

# Sustainable Transportation - Mobility

2023  
Transportation Workshop  
Arkansas Energy and Environment  
Innovation Plan

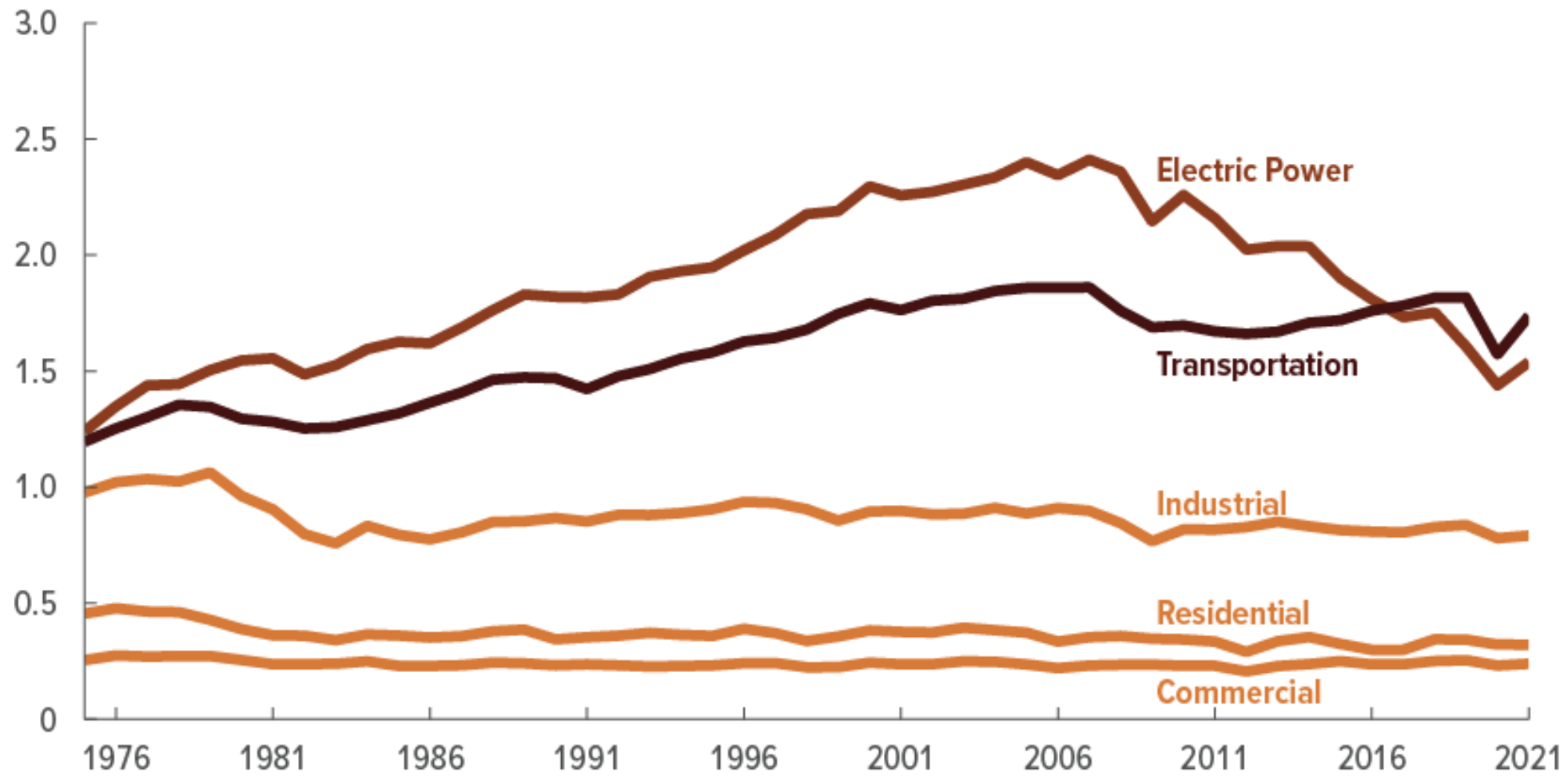
September 21, 2023



PRESENTED BY:

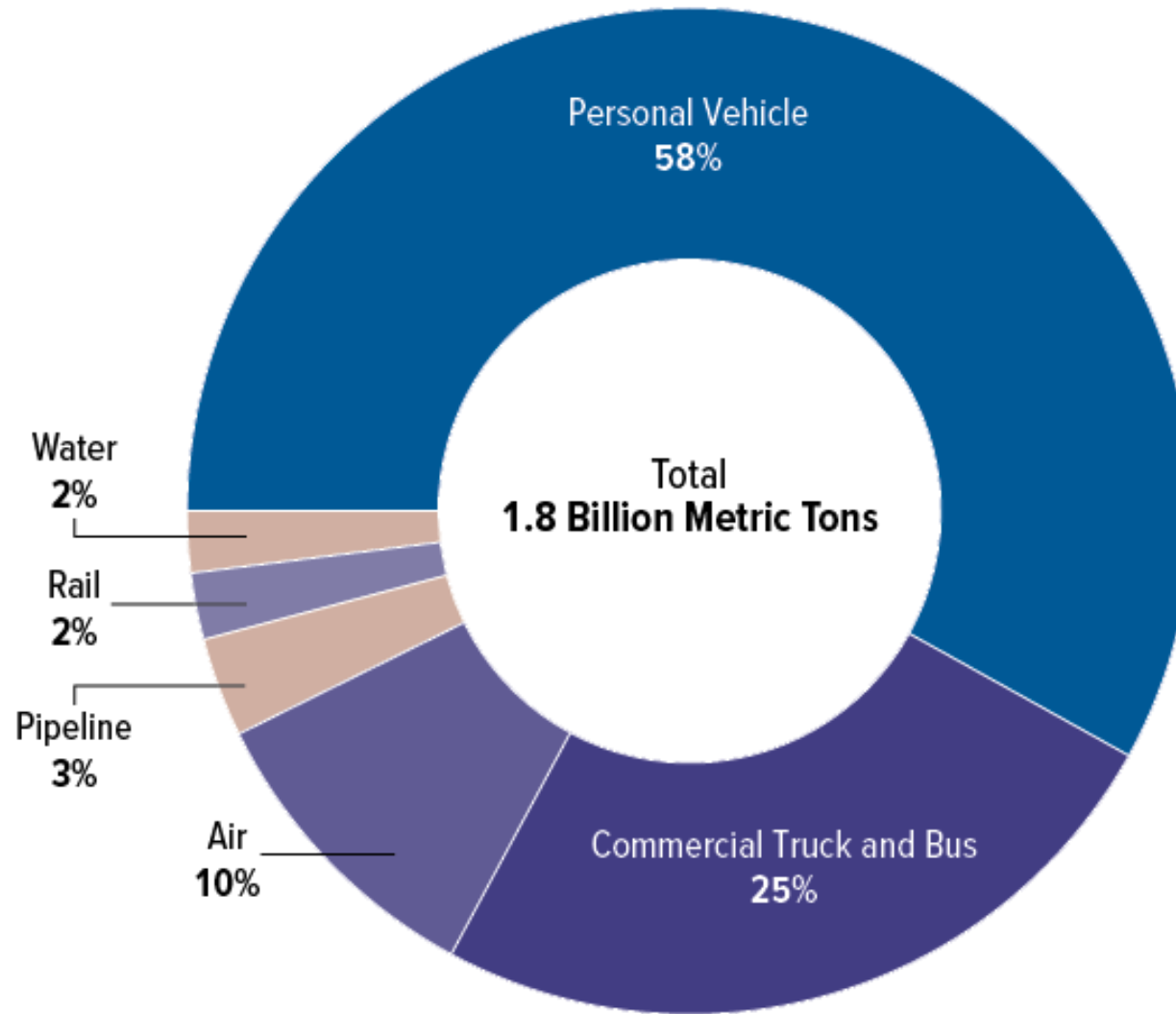
*Andy Brewer, P.E., PTOE – Olsson*

# Why?



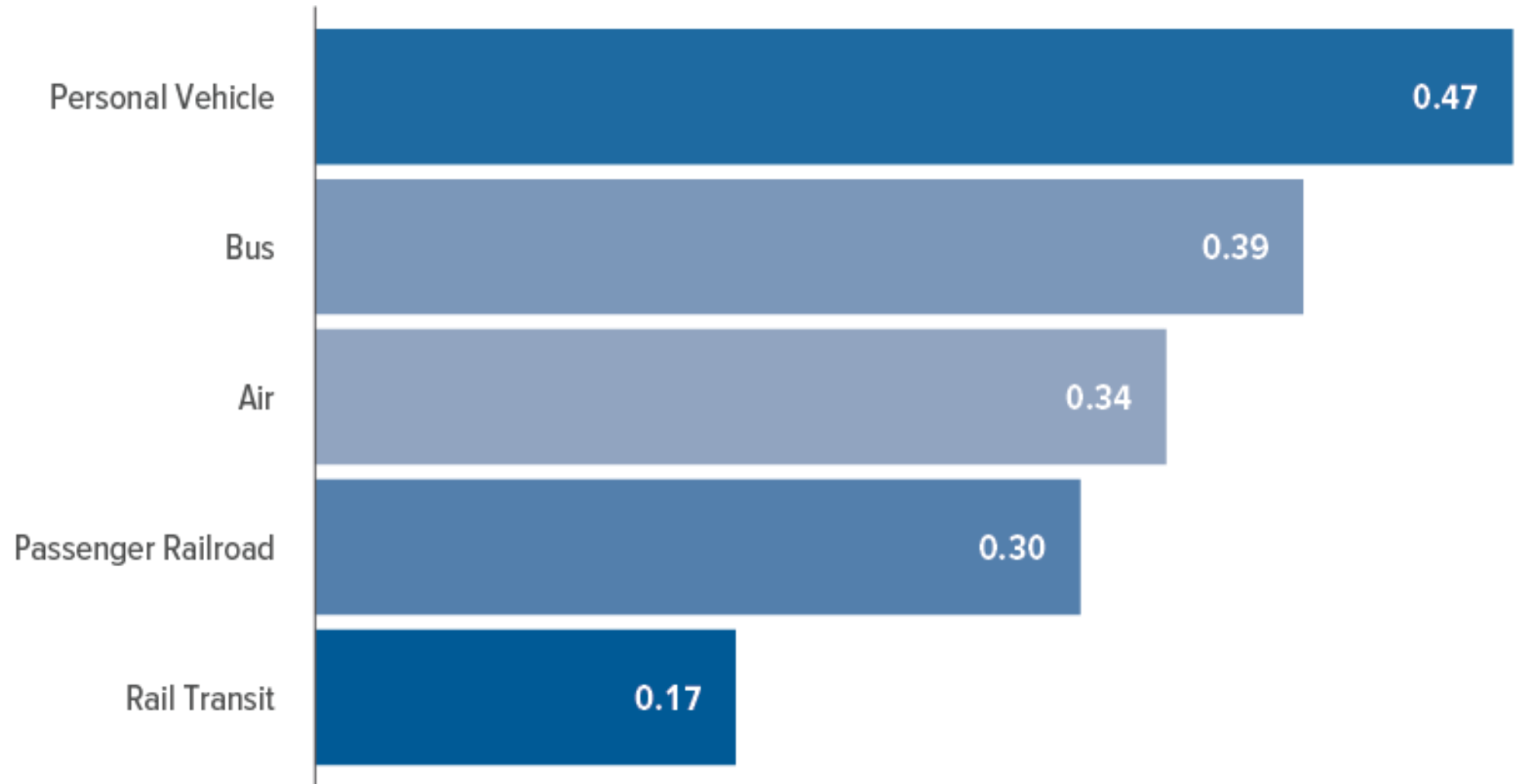
Energy-Related Emissions of CO2 in billions of metric tons

# Why?



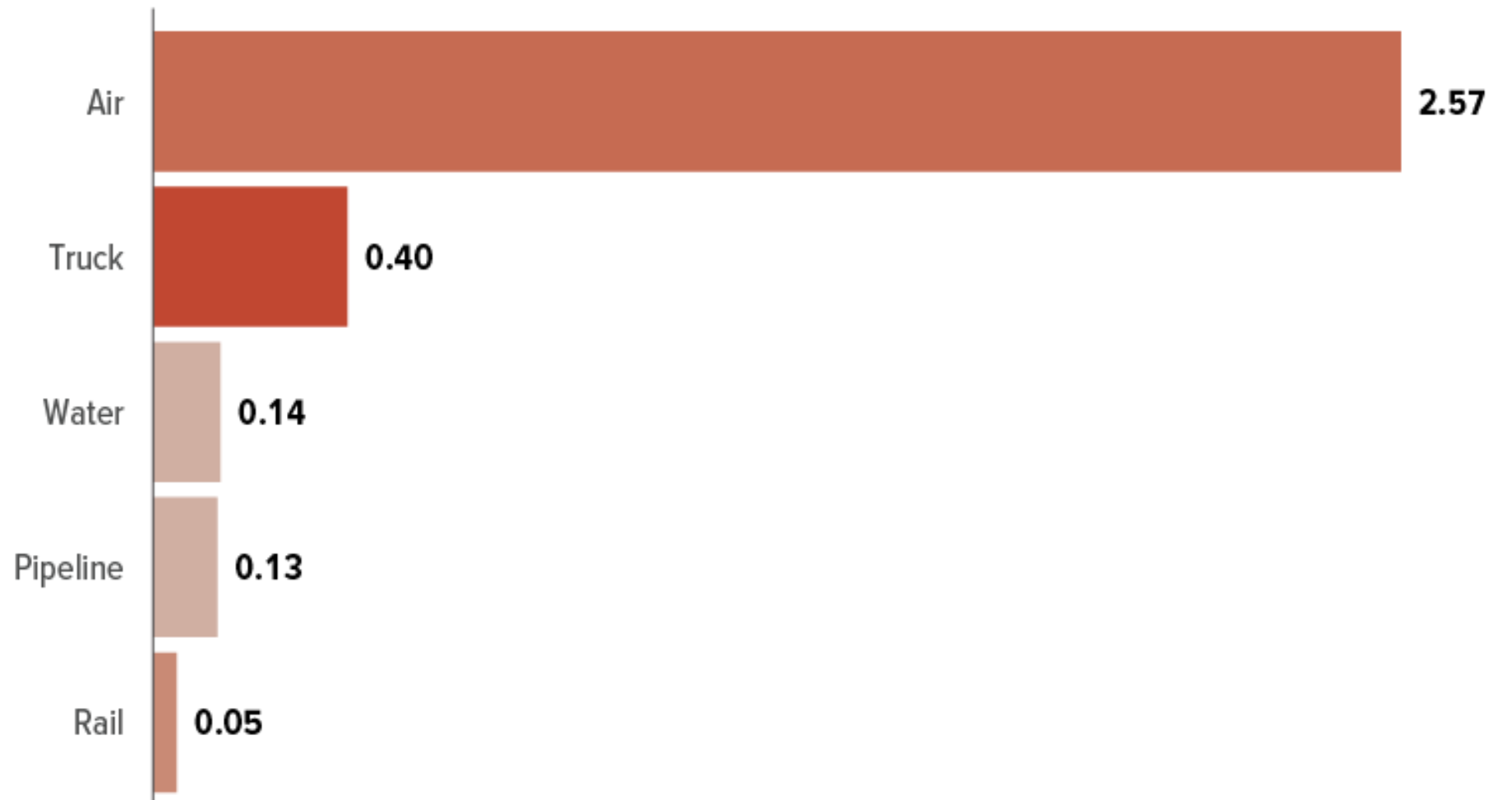
Transportation Related CO2 Emissions by Mode, 2019

# Why?



Pounds of CO2 Emissions per Passenger-Mile, 2019

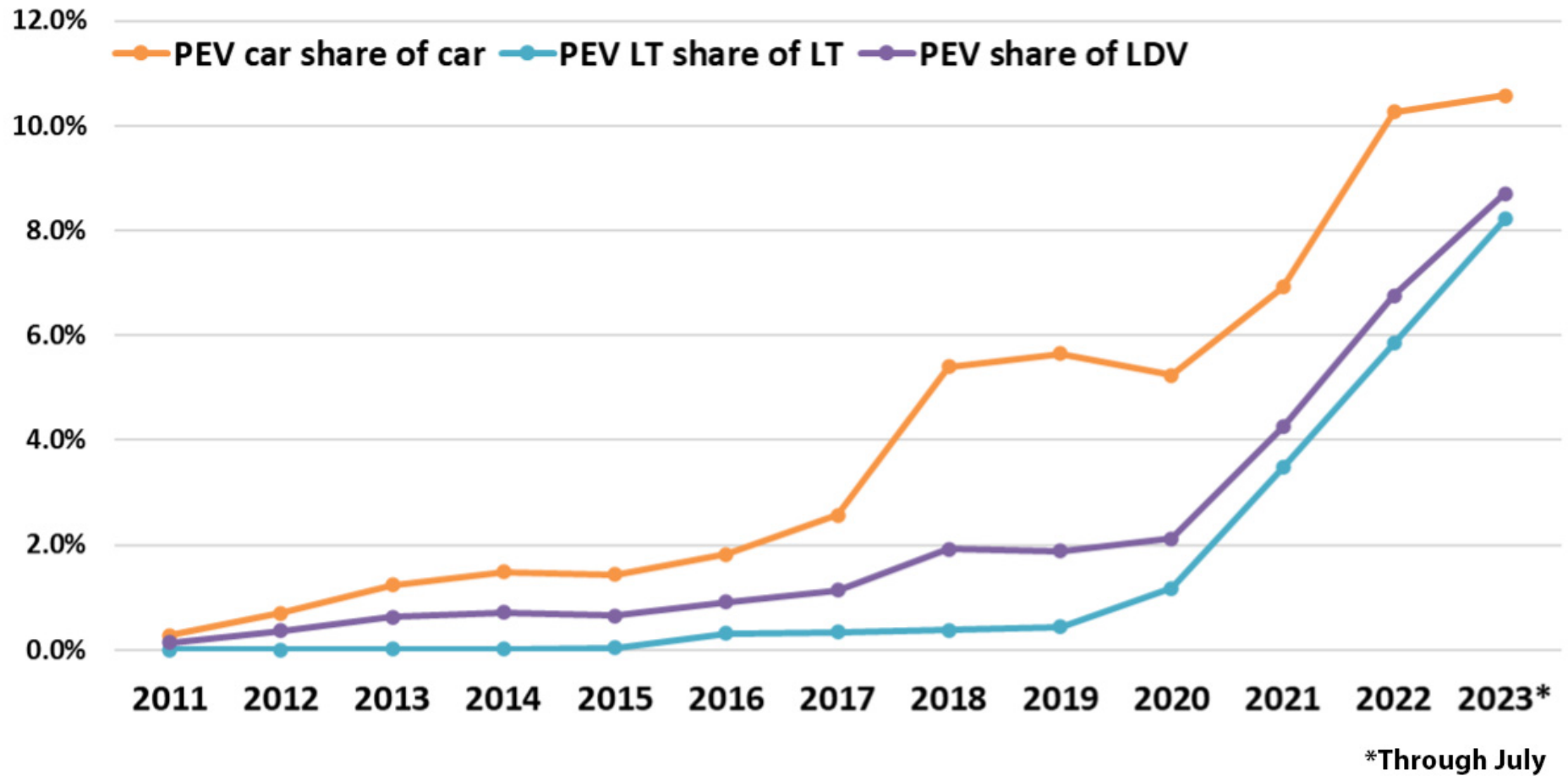
# Why?



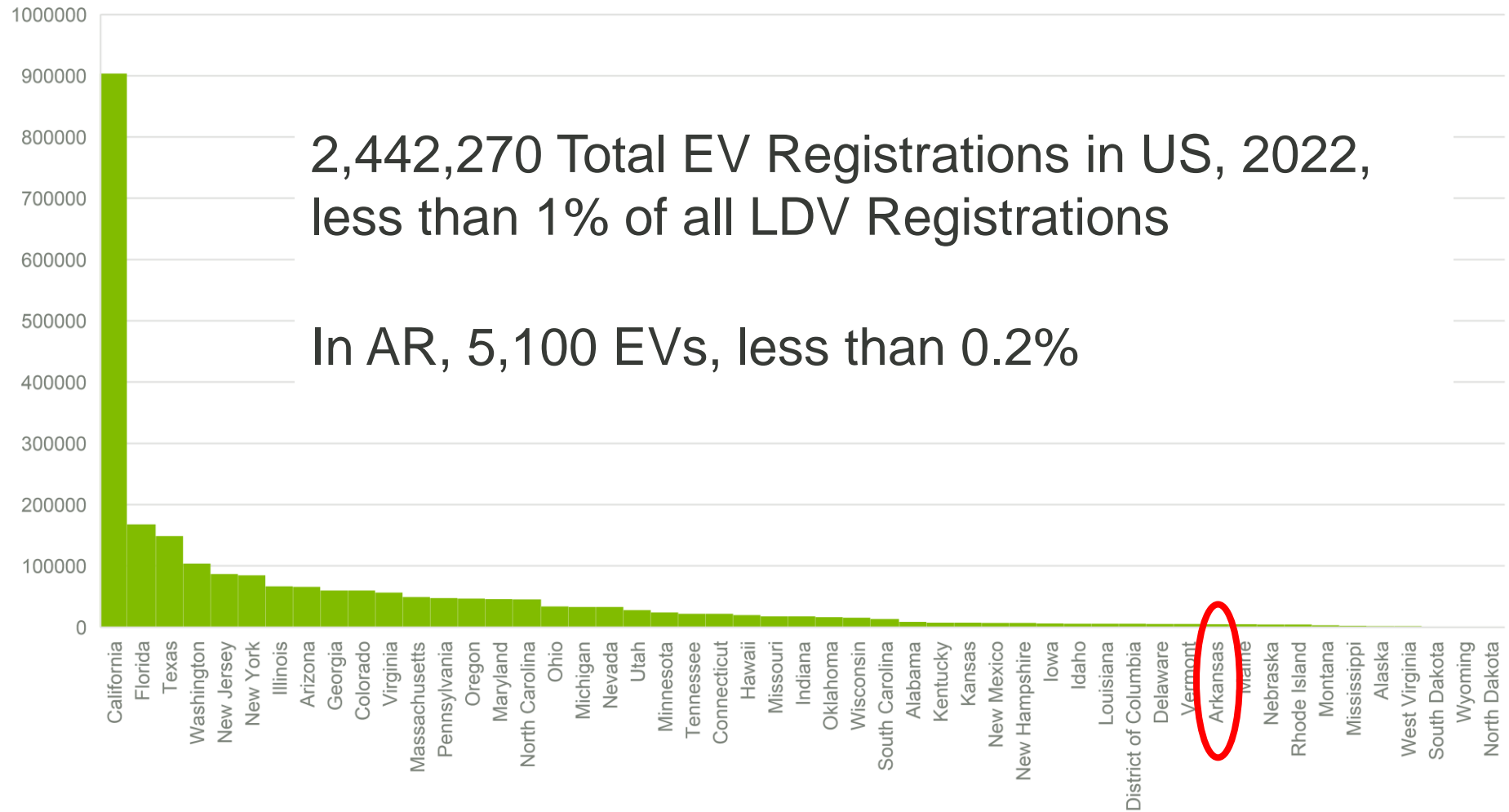
Pounds of CO2 Emissions per Ton-Mile, 2019

# What about EV?

## Yearly Car and LT PEV Shares



# What about EV?



Electric Vehicle Registrations by State, 2022





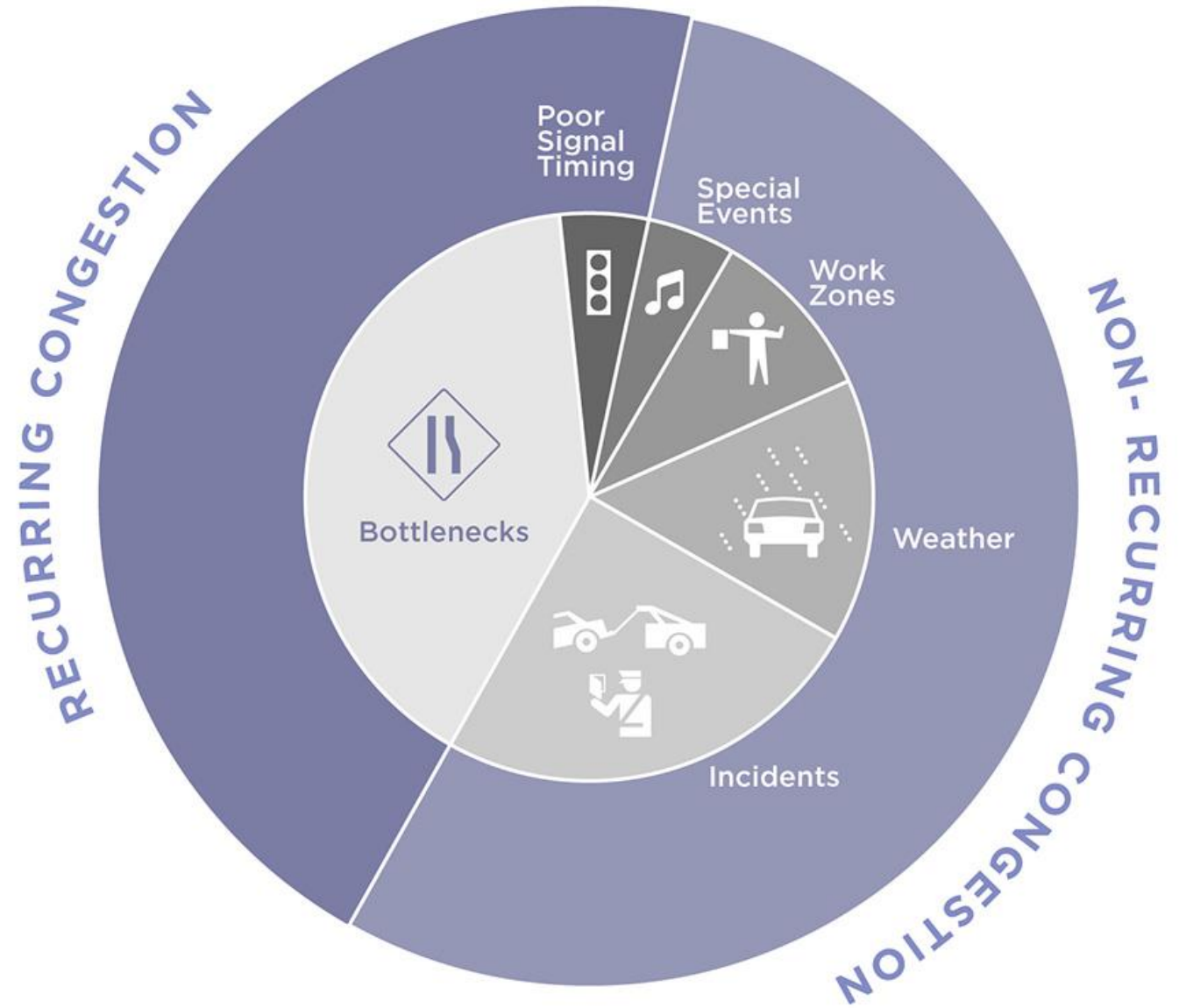
# How do we reduce personal vehicle emissions?

- Reduce congestion through efficient roadway systems
- Reduce vehicle-miles traveled – fewer trips, shorter trips, no trips





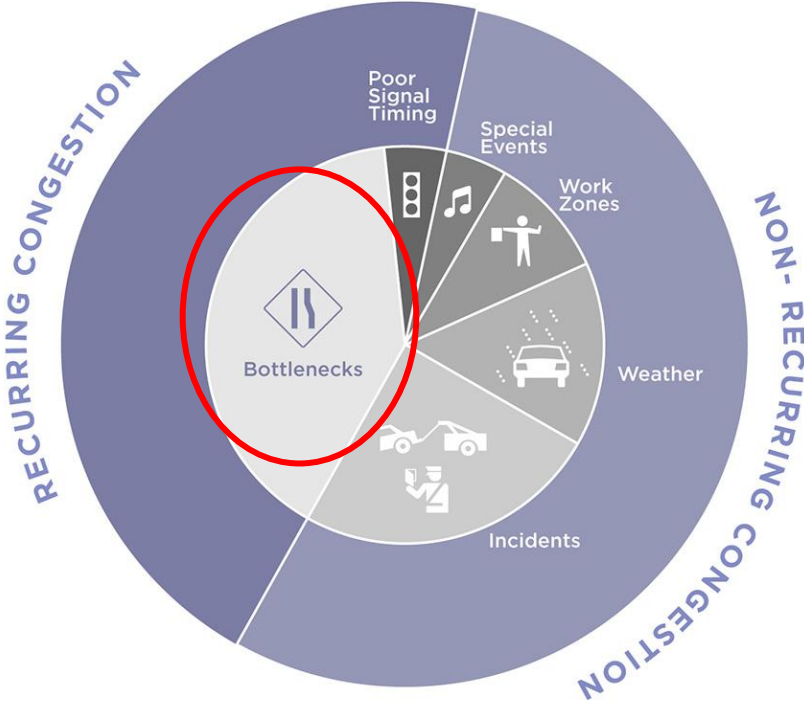
# How do we reduce congestion?



# Traditional Civil Infrastructure



How do we reduce congestion?

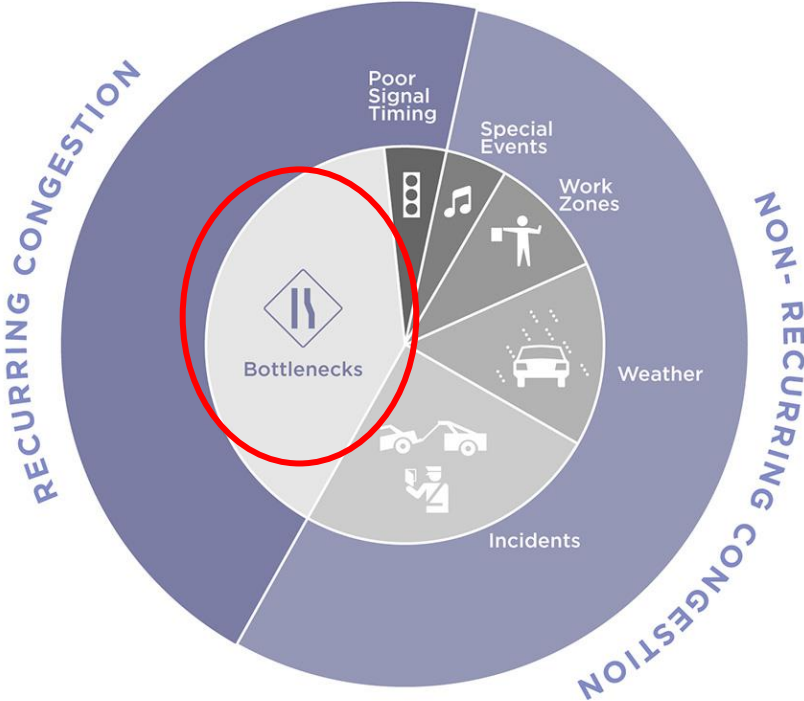




# Traditional Civil Infrastructure



How do we reduce congestion?

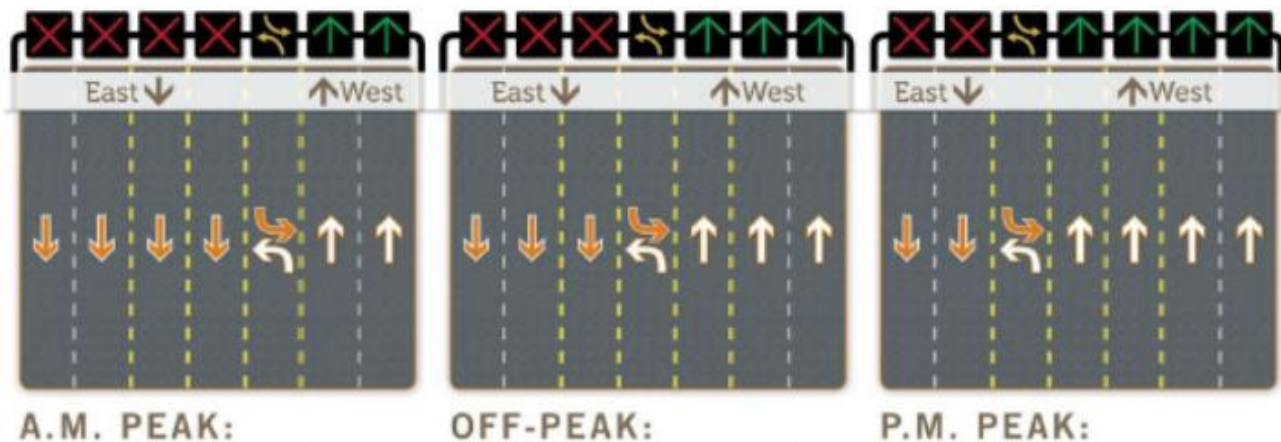




# Flex Lanes

Before and after study of flex lanes in Utah: travel times were reduced by 45 s and 50 s in the AM and PM peak.

Using the travel time savings, the flex lanes were estimated to save users a total of \$792,000 per year and reduce emission toxins by 1.24 tons per year.

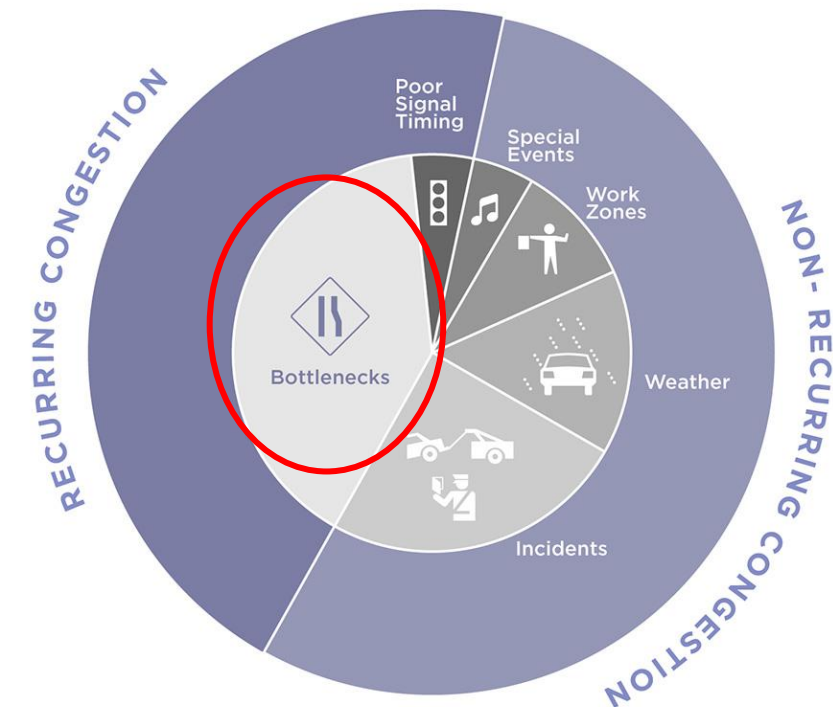


**Figure 1. Illustration. Example of flex lane configurations.**

Source: Utah Department of Transportation

<https://ops.fhwa.dot.gov/Publications/fhwahop17025/index.htm>

## How do we reduce congestion?





# Lane Management

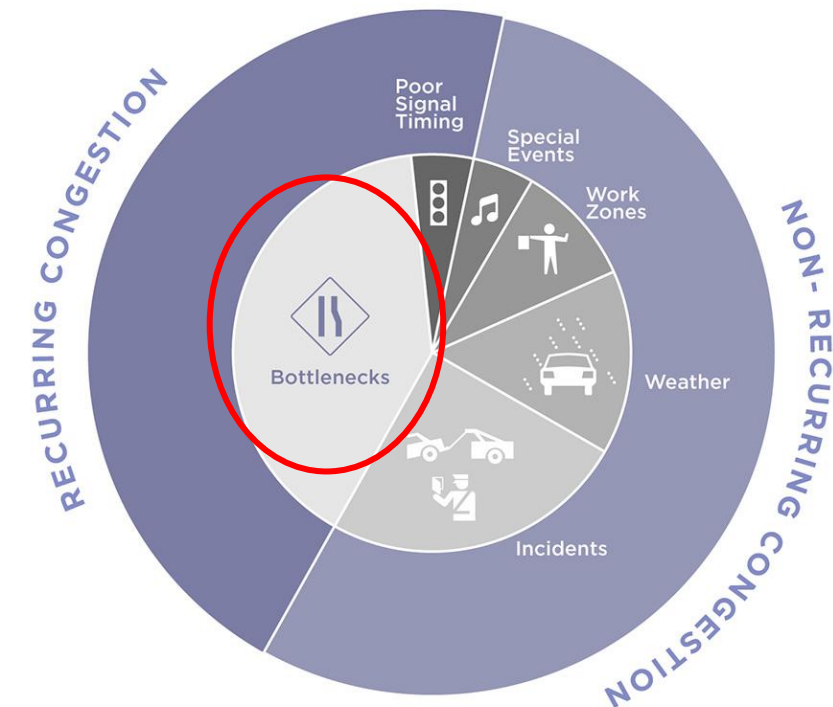


**Figure 2. Photo. Variable message signs showing traffic alerts and speed limits for individual lanes.**

Source: DKS Associates, courtesy of KLiK.

<https://ops.fhwa.dot.gov/Publications/fhwahop17025/index.htm>

## How do we reduce congestion?



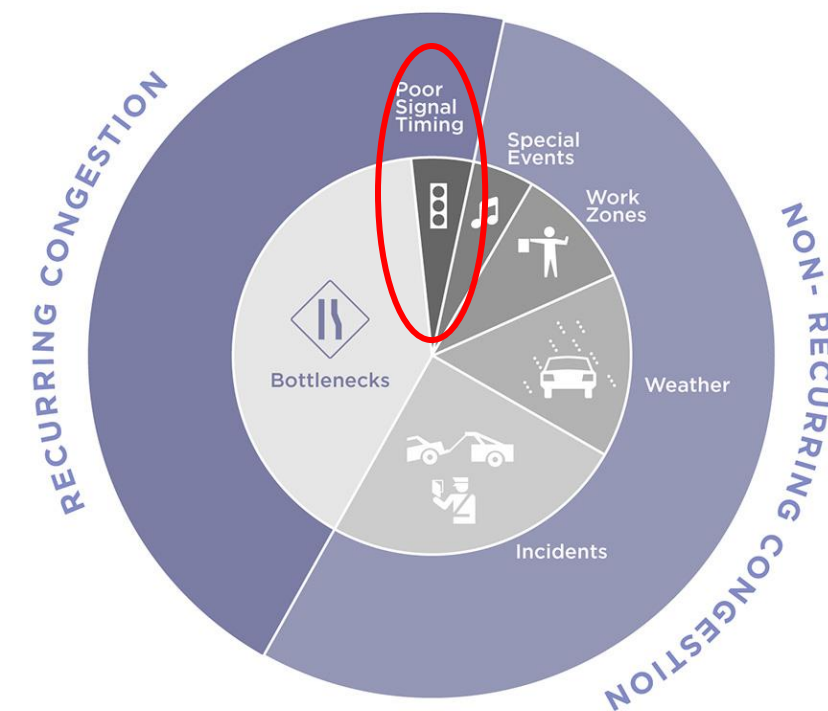
# Traffic Signal Optimization

Re-timing traffic signals or adaptive signal control technologies can reduce fuel consumption by up to 7% and emissions by up to 6%

<https://ops.fhwa.dot.gov/publications/fhwahop12004/fhwahop12004.pdf>



## How do we reduce congestion?



# Operation Green Light Mid-America Regional Council

**750+** Traffic Signals

**200+** Roadway Miles

**1.7 Million** Trips/Day

**50/50** Local Agency/Federal Funding

**\$800** Local Agency Annual Cost Per Signal

## How do we reduce congestion?

### ANNUAL BENEFITS



**220 MILLION**  
FEWER VEHICLE STOPS



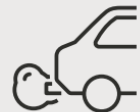
**1.8 MILLION**  
GALLONS OF GAS  
SAVED



POTENTIALLY UP TO  
**50% REDUCTION**  
IN REAR-END CRASHES\*



**1.9 MILLION**  
HOURS SAVED

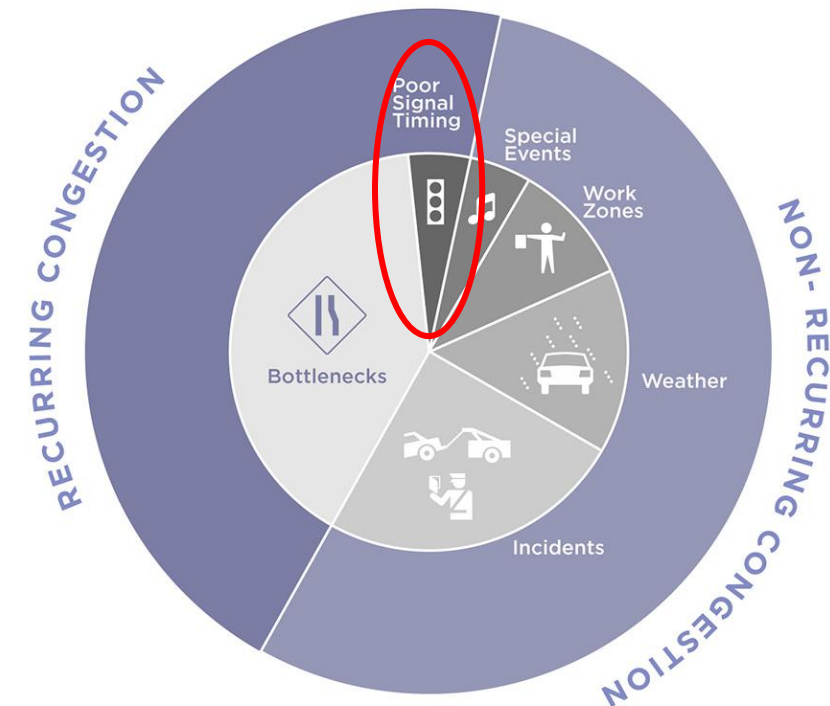


**3,000 TONS**  
OF POLLUTANTS  
AVOIDED



**\$44.2 MILLION**  
SAVED

\*Arash M. Roshandeh, Zongzhi Li, Shengrui Zhang, Herbert S. Levinson, Xi Lu, Vehicle and pedestrian safety impacts of signal timing optimization in a dense urban street network, *Journal of Traffic and Transportation Engineering (English Edition)*, Volume 3, Issue 1, 2016, Pages 16-27, ISSN 2095-7564. (<https://www.sciencedirect.com/science/article/pii/S2095756416000027>)

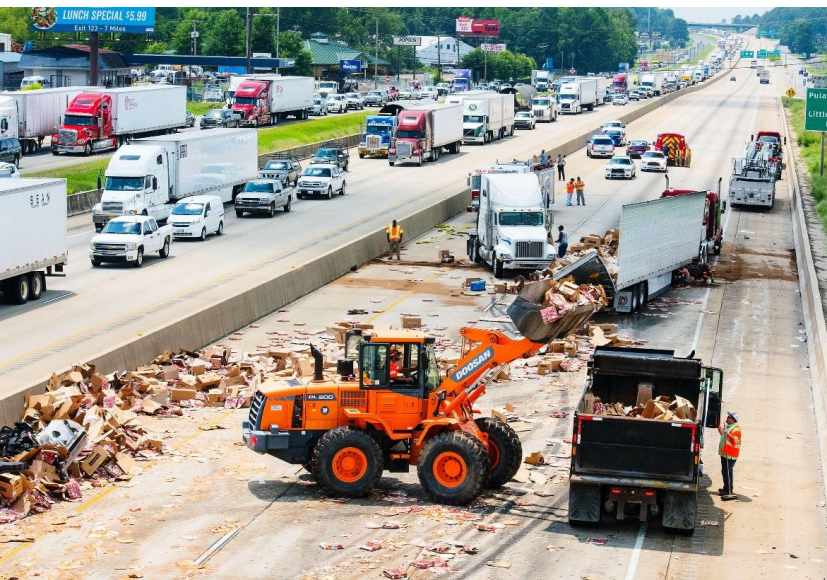




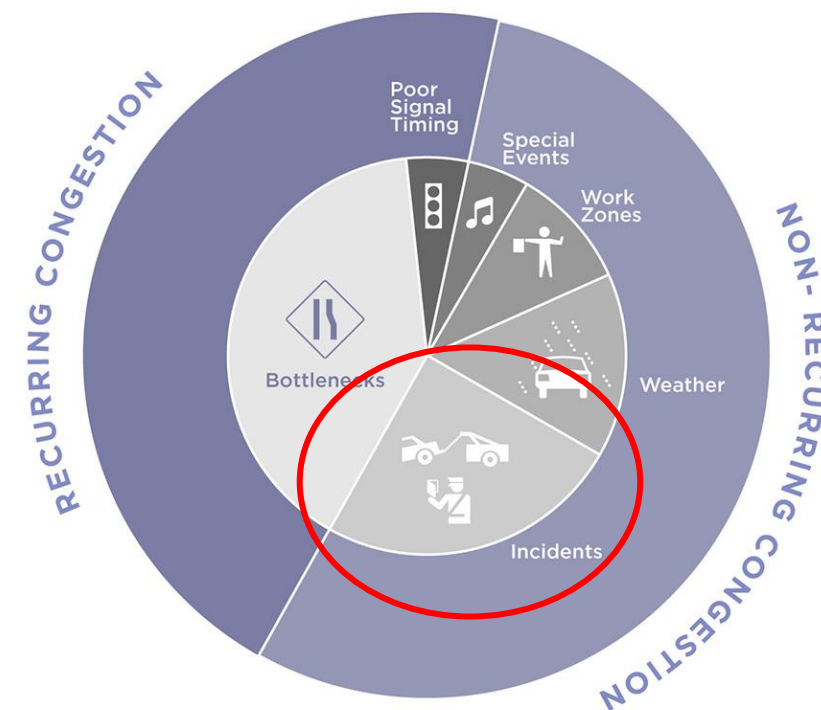
# Traffic Incident Management

Florida's Road Ranger program saves 1.7 million gallons of fuel valued at \$3.4 million monthly.

CHART saved Maryland highway users 6.4 million gallons of fuel in 2005, including 4.8 million gallons saved from delay reductions.



## How do we reduce congestion?





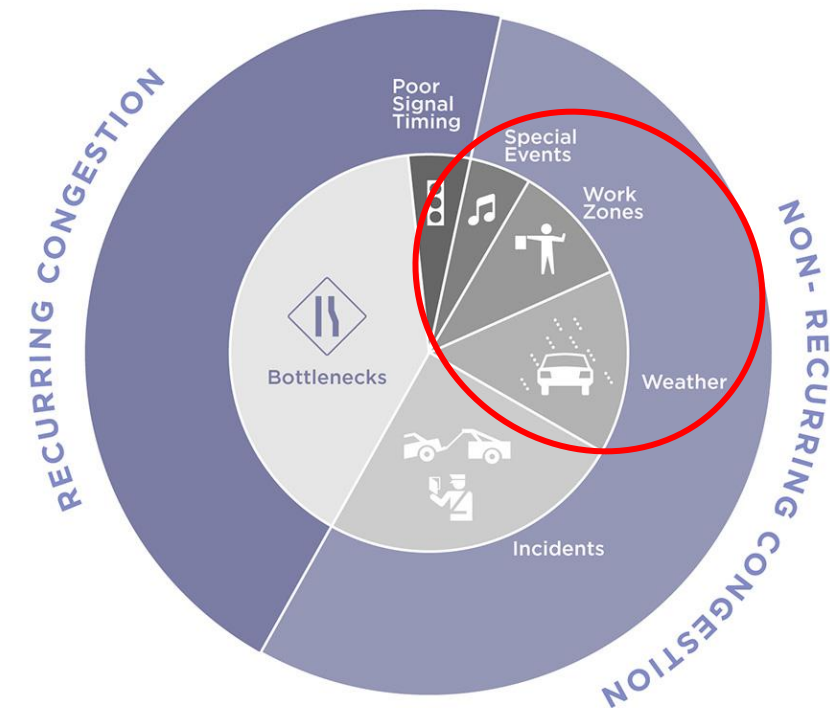
# Other Transportation Systems Management and Operation Strategies

Road Weather Management

Work Zone Management

Special Event Management

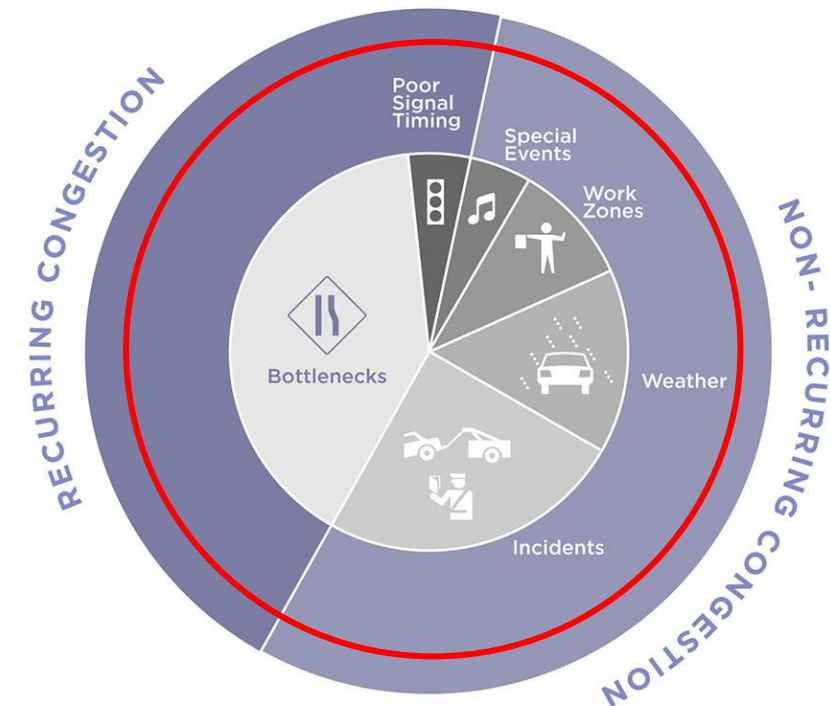
## How do we reduce congestion?



# Transportation Systems Management and Operation (TSMO)

Replace and upgrade equipment and traffic control devices, hardware/software, communication and data sharing, staffing, policies and procedures, inter-agency agreements

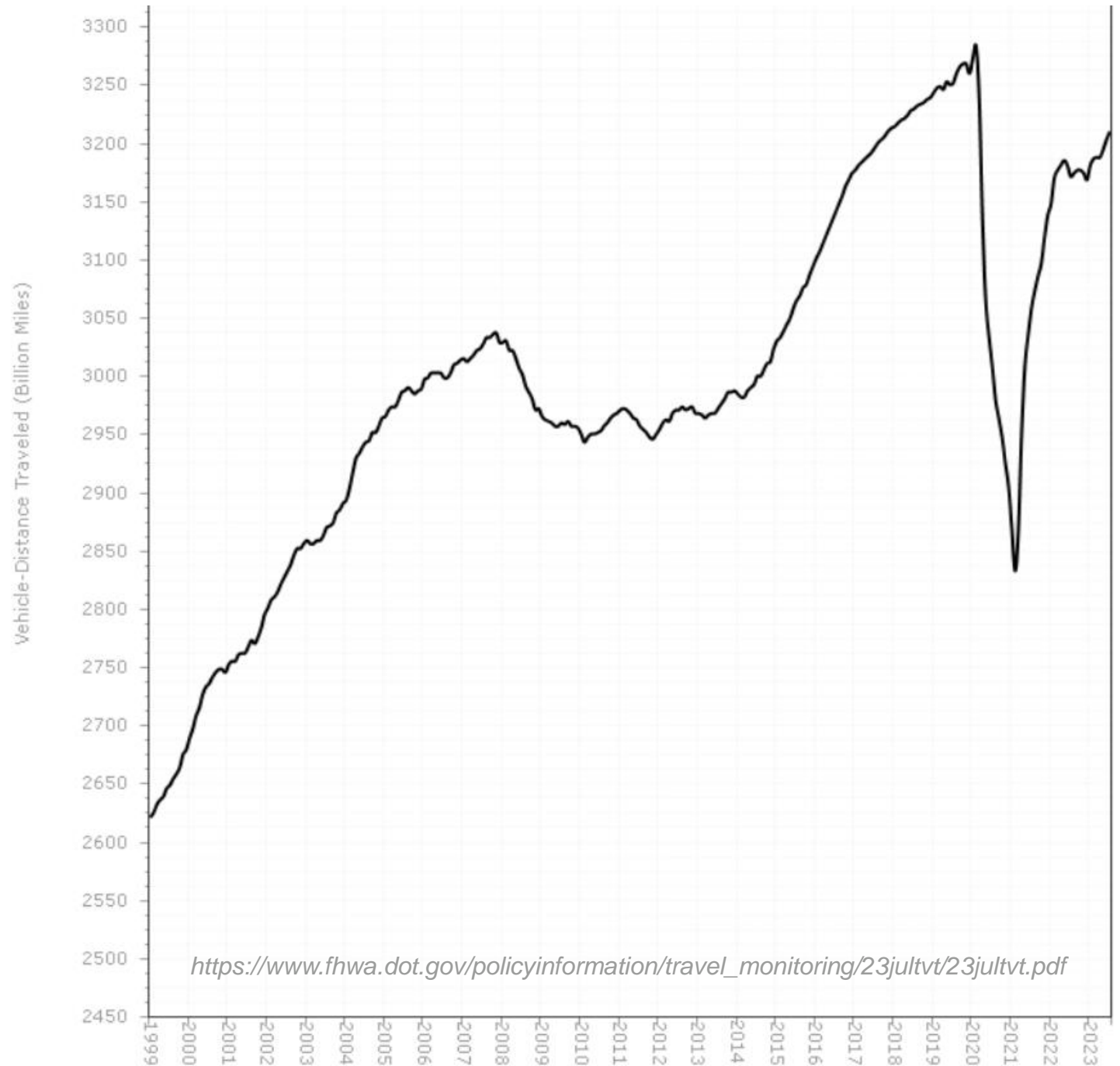
## How do we reduce congestion?



**How do we reduce  
VMT?**

**How do we improve  
transportation  
choice or mobility?**

**How do we  
incentivize desirable  
travel and mode  
choices?**



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## Leverage Technology

Parking decks





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## Leverage Technology

Truck parking



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## Public-Private Partnerships



Shared Micromobility for affordable-accessible housing



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## **SMILIES**

- Bike share program
- Identified neighborhoods with limited transportation options
- Considered various business models, opted to partner with Tandem Mobility to provide turnkey solution using smartphone app
- Challenge - because about 20% of community desired to serve do not have smartphones, bank account or credit cards, they developed pre-loaded RFID cards obtained from local library

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## **SMILIES**

- Challenge - safe and inviting bicycle infrastructure
- Bikes free to rent initially, today the regular bikes are free for the first 30 minutes, and thereafter cost \$.50 + \$.50 per 30 minutes. E-bikes are free for the first 30 minutes and thereafter cost \$1.00 + \$1.00 per 30 minutes.



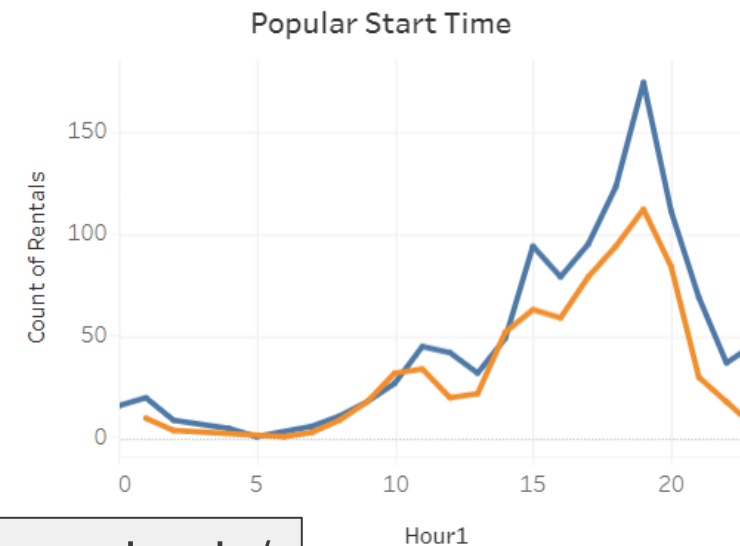
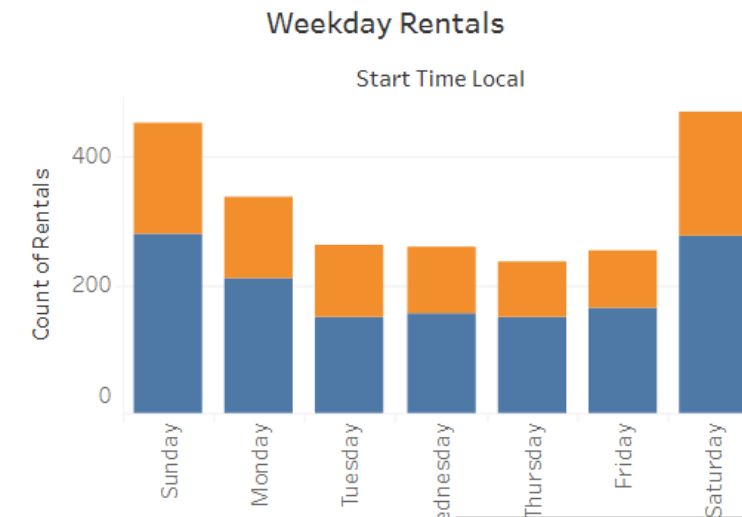
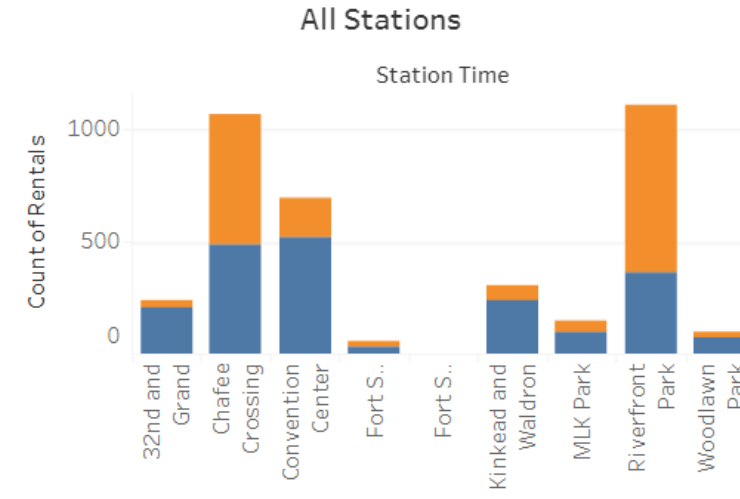
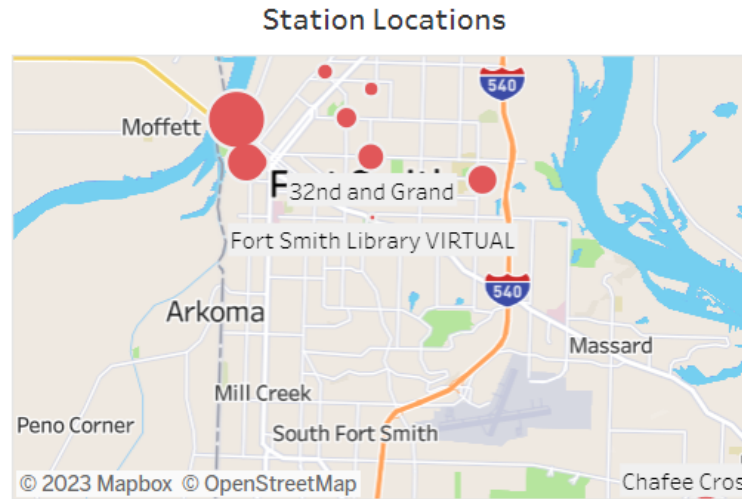
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## Ride 4 Smilies Dashboard

Total Duration	Number of Rentals	Number of Users	Total Distance (E-Bikes)
409,709 min	3,715	1,177	7,161 mi



<https://smilies.uark.edu/>

How do we reduce  
VMT?

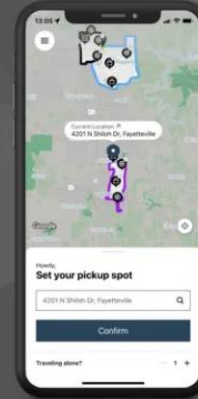
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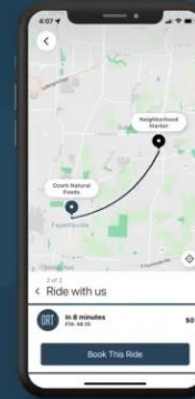
Book rides straight  
from your phone.



Tell us where  
you're going.



Choose a  
ride option.



Track your  
ride in real-time.



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## **Reduce & Manage Demand**

Safe and inviting infrastructure for active transportation users such as sidewalks, trails, LED lighting

Transit improvements such as more frequent buses and headways, improved reliable service, improved bus stops and shelters



THANK YOU!

Andy Brewer, P.E., PTOE  
Olsson

Work Phone: 479.307.5104

Email: [abrewer@olsson.com](mailto:abrewer@olsson.com)



