Urban Mobility and the Cost of Congestion
(Getting the Public Engaged in Solution Discussions)

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Urban Mobility Scorecard Headlines

- Congestion has grown…
  - …in cities of all sizes
- It has spread to more:
  - times of the day, roads, buses & trains
- The recession reduced congestion
  - ..but congestion is still related to economy and metro area size

- There are a lot of solutions,
  - ..but new decision processes need to incorporate all solutions
  - ..and we need to use new data to create more relevant messages to communicate with the public

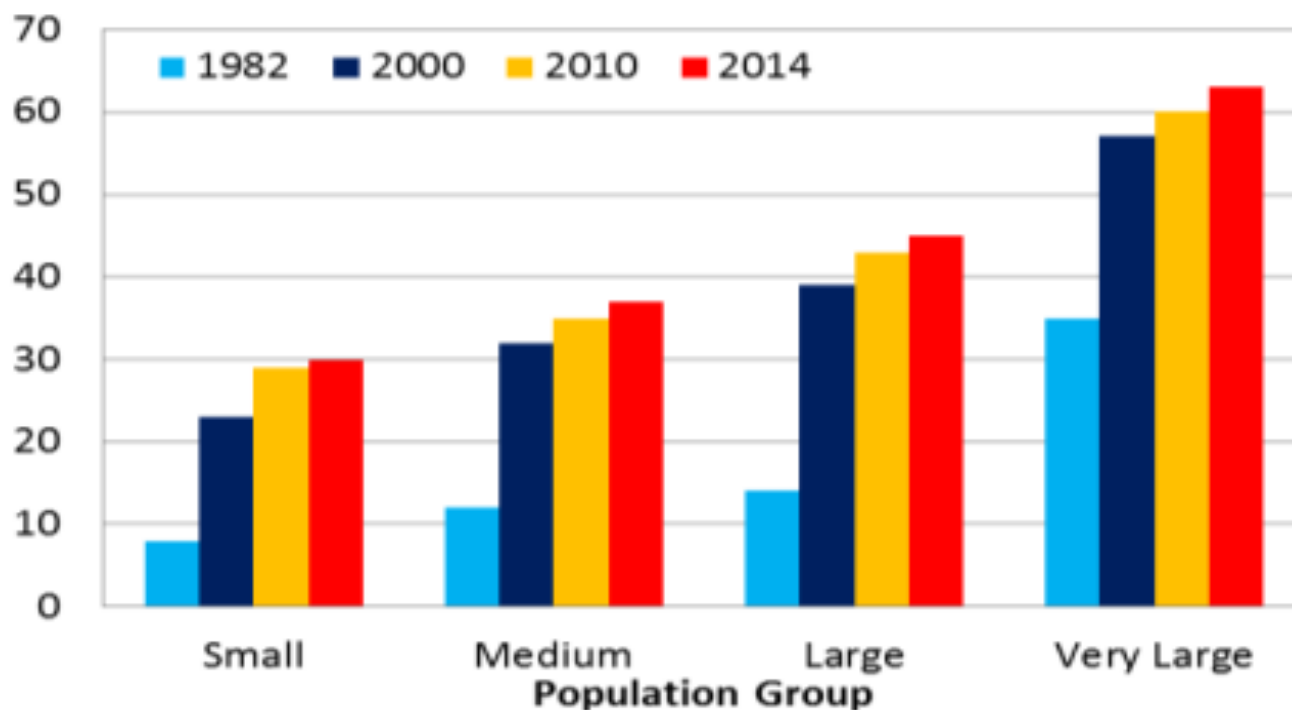# Congestion is Getting Worse in Cities of All Sizes

Very Large = **3 M +**
Large = **1 M - 3 M**
Medium = **500 K - 1 M**
Small = **Below 500 K**

Delay per Auto Commuter

National Urban "Rush Hours"

**For the Average Auto Commuter:
42 Hours
19 Gallons
$960**

2014   **Total Delay =
6.9 Billion Hours**

**Where Is
The Travel?**

**Wasted Fuel
3.1 Billion
Gallons in 2014**

Pie chart labels:
- Uncongested 18%
- Light 22%
- Moderate 20%
- Heavy 14%
- Severe 12%
- Extreme 14%

National Urban "Rush Hours"

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42 Hours
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Total Delay =
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Where Is The Delay?

Wasted Fuel
3.1 Billion
Gallons in 2014

Light 2%

Moderate 7%

Heavy 11%

Severe 17%

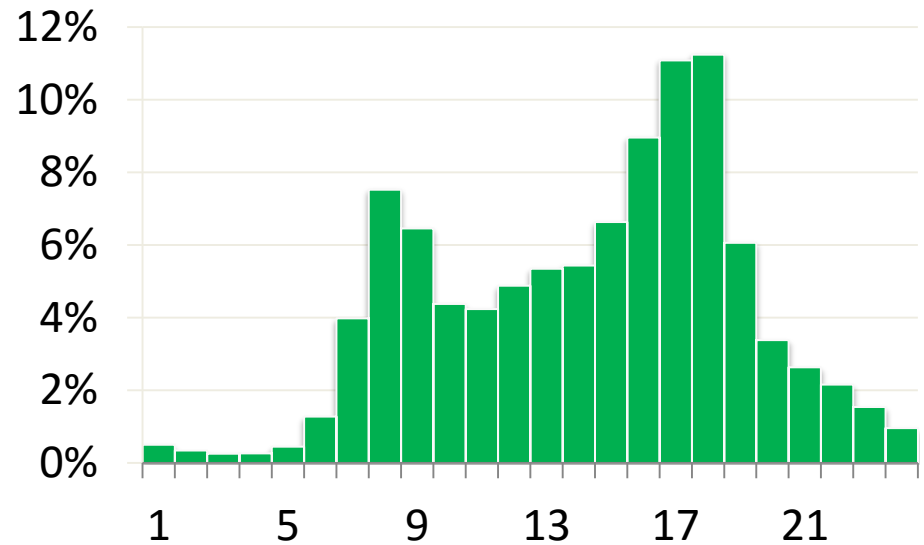Extreme 63%
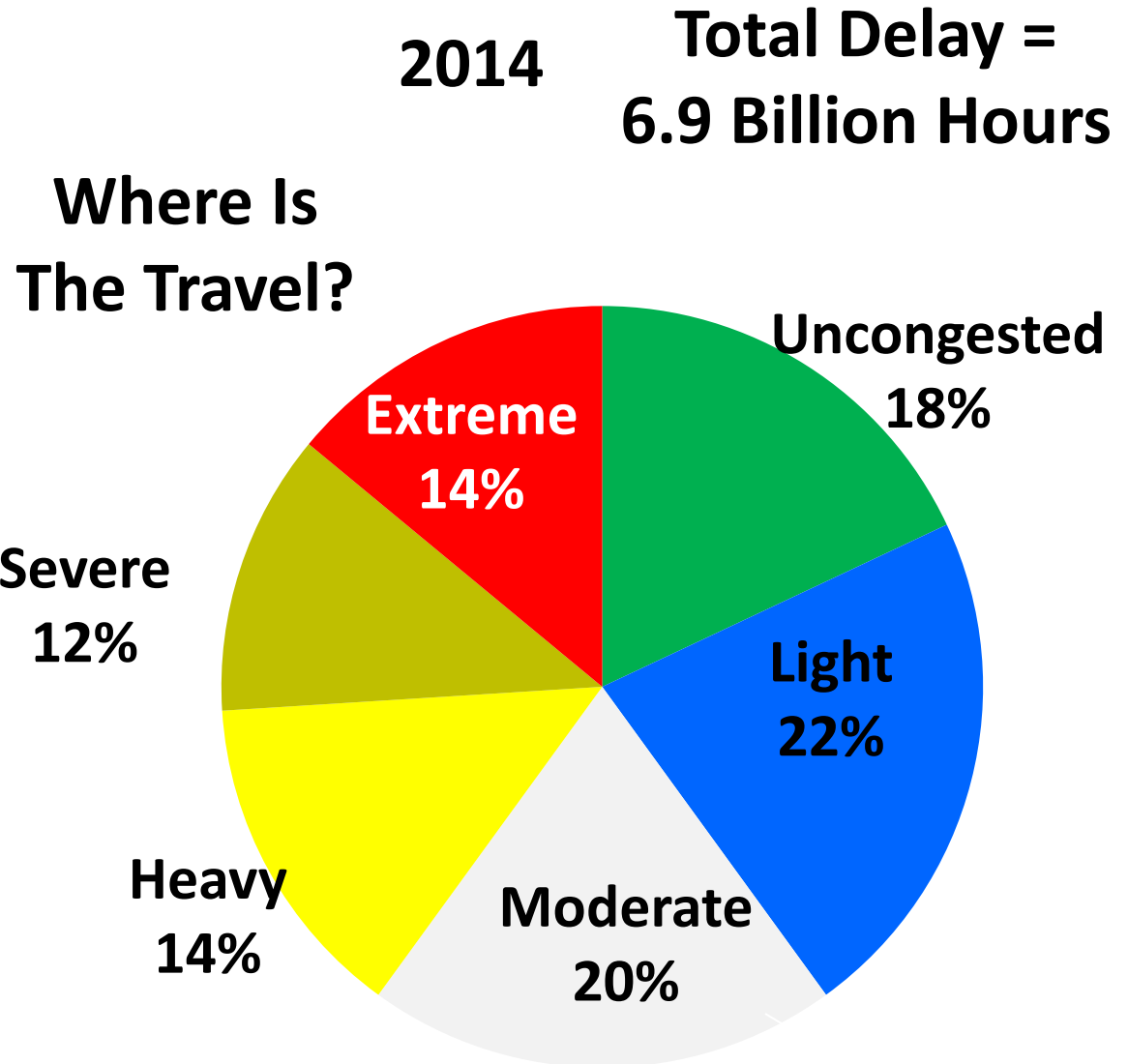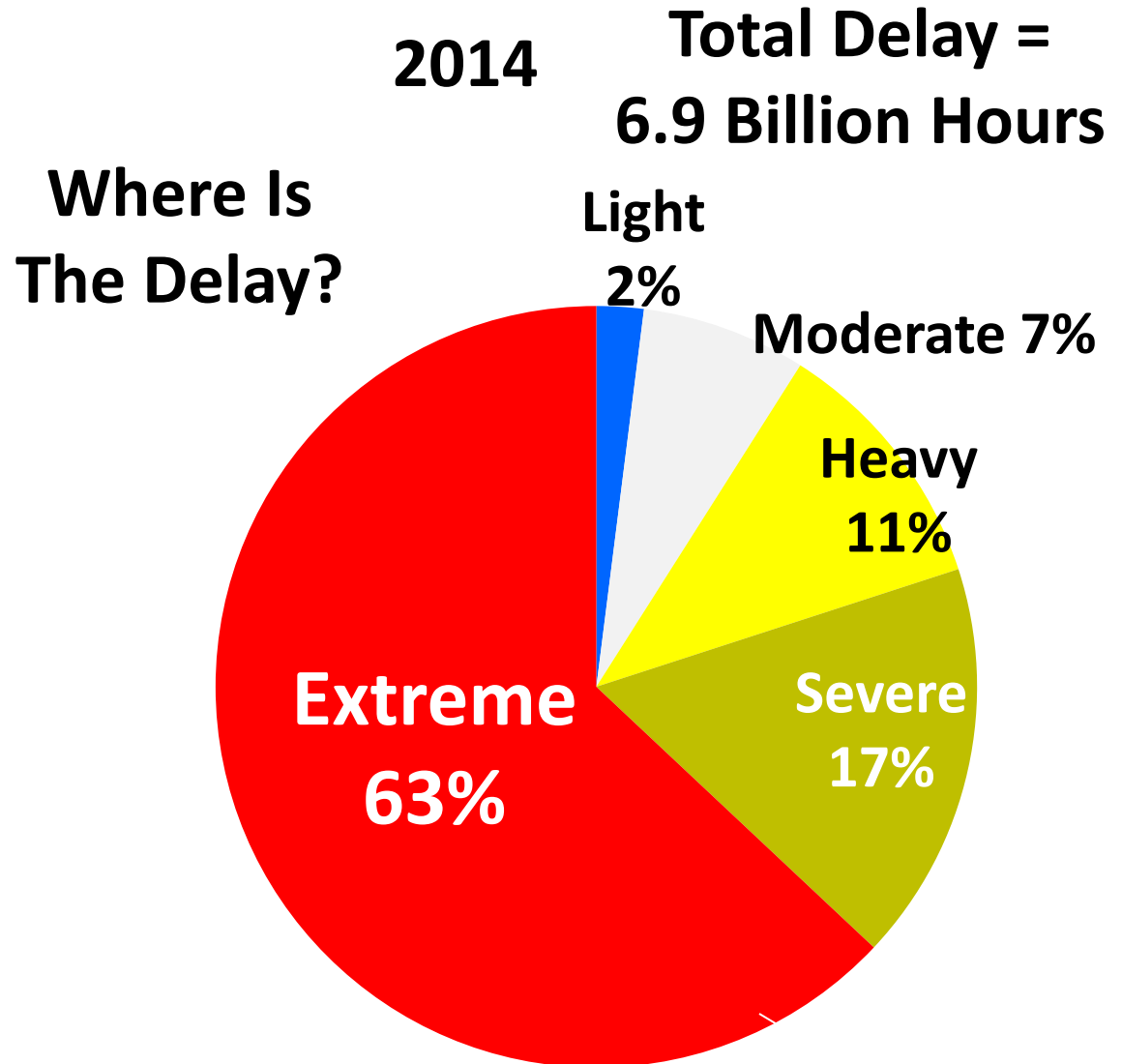
Congestion Patterns
More Detail On The Problems

Delay by Day of Week
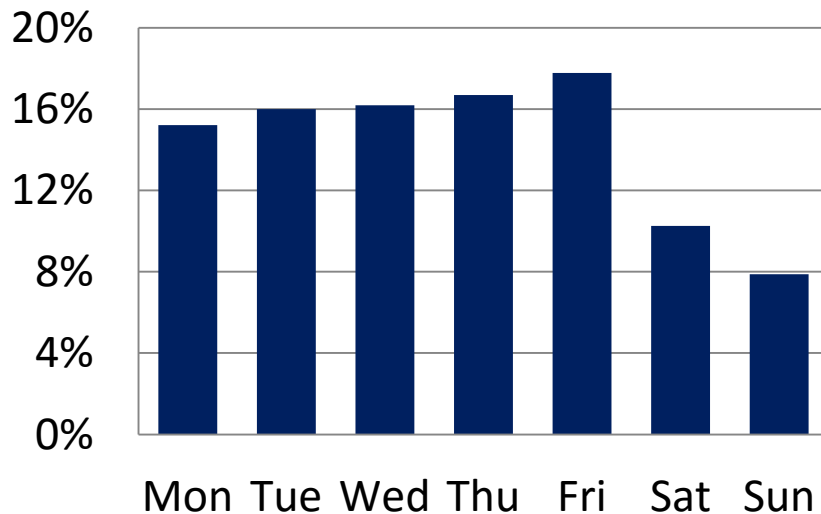
Delay by Weekday Time of Day

Congestion Patterns
Different in Smaller Regions

Over 1 million

Off Peak Streets 29%
Peak Freeways 29%
Peak Streets 32%
Off Peak Freeways 10%

Under 1 million

Peak Freeways 10%
Off Peak Freeways 6%
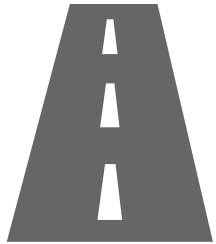Off Peak Streets 41%
Peak Streets 43%
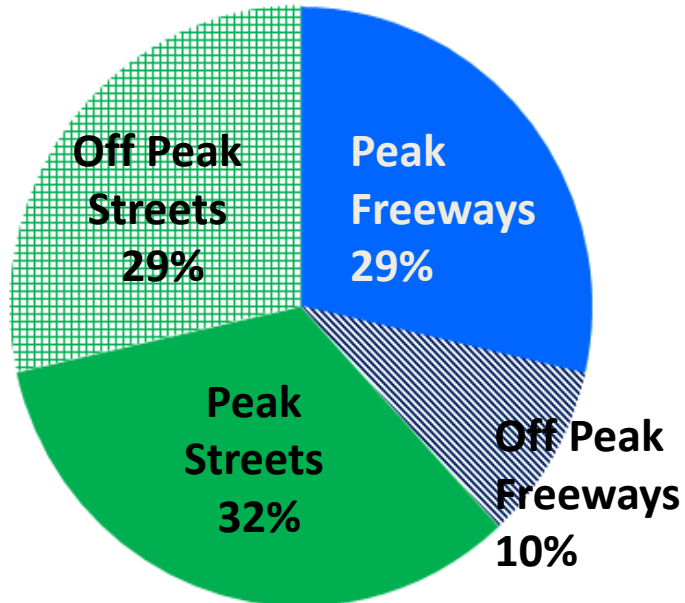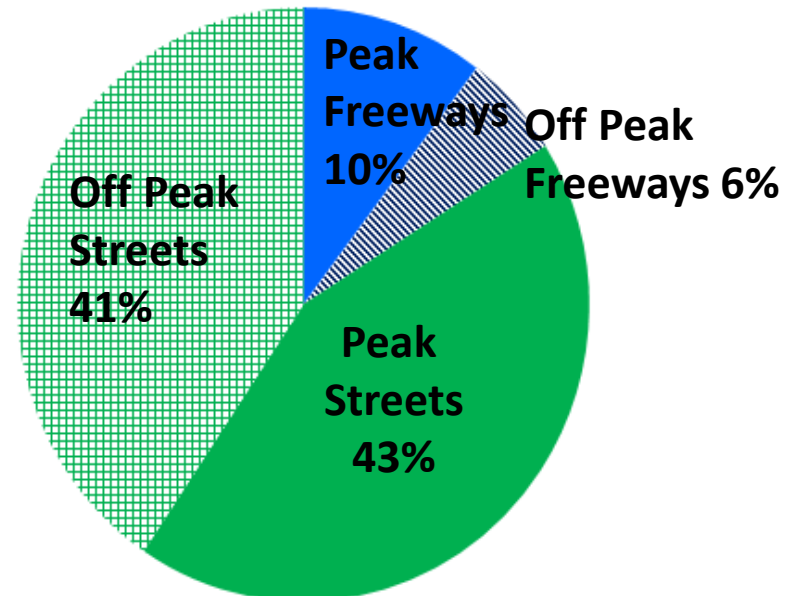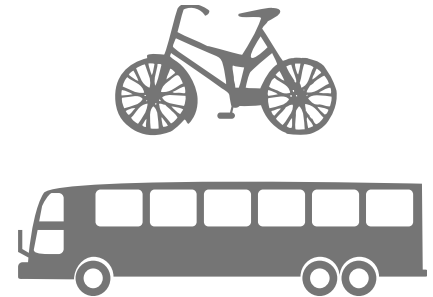
So now what?

Get the biggest bang for the buck

Tackle most congested roadways & accept some congestion

Improve safety

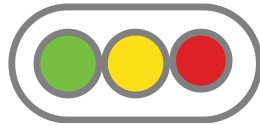**Support** biking, walking and mass transit options

For More Info:
https://tti.tamu.edu/policy/congestion/how-to-fix-congestion/

So now what?

Use our existing roads smarter

Move crashes and stalls out of the way

Time traffic signals so more see green

Encourage carpooling

Change rush hour nightmares through flex-time, telecommuting, etc.

For More Info:
https://tti.tamu.edu/policy/congestion/how-to-fix-congestion/
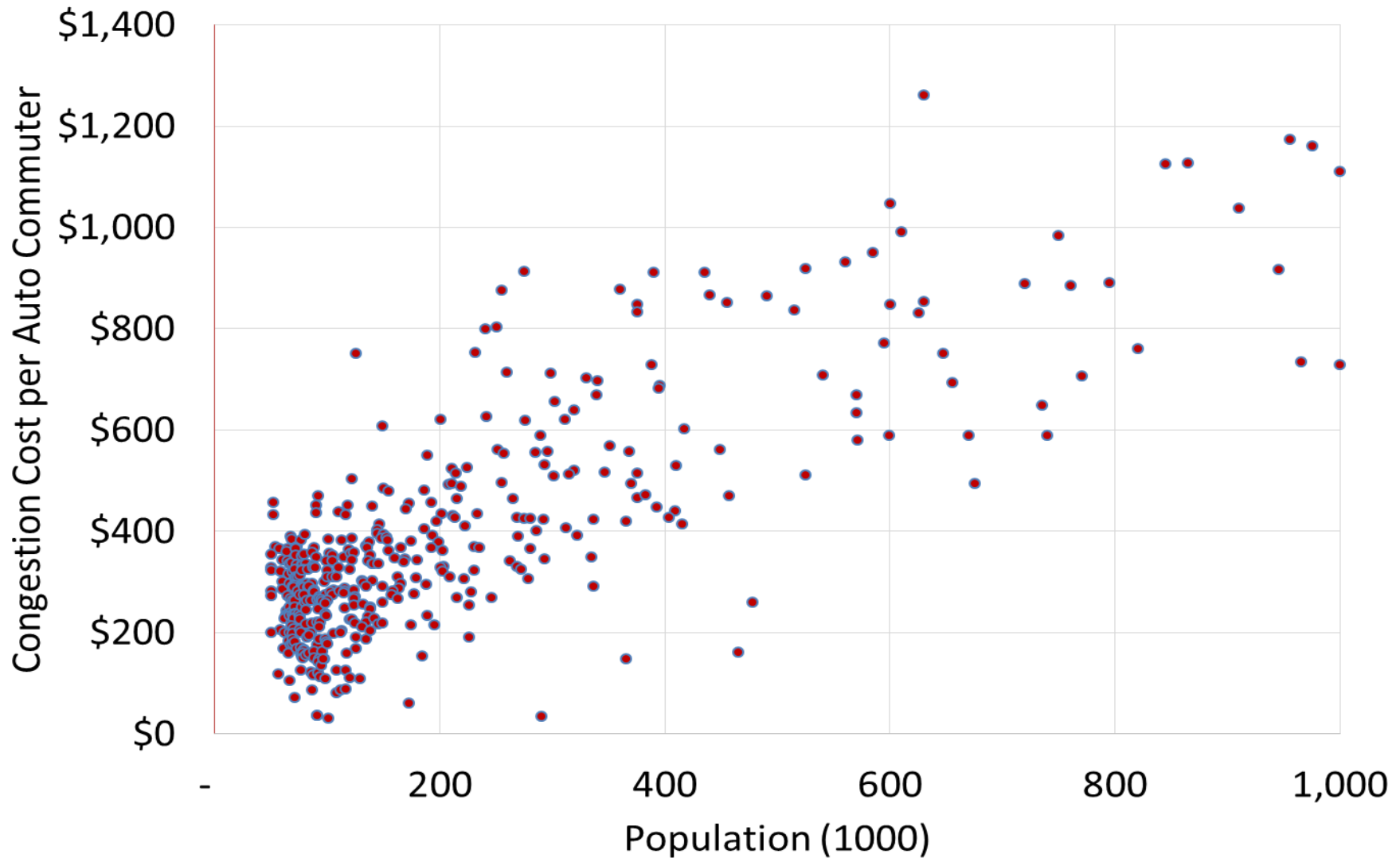
Alabama Congestion Levels

Average peak period auto commuter (Natl Rank)

- Birmingham (58)   34 hours $890
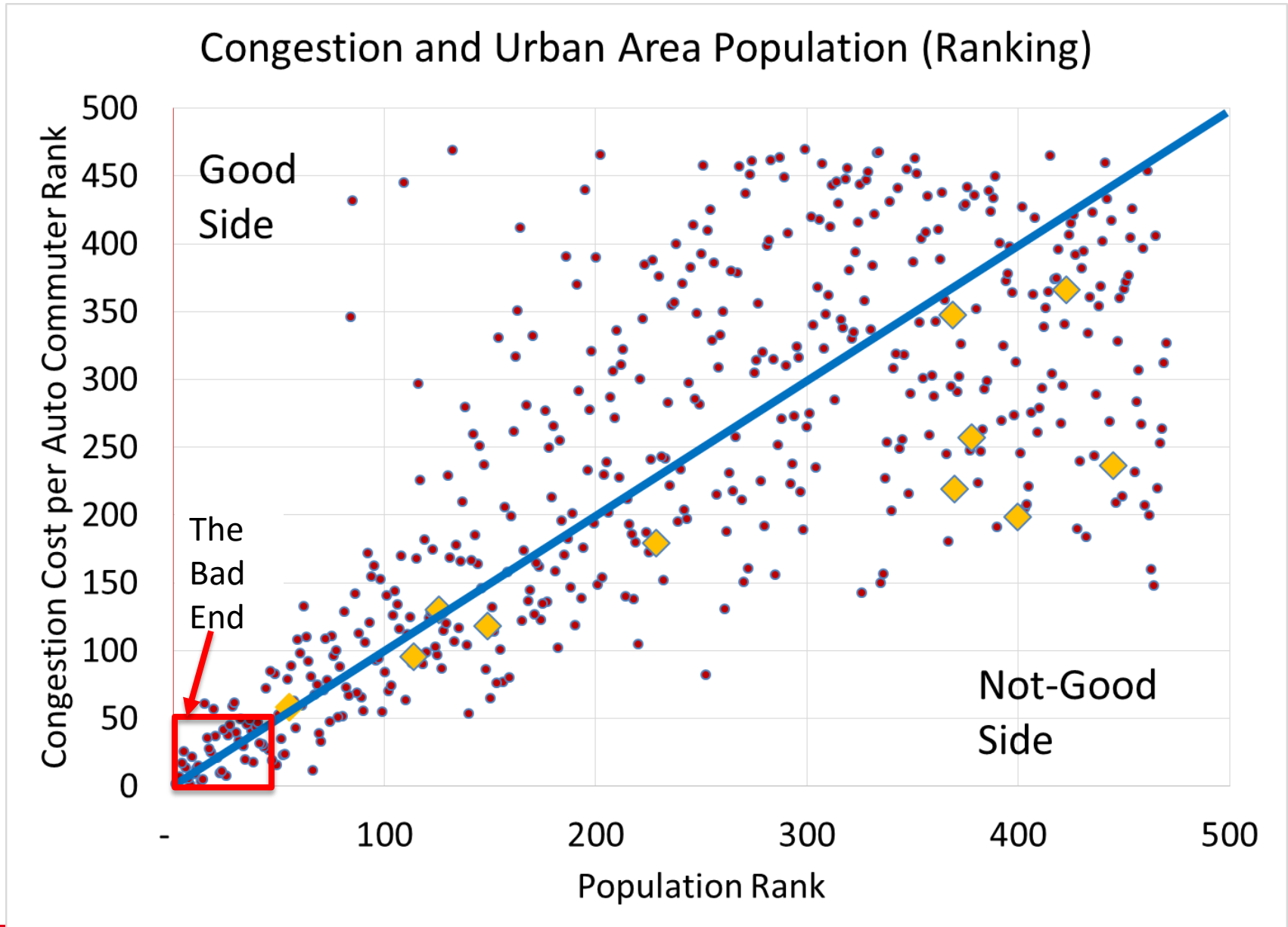- Mobile (86)   30 hours $670
- Montgomery (110)   24 hours $550
- Huntsville (120)   23 hours $510
- Tuscaloosa (175)   17 hours $400
- Dothan, Auburn, Florence, Gadsden, Columbus

  14 to 15 hours $325 to $370

- Anniston, Decatur   10 hours $250

National Congestion Relationships

Congestion and Urban Area Population

Alabama Congestion Levels

Congestion and Urban Area Population (Ranking)

National Congestion Relationships

Congestion and unreliable travel are related –
but operations programs can also have great effect.

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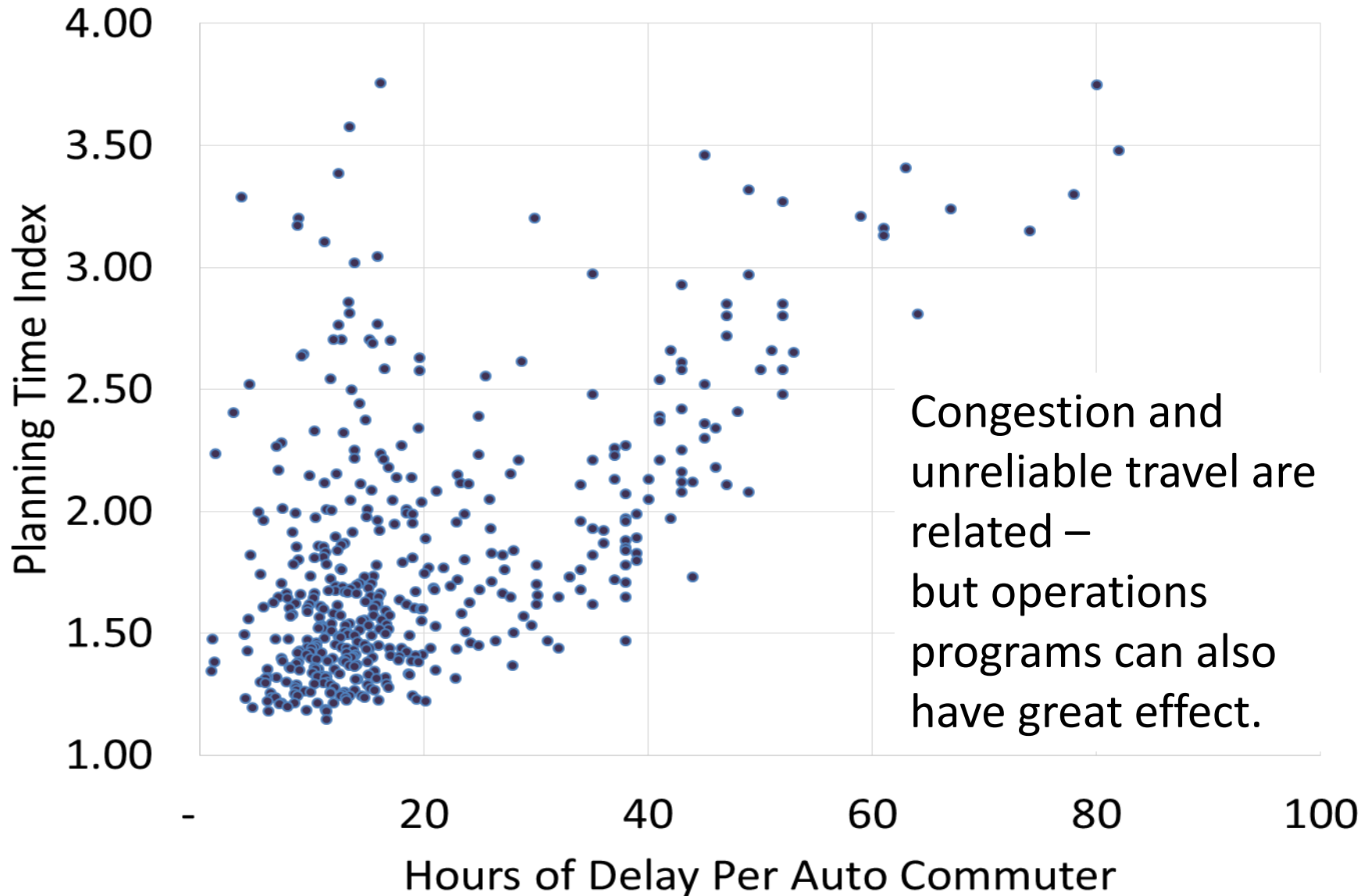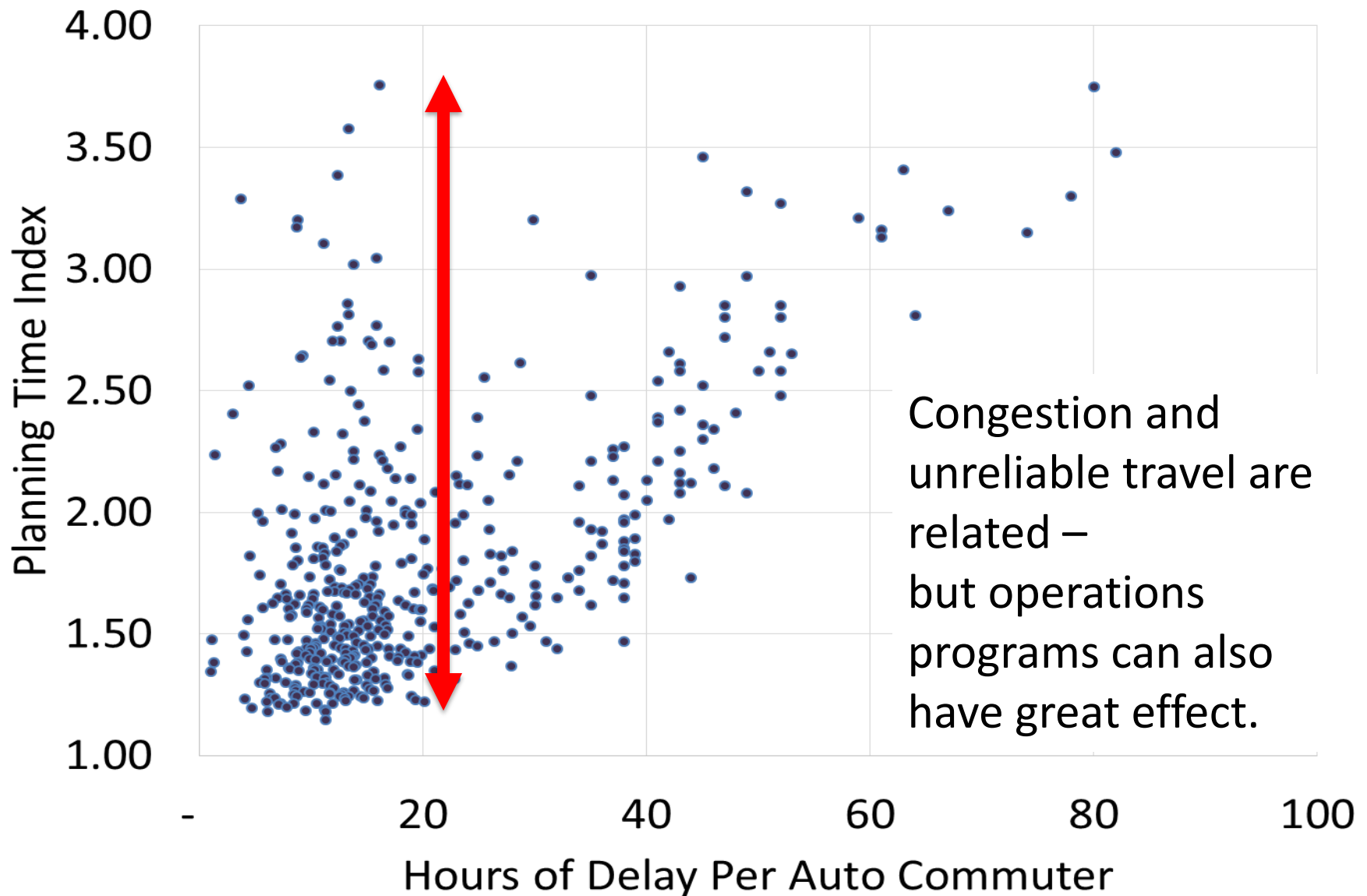
Consider the Connection….
Travel Demand Models, the Planning Process and Real-Time Speed Data

- Estimates of congestion and mobility conditions
- Real-time is about 'now' -- Forecasts are about 'future'
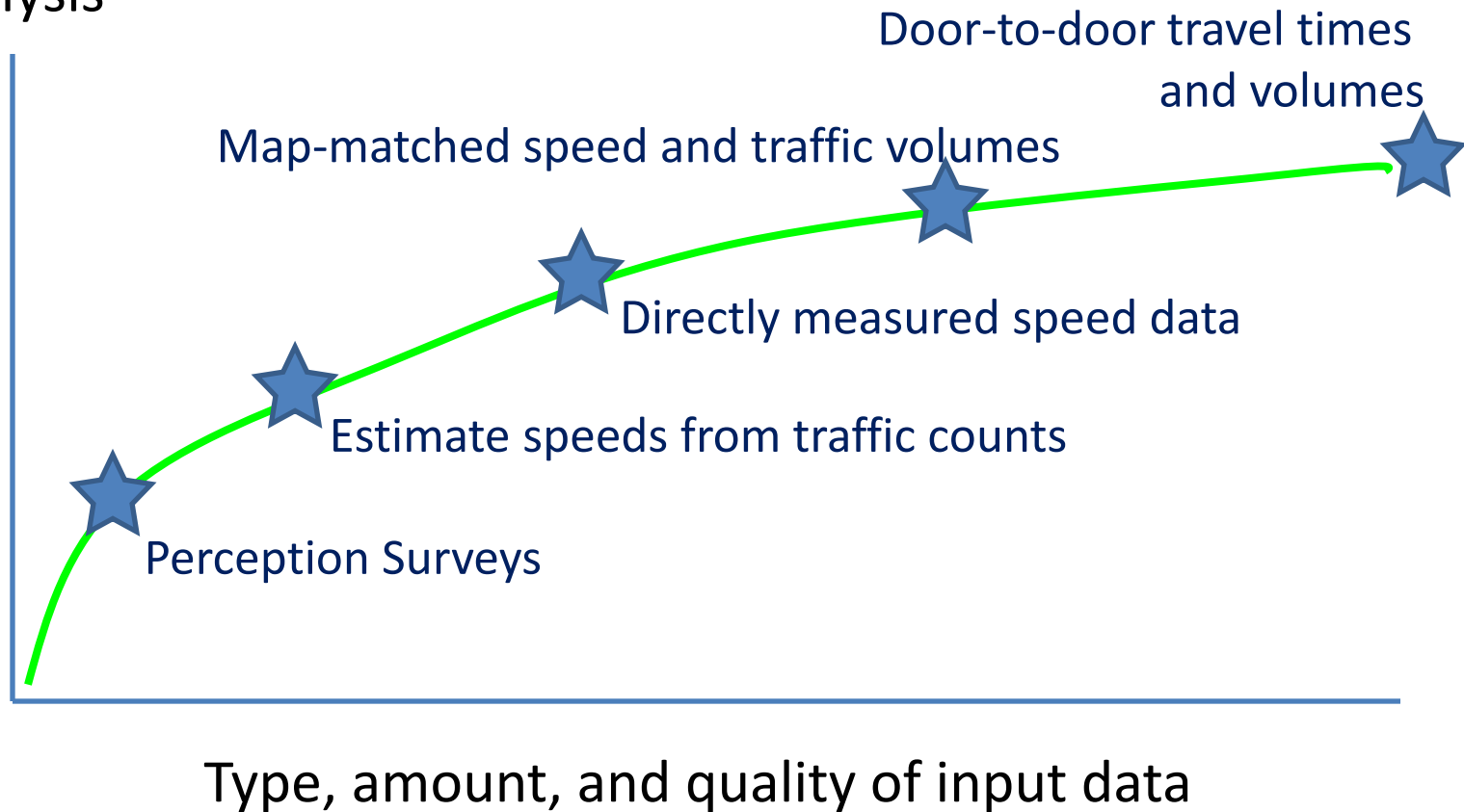- Real-time is a condition – Forecasts show results of possible investment programs
- Planning process can be the link between now & future
- Traffic Operations and Systems Management programs/projects are near-term, relatively inexpensive responses to mobility issues
  - Can be multi-modal
- Travel demand models can be used to identify future needs – both in year and location

Data Continuum for Mobility Analysis

Sophistication and analysis detail

Door-to-door travel times and volumes

Map-matched speed and traffic volumes

Directly measured speed data

Estimate speeds from traffic counts

Perception Surveys

Type, amount, and quality of input data

TTI Philosophy / Basic Principles

1. Know your audience
2. Use the "right" measures
3. Have a plan for improved data
4. KISS: Keep it simple, we're Aggies
5. Use effective graphics and clear, relevant messaging

#3 – Plan for improved data

- "Don't let perfect be the enemy of good"
  - Do the best you can with existing data, but plan for more and better data
- Data will improve as telematics and other technology is implemented
- Measures consistent over time
- Example: travel time data in U.S. 15 years ago

Congestion Measures With Speed Data

- GIS Shapefile for North America
- Speeds from about 1 million miles of roadway
- 24 x 4 x 7 average 15-minute speeds by road section
- Freeflow speed provided for each road section
- But need to match with roadway inventory
  - Cross streets
  - Section length
  - Traffic volume
 - Bridge, pavement, etc
  - State, County

Conflation Process

- Conflation process combines the two networks.
  - Information from the travel speed layer is applied to the roadway inventory information on the base layer.
- Usually a multi-step process
  - 95+% of links can be automatically snapped
  - Review of other links informed by filters (e.g., speed vs speed limit)
- Upon completion, each road segment/direction will have all of the necessary information to calculate performance measures

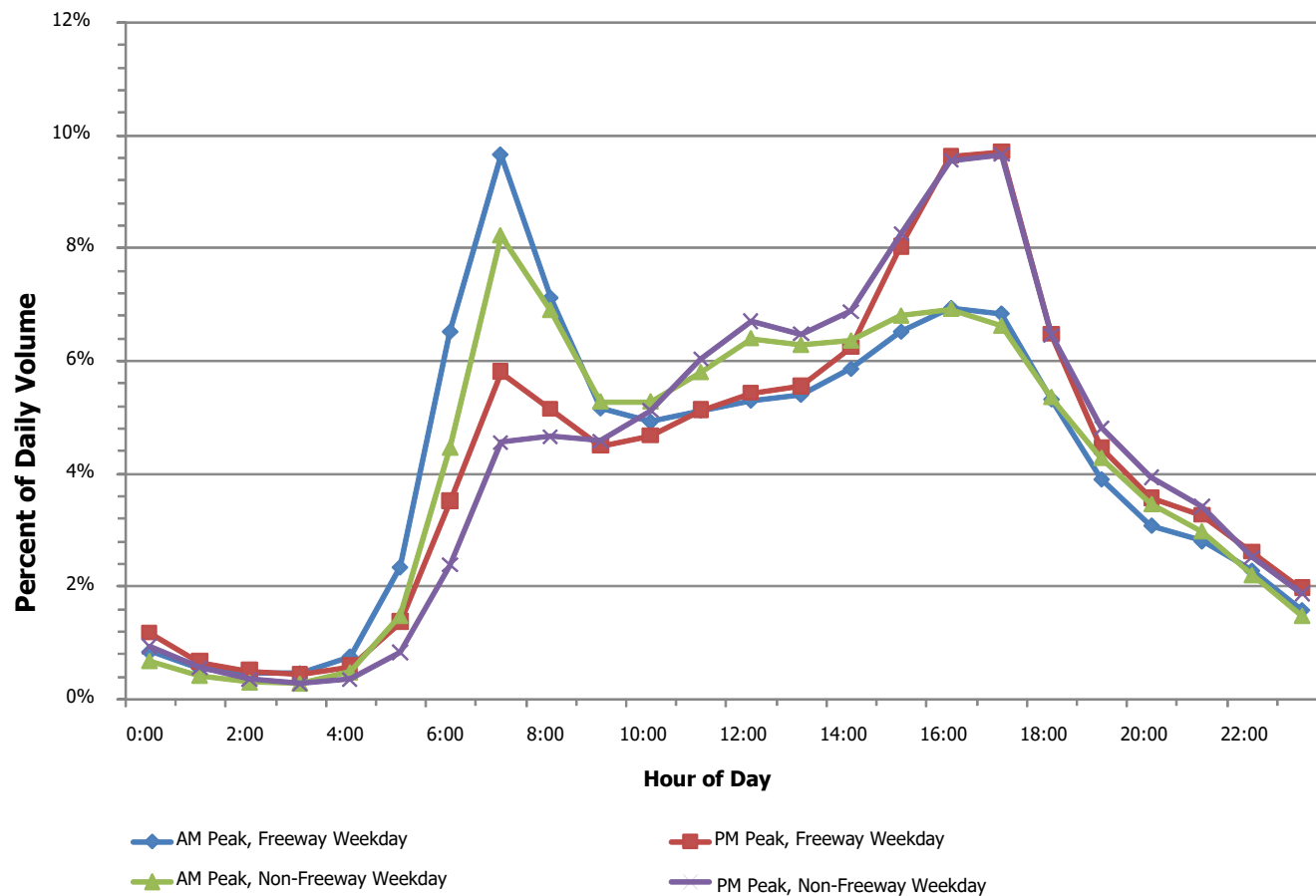# Conflation for State of Minnesota Freeways and Arterial Streets

INRIX

HPMS
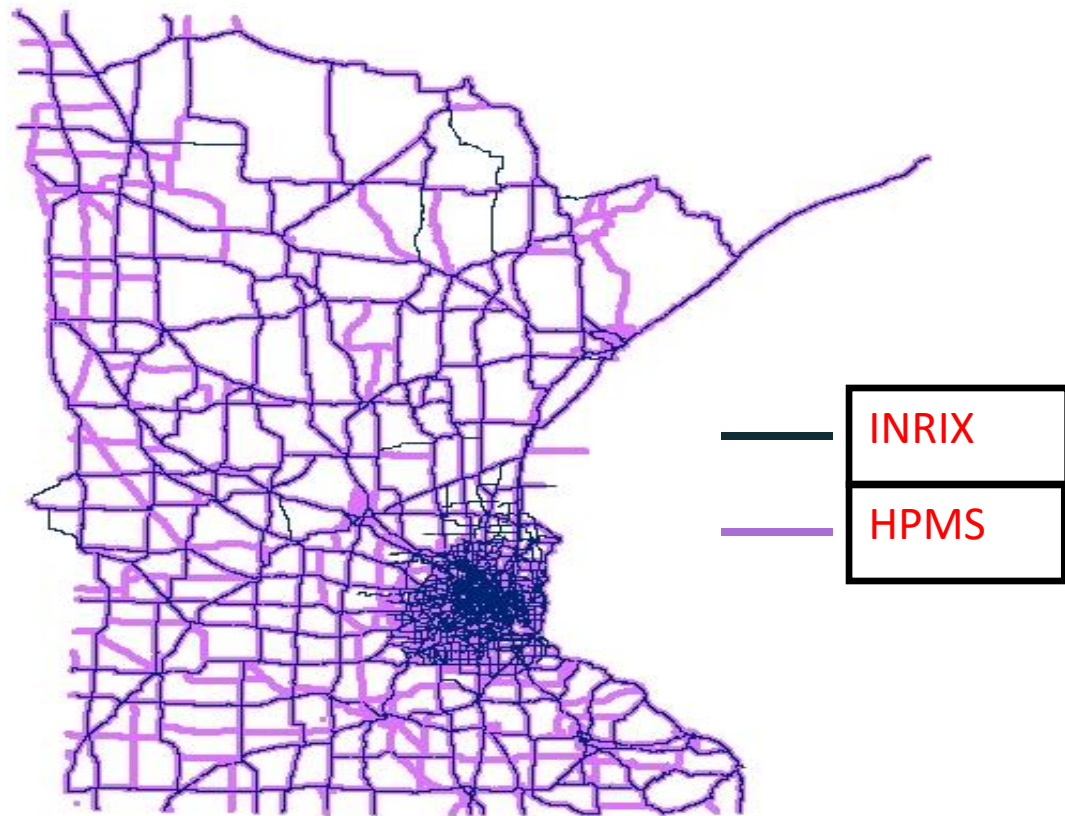
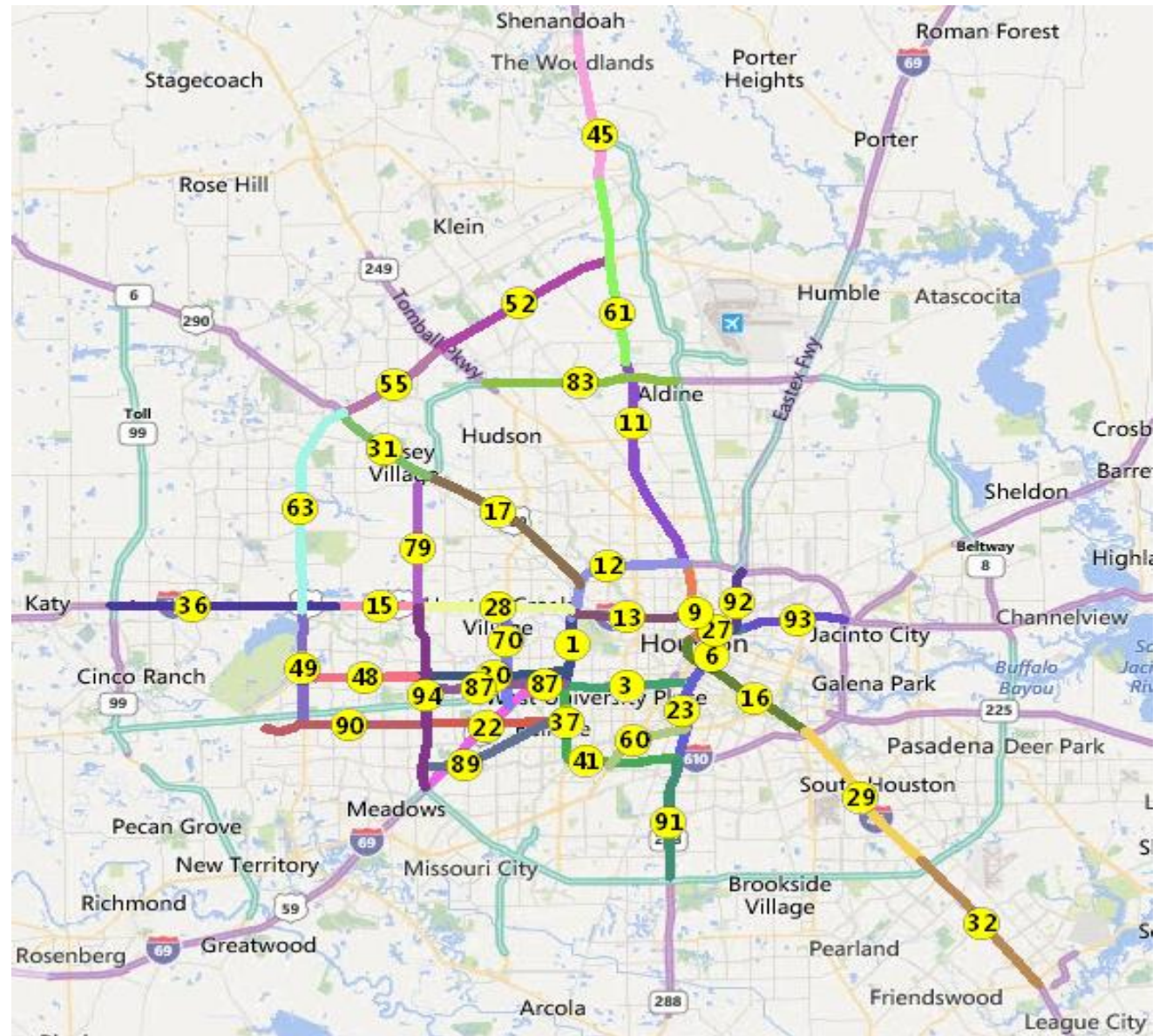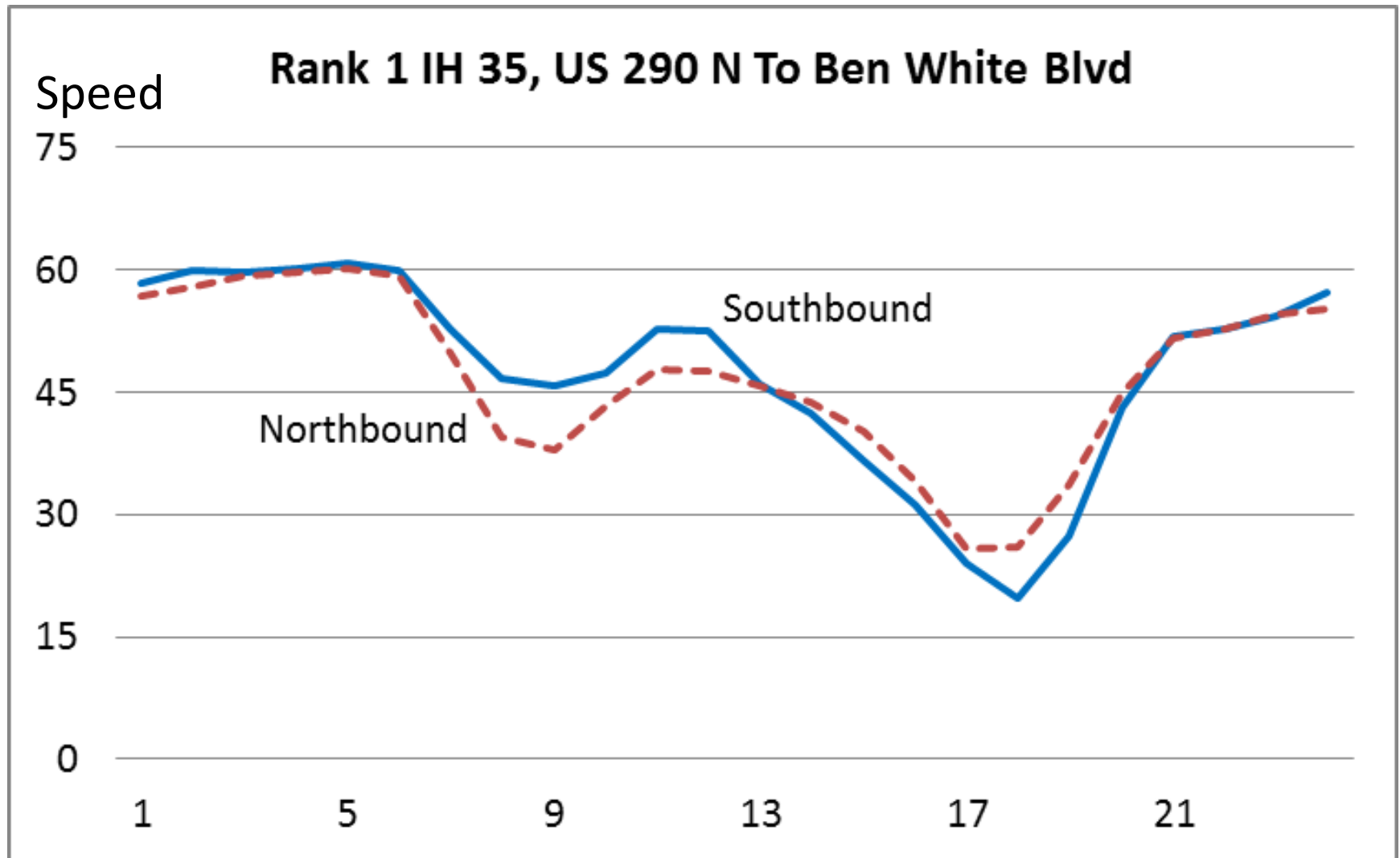# Conflation for Minneapolis/St Paul Freeways and Arterial Streets
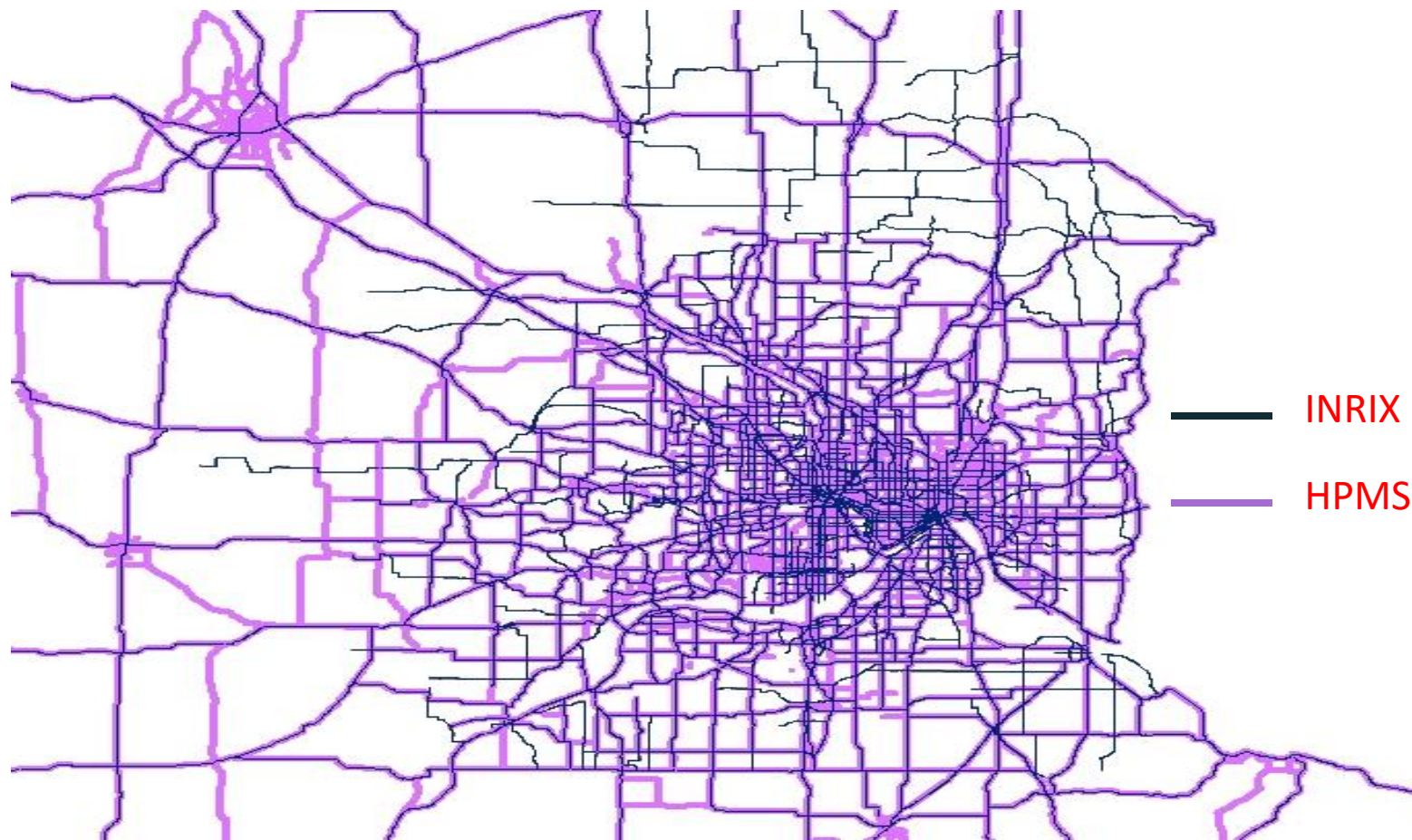
24-Hour Volume Profiles

Weekday Traffic Distribution, <u>No to Low</u> Congestion

100 Most Congested Road Sections Houston

100 Most Congested Austin

Rank 1 IH 35, US 290 N To Ben White Blvd

Transport Canada

- Supply chain weighting demonstrated by twenty-foot equivalent unit containers (TEUs)

- Shipping, rail, truck GPS data and truck dispatch data

- Measure objectives
  - Transparent travel time reliability information on all freight-significant corridors
  - Identifying bottlenecks in Canadian Logistics system (ports, roads, rail; water- and land-side
  - Ensure Canada's overall competitiveness

Private-Sector Grocer

- On-line services for delivery in large US urban area

- Better understand travel time characteristics
  - Selected corridors
    - By day-of-week
    - By time-of-day

- INRIX hourly data

- Computed average and reliability performance measures

THE CO$T of DOING NOTHING NEW

and the Conversation We Should Be Having With the Public

Texas Transportation Poll
Public Support Depends on Plan Elements

- Expectations for any funding plan: (7+/10)
  - Predictable long-term solution
  - Reduce dependency on foreign oil
  - 100% of revenue spent on transportation
  - Encourage business and commerce
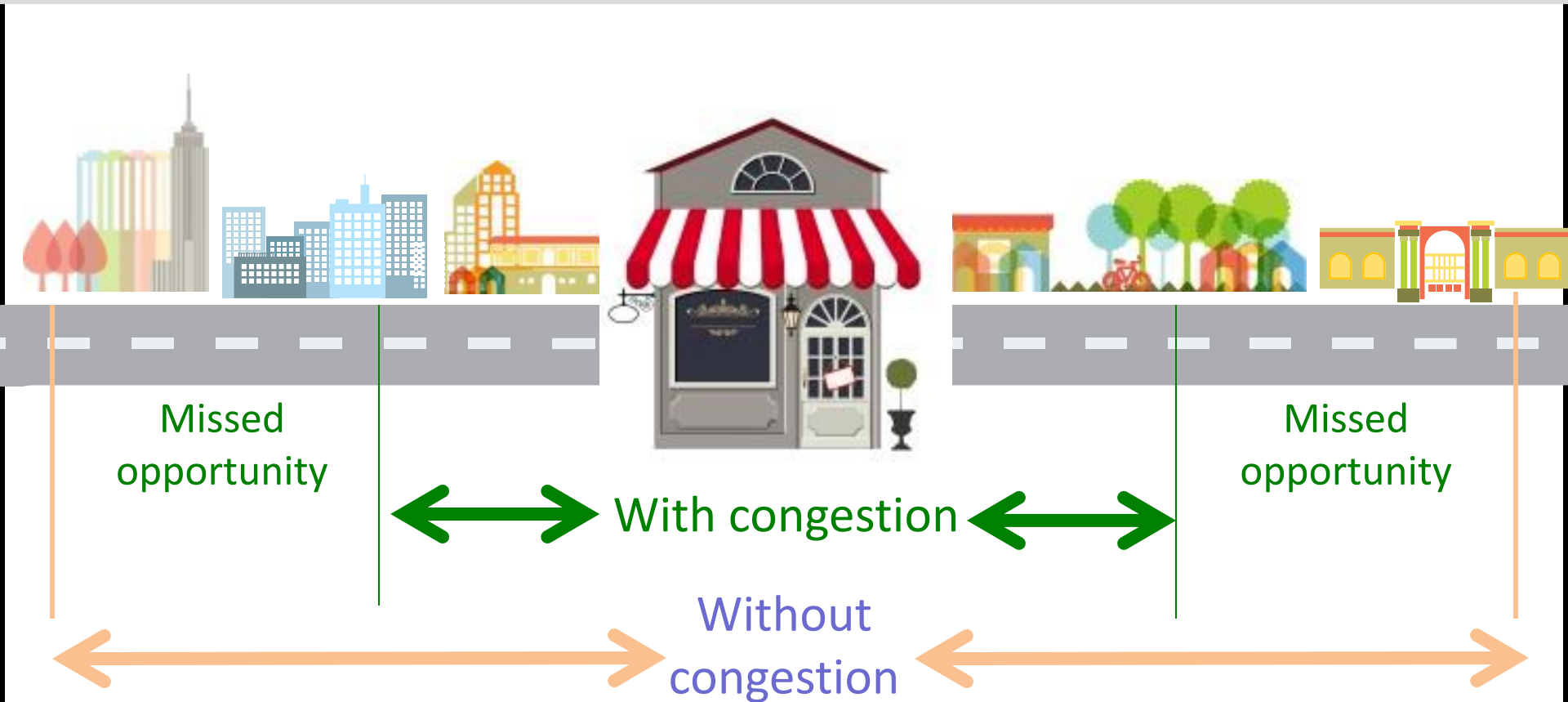 - Promote clean energy
- Transparency and Accountability!

Business **Cost of Congestion**

Commuting distance for **employees**

in 1 hour

Missed opportunity

With congestion

Missed opportunity

Without congestion
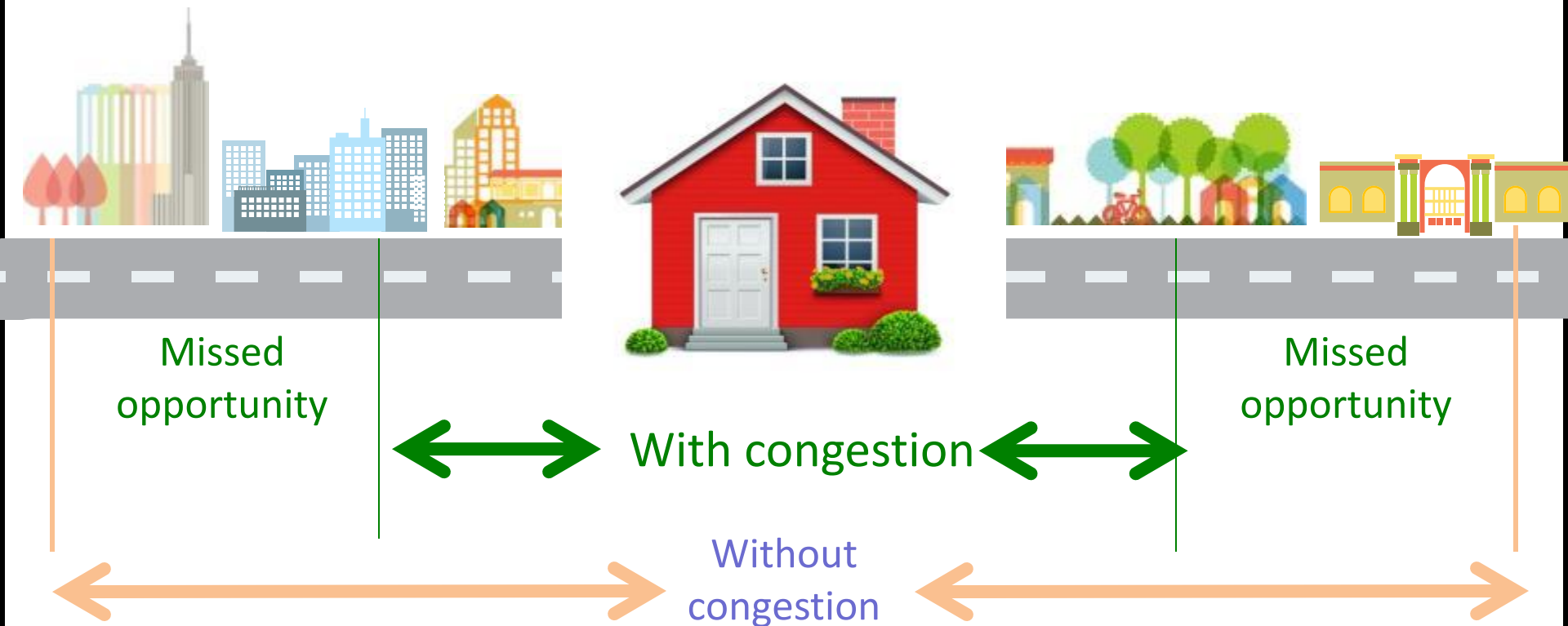
Business **Cost of Congestion**

Distance traveled to connect with **customers** in 30 minutes

Missed opportunity

With congestion

Missed opportunity

Without congestion

What does this mean to me?

The average Texan **pays:**

$22/month
in state/federal gas taxes and auto fees

$128/month
Internet, phone, cable TV

$139/month
cell phone

Possible Conversation Points

- How important is 'transportation' among all other urban priorities?

- How much congestion is acceptable?

- What land use patterns fit with the future community vision?

- What are the benefits of transportation investment? (because we often talk about the taxes/fees/project costs)

- What would we do with an additional increment of funding?

The Take-Aways

- Agencies must involve their stakeholders

- Go meet the public where they are

- Innovative designs, technology and operating ideas will play a role in the future

- Where? When? How? and How Much?

- Performance measures should help agency operations/investments and public messaging

mobility.tamu.edu