MOVING TOWARDS A MORE SUSTAINABLE "NEW NORMAL" - A CASE STUDY OF EL PASO, TEXAS

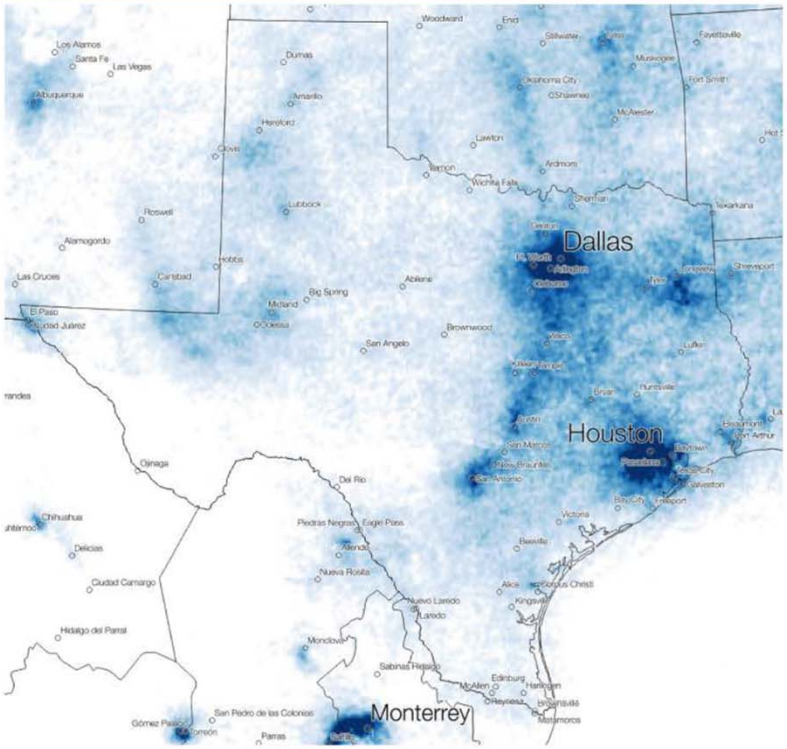
Xiaodan Xu, Josie Decherd, Alexander Meitiv, Ann Xu, Tara Ramani, Josias Zietsman

Center for Advancing Research In Transportation Emissions, Energy, and Health (CARTEEH)
Texas A&M Transportation Institute

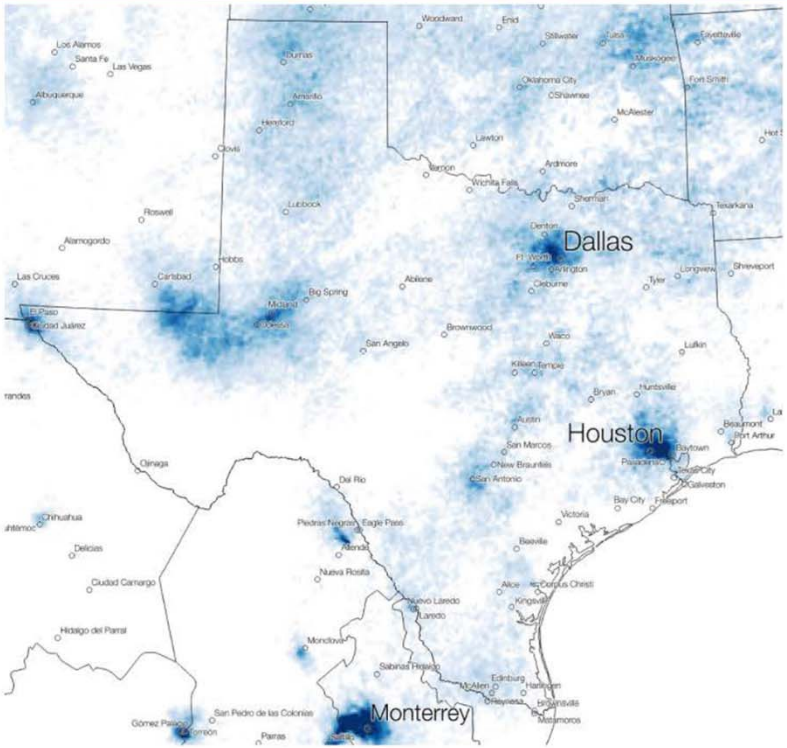
Background

Texas Nitrogen Dioxide (NO_2) Level

Feb, 2020



Week of March 29, 2020



Source:
(Descartes Labs Inc, 2020)

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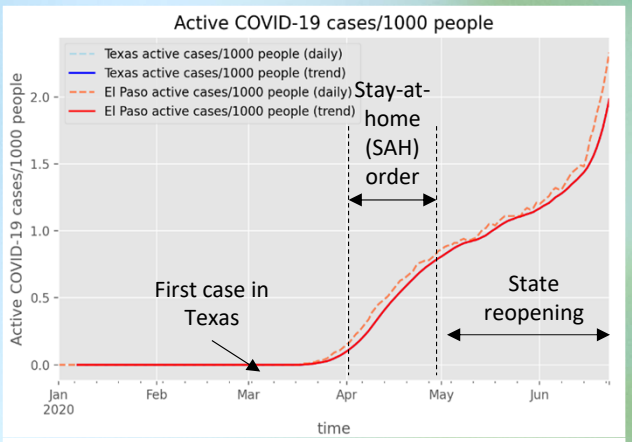
Passenger Travel Trends in Texas during COVID-19

Data Source:

- University of Maryland (UMD) COVID-19 Impact Analysis Platform (https://data.covid.umd.edu/)

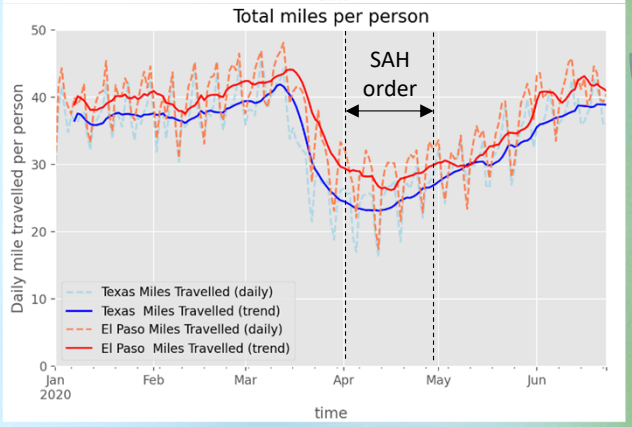
Active cases /1000 people

(Derived from JHU COVID-19 data)



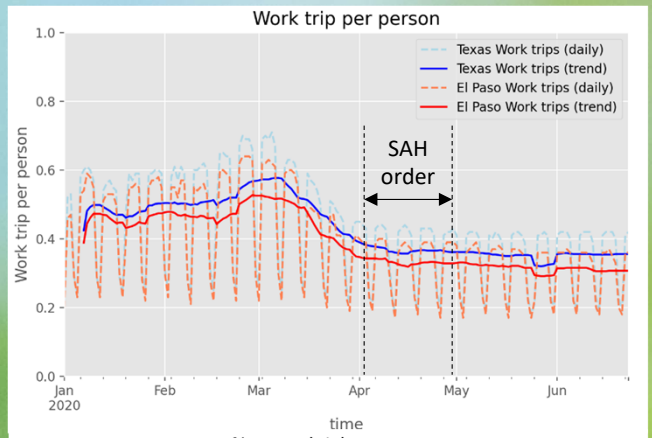
Total miles /person

(movement data collected from mobile devices)



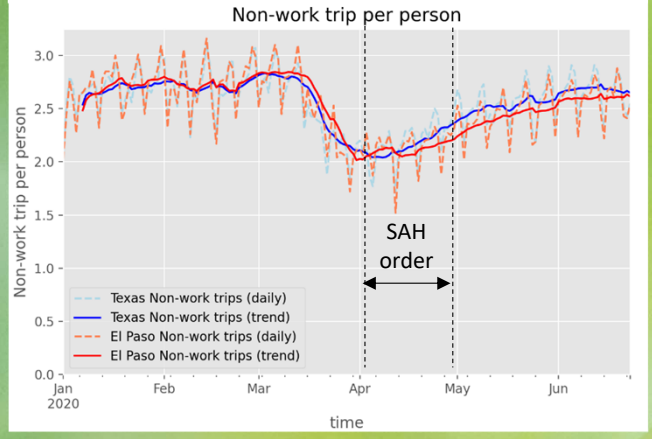
Work trips /person

(mobile device data, trip purpose tagged using geo location)



Non-work trips /person

(mobile device data, trip purpose tagged using geo location)



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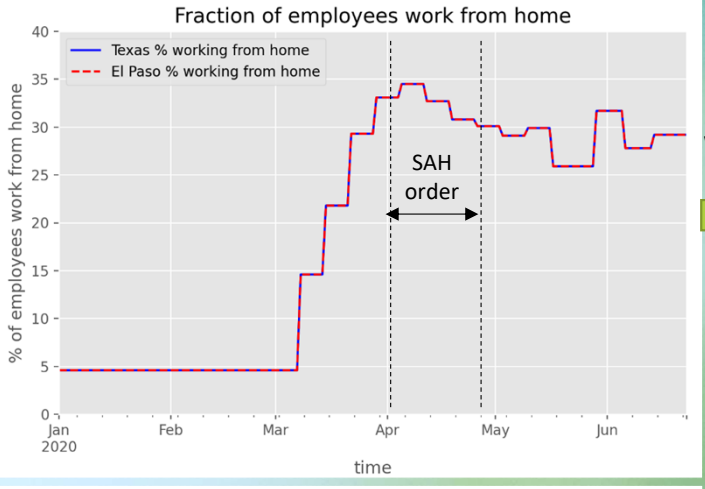
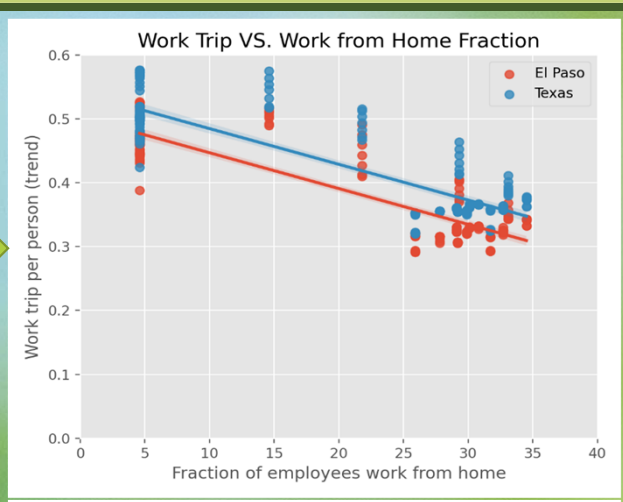
Work Trip Trends in Texas

% work from home

(Estimated by UMD based on other work –related attributes)



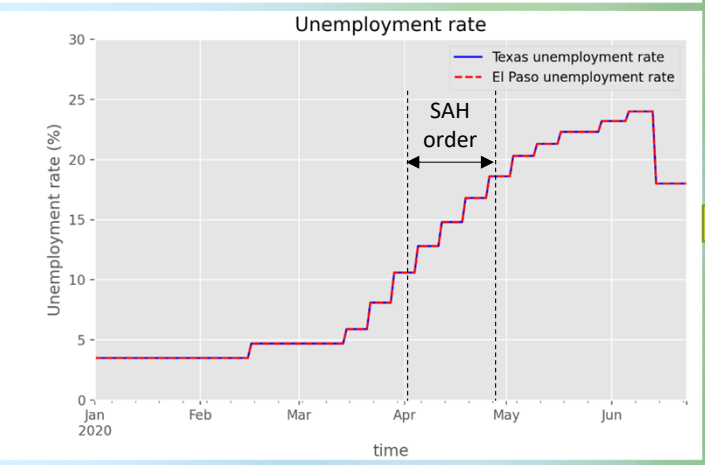
Work from home



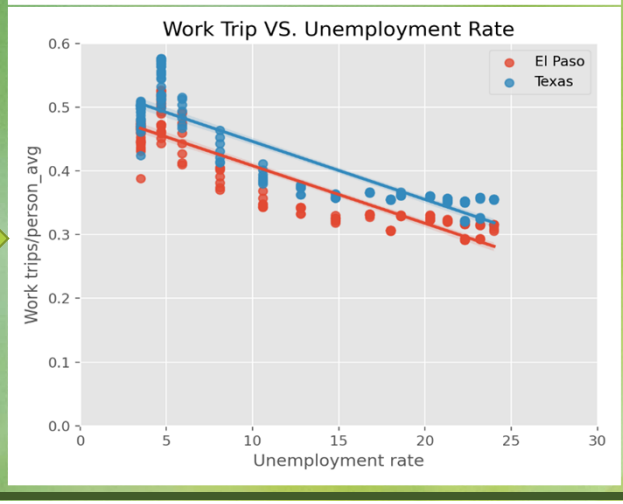
Work trip/person VS. % work from home

Unemployment rate

(Calculated using data from department of labor)



Unemployment



Work trip/person VS. Unemployment rate

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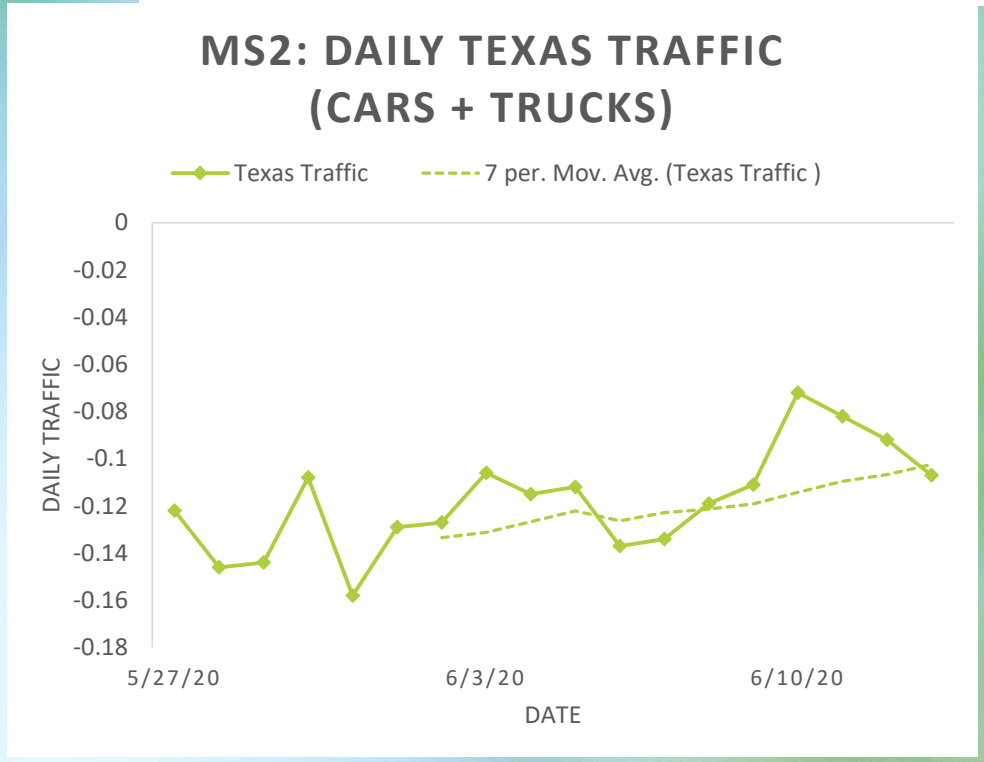
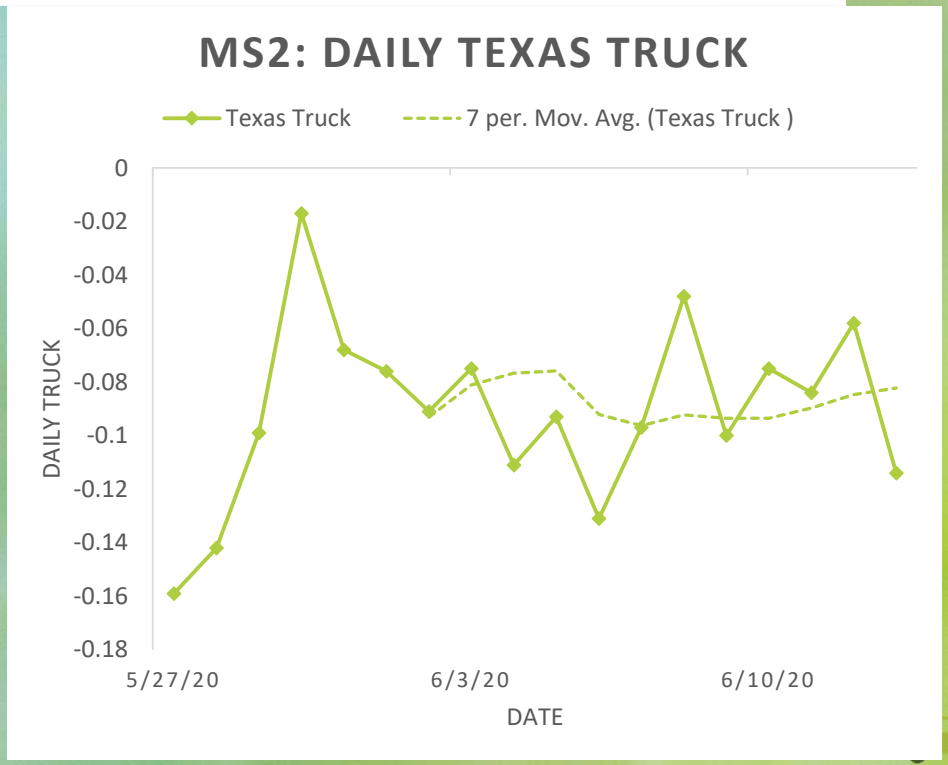
Truck Traffic Trends in Texas during COVID-19

Traffic Reduction Compared to the Traffic from the Same Time Previous Year





MS2 Software. Traffic Dashboard. https://www.ms2soft.com/traffic-dashboard.

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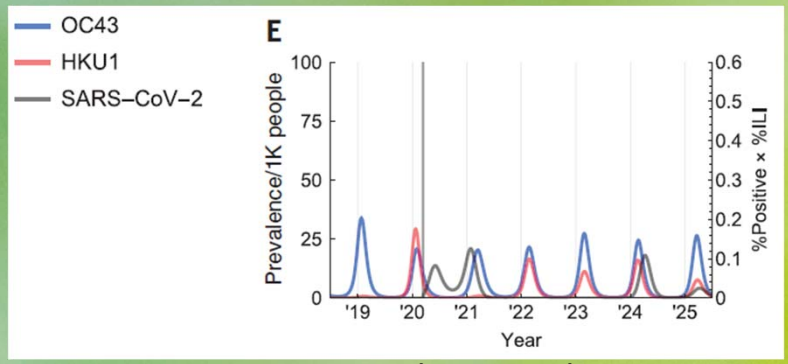
Plausible Post-COVID Scenarios

Could work from home become the 'new normal'?

- 37% of U.S. jobs can be done completely at home (Dingel and Neiman, 2020)
- The immunity of COVID-19 may not be permanent and we may face seasonal outbreak (Kissler, et al. 2020)
  - Social distance may be needed in the long-term
- After adaption to remote working culture, some companies allow their employees to work from home in the long term
  - Amazon, Facebook, Twitter, etc. have announced long-term plan to support remote working



Forecasted seasonal resurgence of COVID-19

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An Envisioned Texas Sustainable 'New Normal'

Assumption Overview

- Work-from-home is supported at the maximum level
  - In Texas, up to **30%** of employees continue to work from home
  - Non-work trips return to pre-pandemic levels
- Economic recovered to pre-pandemic-level
  - Unemployment = **3.5%**
  - Freight movement going back to normal
  - EV sales unaffected, and will reach **6%** penetration by 2030
- Other transportation mode returned to pre-pandemic level
  - Transit, bike, walk, etc.

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An Envisioned Texas Sustainable 'New Normal'-cont.

Methodology Overview

- Performed a case study of El Paso, TX
- Full-chain analysis using TEMPO

https://tempo-dashboard.io/home

- Baseline traffic represent business-as-usual case with pre-pandemic traffic
- Full results: http://54.159.31.130:3838/

Percent reduction compared to baseline	Post-COVID: 18% work trip reduction	Post-COVID + EV: 18% work trip reduction + 6% EVs among LDVs
VMT	3.5%	3.5%
Delay	10%	10%
CO_2	3.5%	7.3%
NO_X	1.8%	2.7%
$PM_{2.5}$	1.8%	2.5%

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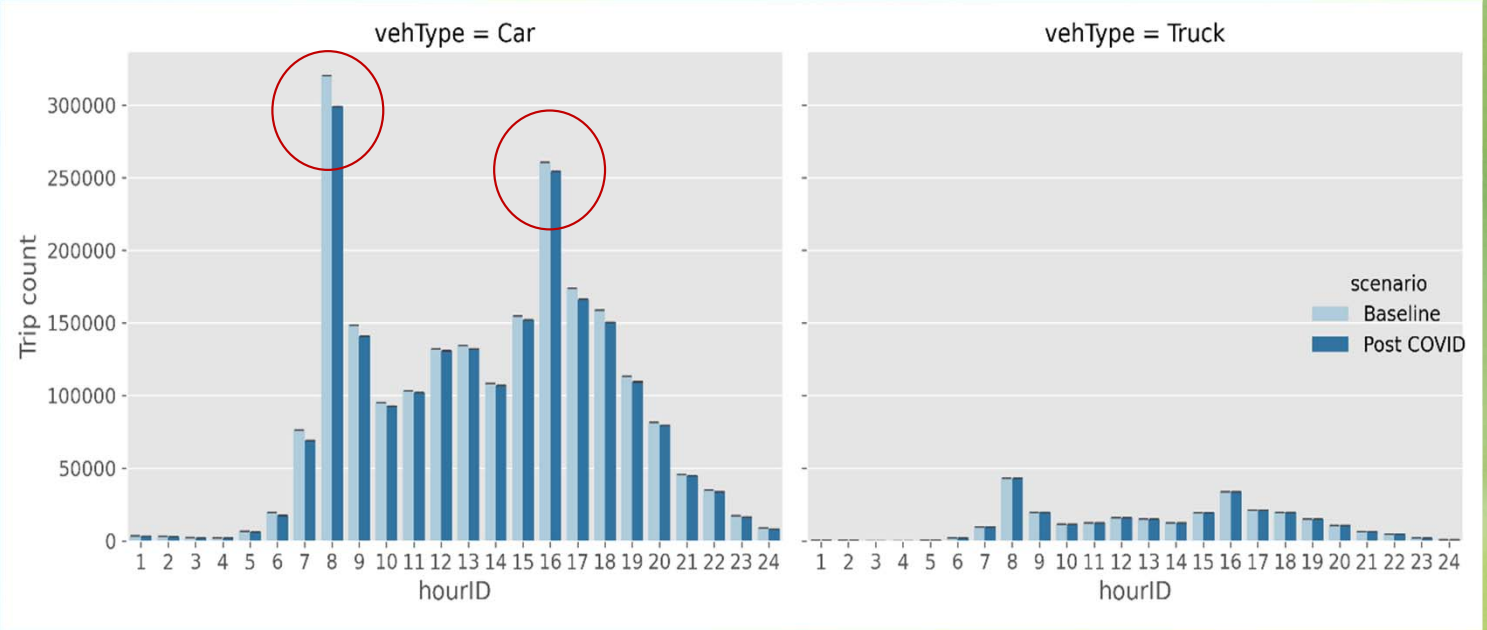
Post-pandemic Travel Demand

- Work trip reduction come from % work from home and unemployment rate
- Developed a linear regression model using UMD data
- 18% of work trips can be reduced if % work from home increase from 5% (pre-COVID) to 30% (post-COVID), without reduction from unemployment rate



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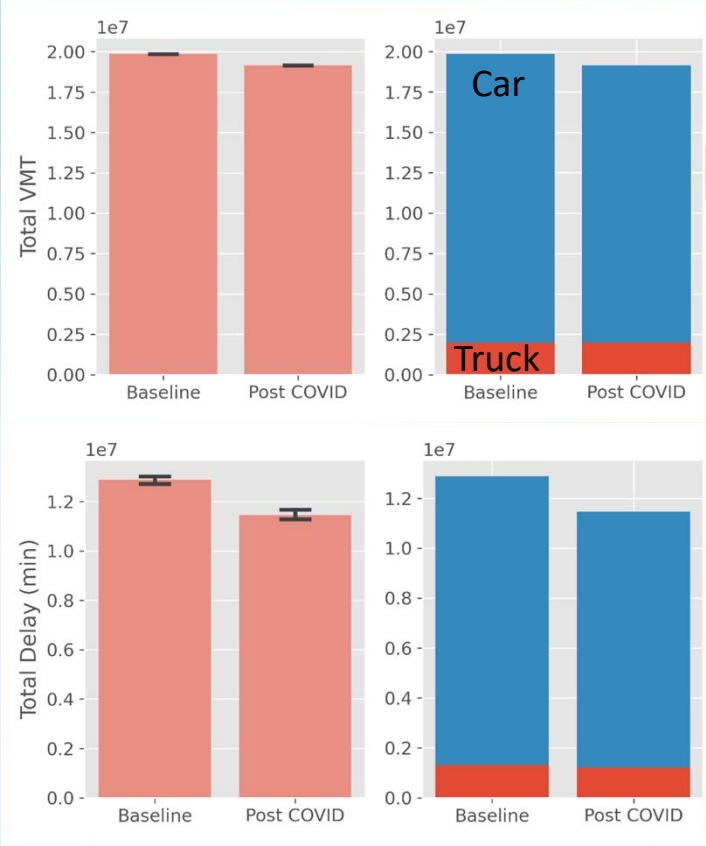
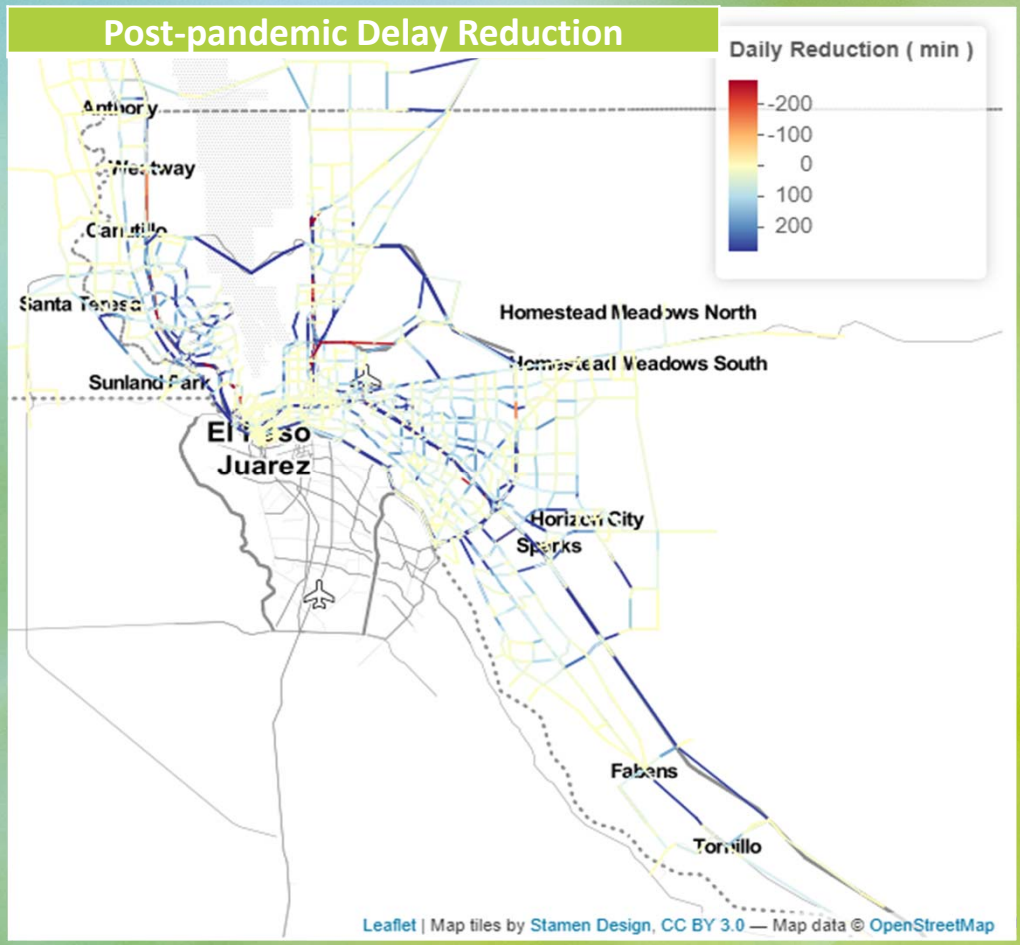
Post-pandemic Congestion Impact

- With 18% work trips removed

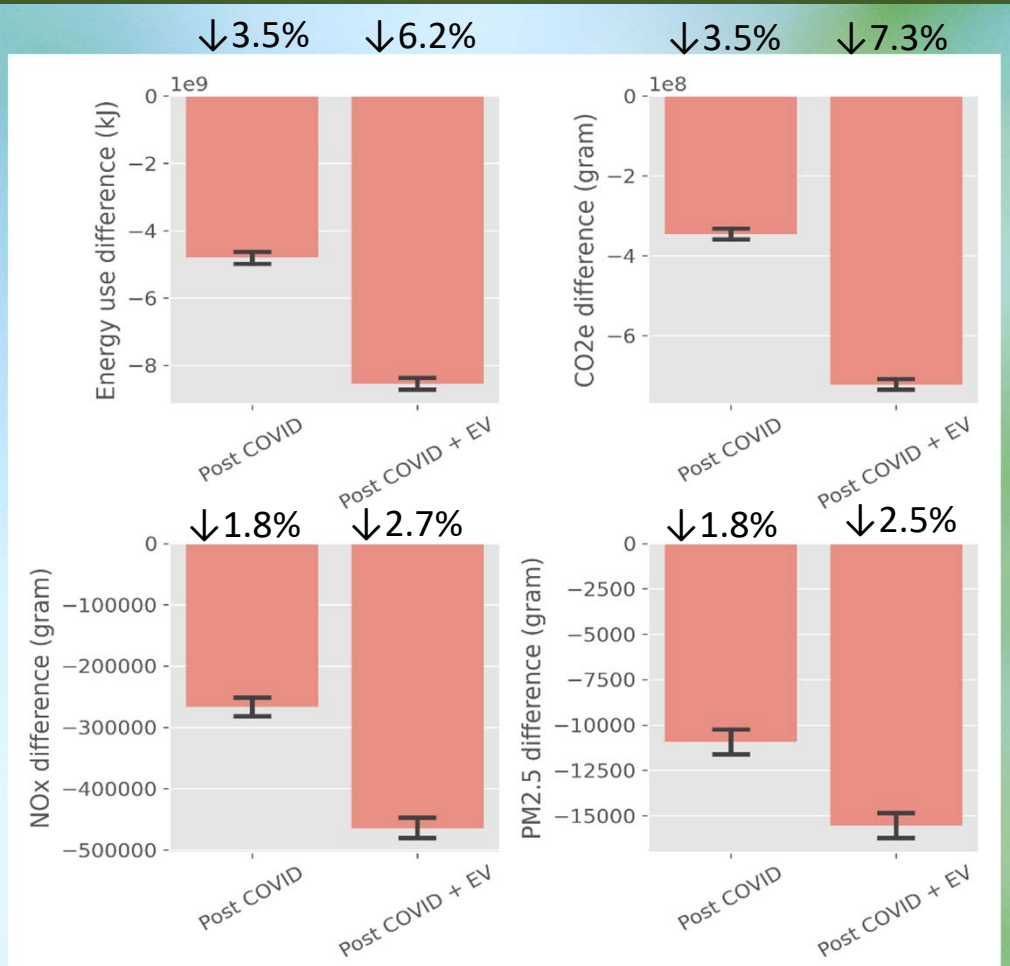
Daily VMT ↓ 3.5%

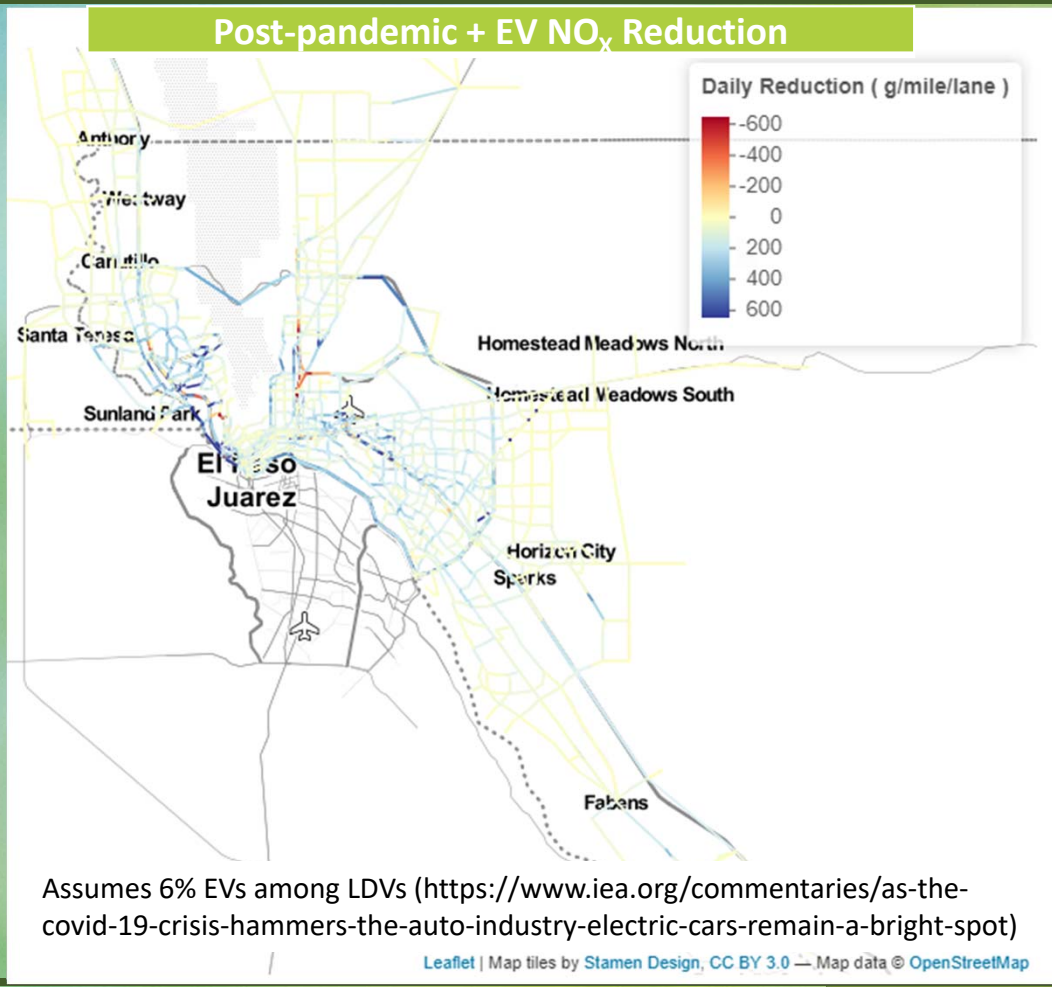
Total Delay ↓ 10%





Post-pandemic Emission Reduction





Assumes 6% EVs among LDVs (https://www.iea.org/commentaries/as-the-covid-19-crisis-hammers-the-auto-industry-electric-cars-remain-a-bright-spot)

Findings

- In Texas, work trips dropped during COVID-19 pandemic, with no immediate trends going back to normal
- The work trip reduction can be attributed to more employees work from home and growing unemployment rate
- If the work culture shift and EV sales trends can last after the pandemic, we can expect:
  - Less travel demand and less congestion
  - Some emission reductions
- To move towards a more sustainable 'new normal':
  - Work from home is an effective pathway to reduce congestion and emissions
  - We need additional strategies for meaningful air quality benefits

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On-going TTI Projects (tentative)

- Post-pandemic scenario planning
  - Disease outbreak and economic impact (UMD data from January to November, 2020)
  - Demographic pattern changes (Census data, expected March 2021)
  - Travel trends for all transportation modes (TxDOT traffic count, expected mid 2021 after FHWA review)
- Emission analysis for major metropolitan areas
  - Houston
  - Dallas
  - El Paso

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