

Interstate Highway 45 ZEV Corridor: Infrastructure Development

Agenda:

1. Welcome/Housekeeping
2. Review of Subgroup Role/Objectives
3. Holistic Energy Station Ideation (H2 & EV)
4. Discussion and Closing Remarks

October 13, 2020

11:00 am – 12:00 pm

Next Meeting: November 10, 2020 at 11:00 AM

Call-In Information: 1-346-248-7999

Meeting ID: 865 8955 3421

Please mute yourself when you are not speaking

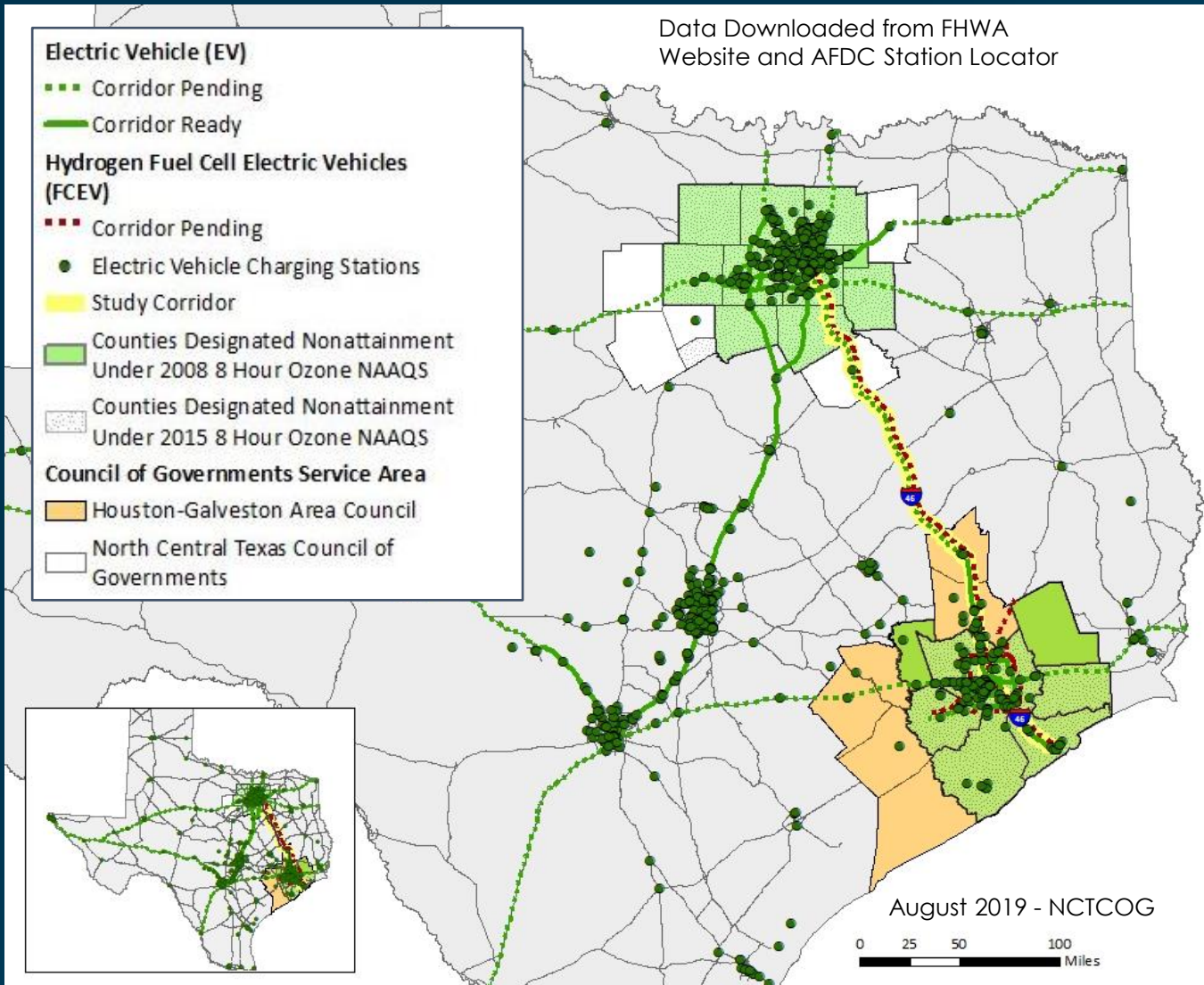


Dallas-Fort Worth
CLEAN CITIES



North Central Texas
Council of Governments

IH-45 ZEV Corridor Subgroups



Infrastructure Development:

- Solicit Infrastructure Needs and Criteria
- Identify and Contact Property Owners

Customer Identification:

- Identify Best Technologies Suitable for Vocational Needs
- Evaluate Commercialization Status of Suitable Vehicles

Vehicle Availability:

- Identify and Engage End-User Fleets
- Match User Needs to Vehicle Availability

Policy/Incentives:

- Identify and Prioritize Non-Monetary Policies/Incentives
- Assess Existing and Needed Monetary Incentives

What we Have Now/Work in Progress

Existing DC Fast Charge BEV Infrastructure (Electrify America)

Truck Volumes Along Corridor (current and forecasted growth)

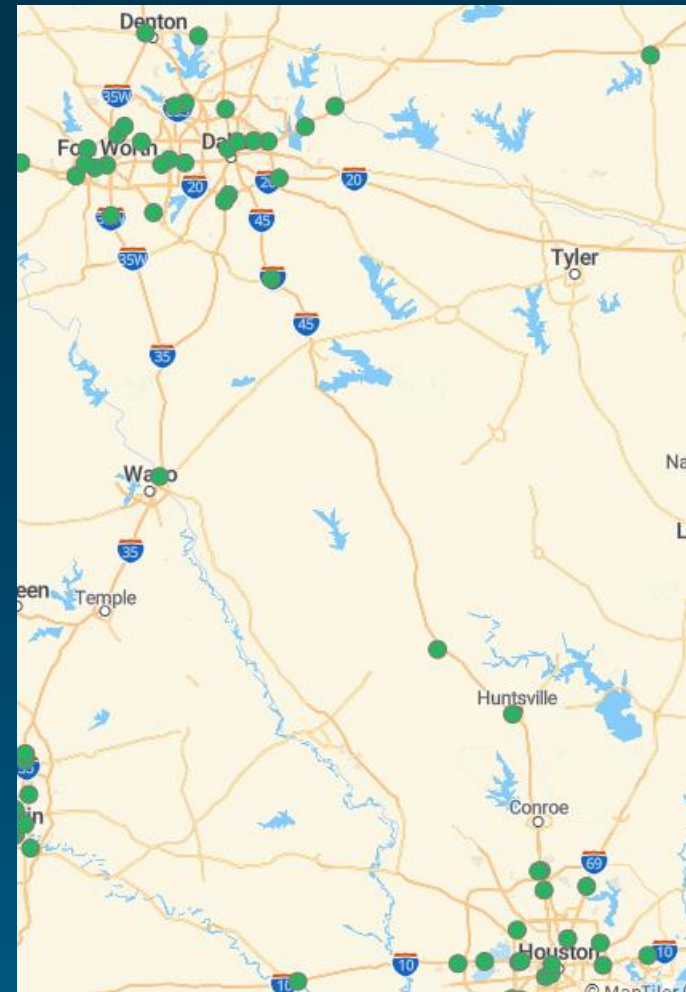
Origin/Destination Data (possibly)

Potential Fuel Volumes Needed (calculated from truck volume and origin/destination fraction)

Total Truck Volume -> Trucks Suitable for BEV or FCEV
Transition based on Weight Class/Type and Origin/Destination

Suitable Trucks -> Fuel Consumption

Need: Port-Specific Information?





Zero-Emission Transportation Fueling

Reducing pollution in an economically
beneficially manner creates long-term
sustainable business advantage

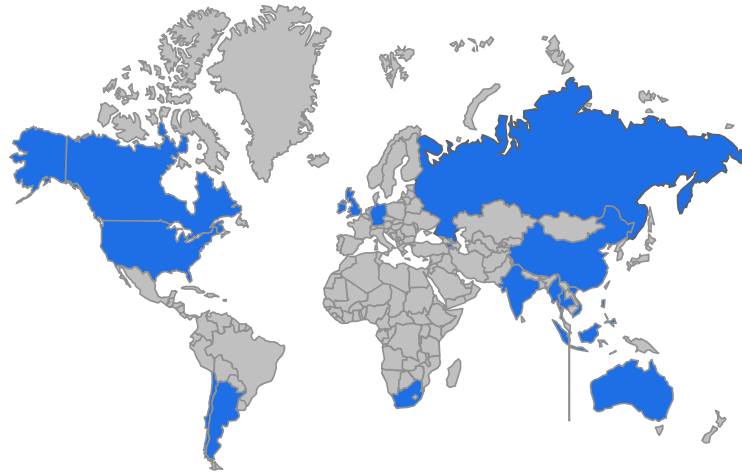
Keith Dickerson, Black & Veatch
October 2020



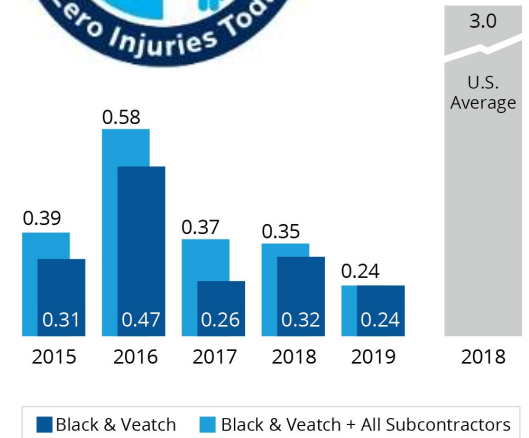
About Black & Veatch



CEO **ACT!ON** FOR
DIVERSITY & INCLUSION



- 10,000+ professionals
- \$3.7 billion in 2019 revenue
- Work in 100+ countries on six continents
- Consistently high industry rankings in Power, Telecom, Water and more



Everybody returns home safely each day

Black & Veatch: Decarbonizing Transportation

Renewable Energy



Battery Energy Storage



Hydrogen Refueling

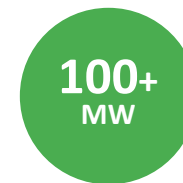


High-Powered Charging

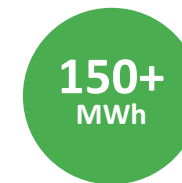
- Strategy, feasibility, planning, design, engineering, permitting & constructing **EV charging and H2 fueling at scale**
- Renewables, energy storage integration and resilient microgrids
- Extensive industry & utility relationships
- **Focus on speed, safety, and quality**



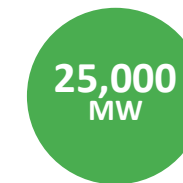
EV Charging Sites Deployed



Transit & Fleet Charging Engaged



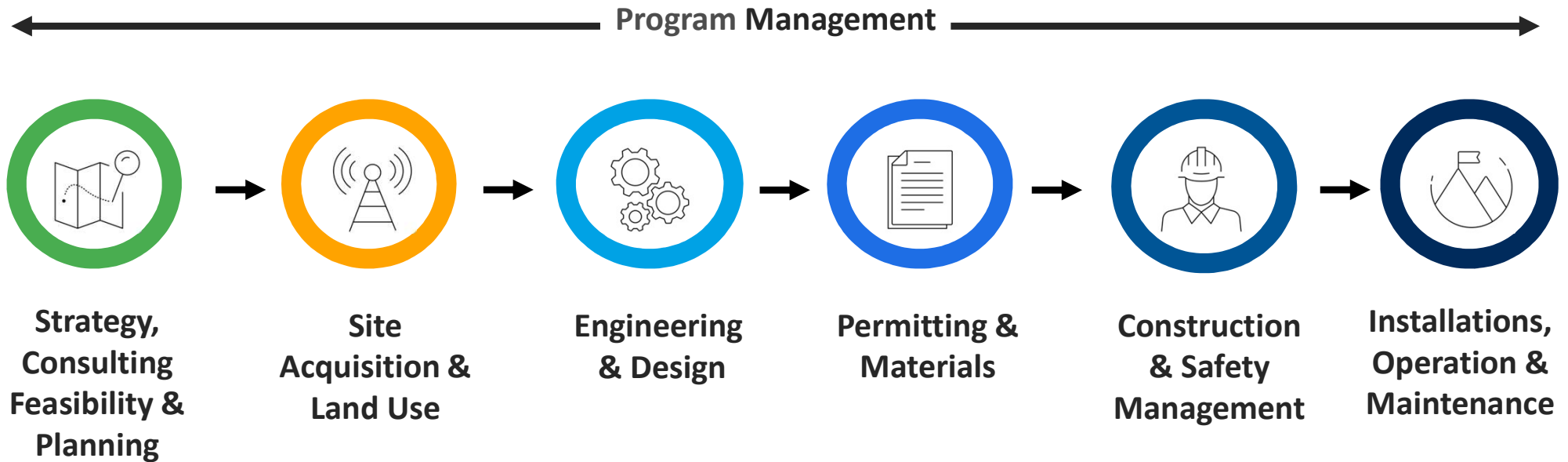
Behind-the-Meter Battery Installations



Solar Capacity Installed

Turnkey Solution for Complete Program Management

Integrated Solution Delivers Speed and Quality



Medium and Heavy-Duty Electric Trucks Are Coming

Truck OEMs are racing to deploy commercially viable electric trucks



The Incumbents: Daimler, Volvo, PACCAR, Navistar

- **Largest truck manufacturers**
- Public commitments to the electric future
- Building first publicly available semi-truck charging center Portland Oregon
- **CharIN Standard up to MW+ Charging under development**

Photo: Daimler Trucks North America: <https://www.daimler.com>



The Challenger: Tesla Semi Truck

- Tesla Semi unveiled Sept 2017
- Expected 2019 but delayed until 2021
- 2,000+ estimated orders including Pepsi, Walmart, Anheuser-Busch, UPS, FedEx and others
- **300 and 500+ mile range models with up to 1MWh battery**
- **CharIN Standard up to MW+ Charging**

Photo: Paul Stith / Sacramento March 2019
Source: <https://www.trucks.com/2019/09/05/everything-we-know-about-the-tesla-semi-truck/>



The Upstart: Nikola H2 & BEV

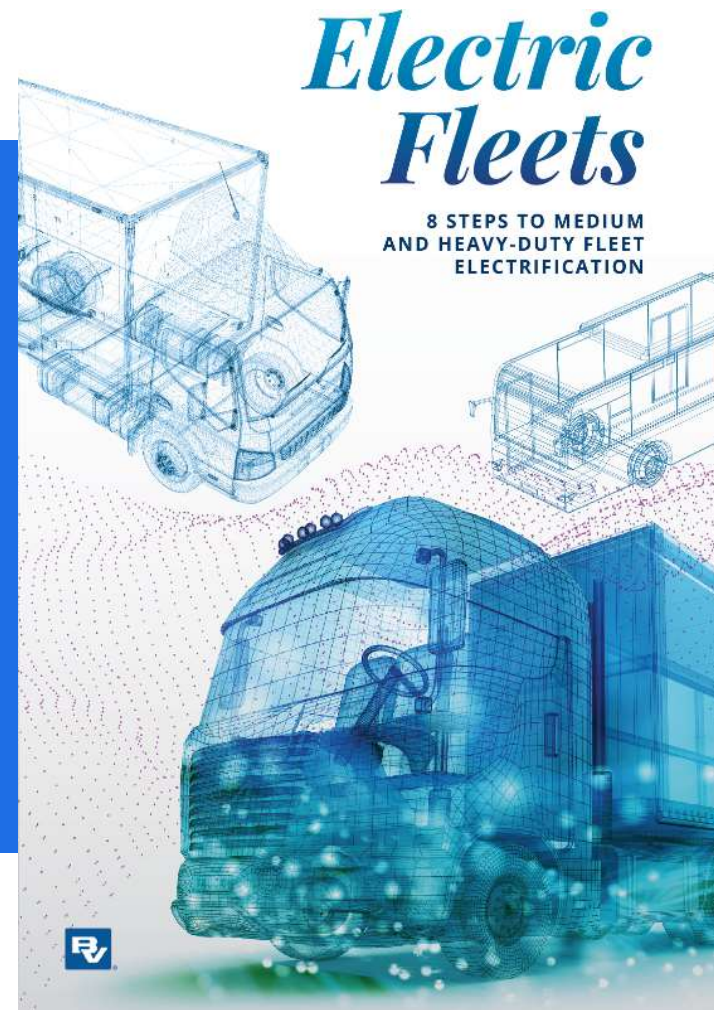
- Unveiled April 2019
- Anheuser-Busch ordered 700 H2
- National Service Agreement with Ryder Trucks
- **700 Mega Fueling Stations with H2 and EV Charging (18MW Peak Load) starting with 10 California sites**
- Publicly Traded Stock 2020 NKLA

Photo: Paul Stith - Nikola World 2019

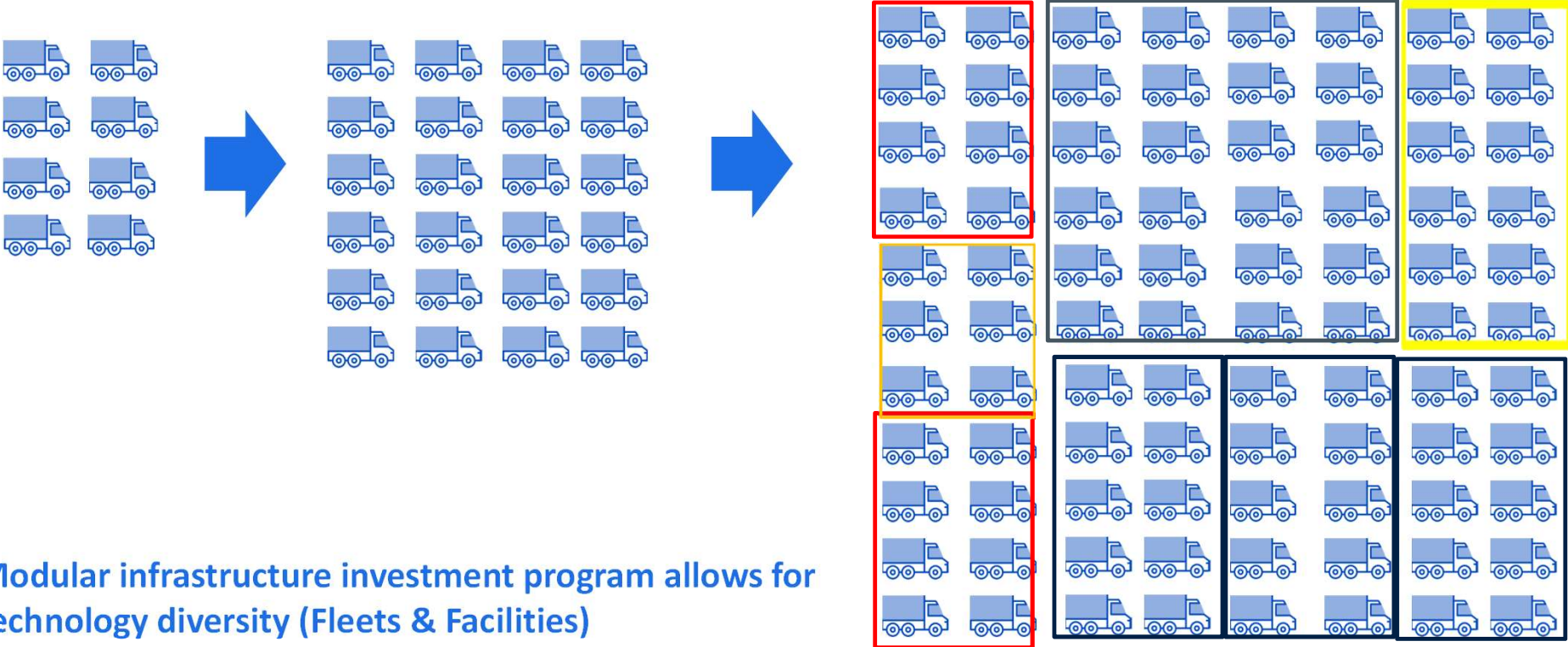
8 Steps To Fleet Electrification

1. Define Drive Cycles, Duty Cycles and Operational Considerations
2. Review and Select Technology Options
3. Understand Charging Loads and Power Delivery
4. Site Planning
5. Conduct Utility Coordination, Engineering and Design
6. Apply for Permit and Approvals
7. Distribution Grid Upgrades
8. Obtain Equipment, Construct and Commission

Download the eBook: bv.com/ElectricFleets



Pilot While Planning for Scale and Resiliency



Modular infrastructure investment program allows for technology diversity (Fleets & Facilities)

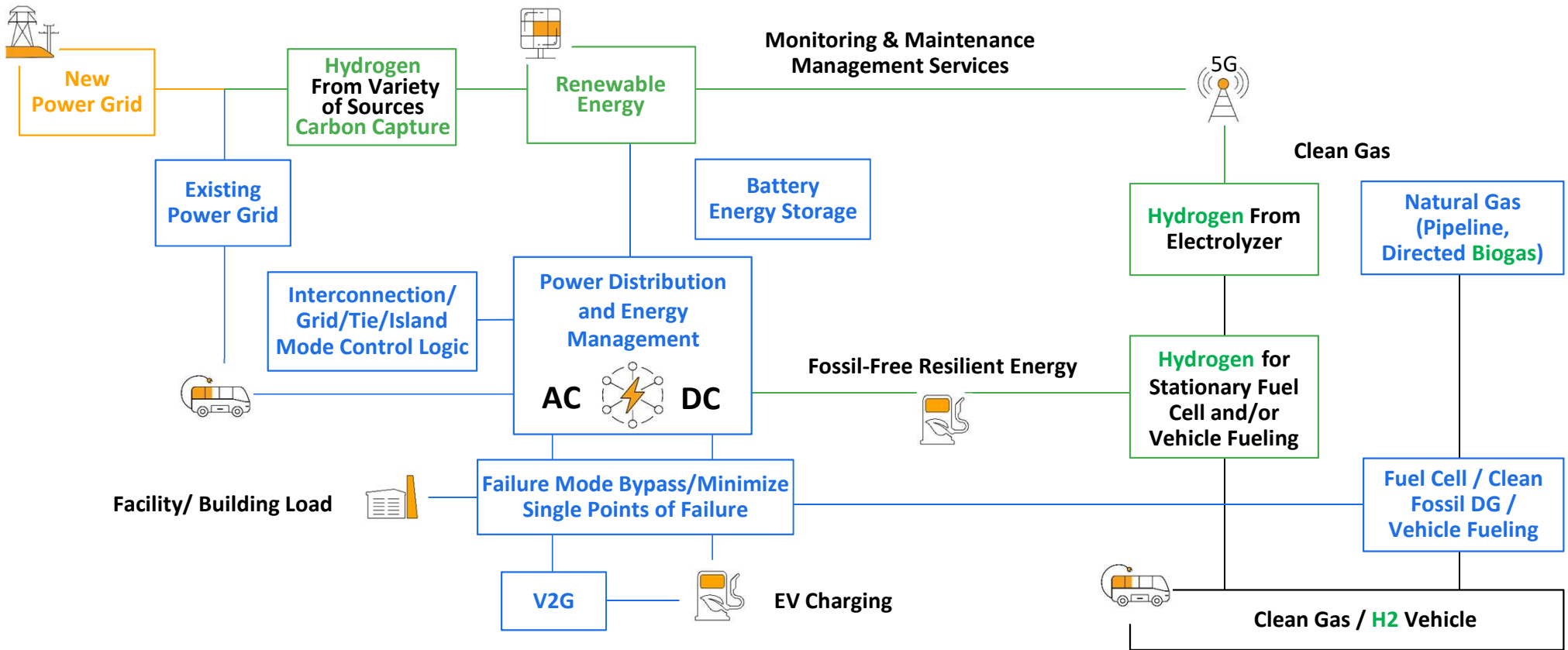


Energy Station Hub Concept

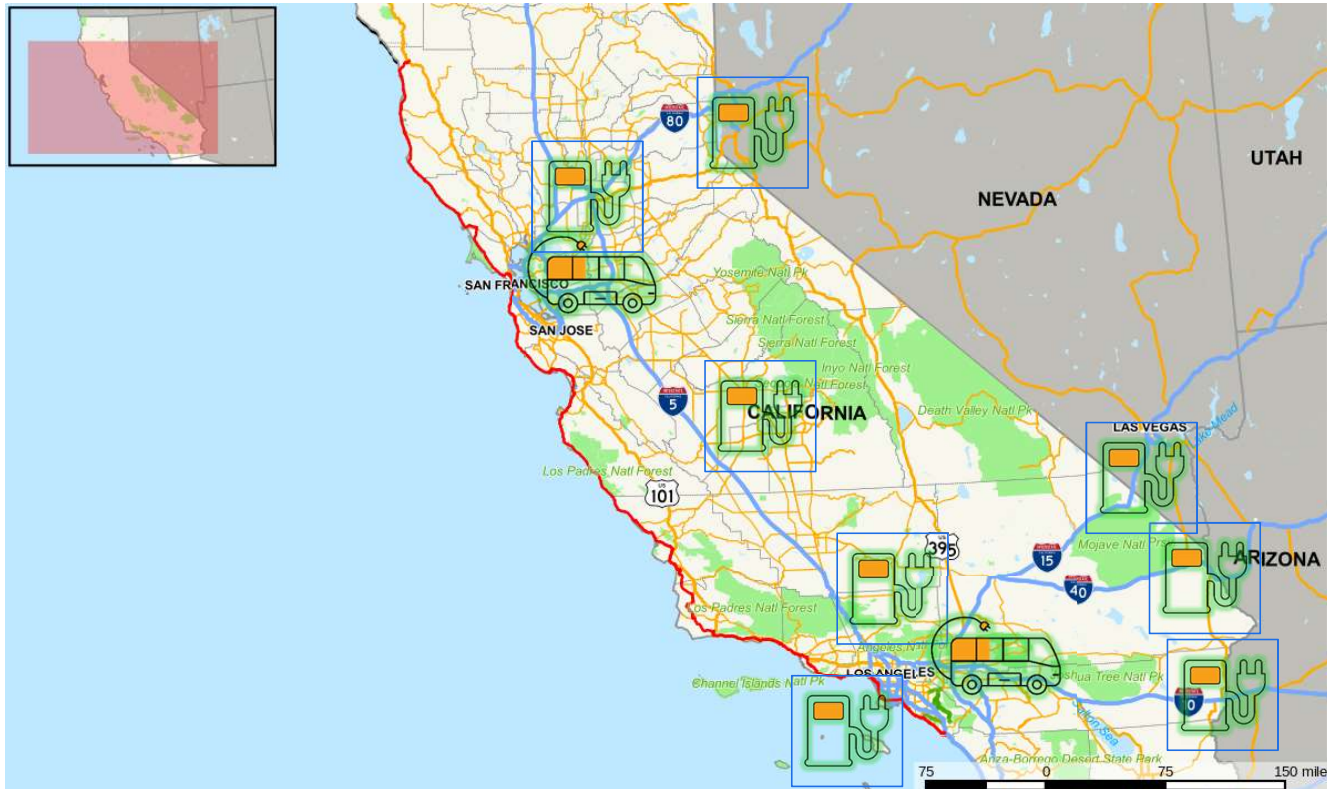
- Clean, Resilient, Sustainable, Scalable, Cost Effective
Locally Generated Power & Energy for Multiple Use Cases
- Potential Subscription-Based / Colocation Business Model
for Zero Emission Vehicle Fueling, Energy-As-A-Service
- EV Charging Network and Energy Management System
Integration = Cost Efficient Operation
- Value Stack Hydrogen Generation, Clean Fossil
Transportation Fueling, EV Charging, and Facility Power
- Utilize existing electrical grid and/or new power to
achieve diverse cost efficient highly available energy
source

Advanced Energy Station Hub Multi-Fuel Concept

Provide clean, resilient energy in a cost efficient manner



Example: Zero-Emission Fleet Fueling Strategy





Contact Us

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INFRASTRUCTURE DEVELOPMENT

Infrastructure Assumptions

Federal Highway Administration designation intervals are appropriate.

Hydrogen: 100 miles between stations, Within 5 Miles

Electric: 50 miles between stations, Within 5 Miles

Plan should focus on build-out of facilities to support medium/heavy-duty vehicles.

Critical Minimum on Light-Duty BEV in Place

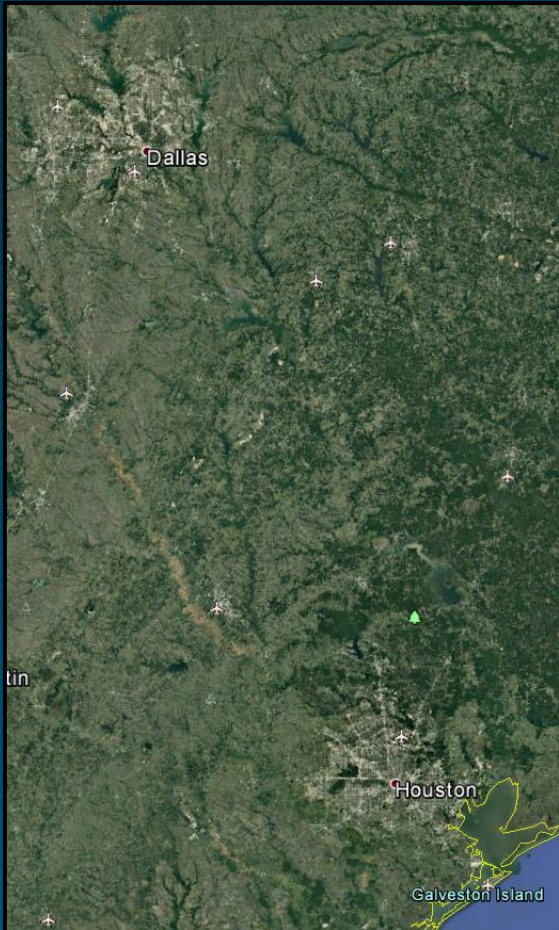
FCEV Adoption Expected First in MD/HD Sectors

Hydrogen facilities and FCEV connectors are universally compatible.

Building consistency in heavy-duty EVSE connector types is key to successful infrastructure build-out.

Discussion:

Infrastructure Cost



What are the driving cost factors?

- Land
- Installation
- Hardware/Equipment
- Utility Needs

What information do we need from the utility perspective?

What is the critical minimum of trucks needed to support a station? (or, minimum fuel throughput?)

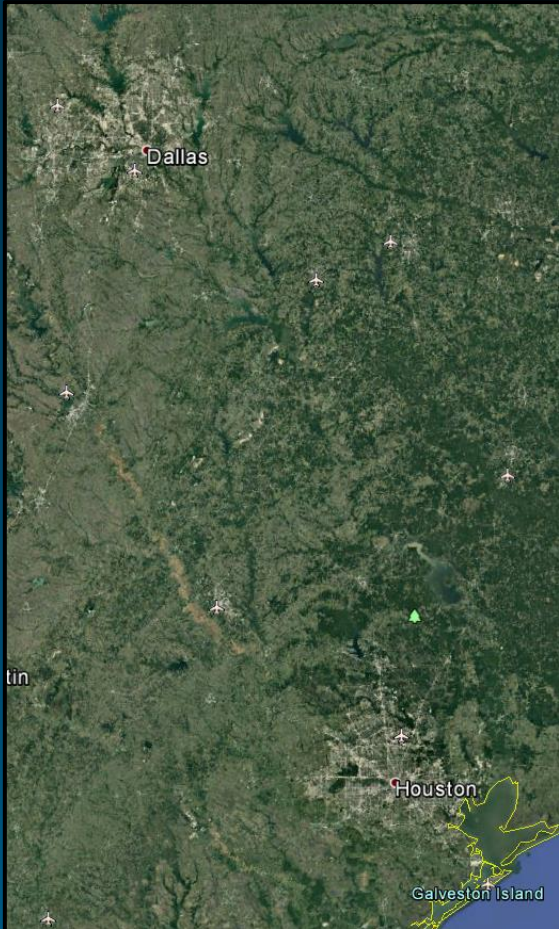
What is the critical minimum of stations needed to support the corridor?

- Approximately 250 miles downtown to downtown
- Proposal for HD EVSE: 5 or 6
- Proposal for Hydrogen: 2 or 3

When should stations be deployed to best support both short-term pilots and long-term refueling?

Discussion:

Ideal Siting/ Location Selection



What are the most critical factors in a location for a driver to stop to charge?

Location
Amenities

Are there special autonomous truck considerations that are impactful?

Should we focus on co-locating EVSE and hydrogen refueling with existing sites (truck stops)?

If a greenfield site, how much space is needed?

For greenfields, where can we get property ownership data?

Counties
TxDOT

Who is the best strategist here?

ZEV Incentives



Volkswagen Environmental Mitigation Program Level 2 Charging Infrastructure

Funds: Up to \$2,500, Not to exceed 70% Funding per Activity

Deadline: First-Come, First-Served Until August 11, 2021

Texas Light-Duty Motor Vehicle Purchase or Lease Incentive Program

Funds: Up to \$2,500 for Electric or Hydrogen

Deadline: First-Come, First Served Until January 7, 2021 or Until all Funds are Awarded

North Texas Emissions Reduction Project

Funds: Up to 45% Funding to Replace Diesel Trucks with Electric Trucks

**Includes charging pedestal and installation cost, one per purchased vehicle*

Deadline: January 8, 2021

For a full list of available funding opportunities, visit www.nctcog.org/aqfunding

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www.dfwcleancities.org/altfuelcorridors

www.nctcog.org/IH45-ZEV

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