May Air Quality Health Monitoring Task Force Meeting

North Central Texas Council of Governments

May 21, 2021

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North Central Texas Council of Governments

Regional Particulate Matter (PM) Episode

October 19, 2017 - *Recap*

North Central Texas Council of Governments

Monitor Readings for PM 2.5

Source of PM: Unknown

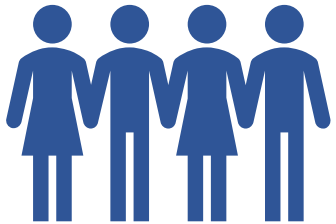
16-Oct-17 17-Oct-17 18-Oct-17 19-Oct-17 20-Oct-17 21-Oct-17 22-Oct-17

Convention Center
Dallas Hinton
Denton Airport South
Fort Worth California Parkway North
Fort Worth Northwest
Haws Athletic Center

Regional Particulate Matter (PM) Episode & Health Data

North Central Texas Council of Governments

October



What

Daily or **Weekly** Health Data (COPD Hospital Discharges, Asthma Outpatient Visits)

Where/When

County-level health data for a week prior to and after October 19, 2017 to analyze the trend

Why

Assess or correlate the health impacts on communities from pollutant exceedance days

Health Data Sources

North Central Texas Council of Governments

NCTCOG Known Sources of Data

- **Texas Department of State Health Services (DSHS) Asthma Hospitalization and Outpatient Data –** *Annual Data by County*
- **Dallas County Community Health Needs Assessment –** *Annual Data for Dallas County by Zip Code*
  https://www.parklandhospital.com/Uploads/Public/Documents/PDFs/Health-Dashboard/CHNA%202019.pdf
- **DFW Hospital Council Foundation Data –** *Adults with Asthma, COPD by County, City Zip Code, Census Tract*
  http://www.healthyntexas.org/
- **Smart Growth for Dallas Tool –** *Annual Data for City of Dallas*
  https://web.tplgis.org/smart_growth_dallas/
- **Cooks Children's Hospital Data –** *Hospital Discharges for Cooks Children's Hospitals (Working to Obtain)*

We are looking for Health Data!

Asthma occurrence/outpatient visits and/or COPD hospital discharge data by county/city or smaller geographic scale

Heath Data Requirements

North Central Texas Council of Governments

NCTCOG Next Steps

- Acquire health data to analyze/evaluate with data from regional PM exceedance occurrences (including October 19, 2017).
- Channel discussion towards local/neighborhood-level hotspots?
- Consolidate regional interests/analysis with various cities, local governments, and communities

As we acquire health data, what do **YOU** want to see from us?

City of Dallas

SM Wright and Joppa Neighborhood Projects Updates

NCTCOG Air Quality Health Task Force meeting
May 21, 2021

Ghassan 'Gus' Khankarli, Ph.D., PE, PMP
Director
Department of Transportation

Presentation Overview

- SM Wright Project Background and Status
- Joppa Neighborhood Project Background and Status
- Discussion

SM Wright Project Background

- SM Wright Project-Phase II is a TxDOT project
- The project replaces the existing S.M. Wright Freeway with a six-lane, street level boulevard.
- Project will include the introduction of traffic signals, landscaping and sidewalks.
- Project estimated construction cost is $79 million with a projected completion date of fall 2023

Source:
https://static1.squarespace.com/static/5f241904a948265ecb1e6c63/t/5f5a6fd098f0bc11040a858e/1599762393651/TxDOT+SM+Wright+Project+Overview+Flyer_EN+2020.09.09.pdf

SM Wright Project Background

Source: https://www.smwrightproject.com/project-overview

SM Wright Project Background

- In August 2020, the City of Dallas partnered with North Central Texas Council of Governments (NCTCOG), Kapsch, Ericsson, and Texas A&M University Transportation Institute (TTI) to employ and analyze data of smart technology on the SM Wright Corridor in southern Dallas.
- The project will address issues and challenges in safety, mobility, sustainability, economic vitality, and air quality via implementing smart technologies.
- The project was submitted for a FHWA's Advanced Transportation and Congestion Management Technologies Deployment (ATCMTD)
- Project was selected as one of 10 projects nationwide in December 2020

SM Wright Project Background and Status

- Key components include
  - **Key Element #1-** Citywide Sharing of Data with Connected Vehicles through adding a Connected Vehicle (CV) module to the City of Dallas' Advanced Traffic Management System (ATMS).
  - **Key Element #2** - Adaptive Traffic Signal Control Technology Deployment which includes emissions monitoring
  - **Key Element #3** - Development of Advanced Real Time Analysis Tools
- Currently project was submitted to be added to the TIP in advance of the next steps

Joppa Neighborhood Project Background

- Increased activities at Union Pacific Railroad's (UPRR) Miller yard necessitated the closure of the at-grade crossing
- Discussions with the community resulted in the understanding of:
  - Closure of the at-grade crossing
  - The construction of a new pedestrian bridge crossing over the UPRR tracks which meets ADA requirements
  - Pedestrian accessibility improvements at loop 12 and Carbondale
  - Landscape improvements
- On June 13, 2019, The Regional Transportation council (RTC) approved the funding of the project which included contributions from UPRR

Joppa Neighborhood Project Background

Joppa Neighborhood Project Background and Status

- On October 13, 2020, the City had 2 council resolutions:
  - CR with UPRR to accept UPRR's $500K contribution for the permanent closure
  - CR with Dallas Area Rapid Transit (DART) to provide on-demand service to residents of the Joppa neighborhood for a limited time while the pedestrian bridge is being designed and constructed
- On June 9, 2021, the City of Dallas will consider a council resolution to accept the other $500K from UPRR
- Meanwhile, the City is currently in the procurement process for engineering services for the project

Joppa Neighborhood Project Status

- Key components for the project:
  - Project should meet applicable federal guidelines including the National Environmental Policy Act (NEPA) of 1969 as amended
  - NEPA's environmental topics include air quality
- Project will include significant community outreach and input
- Project will include significant coordination with all stakeholders and partnering agencies

Q/A

- General questions/comments about the projects?

- Thank You

Design an EV Future for Cleaner Air and Better Health

Presenter
Yanzhi (Ann) Xu, Ph.D.
y-xu@tti.tamu.edu

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

Texas A&M Transportation Institute

CARTEEH

Framing Questions

- What health benefits are associated with EV adoption?
- What kind of additional generation is needed to support EV adoption?
- At what point does additional EV use coincide with or outpace availability of renewables to provide the power
- If EV power needs outpace renewable power generation capacity, do the additional conventional power generation emissions result in increased exposure to harmful pollutants?

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Health benefits associated with EV adoption

For sure!

Less near-road exposure to pollutants

- NOx
- PM

Don’t know

Community exposure to pollutants near certain power plants

Design it!

Less ozone precursor emissions across mobile and stationary sources

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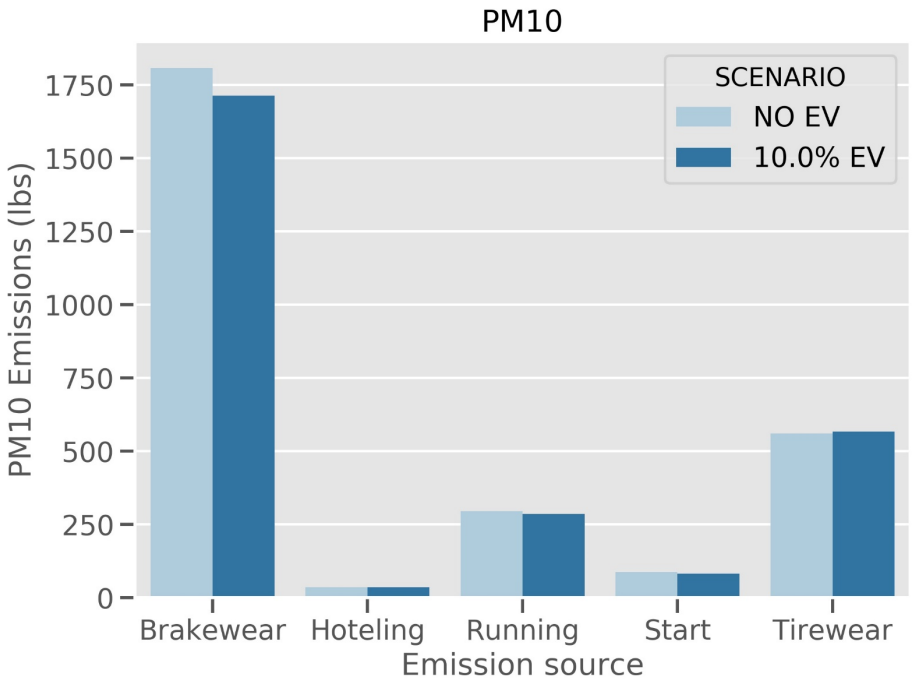
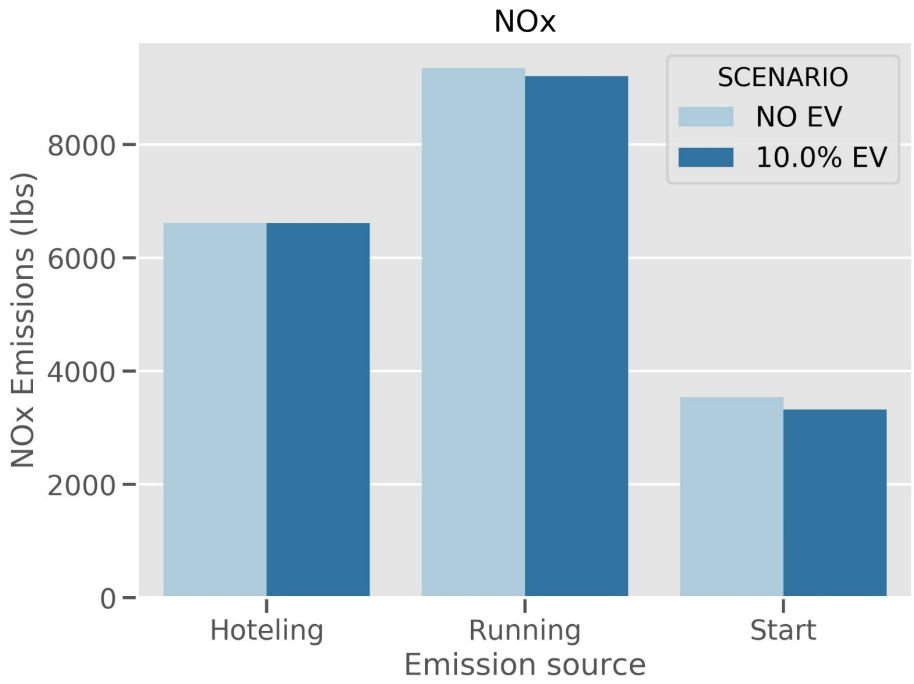
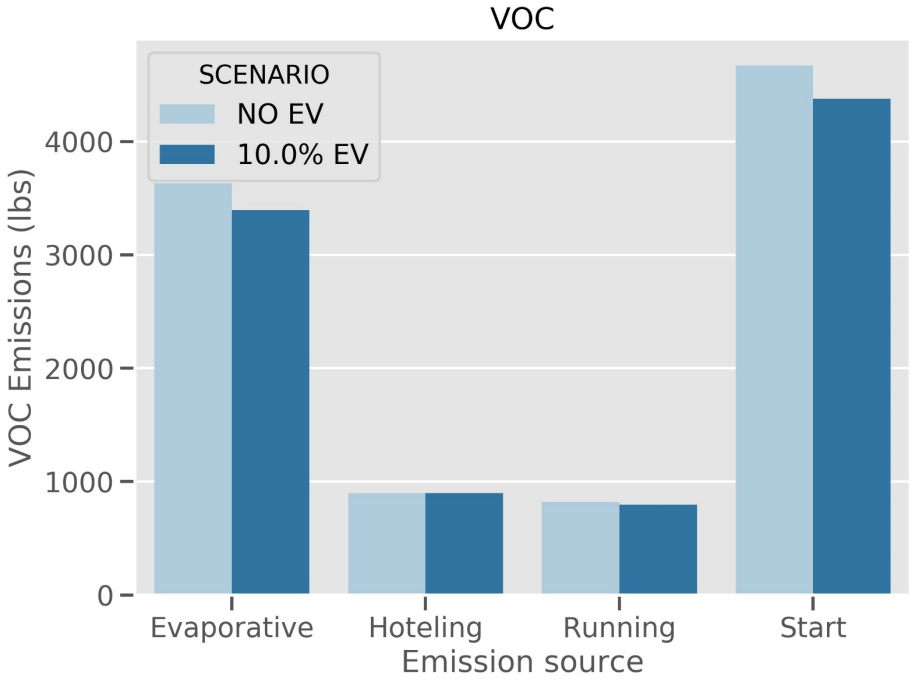
Mobile Source

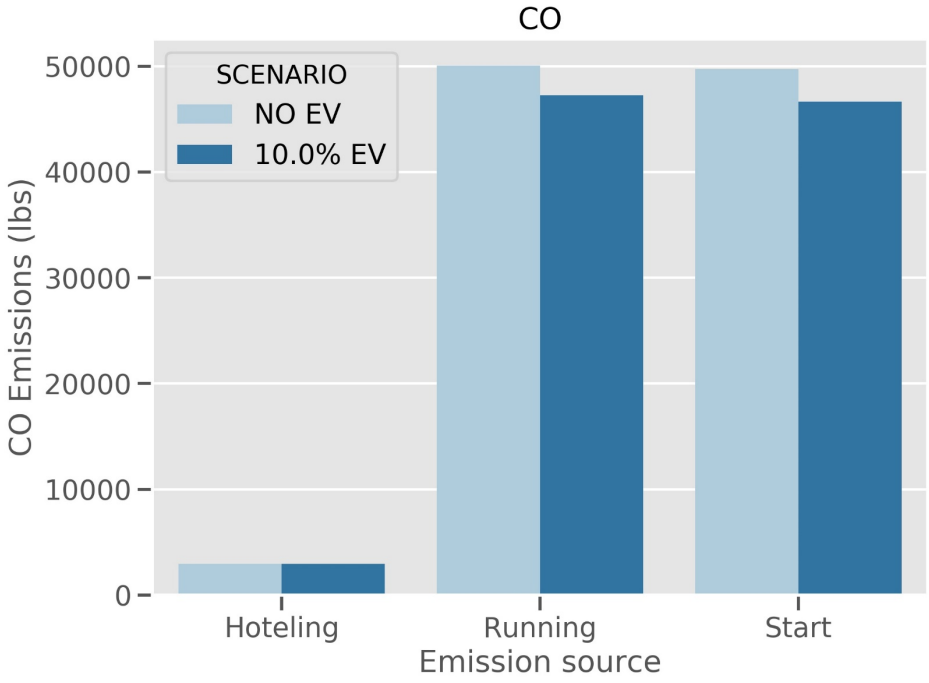
Aggregate vs Distribution

NOx & Particulate Matter









Emissions from Direct Vehicle Use (MOVES)

El Paso, TX Case Study 10% LDV Electrified

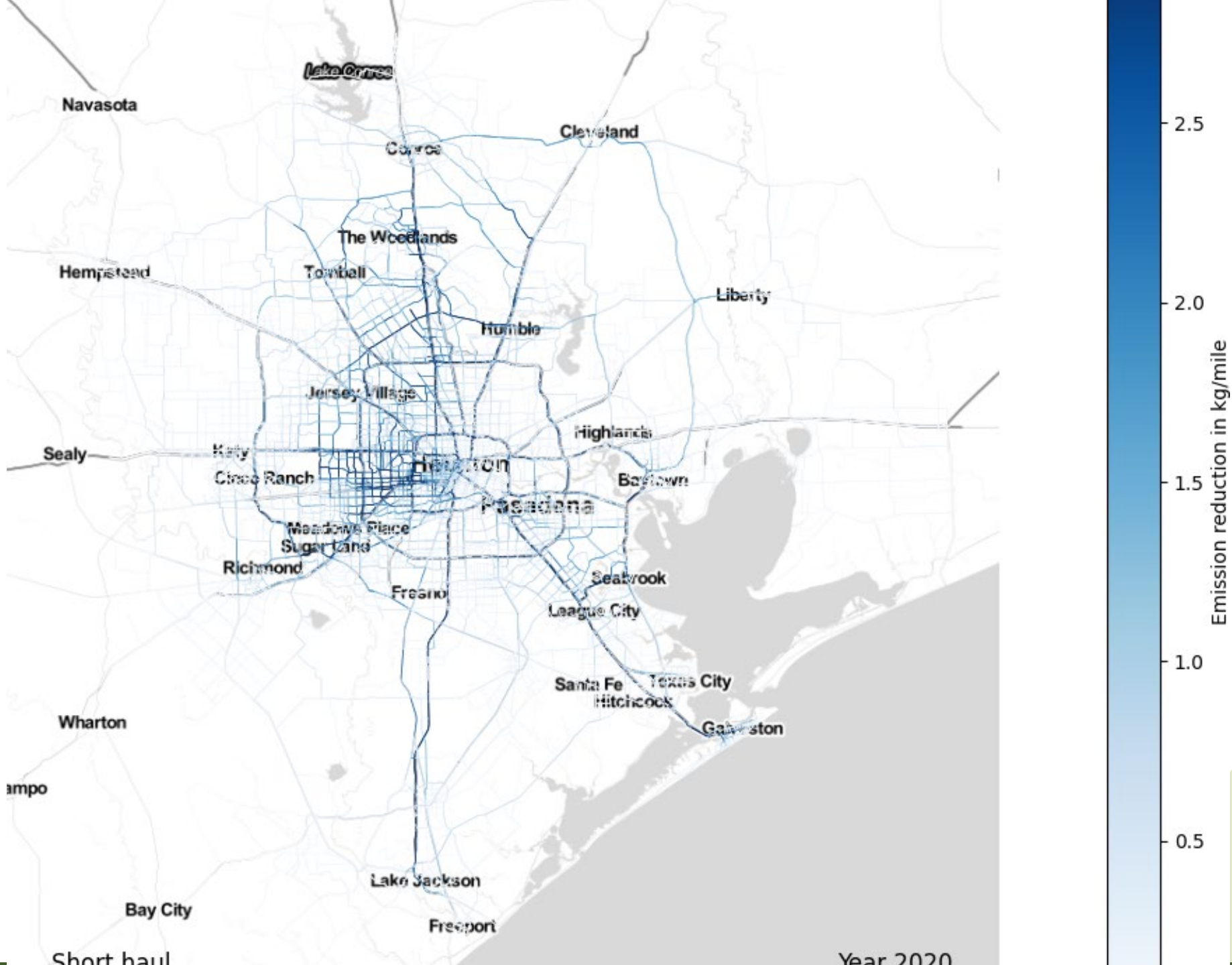
Xu, X., T. Ramani, A. Birt, M. Boardman, Y.A. Xu, J. Zietsman (2020) Addressing New Technologies and Data in Transportation Conformity: Pilot Study. Memorandum for TxDOT. https://server.txaqportal.org/storage/uploads/2020/11/12/5fad8c83bafdalAC-A_Task-2.1-Conformity-Data_PilotStudy.pdf

NOx Reduction

Electrify:
40% MDT
Short-haul

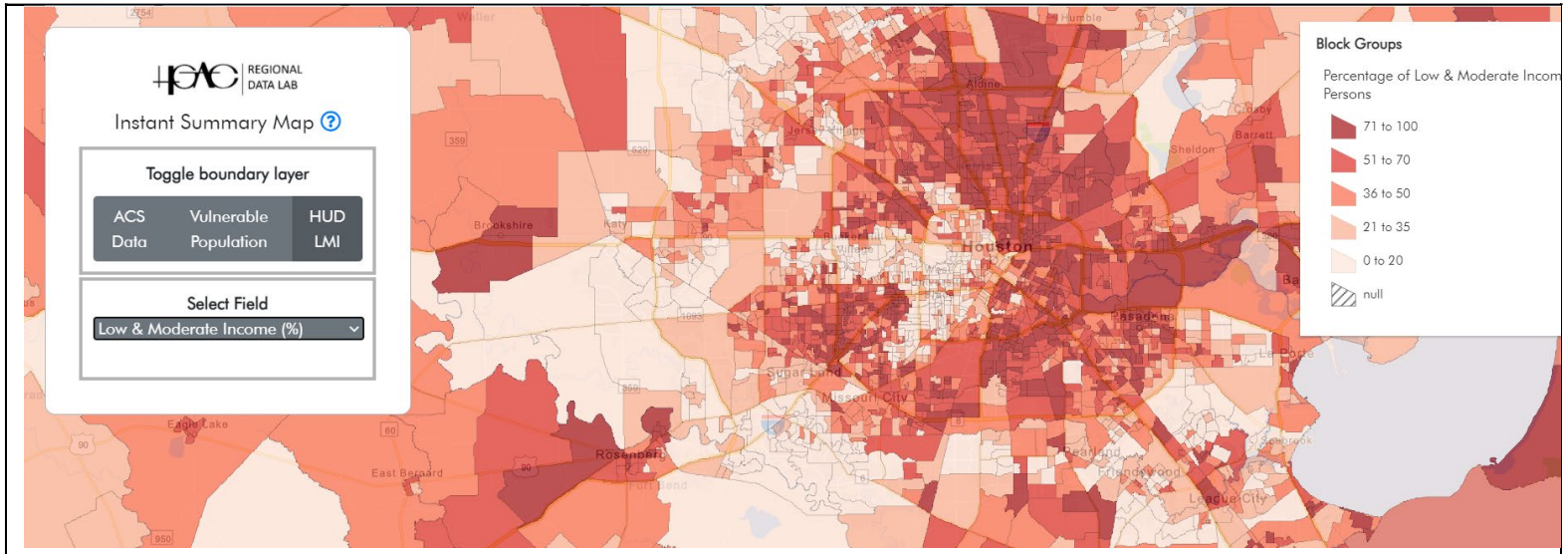
NOx reduction:
5.48 tons/day

Cleaner by the mile: Electric trucks can have outsized environmental and health benefits, UtilityDive. https://www.utilitydive.com/news/cleaner-by-the-mile-electric-trucks-can-have-outsized-environmental-and-he/598369/?:%202021-04-14%20Utility%20Dive%20Newsletter%20%5Bissue:33594%5D

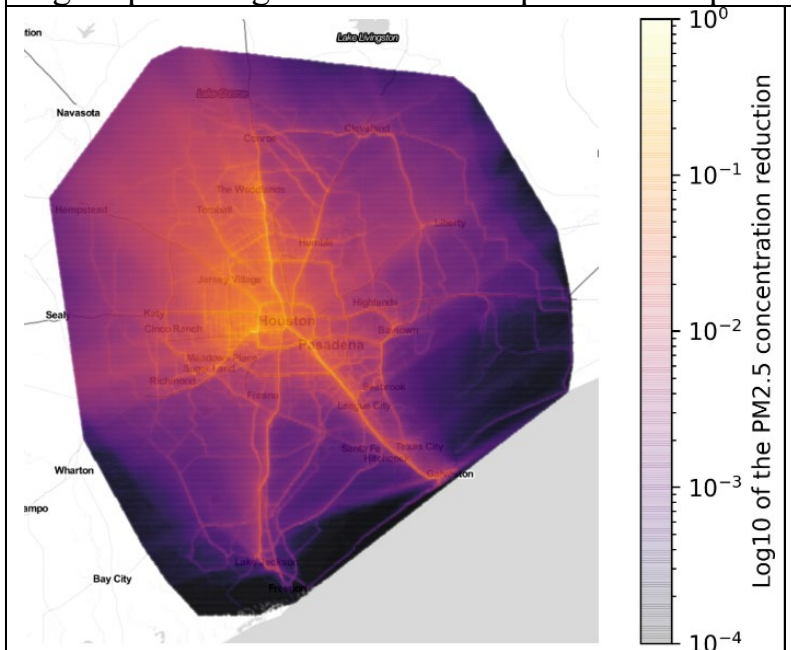


Distribution of PM Reductions

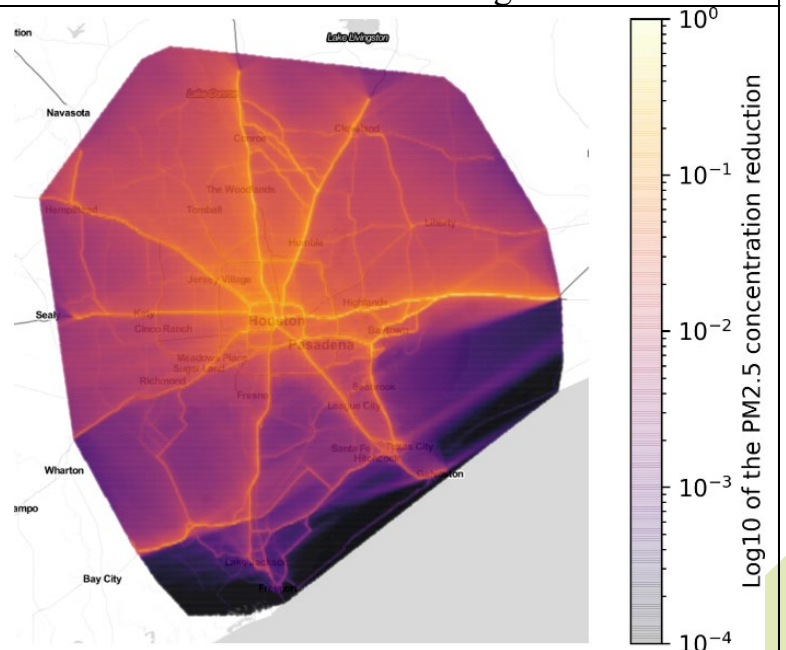
Distribution of environmental benefits from EVs across demographic groups



Census block group map of percentage of low- and moderate-income persons. Darker color indicates higher percentage of low-income persons. Map shows that west side of Houston is higher income.



PM2.5 concentration reduction from 40% medium-duty truck electrification, showing more reduction on the west side



PM2.5 concentration reduction from 40% heavy-duty truck electrification, showing reduction distributed across the region

Xu, Ann; Meitiv, Alexander, 2021, "Tailpipe Emission Benefits of Medium- and Heavy-Duty Truck Electrification in Houston, TX", CARTEEH DATA:HUB, http://carteehdata.org/library/document/tailpipe-emission-benefit-7ea6 (accessed May 20 2021)

Power Generation Emissions

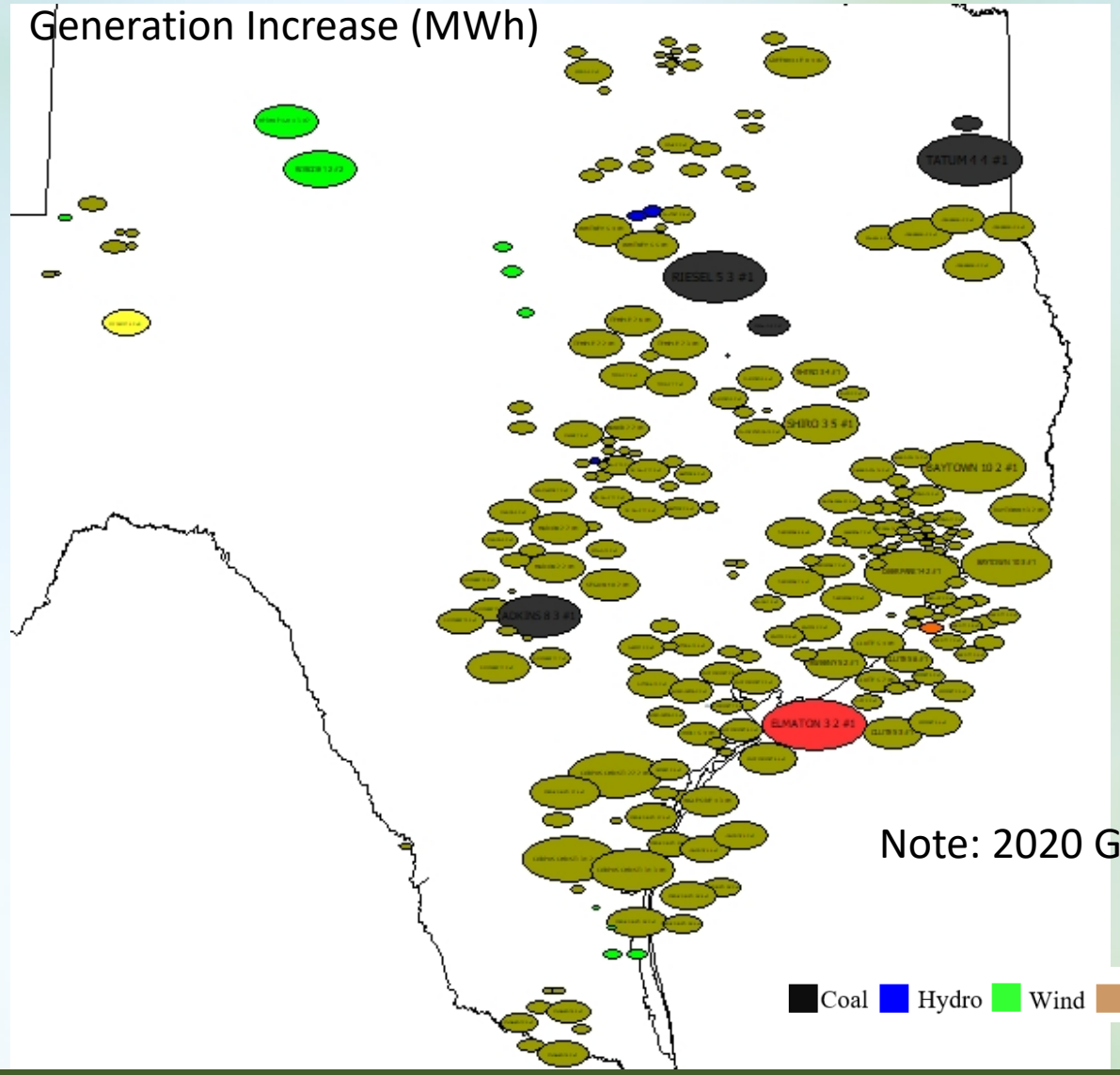
What kind of additional generation is needed to support EV adoption?

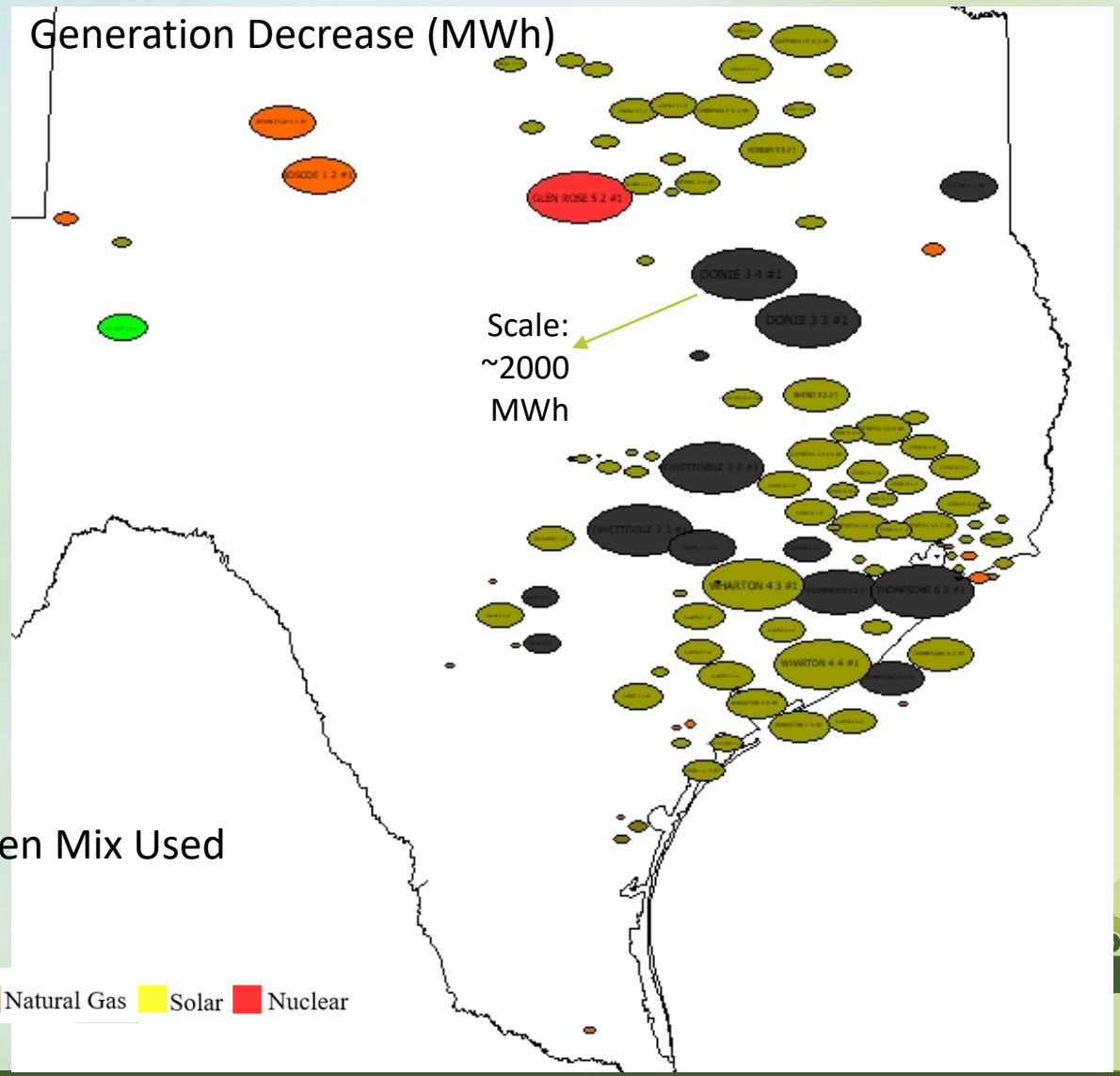
At what point does additional EV use coincide with or outpace availability of renewables to provide the power

If EV power needs outpace renewable power generation capacity, do the additional conventional power generation emissions result in increased exposure to harmful pollutants?

TAMU Smart Grid Center Webinar May 5, 2021. https://smartgridcenter.tamu.edu/index.php/webinars/

What kind of additional generation is needed to support EV adoption?





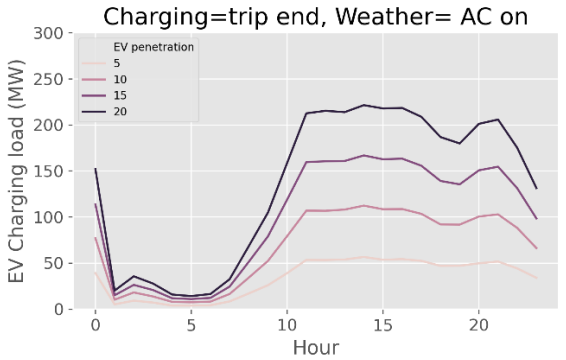
Note: 2020 Gen Mix Used

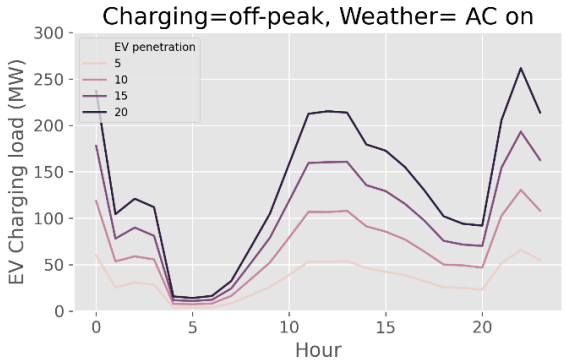
Coal Hydro Wind Natural Gas Solar Nuclear

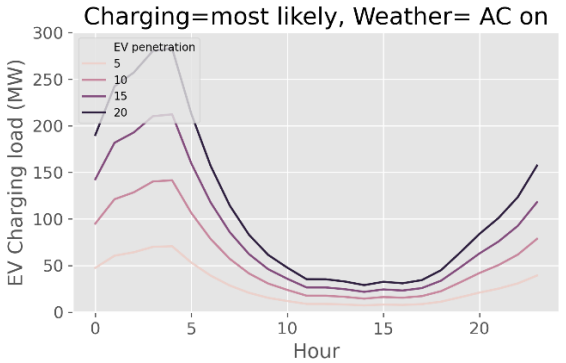
2030 Generator Dispatch – 20% EVs

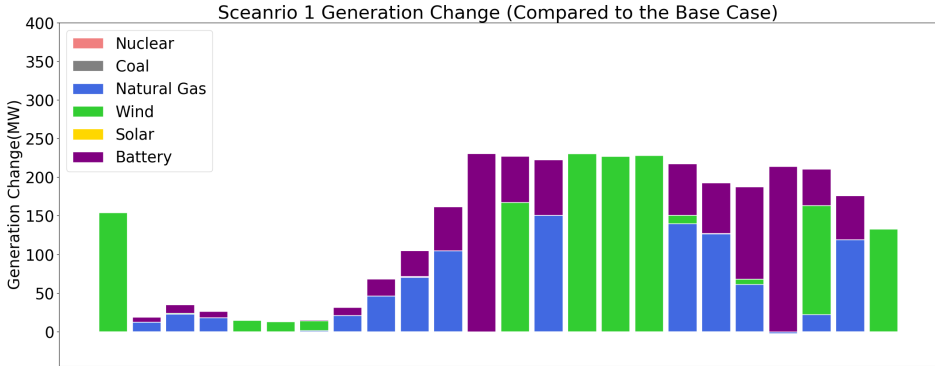
At what point does additional EV use coincide with or outpace availability of renewables

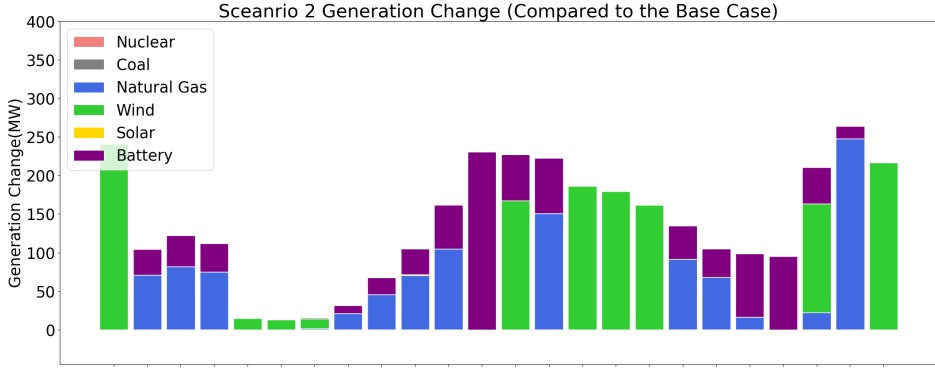
- It depends on how EVs are charged
- Design EV charging rates in lock step with power grid changes

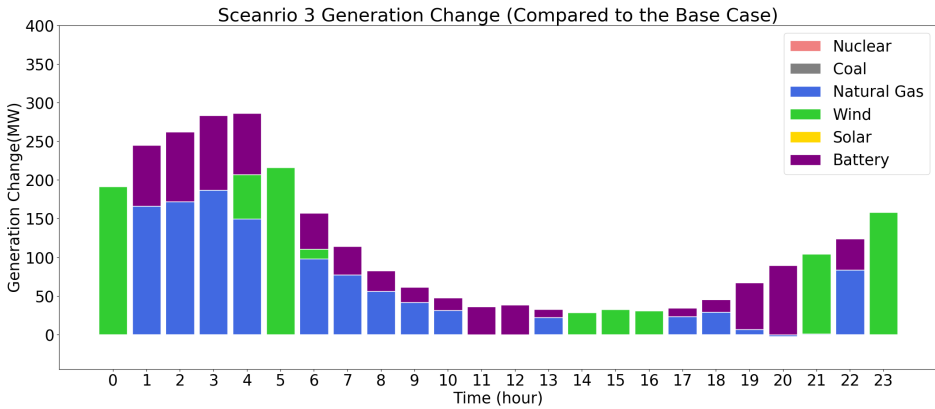








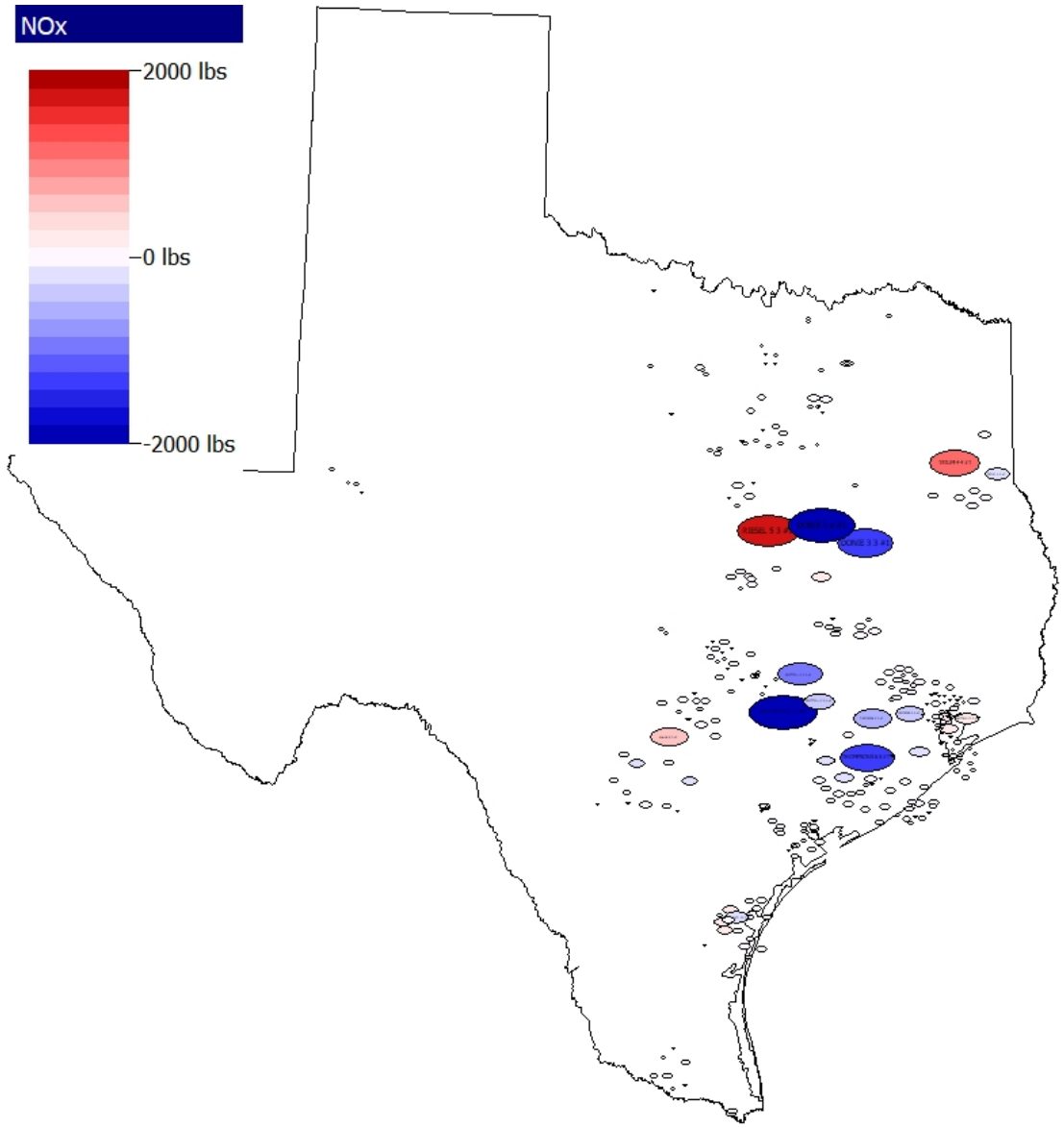




2020 Generation Mix - AUS + HOU 5% EV

If EV power needs outpace renewable power generation capacity, do the additional conventional power generation emissions result in increased exposure to harmful pollutants?

- Overall, the additional charging load does not necessarily lead to additional power generation emissions
- Communities near certain power plants may have higher exposure – don't know yet



Summary

- EVs have zero tailpipe emissions
- EVs reduce brakewear and slightly increase tirewear – these two factors add up to a net reduction
- EV charging does not necessarily increase power generation emissions, even in today's grid (~30% non-carbon)
- Overall, EVs can be *negative*-emission vehicles in ERCOT
- The emissions reductions provide public health benefits: asthma, cancer risk, etc.
  - Less ozone precursor emissions
  - Less exposure to fine particulate matter in dense urban areas

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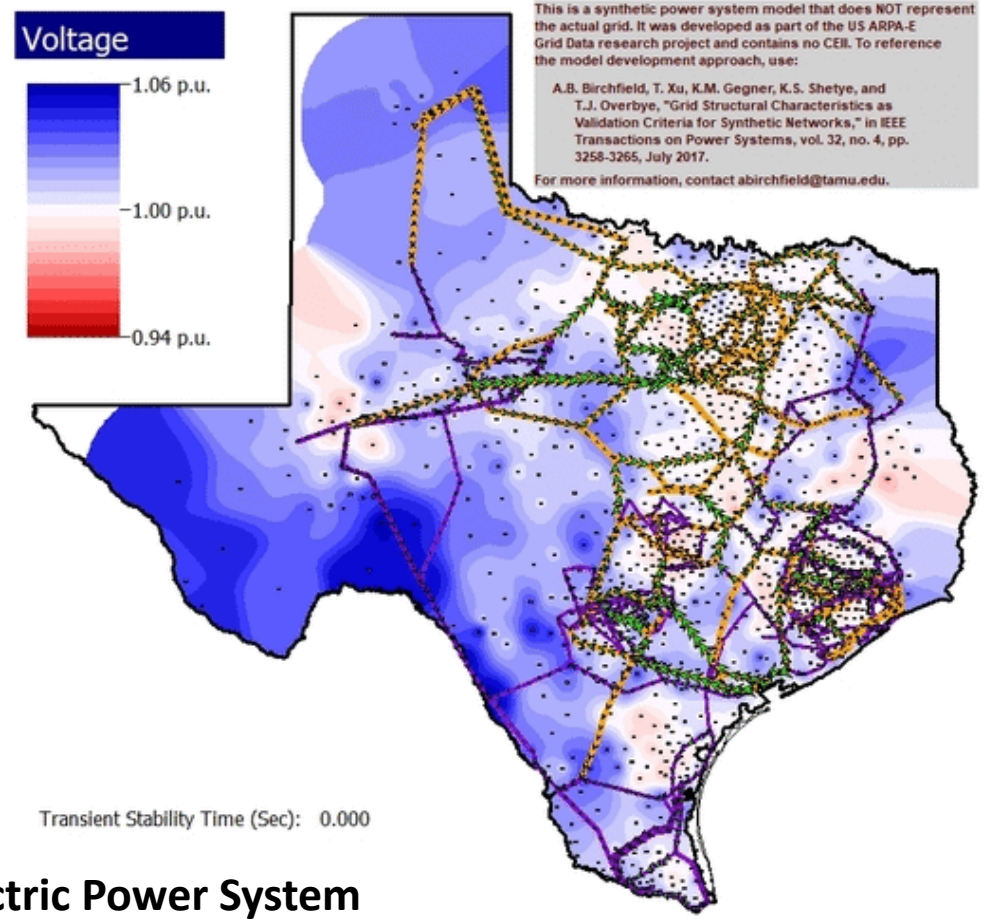
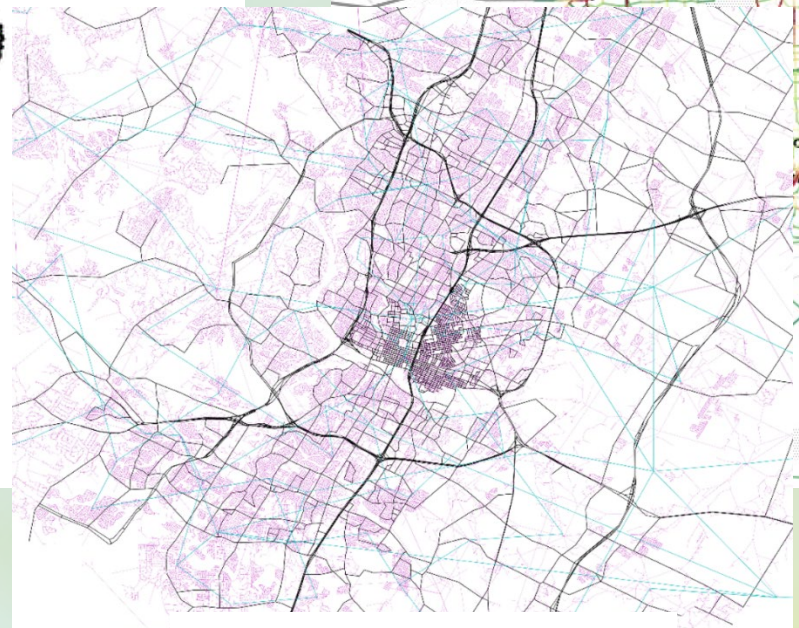
Methodology

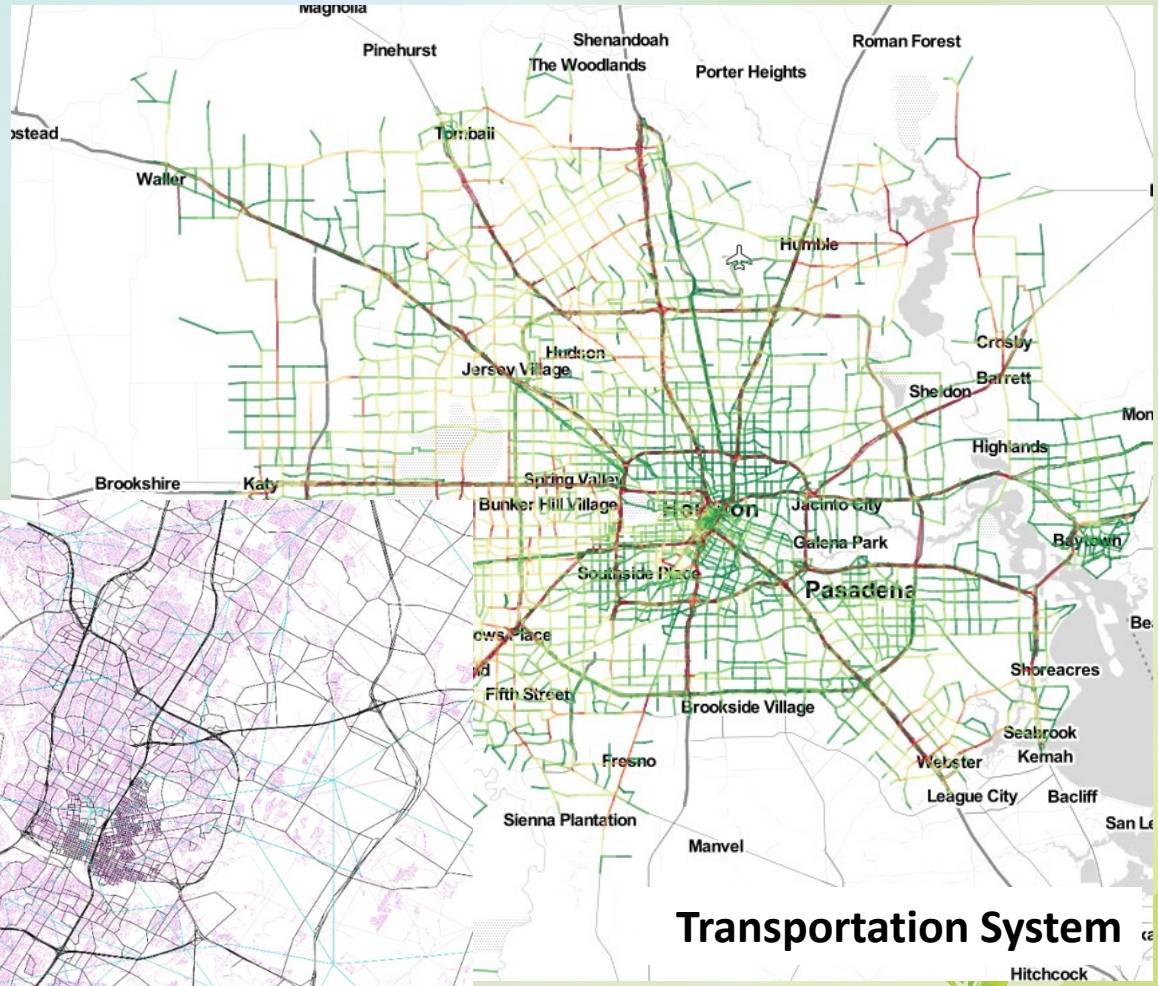
Coupling of Transportation and Power Systems



Electric Power System

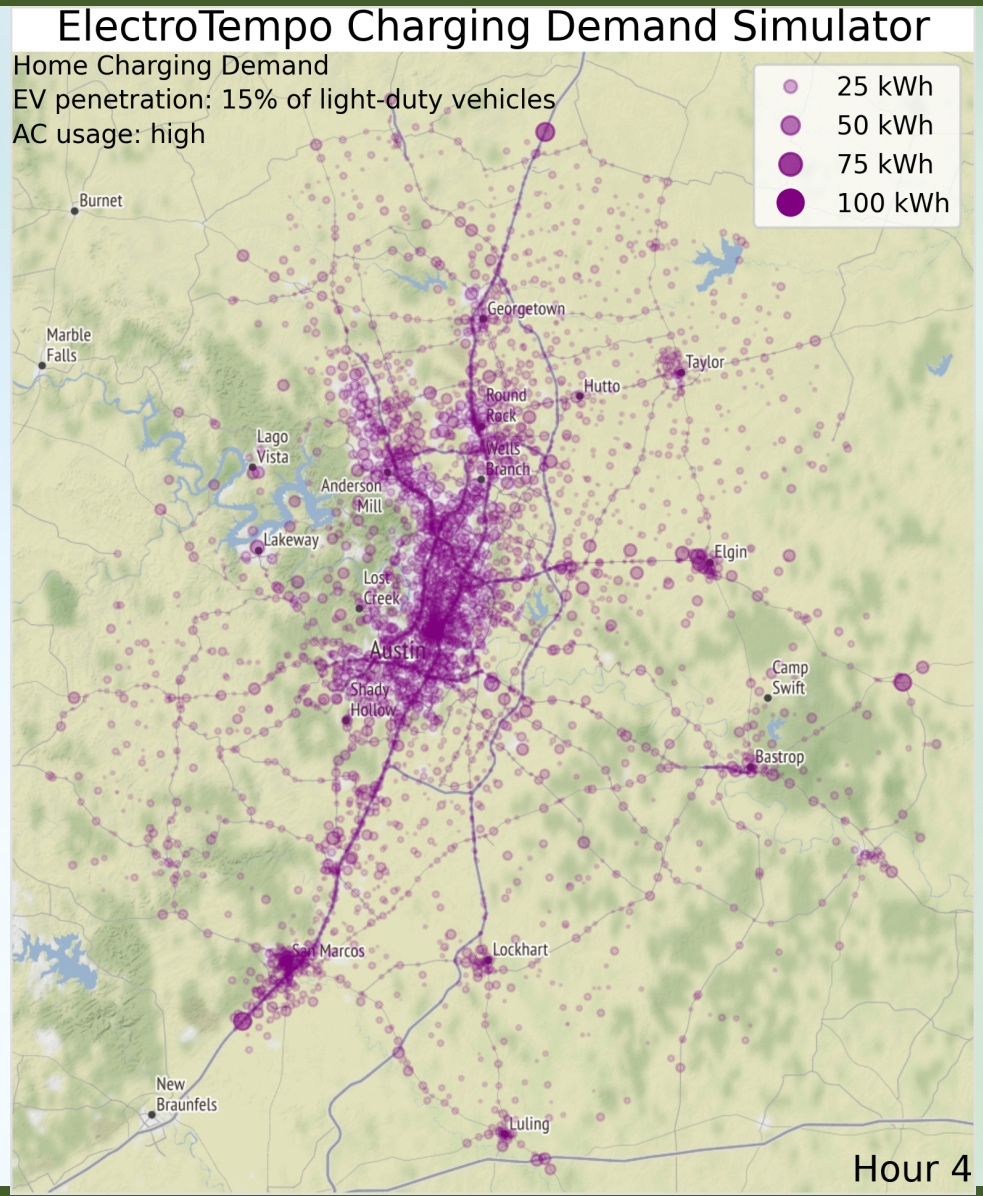


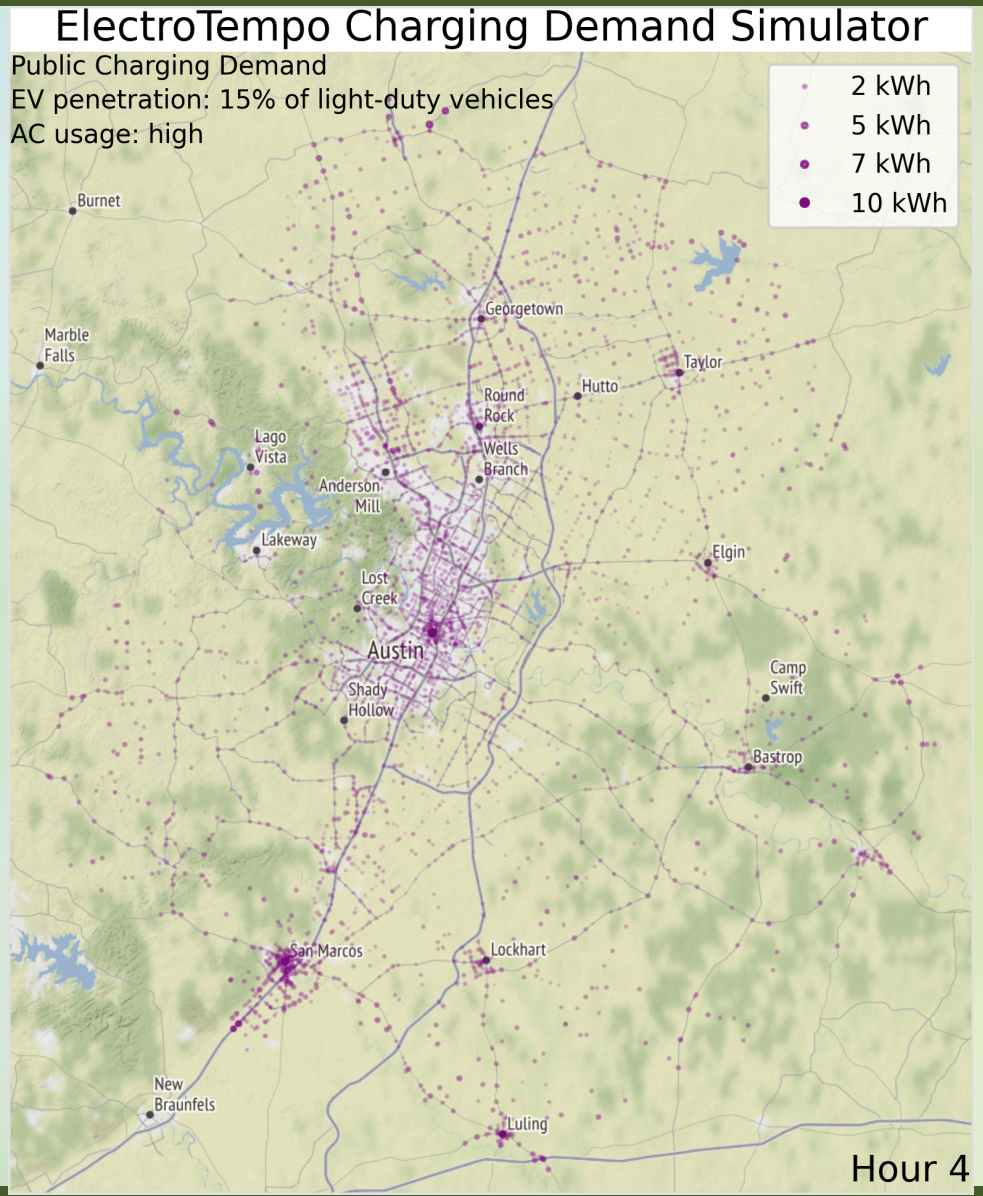
Overlay



Transportation System

Charging Demand Simulation – Austin Example





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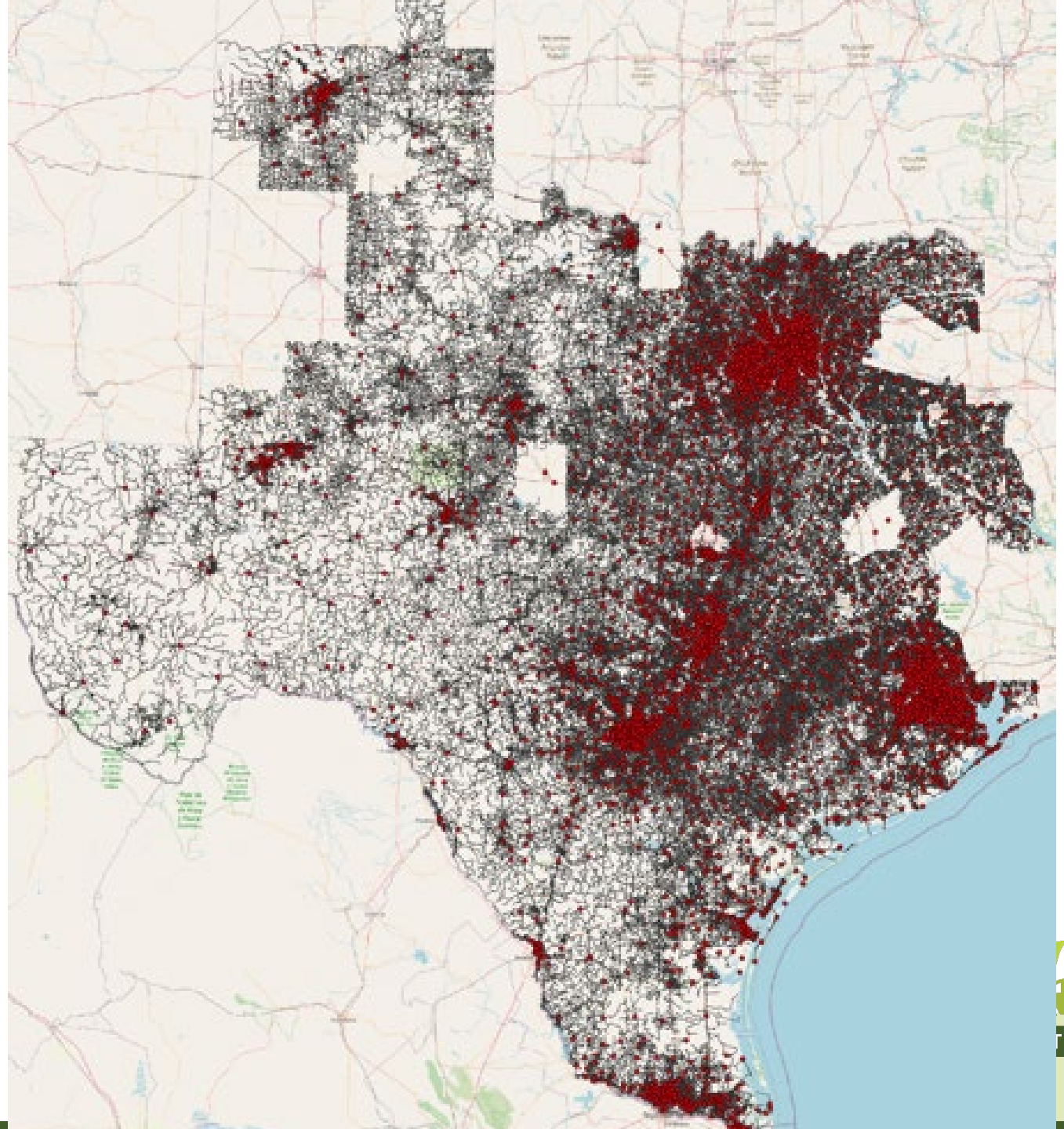
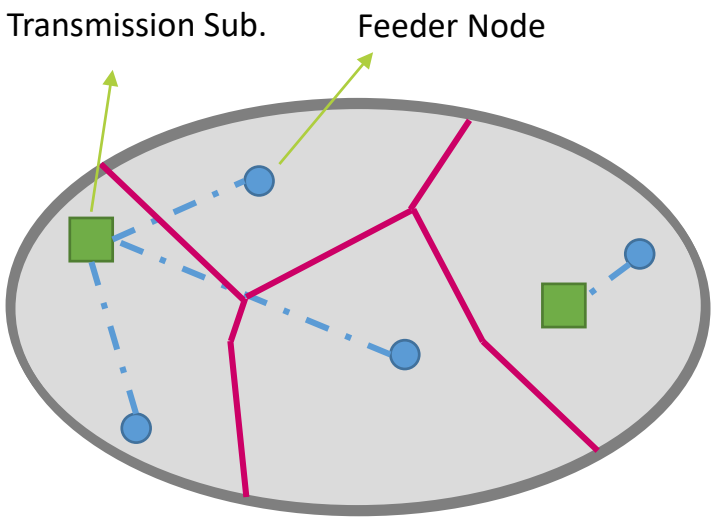
TX 7000 Bus System

- This grid is developed using a 345/138/69 kV grid that will connect distribution substations being developed by NREL and partners on a related, synthetic grids project
  - About 5000 distribution substations
  - We're connecting them to existing generators (using EIA-860 data)
- Loads are based on NREL-provided distribution and transmission loads

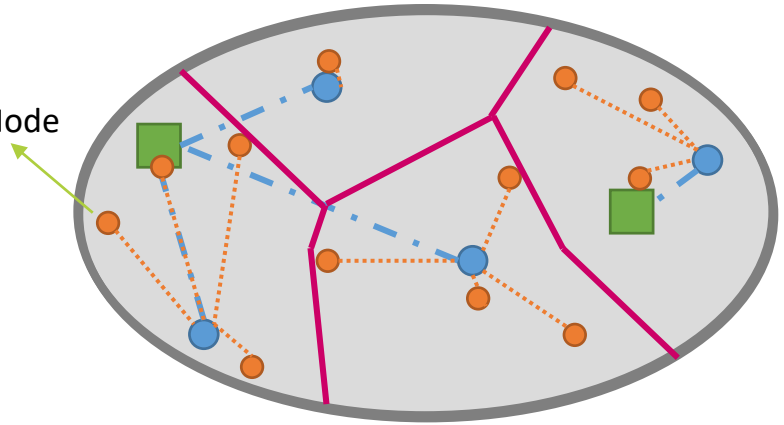
https://electricgrids.engr.tamu.edu/electric-grid-test-cases/datasets-for-arpa-e-perform-program/



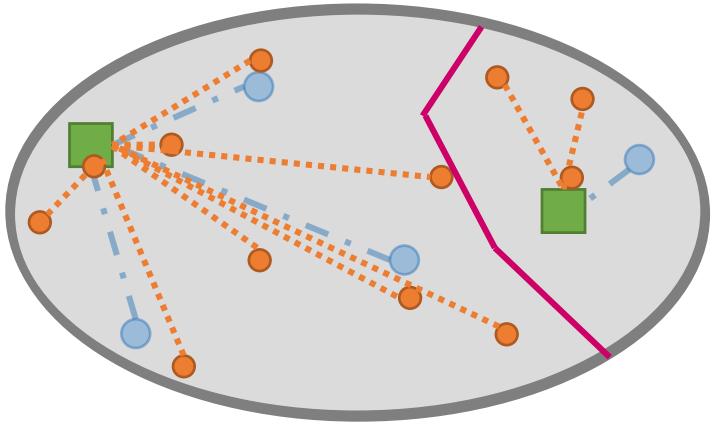
Mapping



1. Establish Distribution-Level Service Areas



2. Assign Transportation Nodes to Distribution Nodes



3. Represent EV Charging Load on Transmission level

17

About Us

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TEES Smart Grid Center

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SMART GRID CENTER
TEXAS A&M ENGINEERING EXPERIMENT STATION

CARTEEH

USDOT University Transportation Center

EV-Related Work in Texas

Region	Vehicle type	Charging demand	Tailpipe emissions	Power generation emissions
Dallas	LDV			
	MHDV	DOE, pending		DOE, pending
Houston	LDV	USDOT, ongoing	USDOT, ongoing	NSF, ongoing
	MHDV	USDOT, on Port Houston, ongoing	Energy Foundation, ongoing	DOE, pending
Austin	LDV	USDOT, completed	USDOT, completed	NSF, DOE, ongoing
	MHDV			

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