

# Adaptive Control

The Immediate Demand for Sustainable ITS Solutions  
*By Bill Brown*

# Agenda

- Importance / urgency of ITS solutions
- How ITS can create sustainable communities
- A closer look at Adaptive Control
  - Case study
  - National statistics
- Further Research
- Q&A

# Immediate Need for ITS Solutions

- We must take a stand today for future generations
- The high cost of transportation
  - 22% of CO2 emissions are from vehicles
  - 4.2 billion hours lost
  - 2.8 billion gallons of fuel wasted
  - Costing more than \$87 billion annually

# Creating Sustainable Communities

- 1) Using ITS Solutions, integrate our entire transportation network
  - ✓ Traffic: Vehicles, Roads, Signals (Intellidrive)
  - ✓ Parking: On & Off Street
  - ✓ Transit / Public Transportation
  - ✓ Urban planning
- 2) Realize benefits for generations to come
  - ✓ Reduce carbon emissions
  - ✓ Increase road safety
  - ✓ Provide better data to the driving public

# Adaptive Control, Defined

- Adaptive control is the coordination of traffic signals along a corridor based on prevailing conditions
- Benefits:
  - Enhanced arterial performance by reducing the number of stops and delays, expediting travel times
  - Increases intersection safety
  - Reduces fuel consumption and emission

# Adaptive Case Study [Overview]

## Where

City of San Marcos

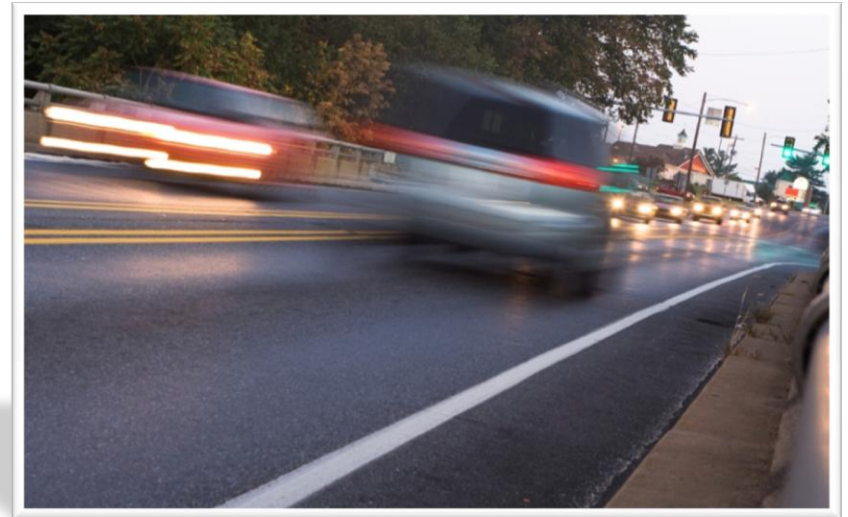
## Corridor

3.6 mile major arterial to interstate highway

## Avg. Daily Traffic

40,000 with a swell to 60,000 in the middle of the corridor

*2<sup>nd</sup> busiest arterial in San Diego County*



# Adaptive Case Study [Results AM]

## Morning Peak, 0700-0900

Condition	Existing	Optimized	Benefit
Travel Time (hr)	834	803	3.7%
CO Emissions (kg)	80.44	75.57	4.87 / 6.0%
NOx Emissions (kg)	15.65	14.7	0.95 / 6.0%
VOC Emissions (kg)	18.64	17.51	1.13 / 6.0%

# Adaptive Case Study [Results PM]

## Evening Peak, 1600-1900

Condition	Existing	Optimized	Benefit
Travel Time (hr)	1049	949	9.5%
CO Emissions (kg)	94.26	89.2	5.06 / 5.4%
NOx Emissions (kg)	18.34	17.34	1.0 / 5.4 %
VOC Emissions (kg)	21.85	20.65	1.2 / 5.4%

# Adaptive Case Study [Summary]

- Confirmed reduction in CO emission, highest during morning and evening peak
- Reduction of travel time up to 9.5%
- Consistent benefit on the NOx & VOC emissions during morning and evening peak hours

# Adaptive Case Study [Intangible]

- Travel time and emissions savings up to 15% during non-coordinated time of day
- Increase satisfaction to the traveling public due to reduced travel time
- Quantifiable emissions savings can help generate more federal funds for future projects

# National Benefits of Adaptive

- Vary based on the corridors makeup prior to installation
- Reduce travel delays by 25%
- Reduce CO2 emissions up to 22%
- Proven to increase safety (by reducing collisions caused by stop-and-go traffic)
- \$40 return in time and fuel savings for every \$1 invested

# Further Education

- Information & Benefits
  - IntelliDrive [www.intellidriveusa.org](http://www.intellidriveusa.org)
  - Intelligent Transportation Systems Benefits, Costs, Deployment, and Lessons Learned: 2008 [www.itsdocs.fhwa.dot.gov](http://www.itsdocs.fhwa.dot.gov)
- Funding
  - Energy Efficiency and Conservation Block Grant [www1.eere.energy.gov/wip/eecbg.html](http://www1.eere.energy.gov/wip/eecbg.html)
  - State Energy Offices [www.naseo.org](http://www.naseo.org)

# In Conclusion

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- Plan for green ITS
- Leverage your existing infrastructure
  - Small things add up to big things
- Use all the transportation components
- Look for different funding sources
- Crawl, Walk, Run



Questions?