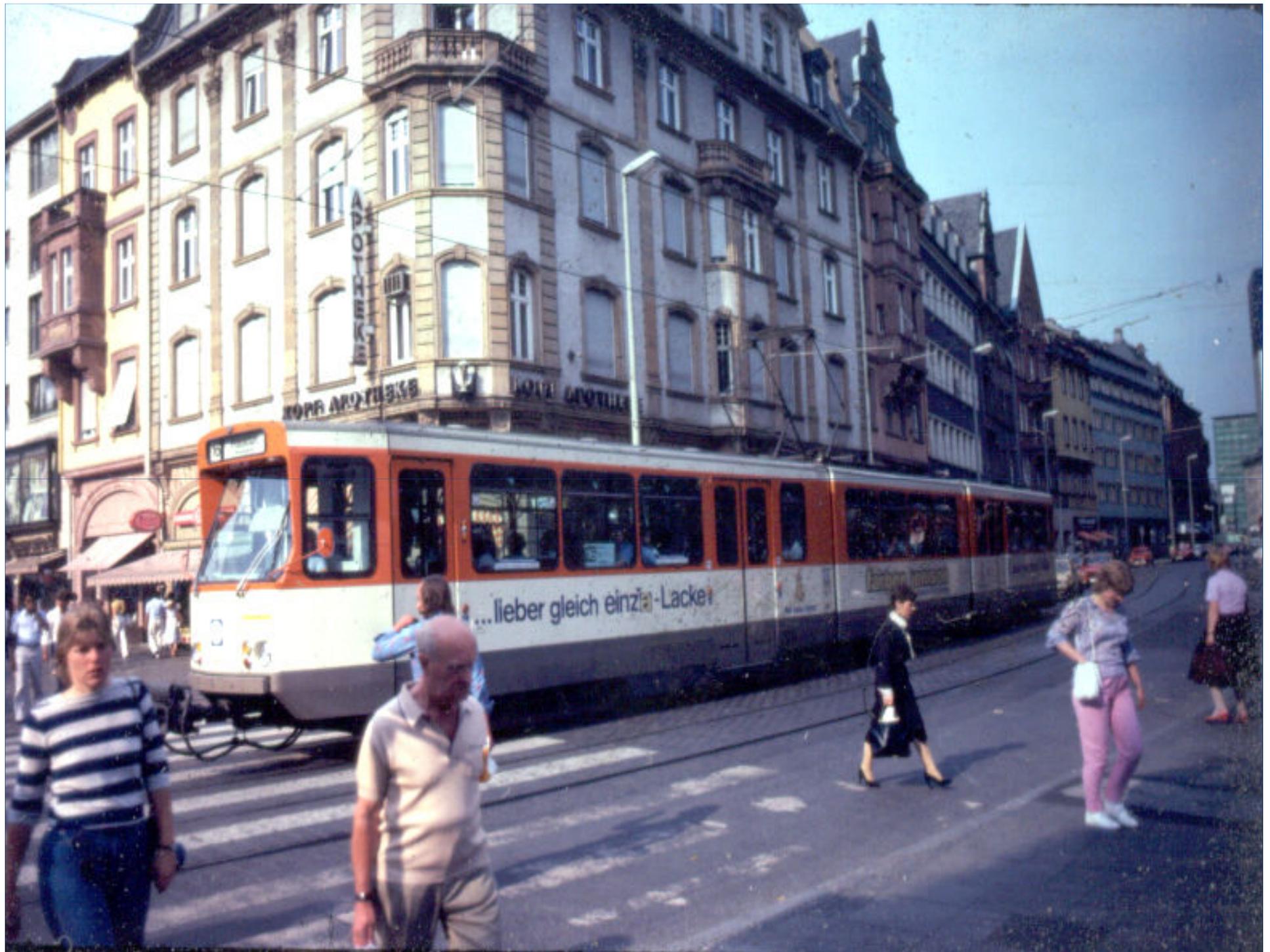














































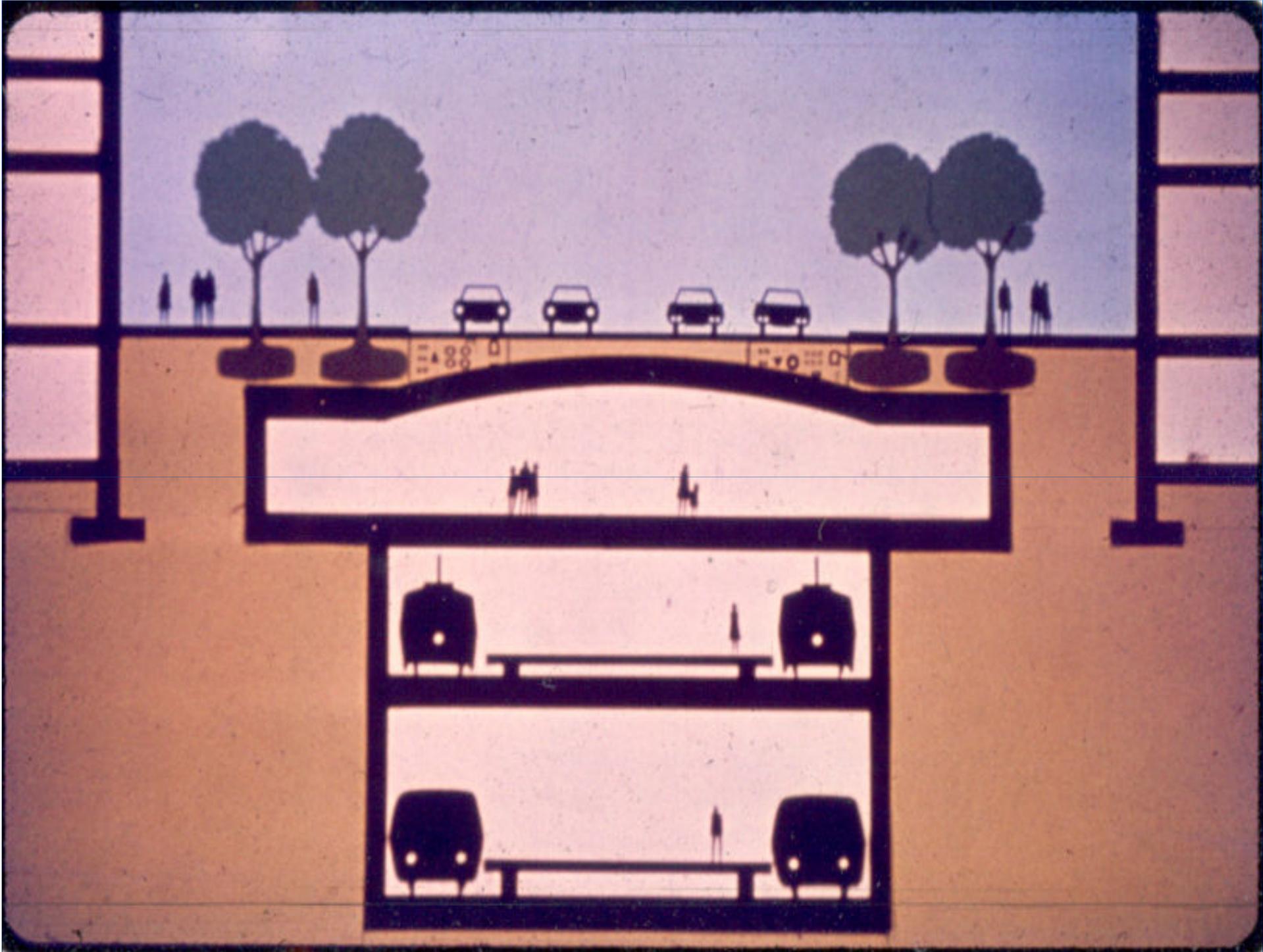


















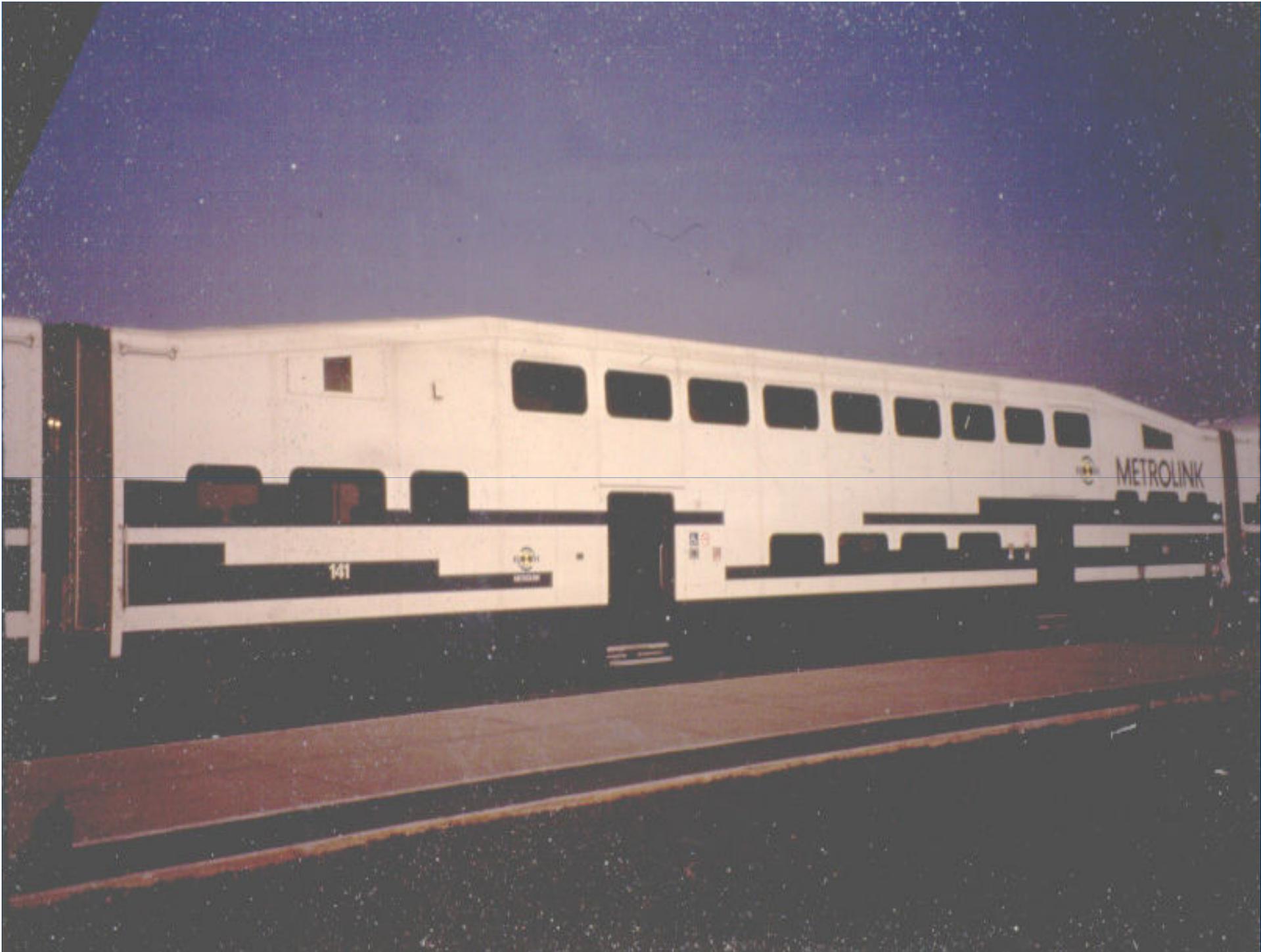
















4. INTERMODAL BALANCED TRANSIT SYSTEM

- **Organizational and operational integration of modes consists of the following components:**
 - **Physical (joint transfer stations)**
 - **Coordinated schedules**
 - **Joint fares**
 - **Integrated information**
- **Balanced integration allocates optimal roles to each mode**

5. IMPLEMENTING OPTIMAL BALANCE AMONG MODES

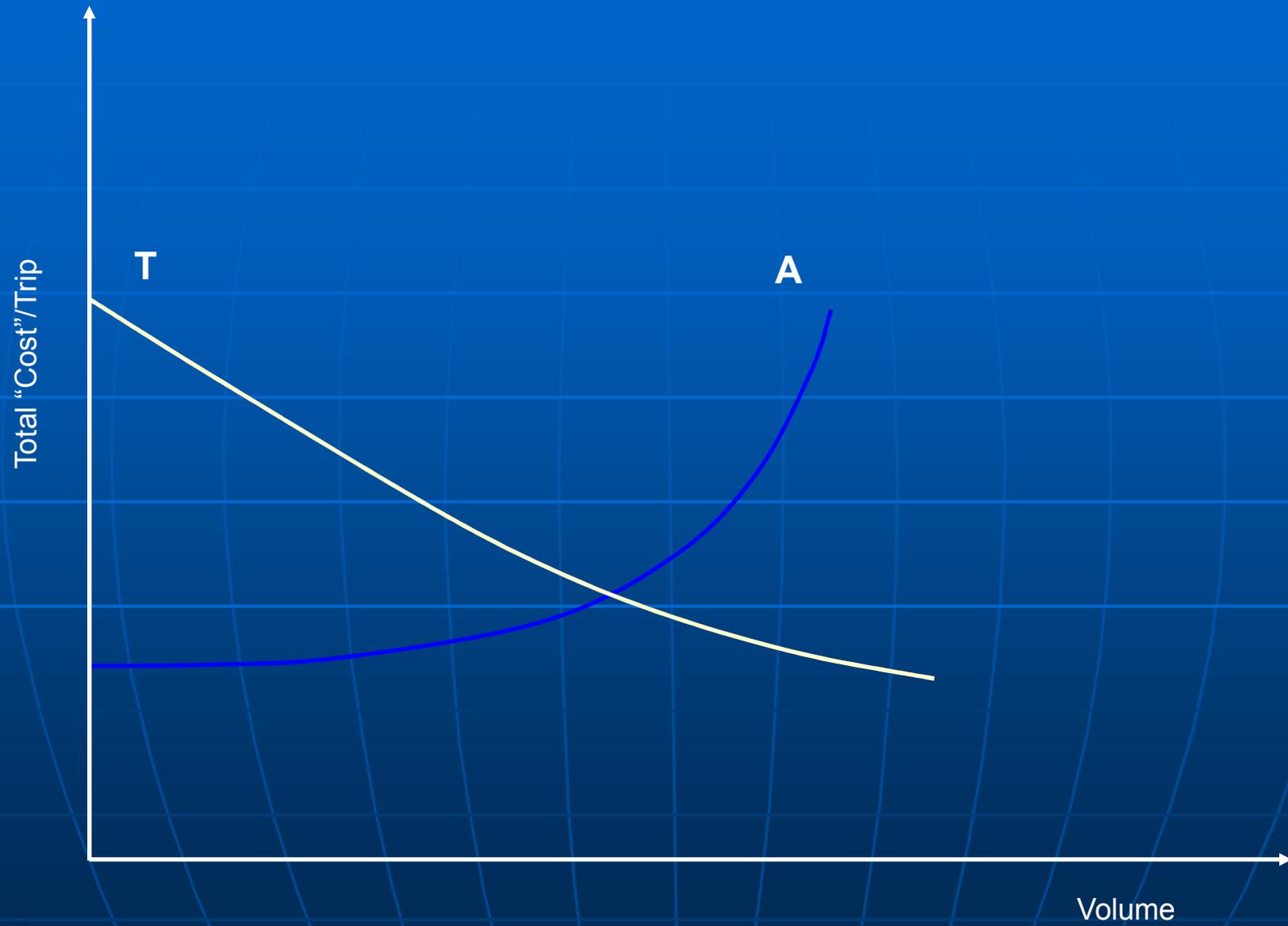
Given current practices and trends, the choices are to:

- **Continue existing policies and expect:**
 - **Increasing congestion**
 - **Suburban and exurban sprawl**
 - **Decay of cities.**
- **Introduce new policies which will:**
 - **Increase mobility**
 - **Reduce negative impacts of transportation.**

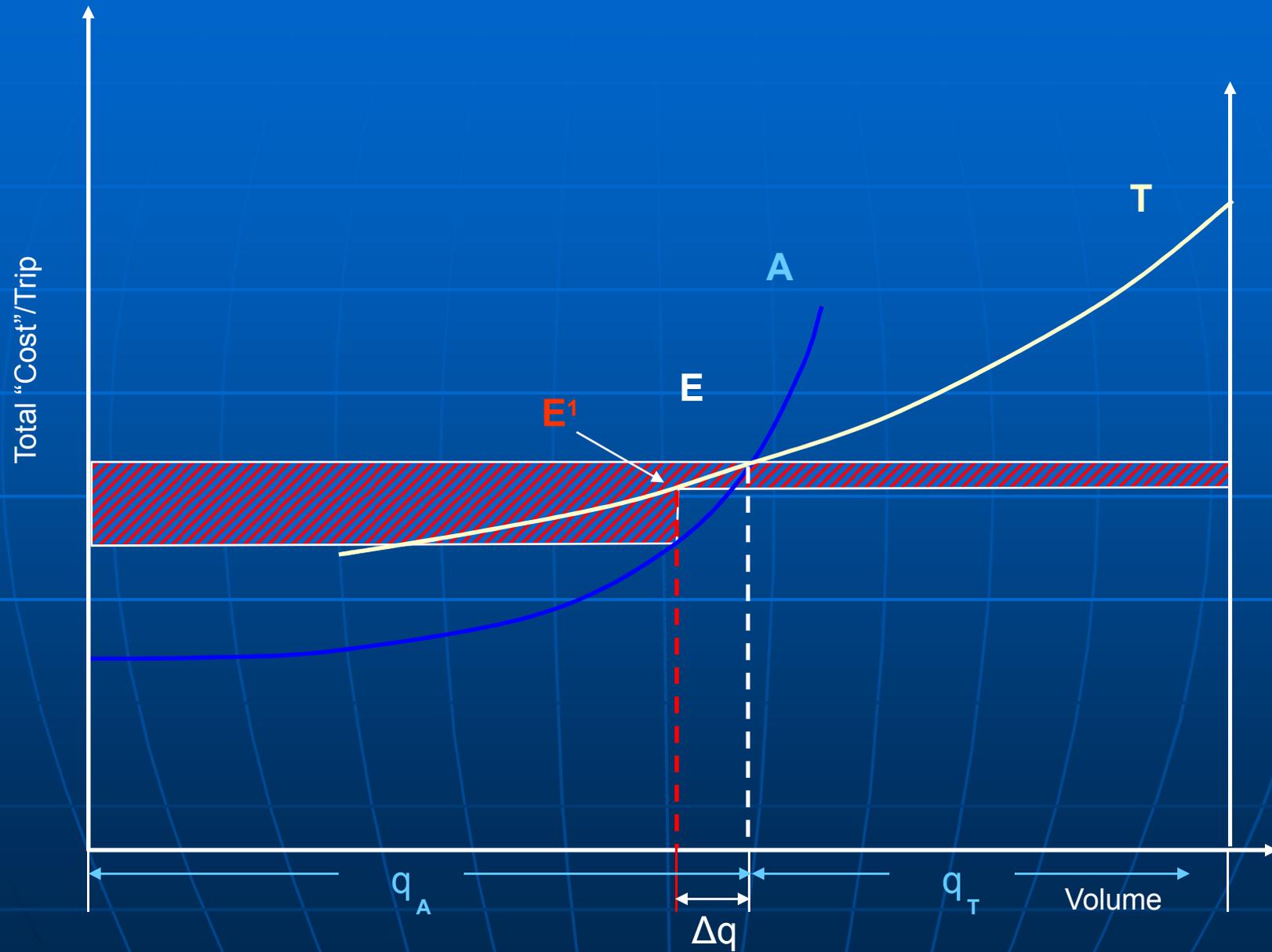
The following figures are explained
in the book

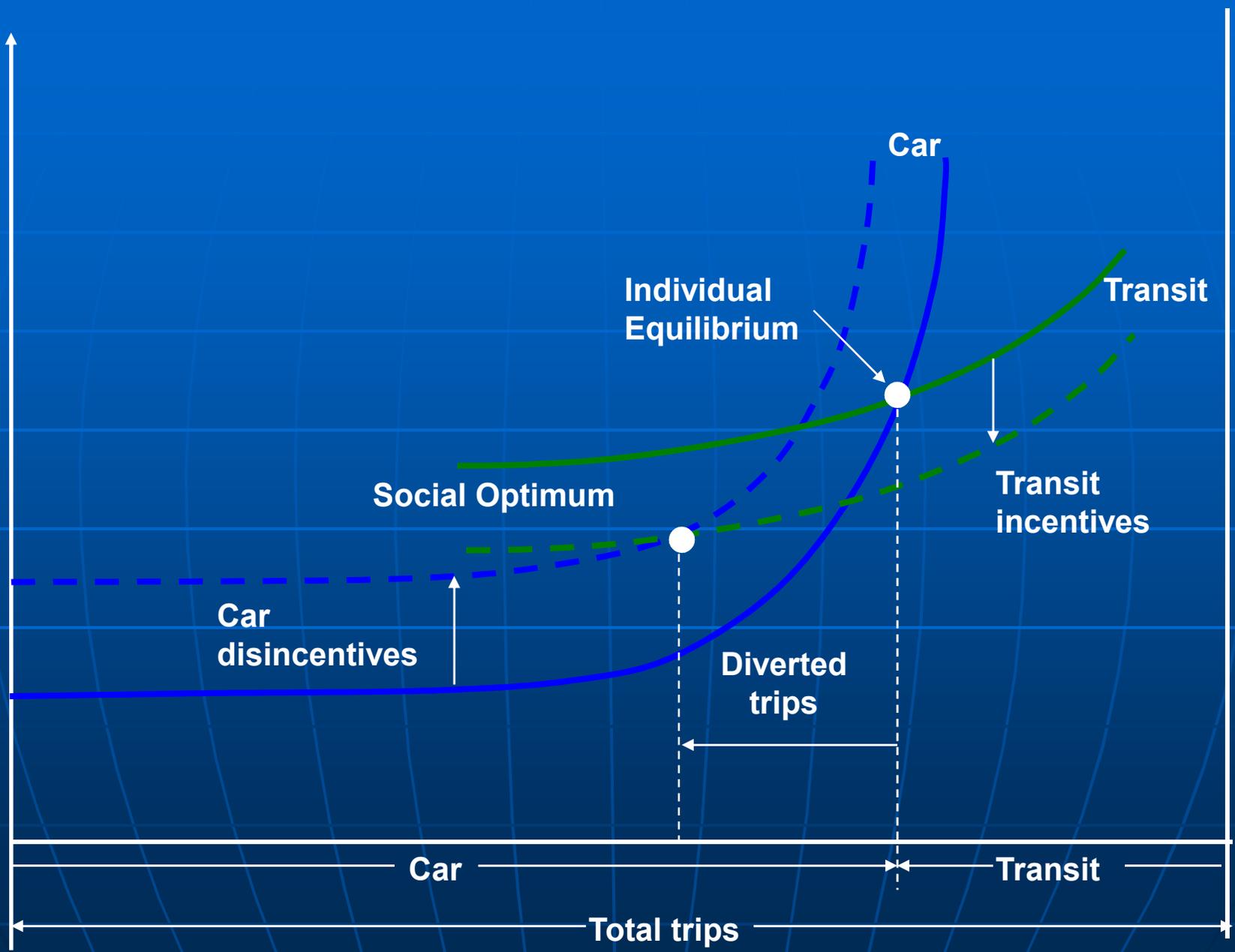
Vuchic, Vukan, “Transportation for
Livable Cities”

TRAVEL DISTRIBUTION BETWEEN AUTO & TRANSIT



TRAVEL DISTRIBUTION BETWEEN AUTO & TRANSIT





5. IMPLEMENTING OPTIMAL BALANCE

AMONG MODES (cont.)

Having understood the fundamental problems, transportation professionals should balance

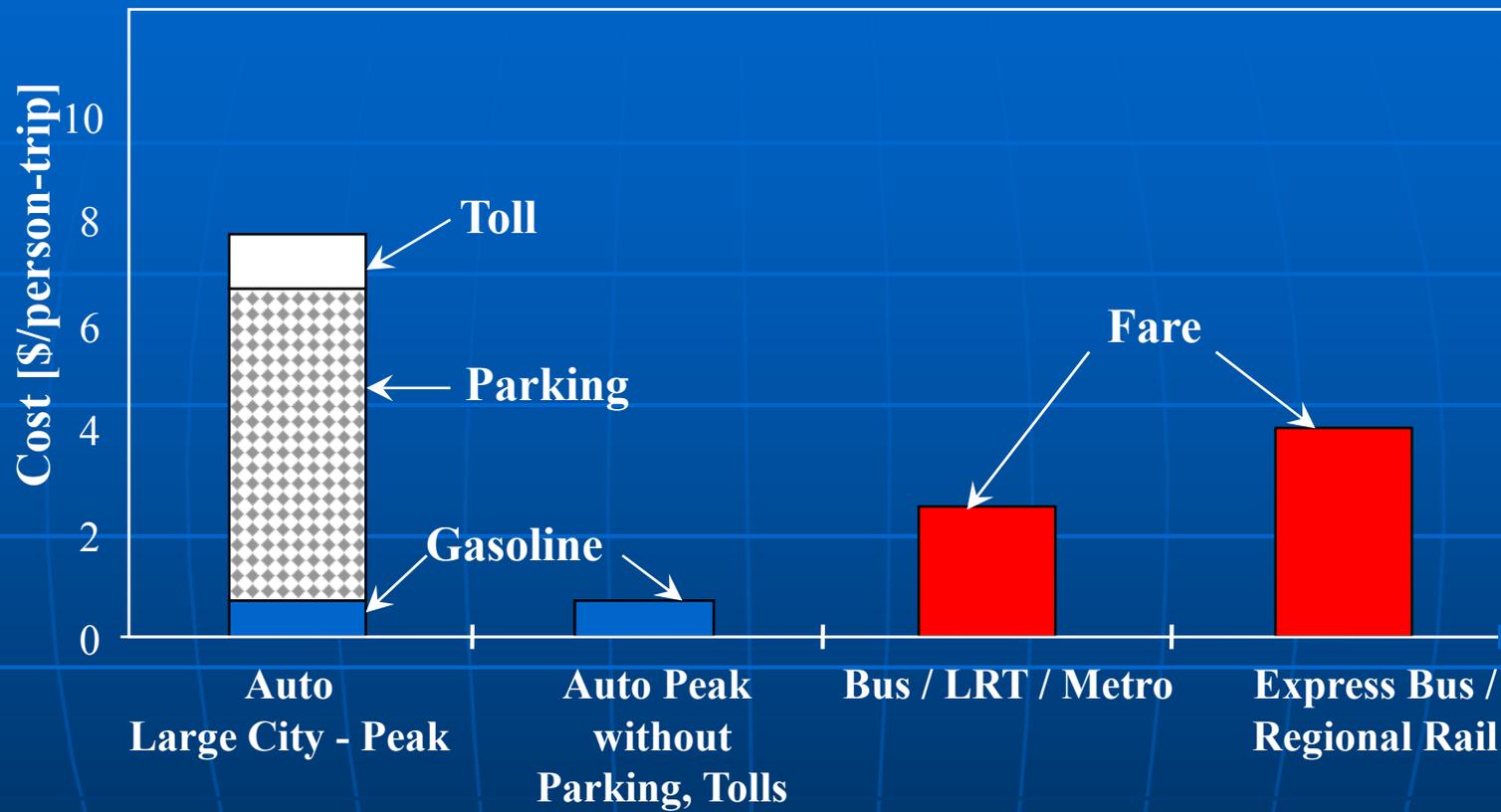
Individual Behavior and System Optimum by two sets of policies:

- Transit incentives: building high-quality, competitive transit systems, fare innovations, better attitude toward passengers, marketing, etc.

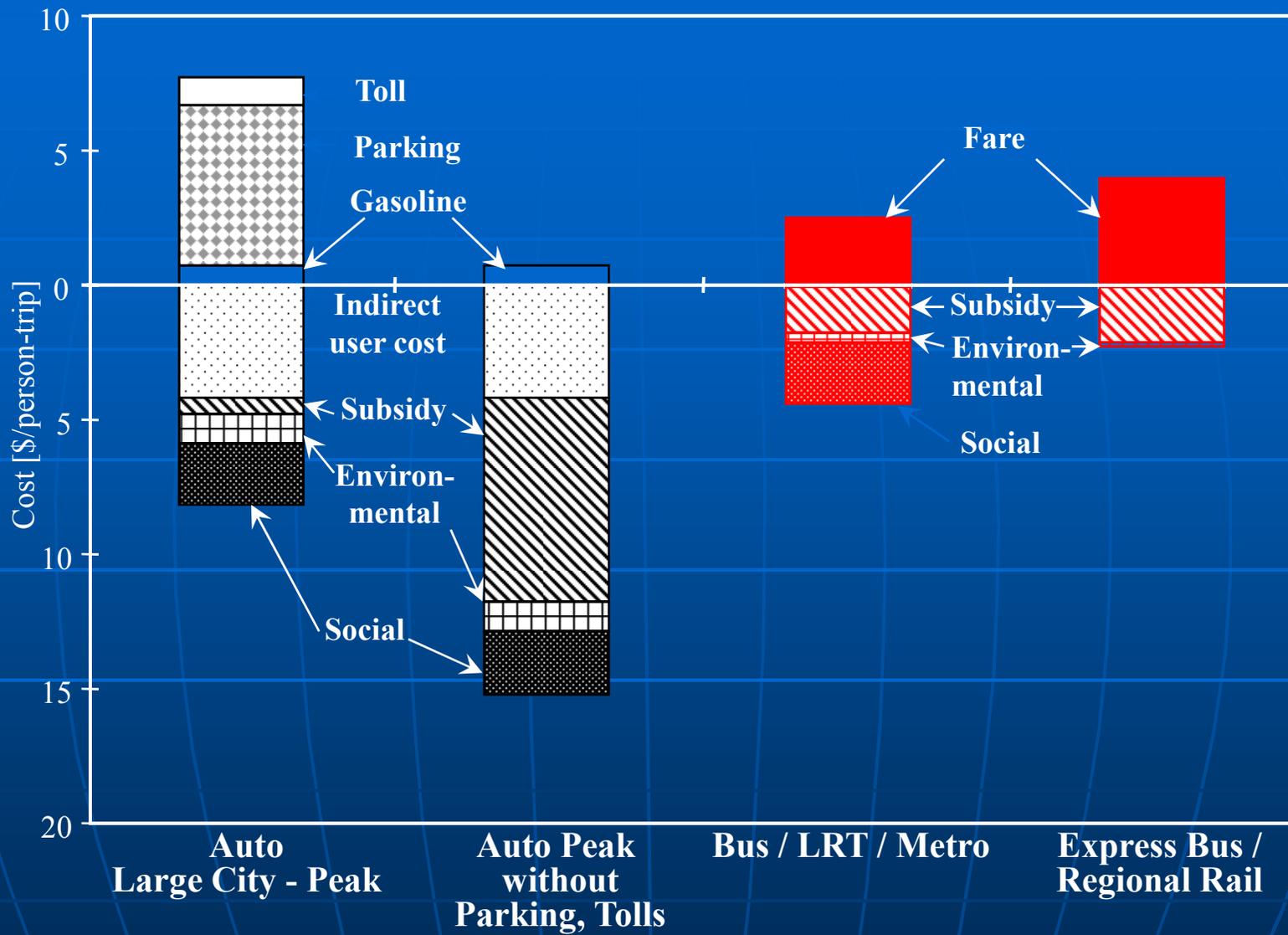
Transit incentives are easily justified and popular

- Auto disincentives: traffic reduction policies, economic policies (parking rates and structure, road pricing)

Politically more challenging, but justified and rational.

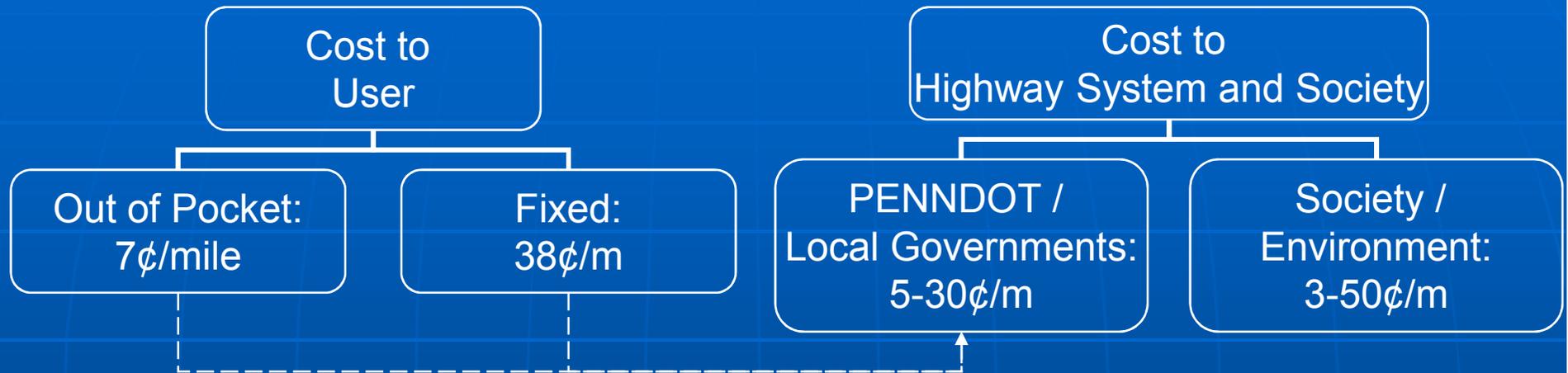


Direct costs of urban travel by different modes



Total costs of urban travel by different modes

AUTO TRAVEL COSTS



USER PAYS 45 ¢/mile, BUT MAKES TRAVEL DECISIONS BASED ON 7¢/mile

UNDERPRICED SERVICE



EXCESSIVE DRIVING



FORCES SUBSIDIES OF OTHER MODES

EXCESSIVE DRIVING



HIGH COSTS ON SYSTEM & SOCIETY



EXCESSIVE AUTO DEPENDENCY

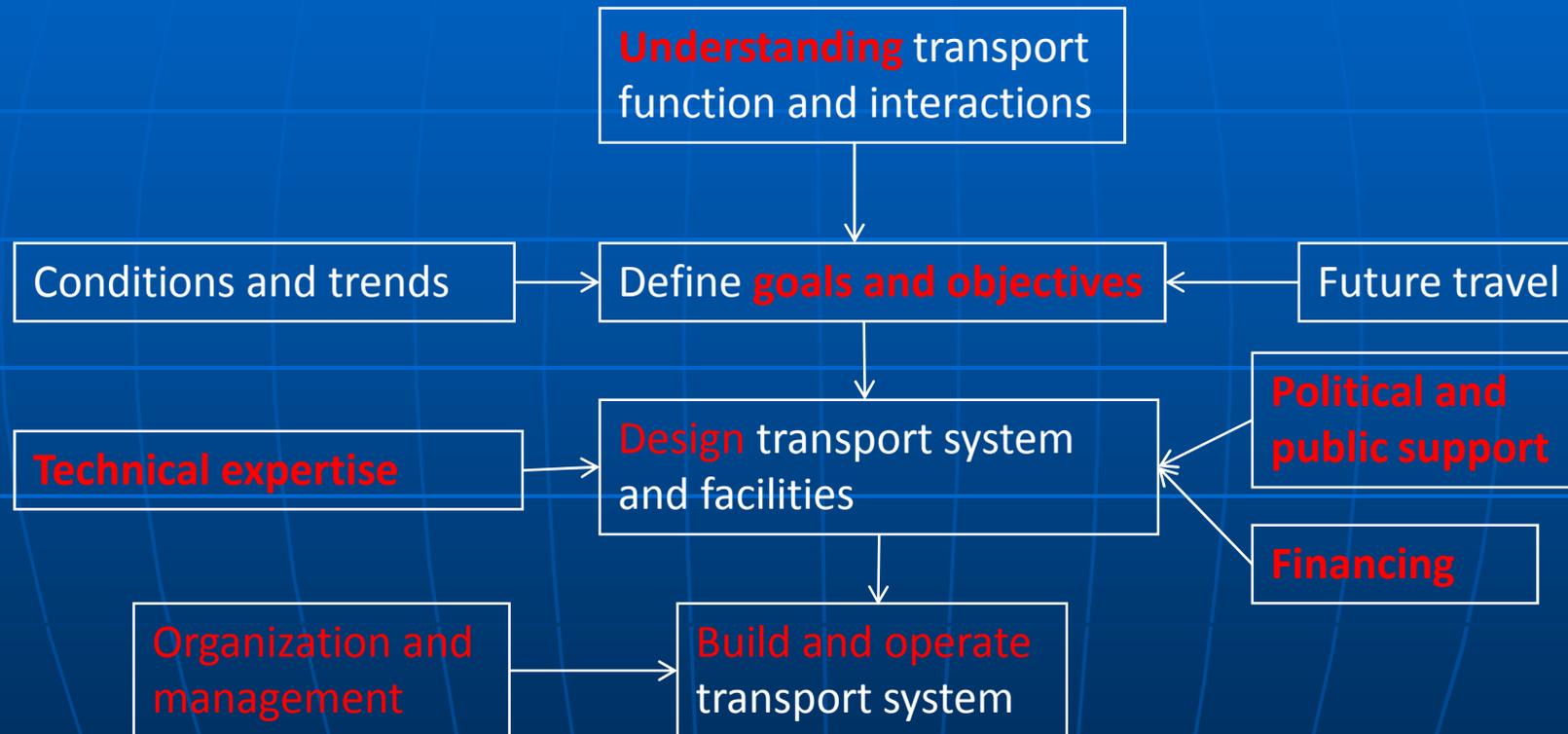
5. IMPLEMENTING OPTIMAL BALANCE AMONG MODES (cont.)

Common obstacles to effective transport planning:

- In many respects individual interests of travelers do not lead to system optimum**
- Individual interests produce negative side effects**
- Special interest lobbies often oppose innovations**
- Public understanding of transport system goals is needed to support plans and approve financing**

A flow chart of components for implementation of rational transport planning is shown next:

Rational transport policy formulation and its implementation



6. EXAMPLES OF SUCCESS: SINGAPORE, WEST EUROPEAN AND SOME NORTH AMERICAN CITIES

- **1975 innovative Area Licensing Scheme introduced**
- **Extensive intermodal coordination implemented**
- **Excellent metro systems, technology and operations**
- **Extensive and well organized bus services**
- **Advanced communication technology and ITS applied**
- **Electronic Road Pricing – ERP - prevents traffic congestion**
- **Land Transport Authority controls all transportation modes.**

WEST EUROPEAN AND SOME NORTH AMERICAN CITIES

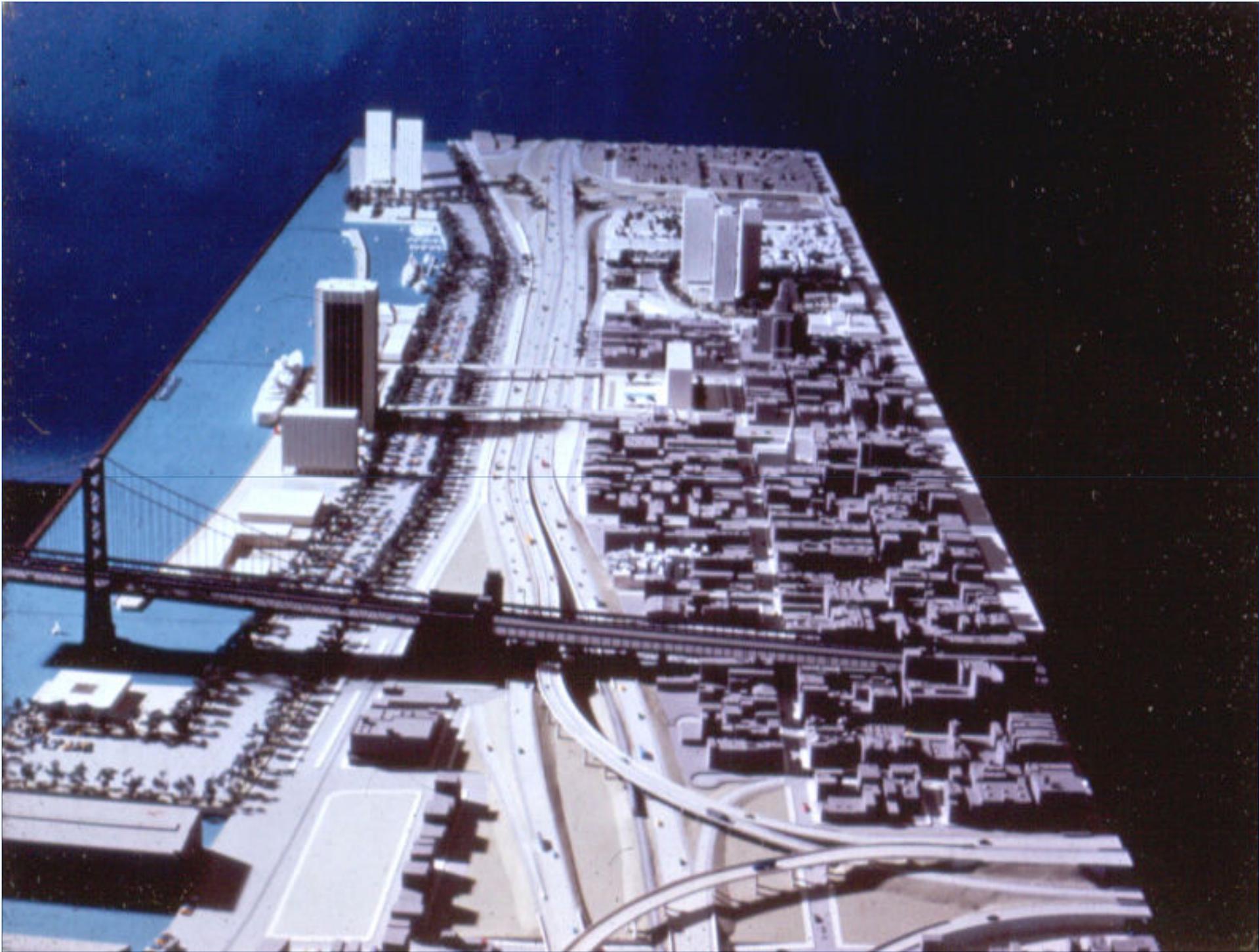
- **Consistent improvements of transit systems, intermodal integration, human orientation for livable cities**
- **Public policies strongly promote urban and rural transit, pedestrians, bicycles.**

6. Examples of Success

Balanced transportation systems
in cities with rational planning:

Examples of mistakes
and successful solutions















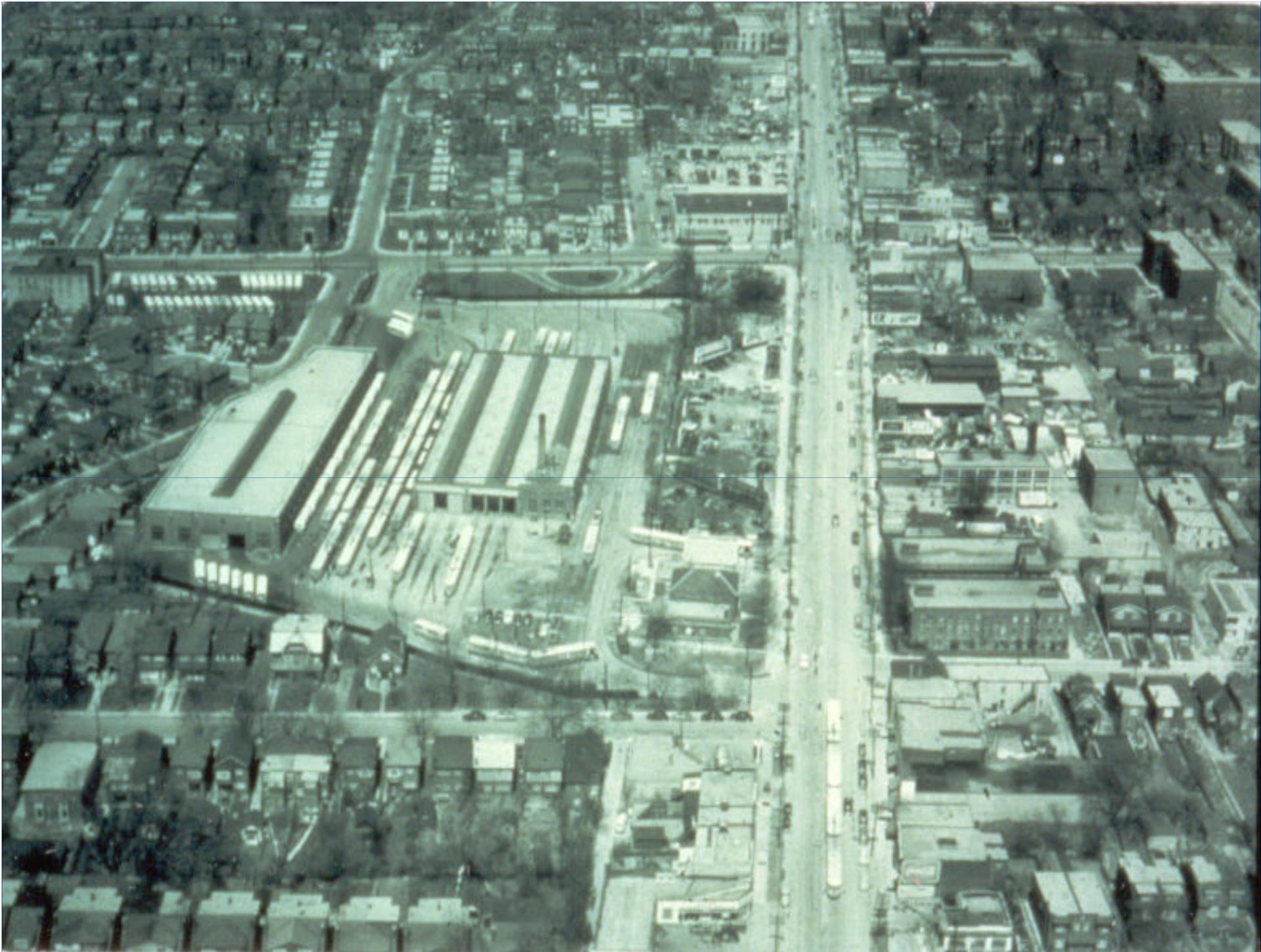




















7. CONCLUSIONS: LESSONS FOR THE FUTURE

The last century has brought tremendous technical advancements.

Causes of present common serious organizational problems:

- **Complexity of transportation system often not understood:**
 - **Basic goals and policies are not clearly defined**
 - **Transportation impacts on cities – their economy, quality of life and sustainability - are underestimated**
- **For efficiency and good services, intermodal systems must be achieved through integration of modes and implementation of policies that achieve their optimal balance.**

7. CONCLUSIONS: LESSONS FOR THE FUTURE (cont.)

- The goal in transportation planning should be not only efficient transportation, but creation of livable cities with good quality of life.
- While technological innovations continue to be important, understanding of problems and introducing innovative policies are usually the critical steps toward solutions
- Public support is needed to overcome institutional barriers and special interest groups
- Well informed public generally supports balanced policies toward intermodal transportation system and livable cities.

Livable cities belong to people



