Dallas-Fort Worth CLEAN CITIES

GTI ENERGY
solutions that transform

Houston to Los Angeles (H2LA) Hydrogen Project Advisory Committee

Workforce, Training, & Education

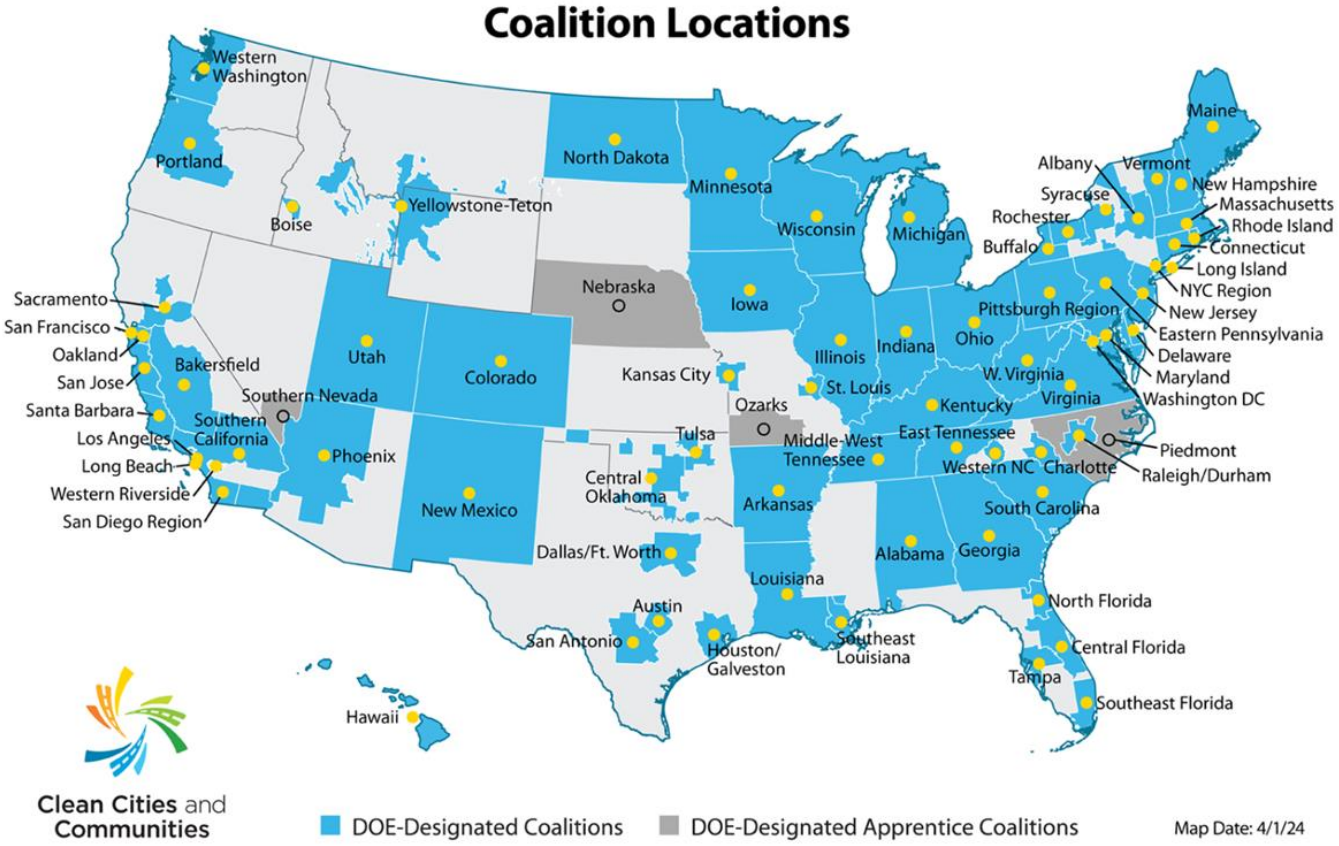
January 10, 2025

Agenda

- Introductions & Recap
- Brief Project Overview
- Workforce Development & Training
- Localizing Benefits: Resources and Action
- Wrap-Up and Next Steps

Clean Cities and Communities

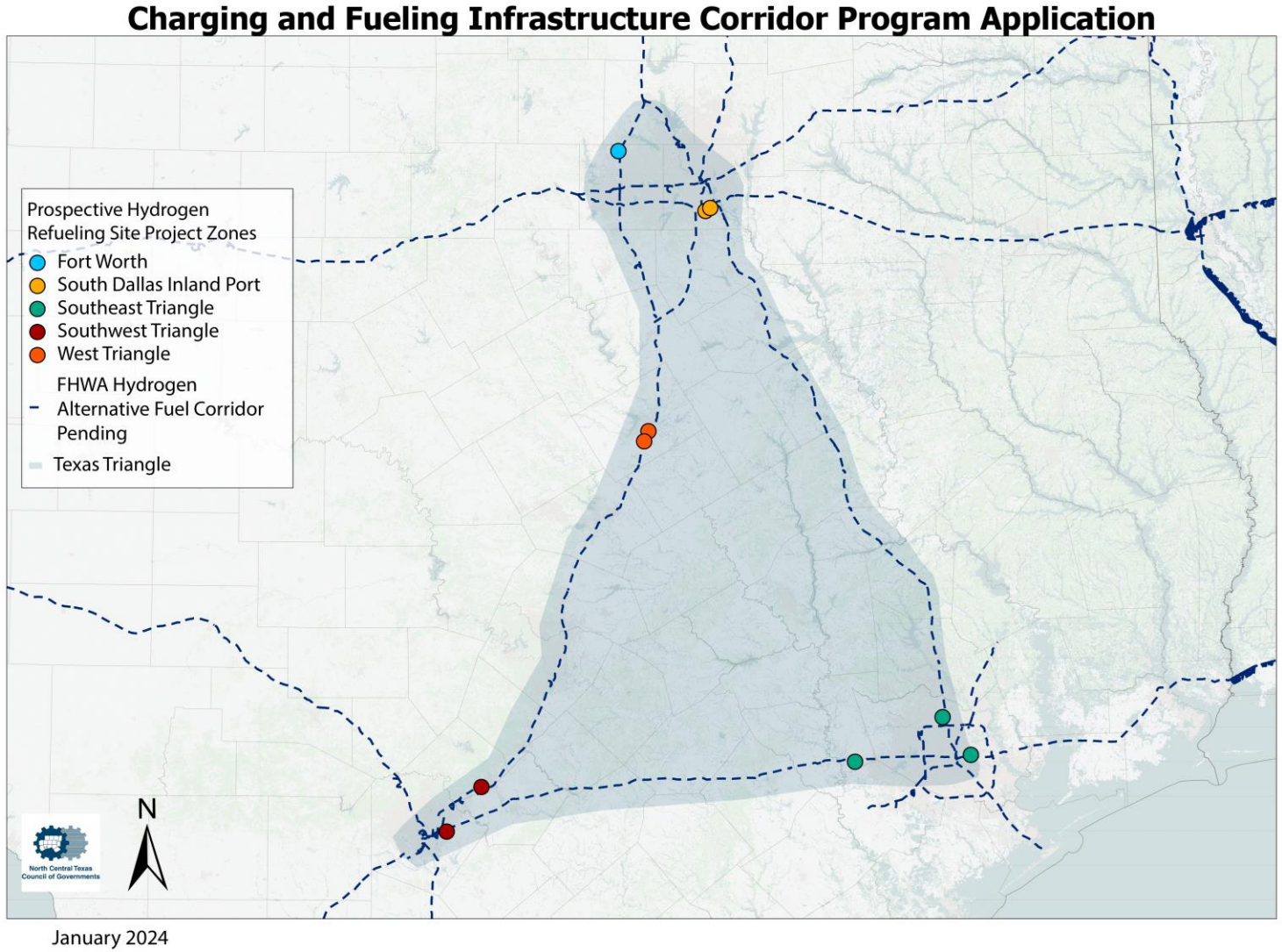
- U.S Department of Energy, Vehicle Technology Office (VTO)
- More than 75 active coalitions
- Goal: Help local decision-makers and fleets understand and implement alternative fuels



Texas Hydrogen and Electric Freight Infrastructure Project (Tx-HEFTI)

Construct up to 5 publicly accessible medium/heavy-duty hydrogen refueling stations

Project Zone	Potential Locations (Existing Truck Stops)
Dallas	City of Dallas
Fort Worth	City of Fort Worth
West Triangle	City of Waco City of Robinson
Southwest Triangle	City of San Antonio City of New Braunfels
Southeast Triangle	City of Brookshire City of Houston



DFWCC Hydrogen Webpages

- New "Hydrogen in North Texas" webpage on the Dallas-Fort Worth Clean Cities website
- General hydrogen information, hydrogen projects, and state/federal funding for hydrogen projects

dfwcleancities.org/hydrogen-in-north-texas

H2LA Project webpage with past meeting materials also now available

Project Overview

Technical Objectives

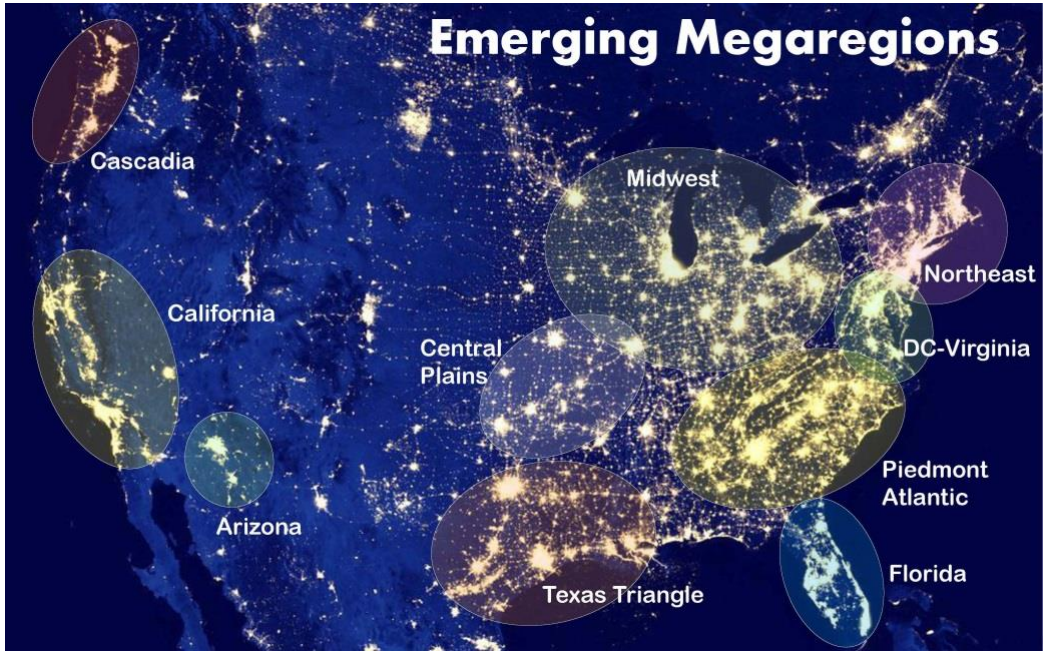
- Build computer models for vehicle fueling infrastructure and operational data
- Establish a hydrogen fueling and heavy-duty freight truck network leveraging this fueling infrastructure in the Texas Triangle and I-10 corridor from Houston to Los Angeles

This material is based upon work supported by the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy (EERE) under the Vehicle Technologies Office (VTO) Fiscal Year 2022 Vehicle Technologies Office Program Wide Funding Opportunity Announcement Award Number DE-EE0010650.

Project Overview

Community Benefits Objectives

- Assess community needs and benefits through Diversity, Equity, Inclusion and Accessibility (DEIA), Energy Equity (EE) and Workforce Implications (WI) effort
- Engage impacted communities to gather input and conduct outreach
- Develop a replicable and catalytic blueprint for other corridors and megaregions
- Disseminate findings to relevant stakeholders
- Q3 2025 completion



Hydrogen Safety – October 2024

- Discussions of infrastructure safety and first responder training
- What we heard:

Communication	Knowledge Base	Environmental Considerations
• Need more opportunities to raise concerns about hydrogen safety • Figuring out first steps in engaging with cities and first responders on hydrogen safety	• Lack of knowledge in the public sector and many private sectors • Ensuring that first responders and Authorities Having Jurisdiction are made aware of the benefits and drawbacks of hydrogen fuel • Colleges are not sure what sort of training is required for their students for hydrogen	• Looking into fire suppression systems • Hydrogen vehicle ability to withstand cold temperatures and extreme weather events

Hydrogen Workforce Development and Training

Hydrogen Workforce:
Trucking

Economic opportunities/challenges/feasibility **for trucking and fleets**

- What are the opportunities and challenges that need to be addressed for successful implementation:
  - Vehicle Maintenance/Technician Training
  - Vehicle Operations/Driver Training

- Are there lessons to be learned from similar fuels/technologies/ industries?

Hydrogen Workforce:
Station Operation

Economic opportunities/challenges/feasibility **for station operation**

- What are the opportunities and challenges that need to be addressed for successful implementation:
  - Station construction
  - Station operations
  - Station maintenance

- Are there lessons to be learned from similar fuels/technologies/industries?

Hydrogen Workforce:
Fuel Production and Supply

Economic opportunities/challenges/feasibility for **H2 production and supply**

- What are workforce and economic considerations for fuel production and supply?
  - Production locally vs trucked in
  - Transport jobs
  - On-site jobs
  - Economic opportunities related to local production?

- Are there lessons to be learned from similar fuels/technologies/industries?

Hydrogen Workforce:
Other Careers

What types of careers are available in the hydrogen sector?

- Civil, electrical, mechanical, chemical engineers
- Instrumentation / electronics technicians
- Industrial equipment mechanics
- Assemblers and fabricators
- Plant / station operators
- Truckers

Table 1. Examples of emerging jobs, salaries, and education and training requirements in the hydrogen and fuel cell industries.

Occupational title	Average salary (2016$)	Minimum educational requirements
Director of hydrogen energy development	$138,000	Bachelor's (Business)
Hydrogen fueling station manager	$56,300	Bachelor's (CE)
Hydrogen/fuel cell R&D director	$129,000	Doctoral
Hydrogen fuel cell system technician	$39,500	HSD/GED/OJT/TS/apprenticeship
Junior hydrogen energy technician	$23,400	HSD/GED/OJT/TS/apprenticeship
Fuel cell engineering intern	$6,800	HSD/GED/OJT/apprenticeship
Fuel cell manufacturing technician	$45,650	Associate's
Fuel cell fabrication and testing technician	$45,800	Associate's
Hydrogen power plant installation, operations, engineering, and management	$69,700	Bachelor's (EE, ME, CE)
Hydrogen energy systems designer	$47,900	Apprenticeship/TS
Fuel cell plant manager	$90,500	Bachelor's (EE, ME)
Hydrogen energy system operations engineer	$68,100	HSD/GED
Hydrogen fueling station designer & project engineer	$74,200	Bachelor's (Engineer)
Hydrogen fuel transporter – trucker	$36,950	OJT
Hydrogen fueling station operator	$29,700	OJT
Hydrogen fuels policy analyst & business sales	$56,200	Bachelor's (Business)
Hydrogen systems program manager	$73,220	Bachelor's (Engineer)
Emissions accounting & reporting consultant	$64,200	Bachelor's (various)
Fuel cell quality control manager	$74,600	Master's (Science/Engineering)
Hydrogen pipeline construction worker	$46,300	HSD/GED/OJT/TS/apprenticeship
Fuel cell designer	$78,200	Master's (Science)
Hydrogen energy engineer	$72,300	Bachelor's (Engineer)
Fuel cell power systems engineer	$76,400	Master's (EE)
Fuel cell fabrication technician	$23,150	HSD/GED/OJT/TS/apprenticeship
Hydrogen systems & retrofit designer	$90,600	Bachelor's
Fuel cell retrofit installer	$41,600	HSD/GED/OJT/TS apprenticeship

Bezdek, Roger. (2019). The hydrogen economy and jobs of the future.
https://www.researchgate.net/publication/330217420_The_hydrogen_economy_and_jobs_of_the_future

Hydrogen Training

What type of training is needed to work with hydrogen directly?

- Most certifications require an understanding of:
  - Hydrogen properties and behavior
  - Safety requirements for working with hydrogen
  - Hydrogen equipment inspection, operation, and maintenance
  - Safety requirements for high pressure gas and cryogenic liquid handling
  - Emergency response and first aid procedures
- Currently, many organizations and companies offer hydrogen safety and workforce training programs
- However, there is a lack of standardization and clarity on which certificates are necessary for which roles in the hydrogen workforce

- Source: (H2Tools)

Localizing Benefits: Resources and Action

Localizing Benefits

Regional Demographics: Collin, Dallas, Denton, Ellis, Hunt, Johnson, Kaufman, Parker, Rockwall, and Wise counties

Employment on nonfarm payrolls and employment by major industry sector, over-the-year changes

Dallas-Fort Worth area employment (number in thousands)	Oct. 2024	Change from Oct. 2023 to Oct. 2024	
		Number	Percent
Total nonfarm	4,352.0	74.8	1.7
Mining, logging, and construction	258.4	8.4	3.4
Manufacturing	316.0	6.4	2.1
Trade, transportation, and utilities	918.3	10.6	1.2
Information	92.4	1.2	1.3
Financial activities	383.0	12.9	3.5
Professional and business services	791.0	2.5	0.3
Education and health services	525.6	14.1	2.8
Leisure and hospitality	430.0	2.5	0.6
Other services	143.8	6.2	4.5
Government	493.5	10.0	2.1

Source: U.S. BLS, Current Employment Statistics.

- Trade, transportation, and utilities make up the largest employment sectors in the region

Hydrogen Training – Local Resources

- Any local resources the group is aware of?

Hydrogen Training – National Resources

Renewable Energy Institute: Hydrogen Energy Consultant Expert Certificate (USA)

- 3 accredited online courses
- Results in certification of hydrogen energy consultant expert
- $1,490 - $2,330

Center for Hydrogen Safety: Fundamental Hydrogen Safety Credential

- 9 safety courses: not accredited but count as CEUs for ICC members
- $490 - $861
- Intended for employees whose work exposes them to hydrogen
- Online course

DNV Joint Industry Project: In-depth hydrogen training and competency program

- Will offer 45 different courses/modules
- Online, in the classroom, and in the field options (in development)

H2EDGE: professional development activities and university instruction

- Free online trainings and development of curricula for universities
- 20 university partnerships, 5 university courses

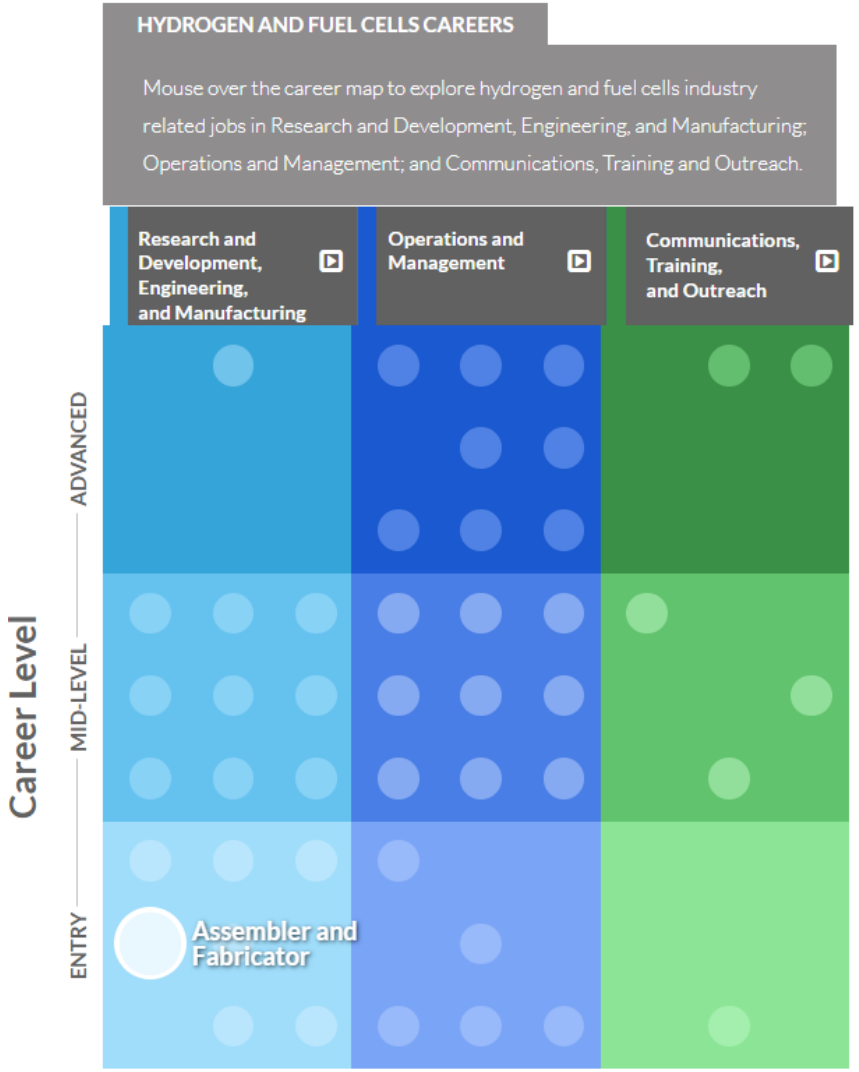
Hydrogen Training – Additional Resources

[Hydrogen and Fuel Cells Career Map]

- Interactive DOE map showing different job opportunities in the hydrogen field at varying expertise levels

[The Hydrogen Economy and Jobs of the Future]

- Literature review of hydrogen economy workforce requirements



Localizing Benefits – Discussion

How can we ensure that hydrogen jobs coming to the region will **benefit the existing workforce**?

What do you see as the **biggest challenge** for developing a strong hydrogen workforce?

What do members of the labor workforce in the Alamo Area need to access jobs in the hydrogen workforce?

What local resources can we leverage to create an equitable energy transition?

What other factors should be considered based on workforce demographics of the Alamo Area to create high-paying jobs in the region?

Localizing Benefits – Discussion

How do we ensure that workforce development is **fair and equitable**?

How do we **make training more accessible** to the labor workforce? What training structures are the most beneficial? (online classes, hands-on training, apprenticeships, etc.)

What other workforce **resources and opportunities, other than local, are needed** to create a thriving hydrogen workforce?

Resources & Routes of Action – Discussion

What are some "wish list" items that NCTCOG and GTI Energy can work toward accomplishing?

Wrap-up and Next Steps

- H2@Scale Site Visit: Late January / Early February
- Next Meeting: April 9, 2-3:30pm
- Next Meeting Topic: Update on Community Identified Priorities and Modeling

Future Meeting Dates and Topics:

Date	Topic
April 9, 2024	Introduction and Overview
July 8, 2024	Community Perspectives and Priorities
October 9, 2024	Public Health and Safety
January 6, 2025	Workforce, Training, and Education
Late Jan / Early Feb	**H2@Scale Site Visit**
April 9, 2025	**Update on Community Identified Priorities and Modeling**
June 27, 2025	Site-Specific Considerations
August 13, 2025	Wrap Up

H2@Scale Site Visit

Most popular date from survey: **Tuesday, February 4, 2025**

Afternoon visit

Contact Us

Lori Clark
Senior Program Manager
& DFWCC Director
lclark@nctcog.org

Jared Wright
Senior Air Quality Planner
jwright@nctcog.org

Maggie Quinn
Air Quality Planner
mquinn@nctcog.org

Dallas-Fort Worth CLEAN CITIES

dfwcleancities.org

@NCTCOGTrans

cleancities@nctcog.org

linkedin.com/showcase/dfwcleancities/