

Measuring the Distribution and Costs of Congestion

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The Congestion Measurement Story

- **WHAT?** Travel time, variations, compare to goals
- **WHY?** Is it a problem? Causes?
- **WHERE?** Areawide, Sub-Region, Corridor, Facility, Service
- **WHEN?** Day, Week, Season, Events
- **HOW?** Fix it? Define Success?

Performance Measure Needs

- Start with Goals and Vision
- Congestion and Reliability
- Location, Time & Costs
- Effect of Solutions and Trends
- Connect to Expectations
- Connect to Individual Actions
 - Travelers
 - Businesses
 - Agencies

What?

Urban Mobility Measures

Delay/Person – Hours per year

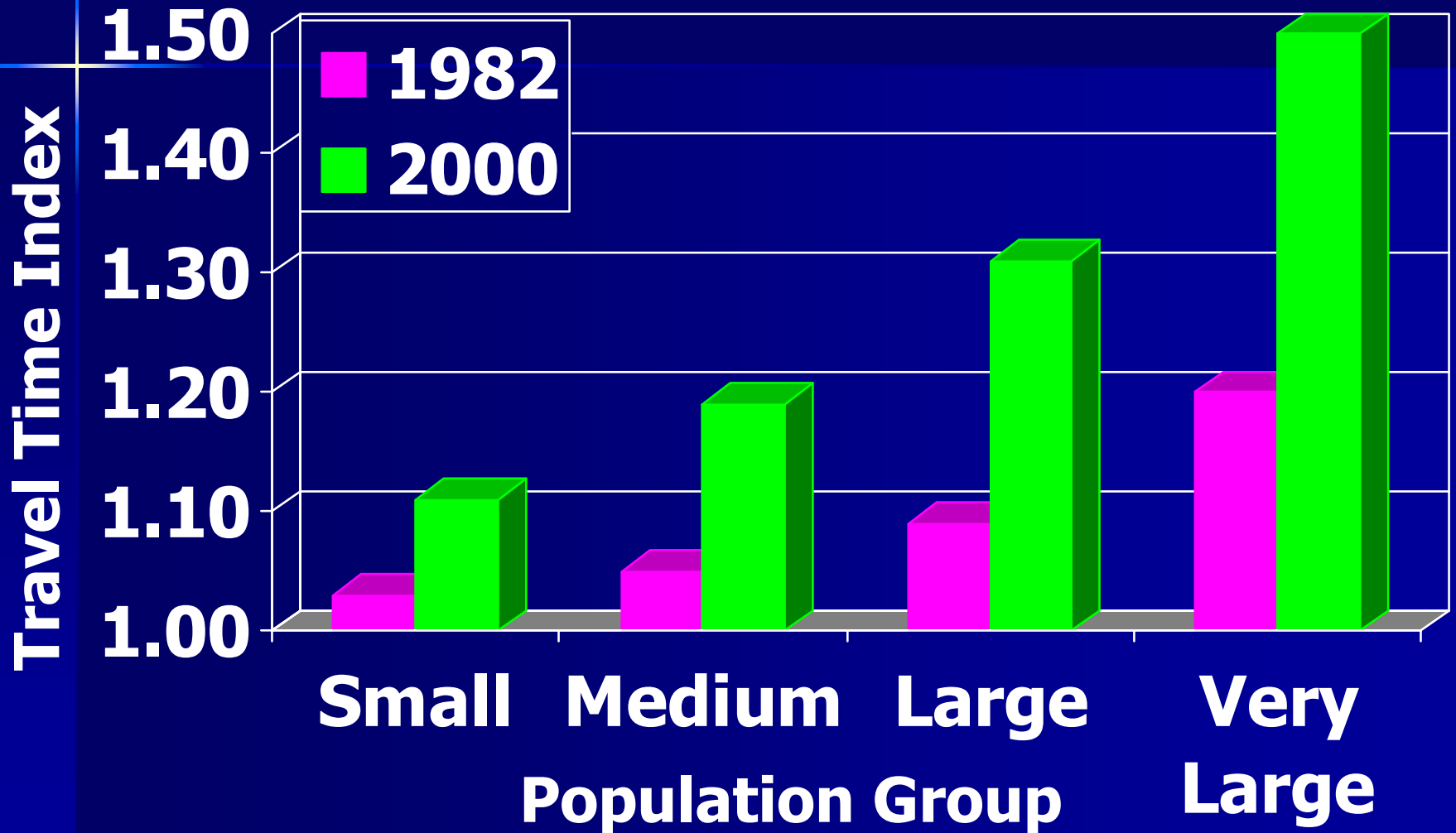
Travel Time
Index

$$\frac{\text{Peak Period Travel Time}}{\text{Free Flow Travel Time}}$$

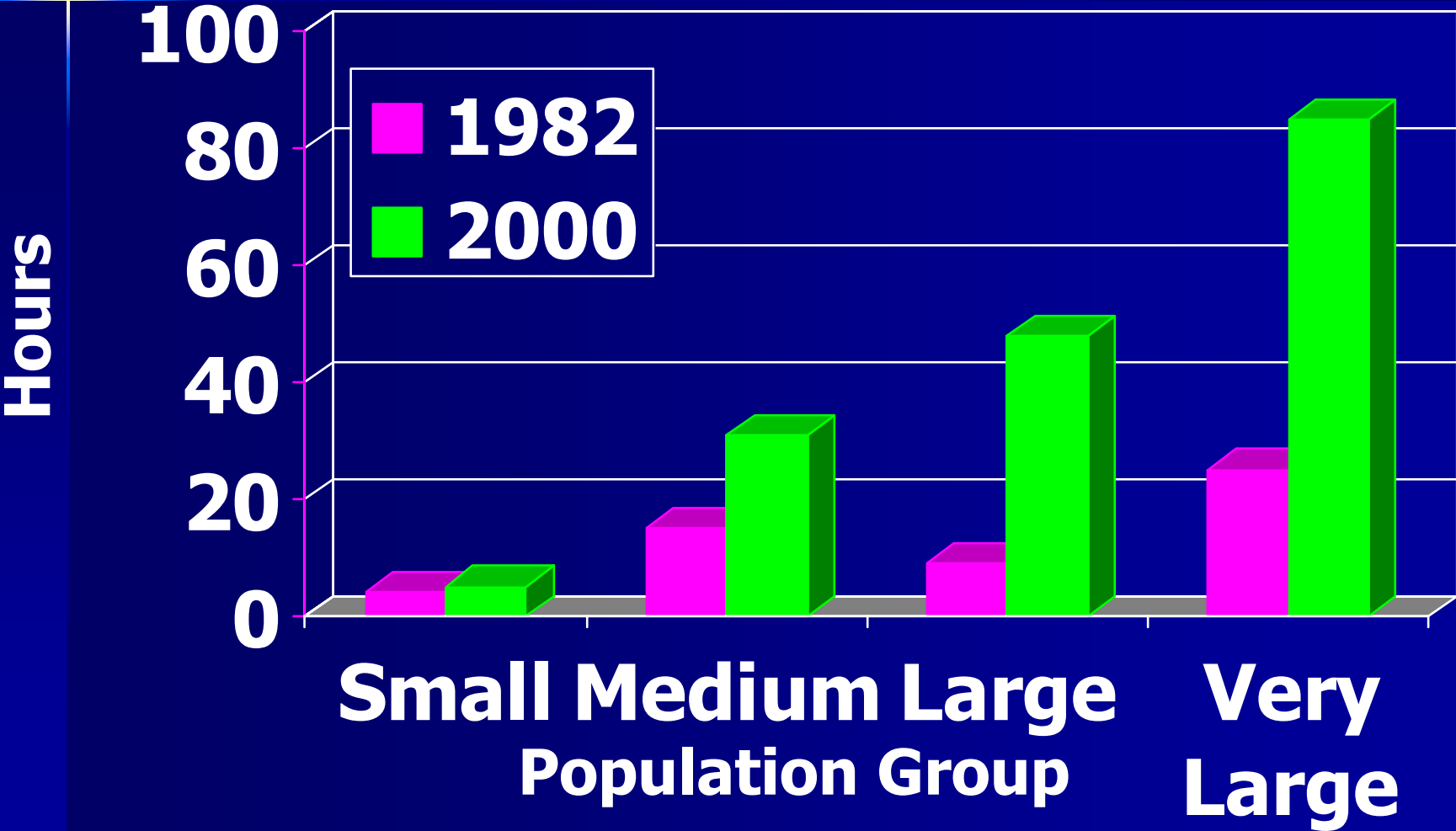
Buffer Time
Index

$$\frac{95\% \text{ Travel Time} - \text{Average Travel Time}}{\text{Average Travel Time}}$$

Travel Time Index

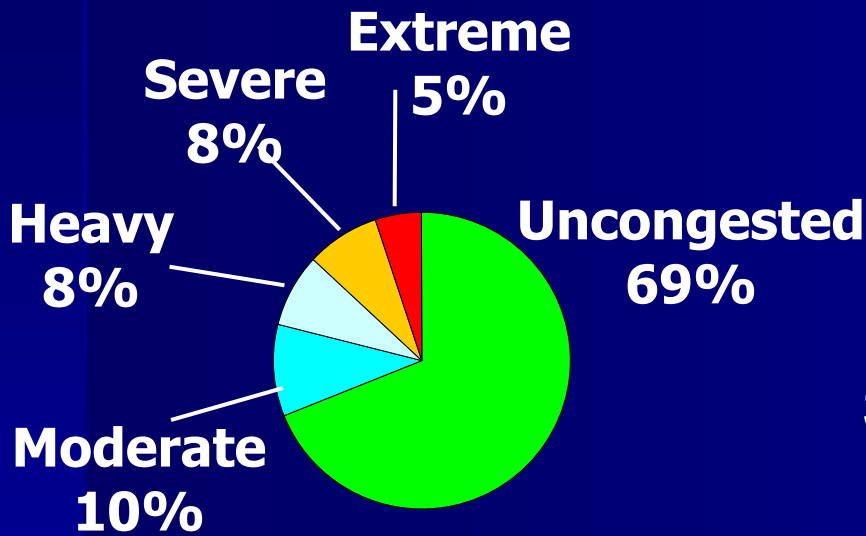


Annual Delay per Person

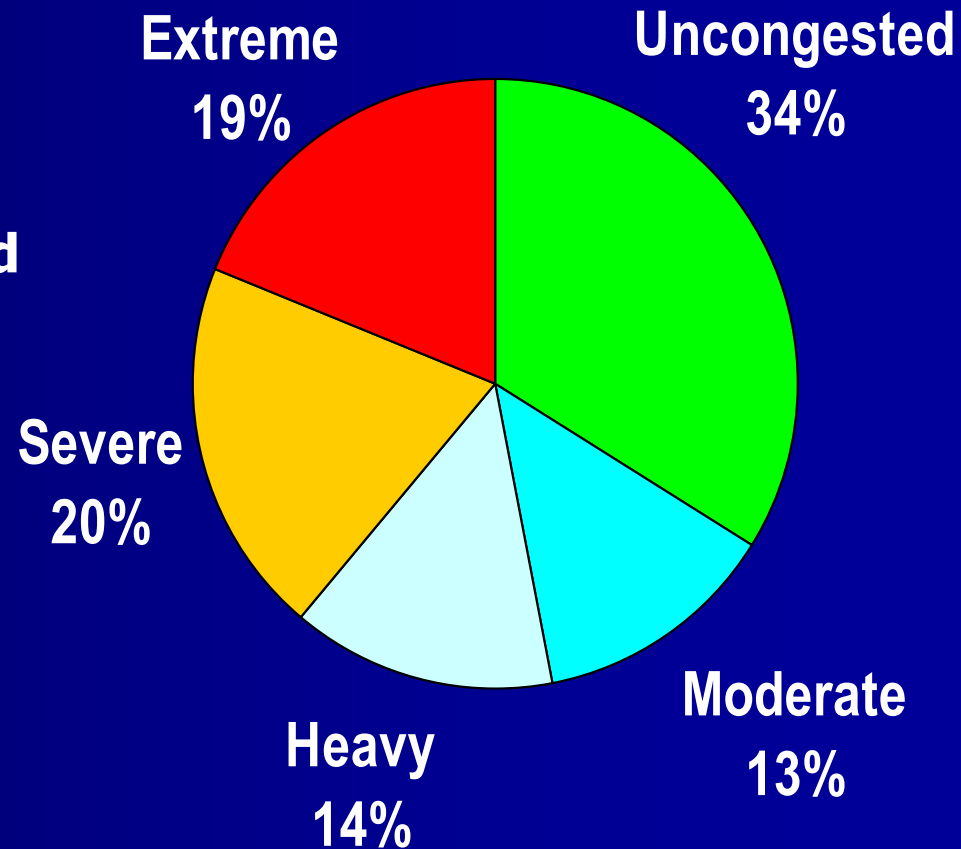


Growth of Congested Travel 1982 to 2000

1982

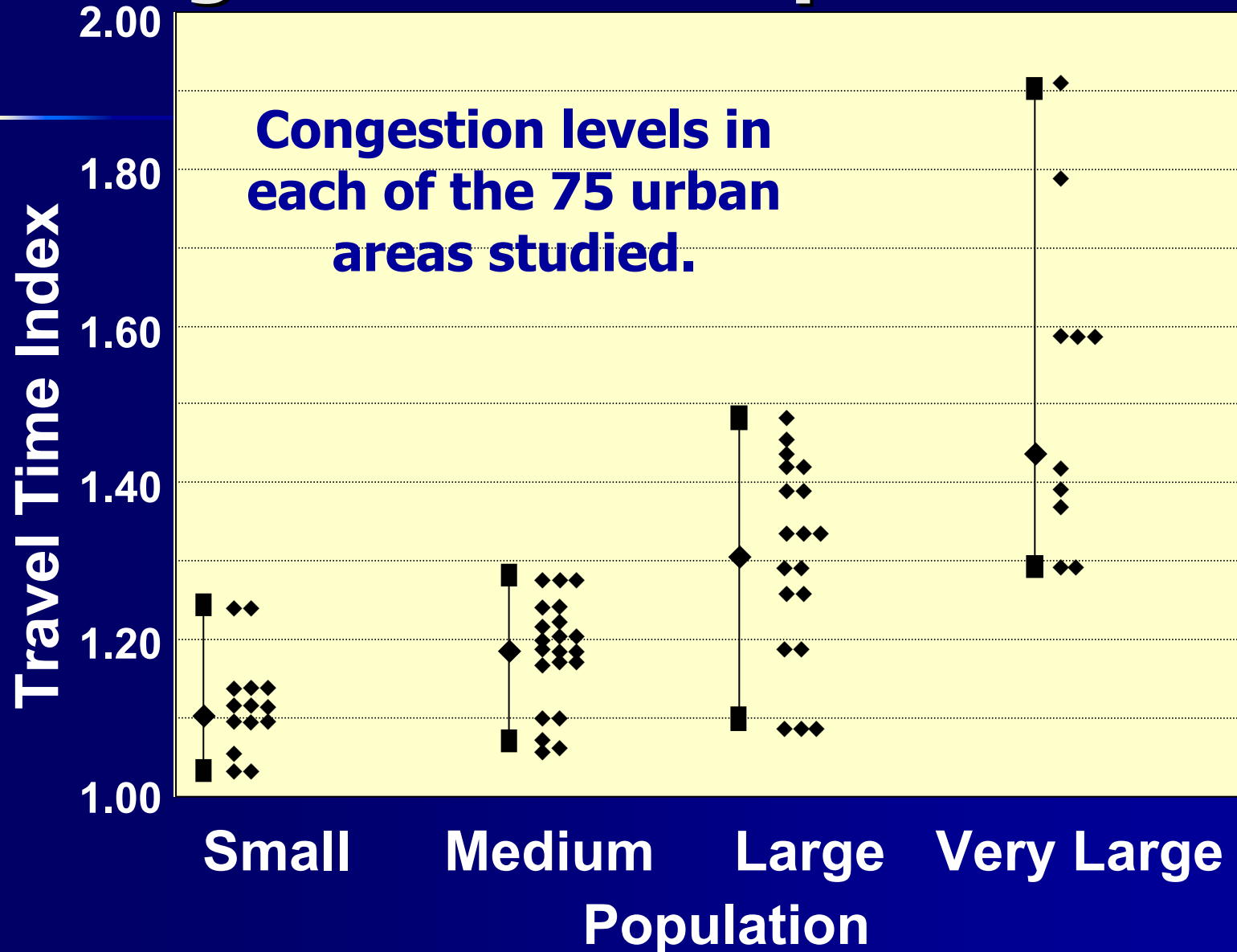


2000

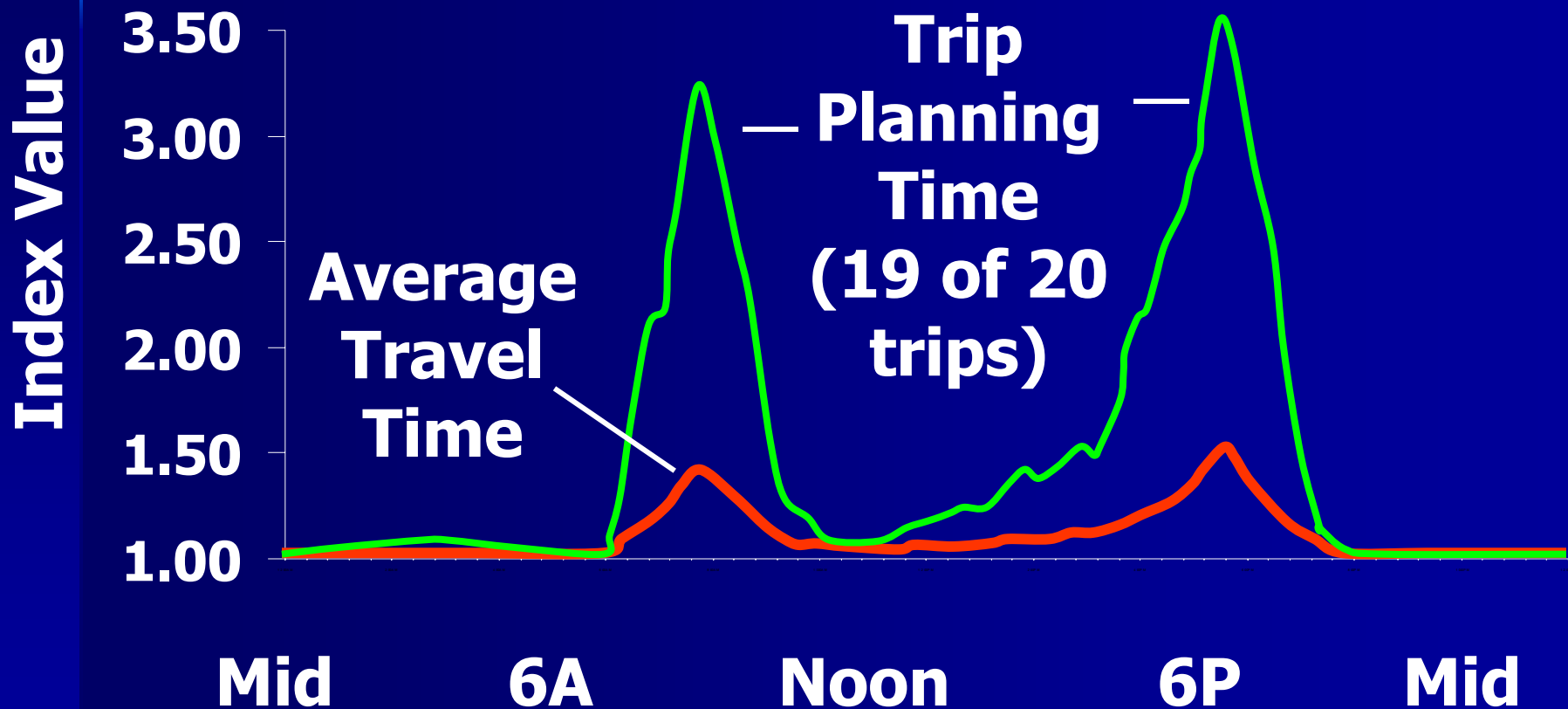


Where?

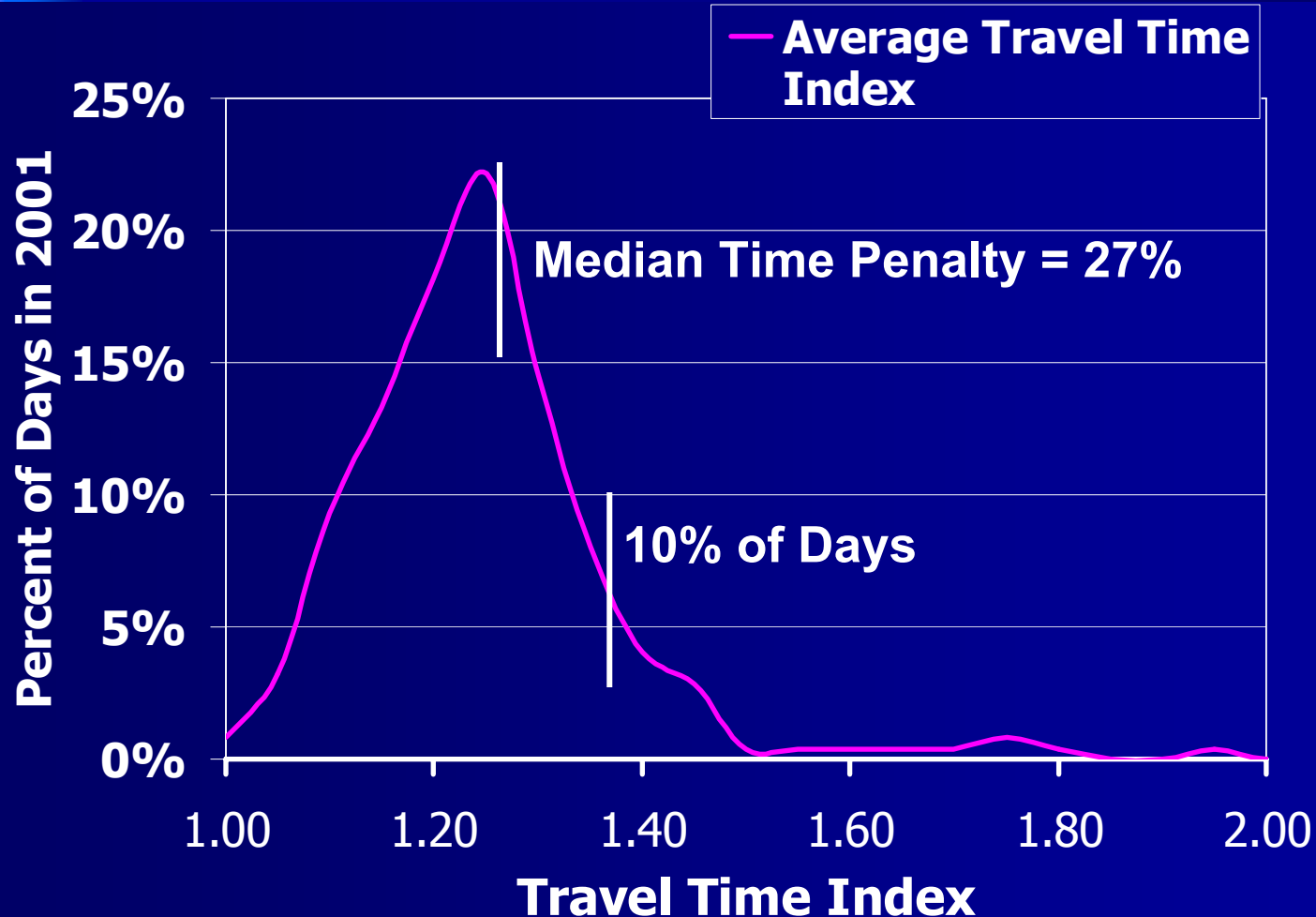
Congestion and Population



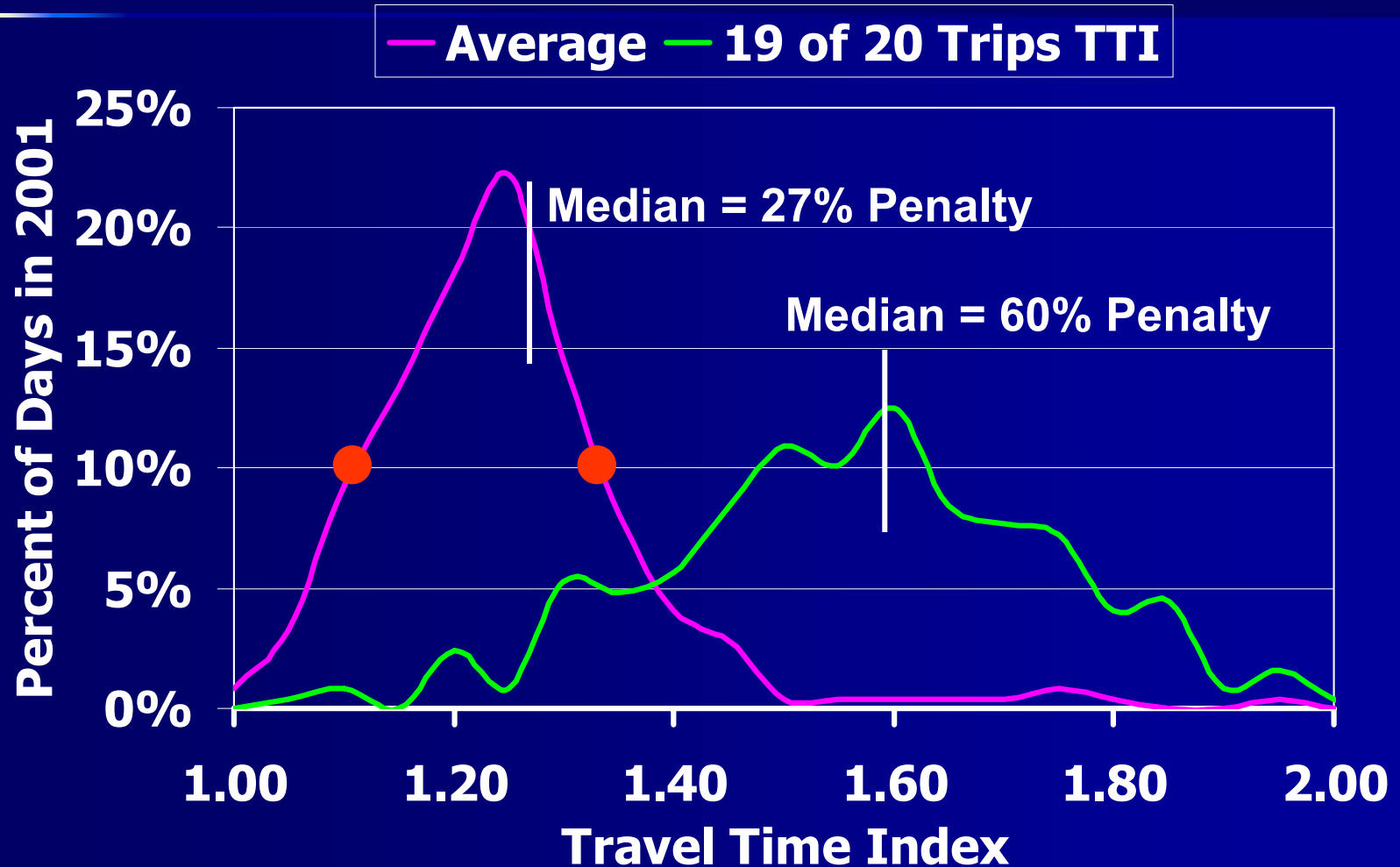
When? Average and Trip Planning Time



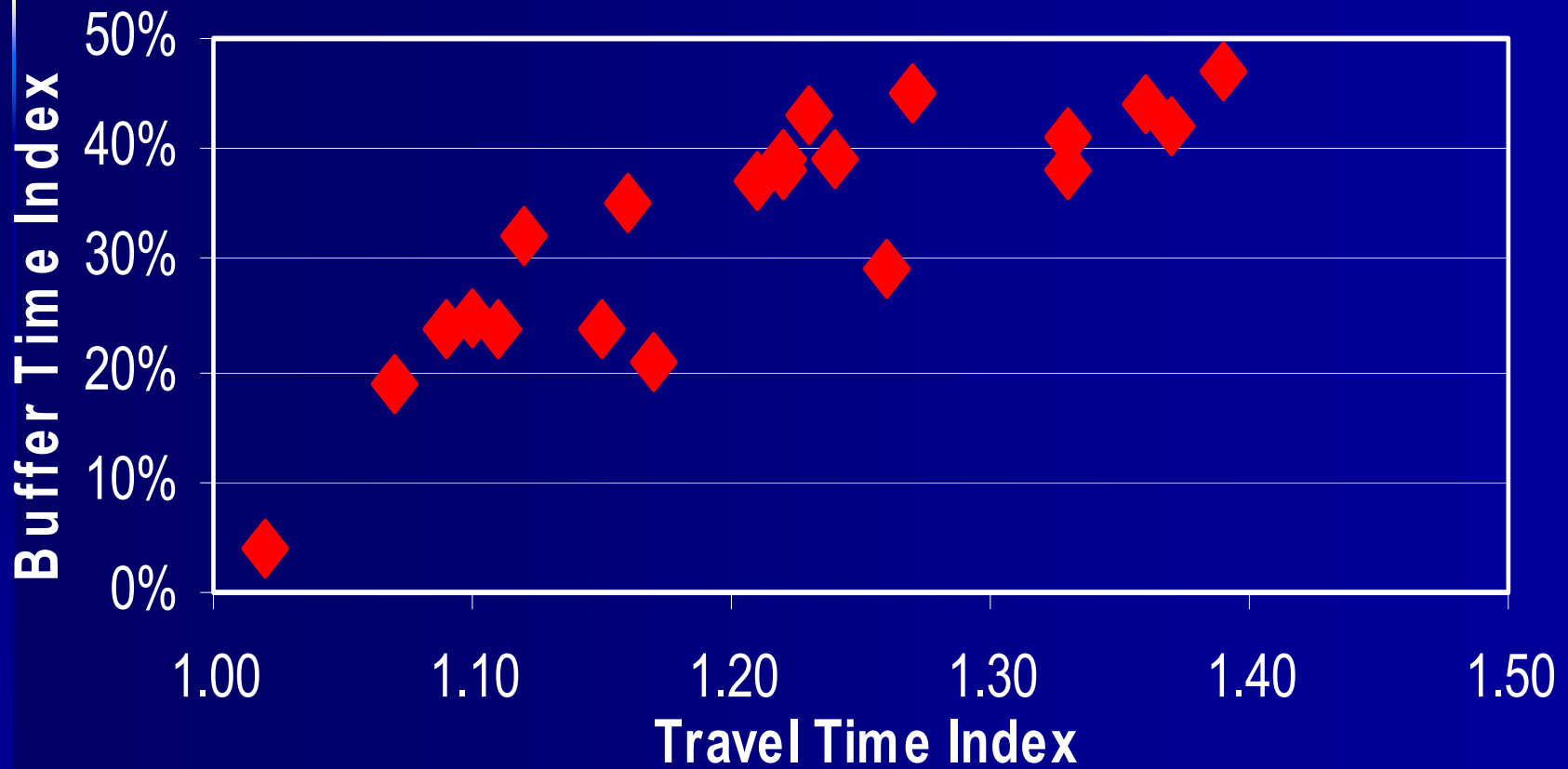
When? Peak Period Congestion Levels



When? Peak Period Frustration Levels



Congestion and Reliability Are Related



Congestion Costs

- Delay and fuel - \$68 Billion (2000 \$)
- Extra travel time - 3.6 Billion Hrs
- Extra fuel consumed – 5.7 Billion Glns
- Business productivity
- Air quality
- Worker, market & supplier accessibility

Congestion Successes – How are They Measured?

- Lower travel time
- More options
- Cheaper travel
- Predictable travel times
- Shorter trips
- Less congested time and space

Toolbox: No Lack of Solutions

Alternate Hours of Travel
Variable Pricing Strategies
Flow Signals
Traffic Signal Improvements
Incident Management
Event Management
Local Bus Service
Neighborhood Circulator Bus
Activity Center Circulator Bus
Express and Park & Ride Service
Demand-Response & Hybrid Bus Service
Vanpools
Telecommuting
Urban Development Patterns
Parking Strategies
Bicycle and Pedestrian
Light Rail
Bus Rapid Transit
Commuter / Light Rail
Managed Lanes/Truck Lanes

Electronic Toll Collection Systems
Intersection Improvements
One-Way Streets
Changeable Lane Assignments
Arterial Access Management
Technology-Based Transit Improvements
Ridesharing
Telecommuting
Assessing the Transportation Impacts
Parking Strategies
Bicycle and Pedestrian Elements
Fare Strategies
Street Continuity
New Lanes
New Toll Roads
Grade Separation
Geometric Design
HOV Lanes
Multimodal Corridors
Freight Rail Improvements

Why not more "Success"?

Many Reactions to Congestion

- Acceptance
- Frustration
- Plan more time
- Vote to fix the problem or to blame
- Move job, business or home

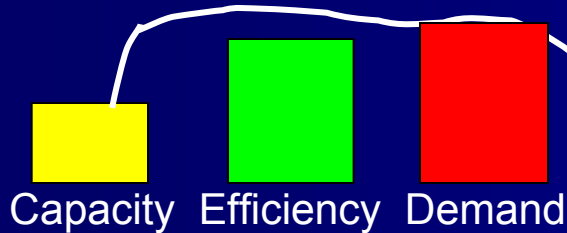
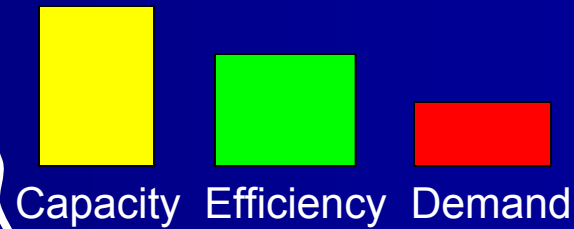
- Is this flexibility “cost free”?

Variety of Solution Types



Strategy Mix Will Be Different

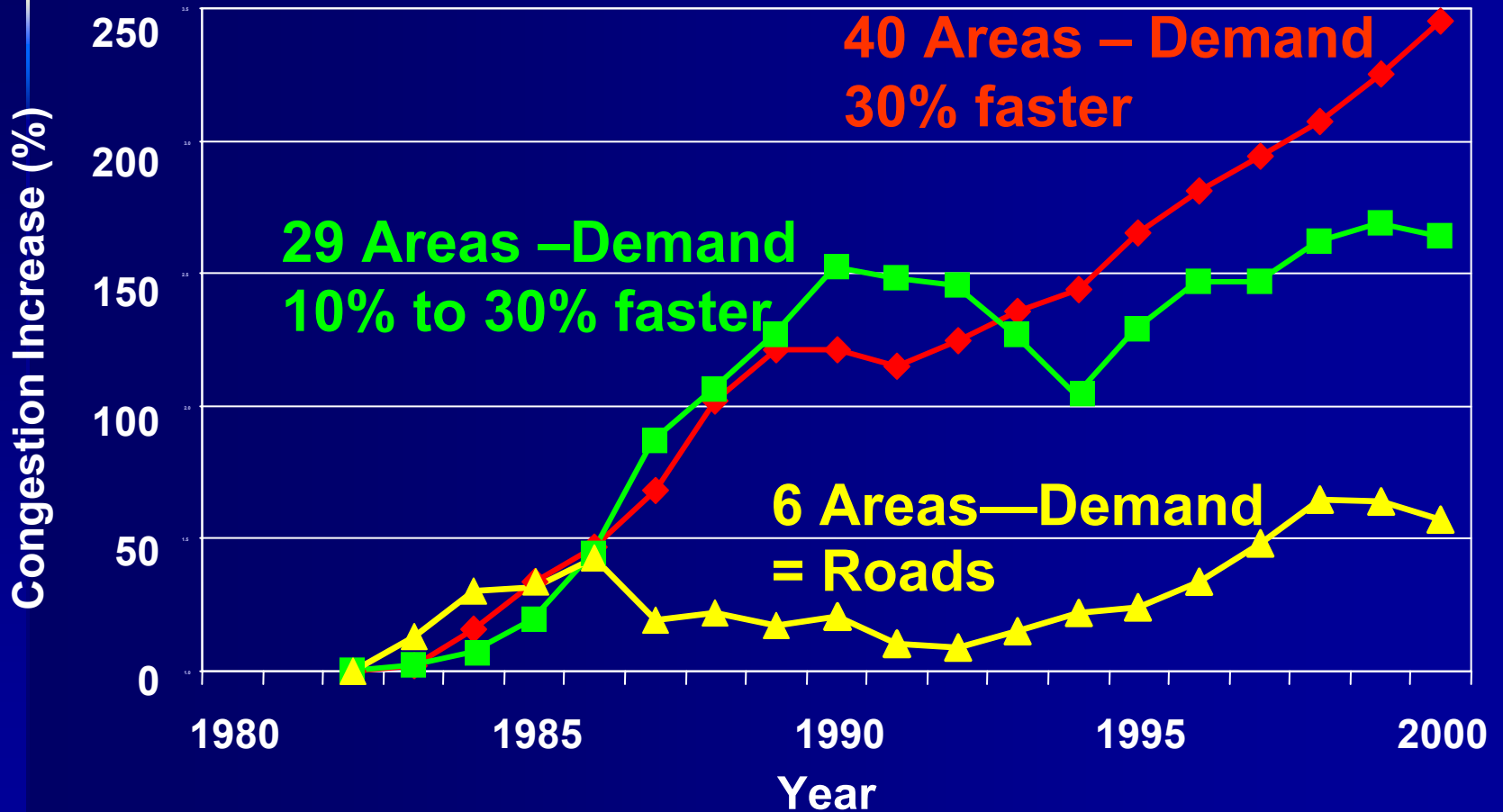
Outer Loop



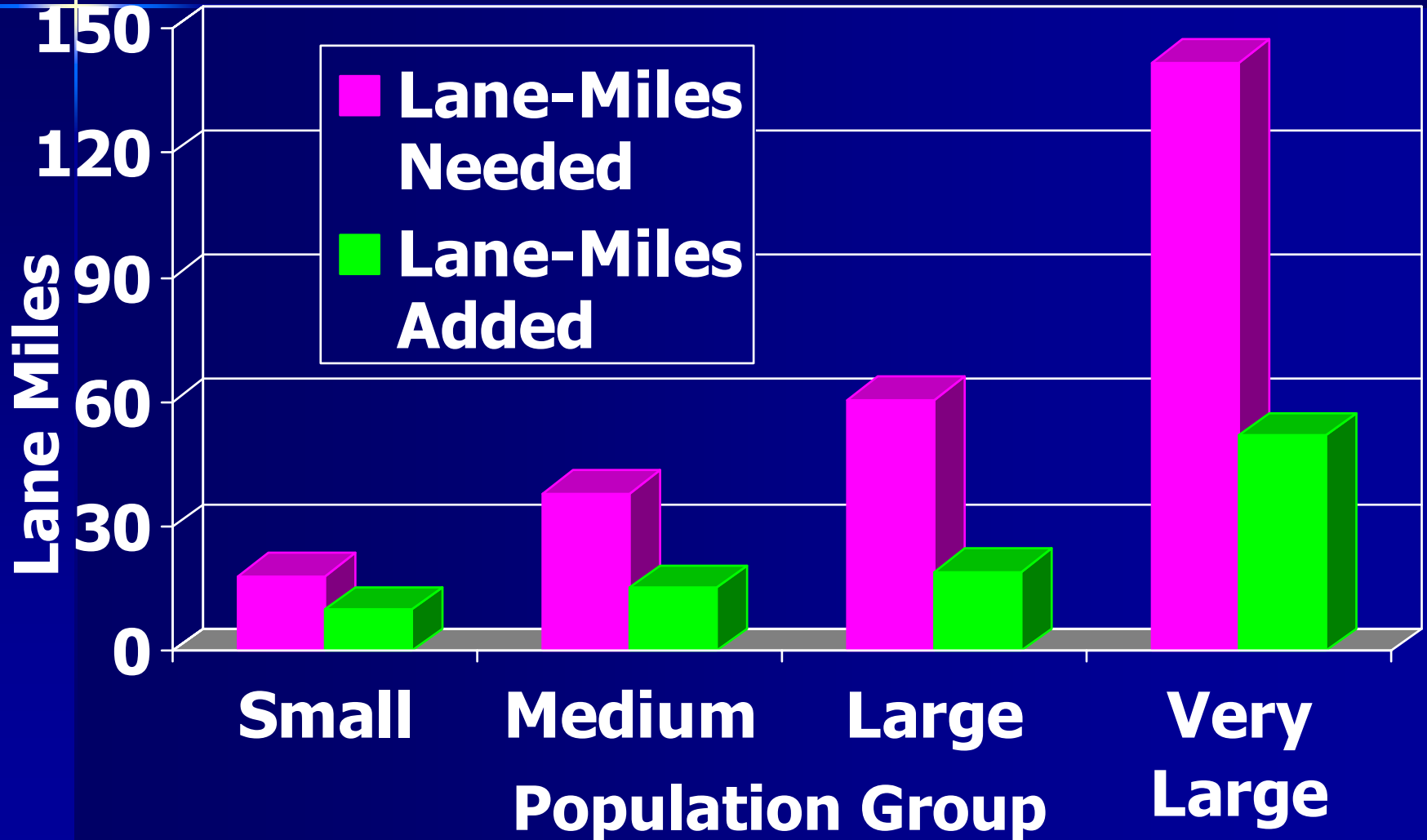
Inner Loop

-  **Add Capacity**
-  **Greater Efficiency**
-  **Demand Management**

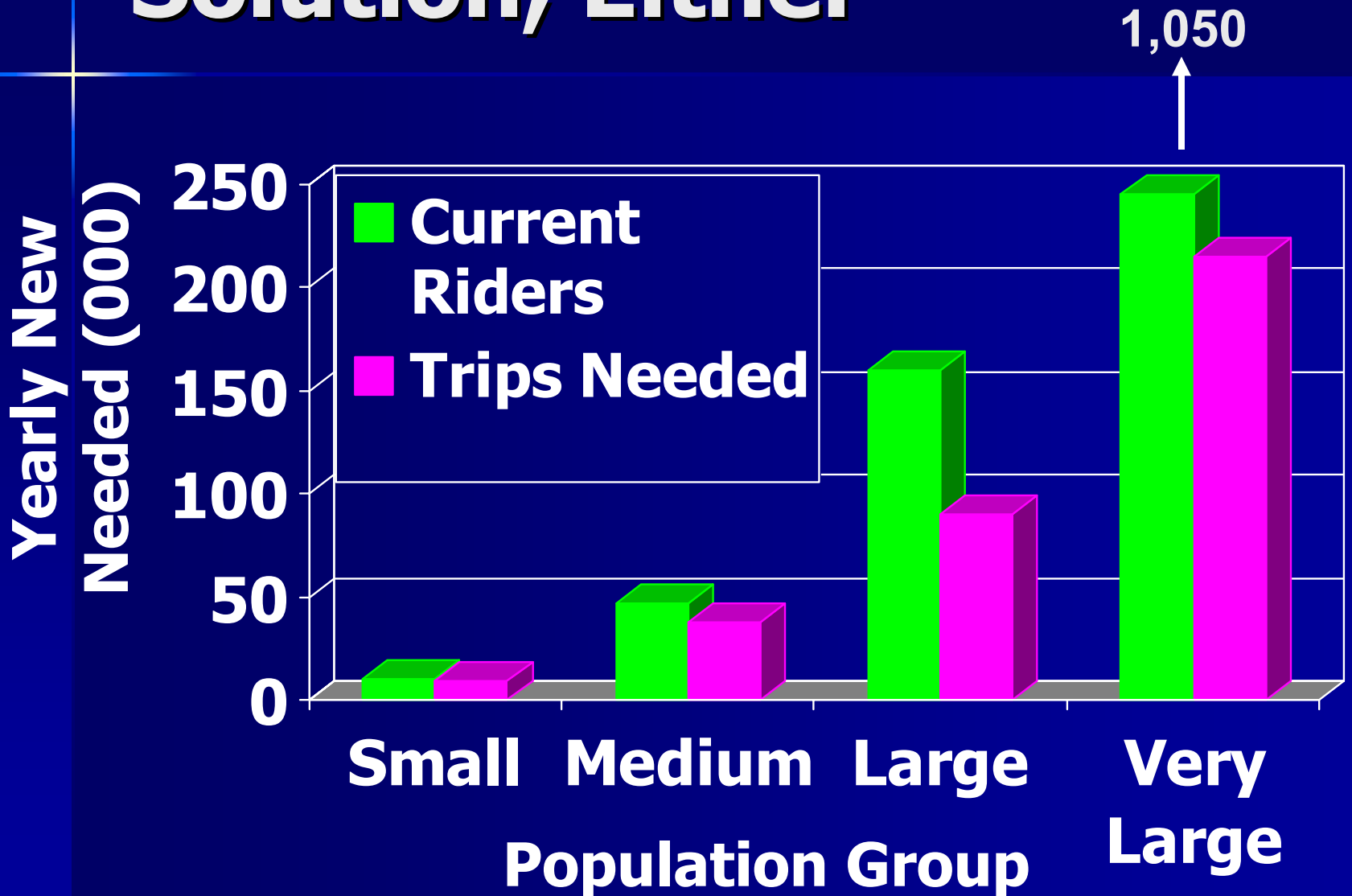
Adding Roads Helps...



... But, Difficult to Add Enough Roadway.



Transit Is Not The Only Solution, Either



Solutions?

- In the past we managed:
 - Construction Projects
 - Supply & Capacity
 - Operations
 - Demand

Solutions? Need for Expanded Management

- In the past we managed:
 - Construction Projects
 - Supply & Capacity
 - Operations
 - Demand
- Should we add?
 - Pricing?
 - Expectations?
- Consensus and Effort = Success

Summary

- Congestion is growing
- Solutions are multimodal policies, programs and projects
- More aggressive operation and deployment
- Achievable goals
 - Stop the growth of congestion
 - Improve reliability
 - Provide more travel options

"...what I found in practice was that the tool that made the most difference in my community was transportation. Nothing else had as great an impact on our economic development, on the pattern of growth, or on the quality of life."

***-Norman Y. Mineta, former Mayor San Jose, CA
Current Secretary of Transportation***