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Transportation Research  
The University of Texas at Austin



College of Engineering

# *Urban Traffic Congestion*

## *Austin District Congestion Management Projects*



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# *Solutions Require A Comprehensive Approach*



- **Increase** Transport System Capacity
- **Improve** Operational Efficiency
- **Modify** Travel Demand

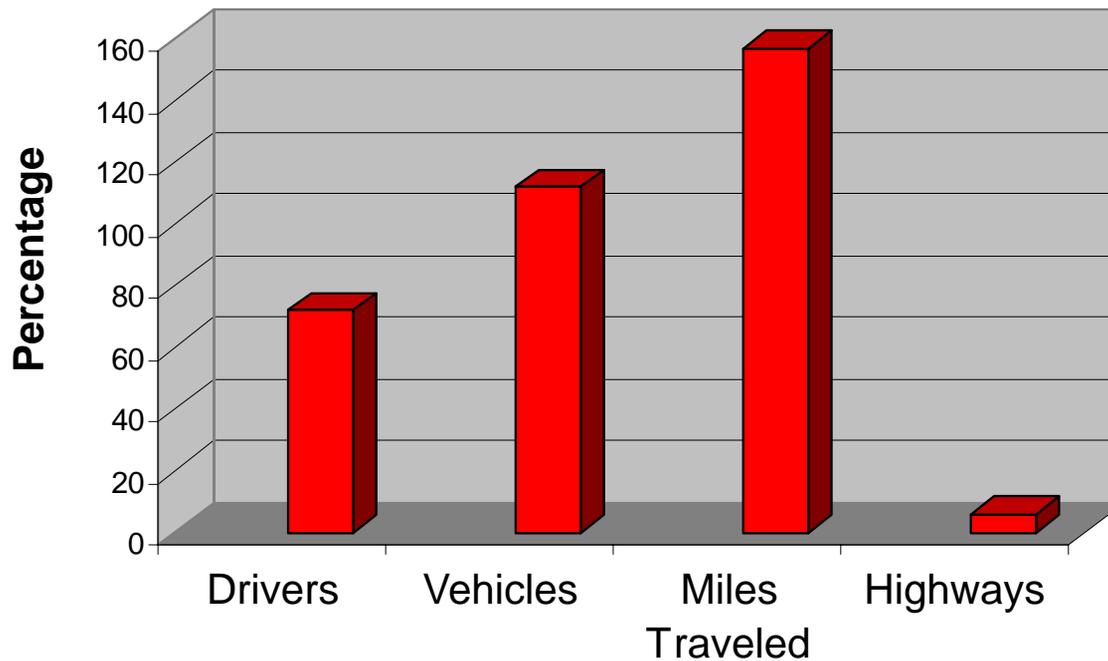
# *Increasing Transport System Capacity*



- Two Elements Must **Both** BE Implemented
- Add new transportation system links
- Renovate existing system elements

# *Increasing Transport System Capacity*

**Changes Compared to 1970**



# *Increasing Transport System Capacity*



- **Add new system elements**
- New street lanes on existing streets
- New freeway lanes on existing freeways
- New freeways
- New Transit concepts
- New Transit Modes

# *Increasing Transport System Capacity*



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# *Increasing Transport System Capacity Dallas Rail System*



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# *Increasing Transport System Capacity*



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# *Increasing Transport System Capacity: Financing Issues*



Toll based financing:

Highway projects

Design-Build-Operate Concepts:

Highway and transit  
projects

# *Increasing Transport System Capacity: Trans-Texas Corridor*



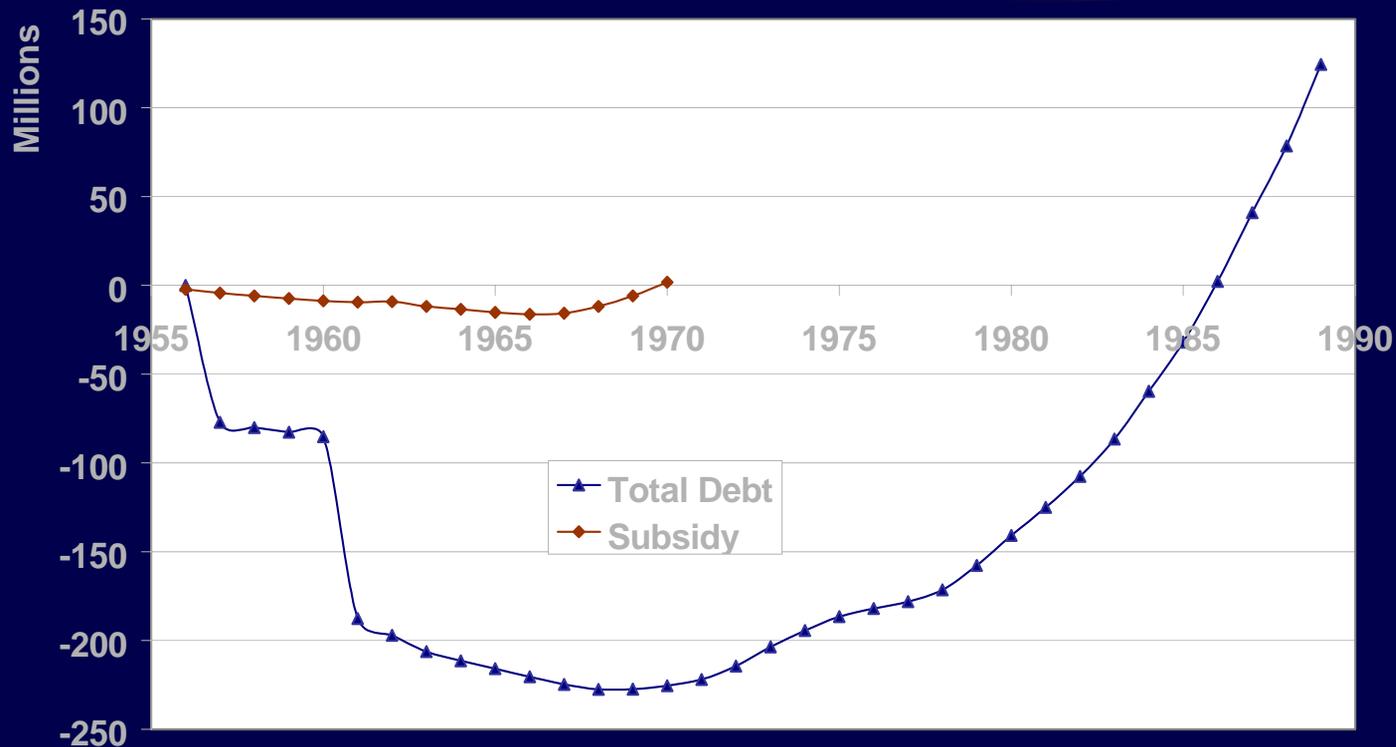
# *Increasing Transport System Capacity: Monorail*



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# *Increasing Transport System Capacity: Toll Based Financing*

## Florida Debt History



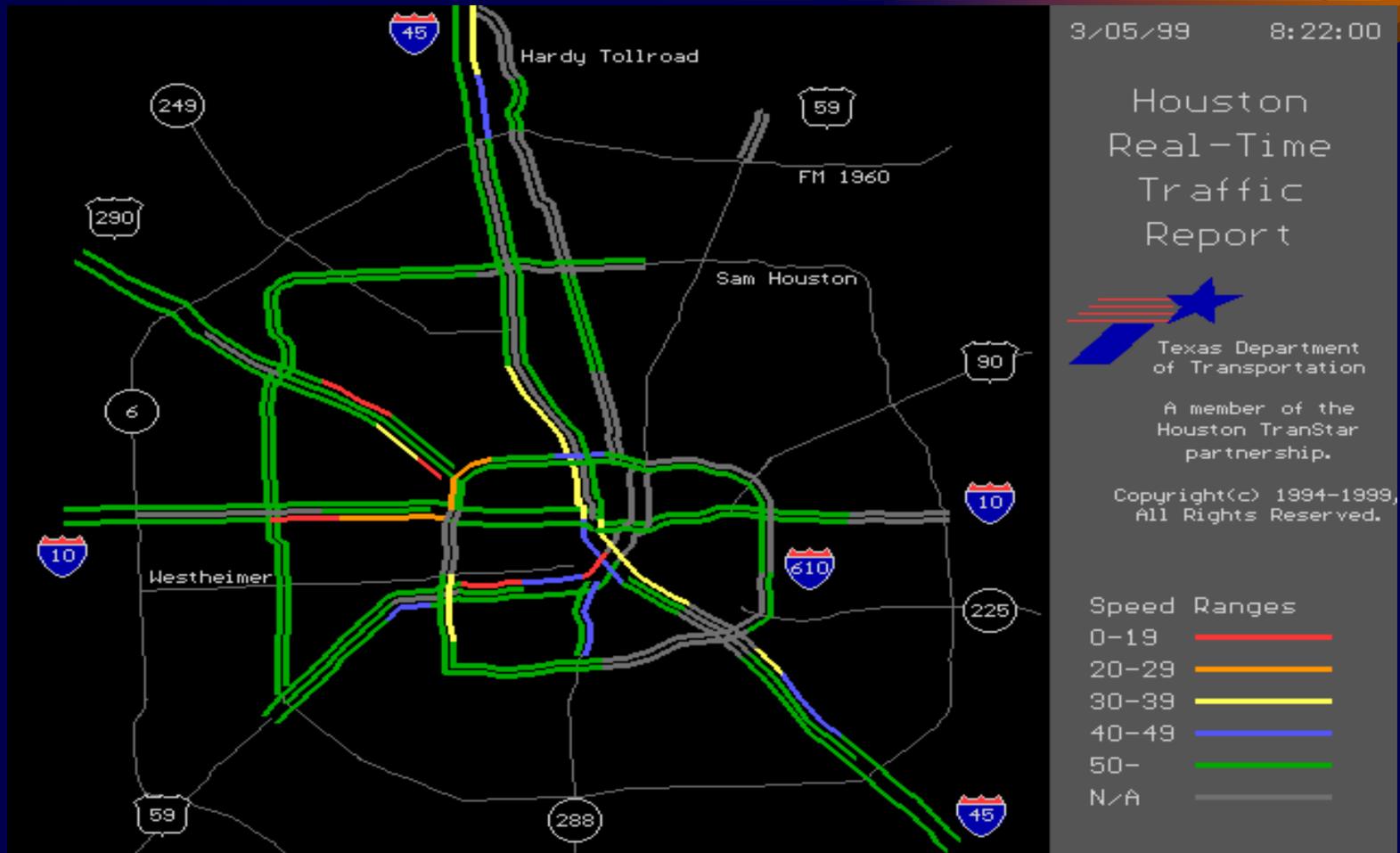
# *Improve Operational Efficiency*



- Implement ITS concepts
- More robust operational monitoring
- More flexible control methods
- Improve incident management procedures

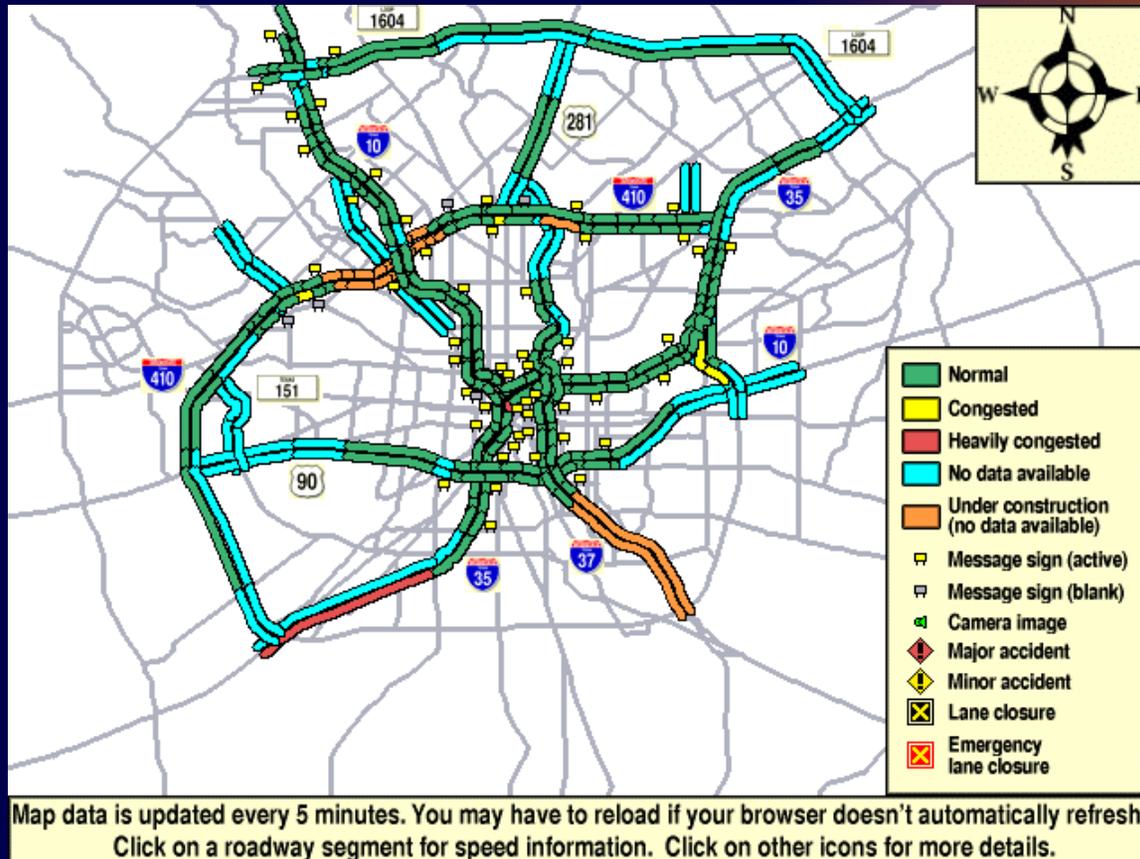
# Improve Operational Efficiency

## Houston Real Time Traffic Data



# Improve Operational Efficiency

## San Antonio WEB Based Traffic Information



# *Improve Operational Efficiency*

## *Transguide Video Surveillance*



# *Improve Operational Efficiency*



- Streets
  - Flexible signal operation
  - Real time channelization
  - Bus Stop Locations, bus turn-outs
  - Pedestrian Facilities

# *Improve Operational Efficiency*



- Freeways
  - Bottleneck Resolution
  - Ramp Metering
  - HOV Lanes
  - Dedicated truck lanes

# *Improve Operational Efficiency*



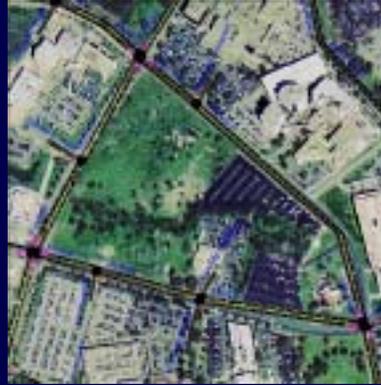
- New Generation Operational Analysis Tools
  - Computer Traffic Simulation Modeling
  - Optimization Capabilities

# *Improve Operational Efficiency: Traffic Simulation Models Require Calibration*



VISSIM

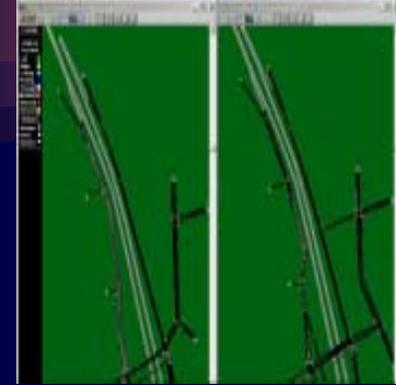
Texas Model



SimTraffic

WATSIM

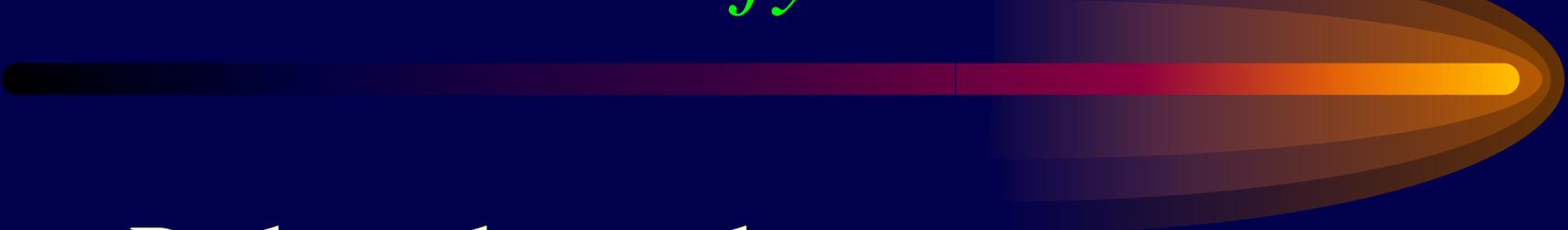
Passer V



CORSIM

Transyt-7F

# *Modify Travel Demand*

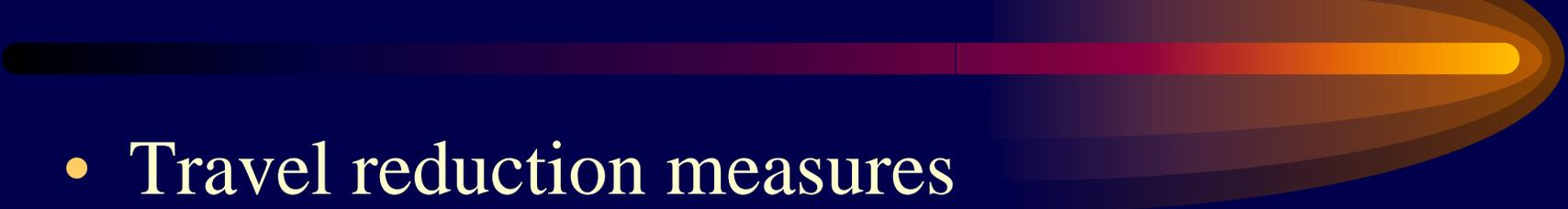


- Reduce demand
- Change peaking characteristics
- Change mode choices

# *Modify Travel Demand: Demand Reduction is Problematic*

- More people mean more travel demand
  - Austin Metro Area is almost 1,000,000 people
  - CAMPO 2025 forecast is 2,335,037 people
- Per person travel demand may decrease
  - Trip rates may decrease as population increases
  - Congestion will limit the rate of increase
- The net result will be increased demand

# *Modify Travel Demand*



- Travel reduction measures
  - Four day work weeks
  - Telecommuting
  - Home shopping
- Net impact has been 1-2 percent of all trips
- Why has the impact been so minimal?

# *Modify Travel Demand*



- Vehicle Occupancy
- Average Vehicle Occupancy During Peak Hours is
- Barely more than 1 person per car

# *Modify Travel Demand*

- How would an **average** vehicle occupancy of **2 persons per car** effect our system?
- **How could this be attained?**
- **Car pooling**
- **Van pooling**

# *Modify Travel Demand: Peaking Characteristics*



- Work Trip Travel Times
  - Does everybody really need to begin work at 8:00 AM???
- How would morning congestion be changed if-
  - 1/3 of us arrived at 6:00 AM,
  - 1/3 arrived at 10:00 AM
  - and the rest at 8:00??

# *Modify Travel Demand: Change Mode Choices*



- Travel Modes
- What will convince me to use transit instead of my car for work trip travel??
- My perception of service with my car must decrease to that of transit . . . **or** . . .
- My perception of transit service must improve to that of my car

# *Modify Travel Demand: Change Mode Choices*



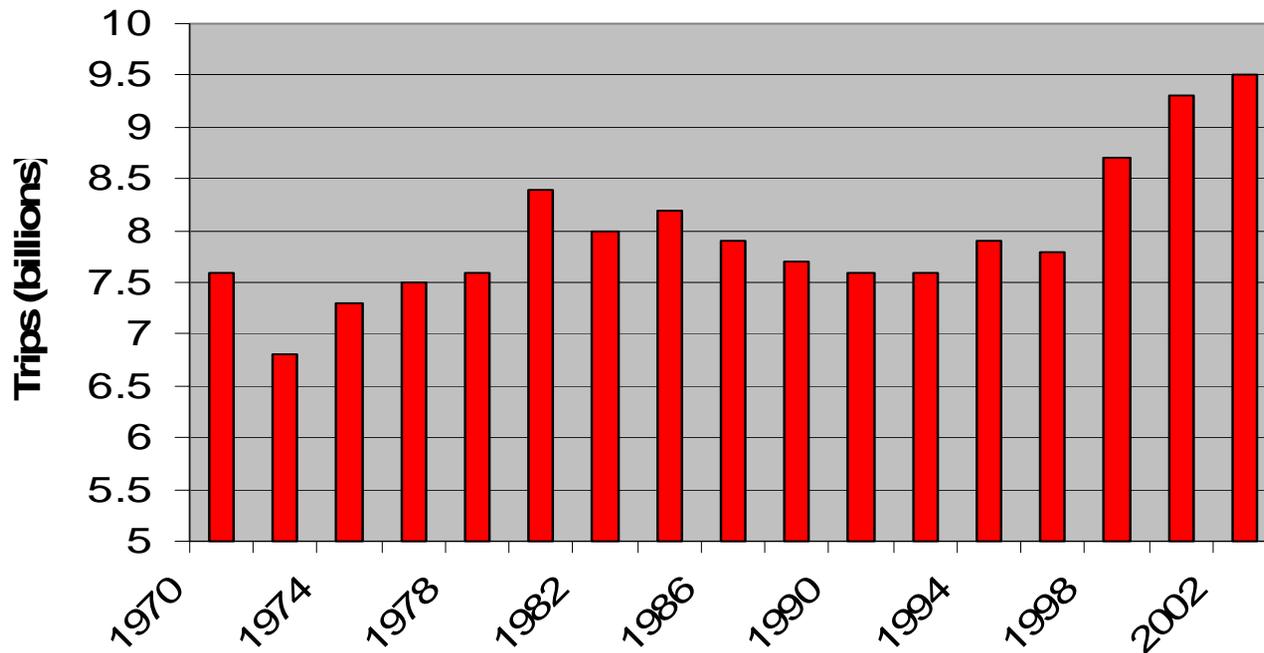
- Poorer auto service
  - No Parking at my destination
  - Congestion on my auto travel route
- Better transit service
  - Available transit service
  - Travel times competitive with my car
  - Bus rapid concepts

# *Modify Travel Demand:*

- Washington Post, Sunday 30 April 2000  
Headline:
  - *Mass Transit Popularity Surges in U. S.*
  - Biggest Demand in 40 Years
  - Last year ridership rose 4.5% compared to 2% for motor vehicle travel

# Modify Travel Demand

**U.S. Annual Public Transportation Ridership (Billions, source APTA)**



# *Modify Travel Demand: Possible Measures*



- **Tolling:**
  - Acceptable if travelers perceive improved service
- **Congestion pricing:**
  - Technology for implementation is available



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