SOLID WASTE SUMMIT

Thursday, March 13, 2025

1:00 p.m. - 4:00 p.m. ET
12:00 p.m. - 3:00 p.m. CT
11:00 a.m. – 2:00 p.m. MT
10:00 a.m. - 1:00 p.m. PT

This program is sponsored by the APWA Solid Waste Management Committee in collaboration with the Fleet Management Committee and the Emergency Management Committee.

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- A link to the program evaluation will be emailed to you after today's program.
- To request CEU's - you must correctly answer 80% of the questions.

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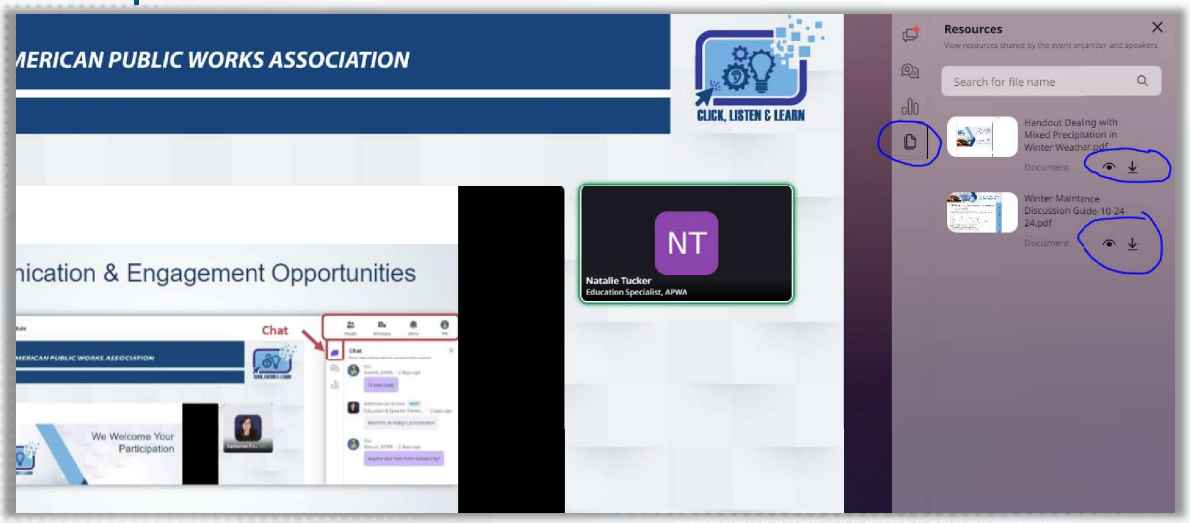
For more information go online to www.apwa.net/resources.

Handouts for Today's Program can be downloaded from the right-hand chat panel



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We Welcome Your Participation

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Viewing the Presentation

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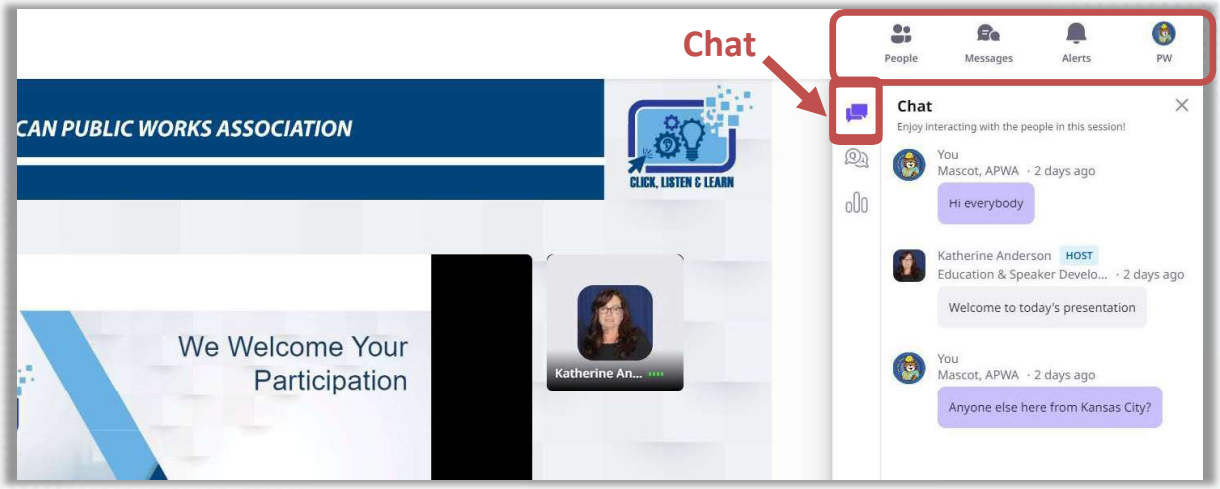
Communication & Engagement Opportunities



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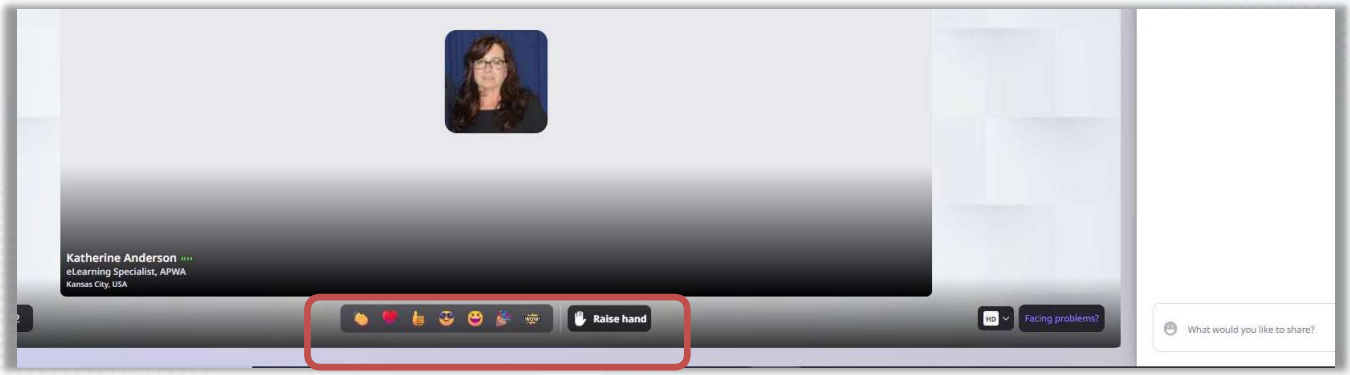
Reactions



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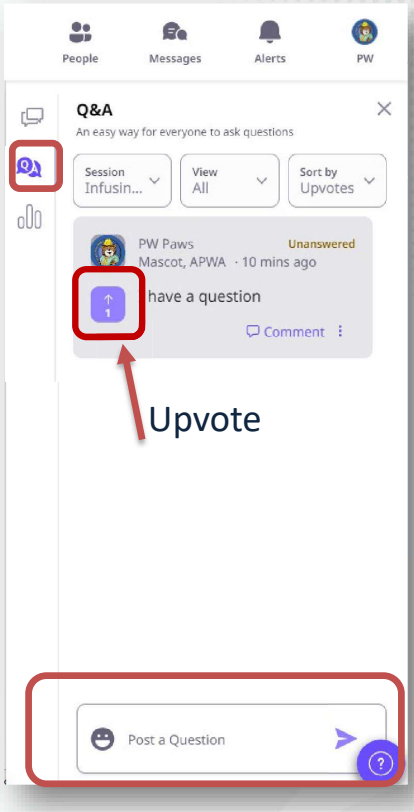
Program Questions

1. If you have questions for our speakers, you may ask them using the Q&A feature.

2. Choose to Upvote a questions that is the same as your question.



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Get Involved with APWA

Solid Waste Management

Fleet Management

Nominations to join an APWA knowledge team and subcommittees are considered year-round. Please email education@apwa.org if you are interested.

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Today's Moderator

Samantha Yager

Solid Waste Superintendent

City of Columbia, SC

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Fleet Health and Maintenance Best Practices

William Klous
Director of Fleet Operations
City of Stamford, CT

Vincent Olsen
Interim Director
City of Dallas, TX

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Transitioning to Alternative Fuels

Paul Sandsted
Director of Technology and Sustainability
The Transport Project

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Debris Management in a Changing Climate

Alysen M. Abel, P.E., MPA
City Engineer
City of Spring Hill, Kansas

Philip R. Mann, PE
Special Advisor to the City Manger for Infrastructure and Capital Projects
City of Gainesville, FL

Crystal Stapley
Sustainability Manager
LaBella Associates

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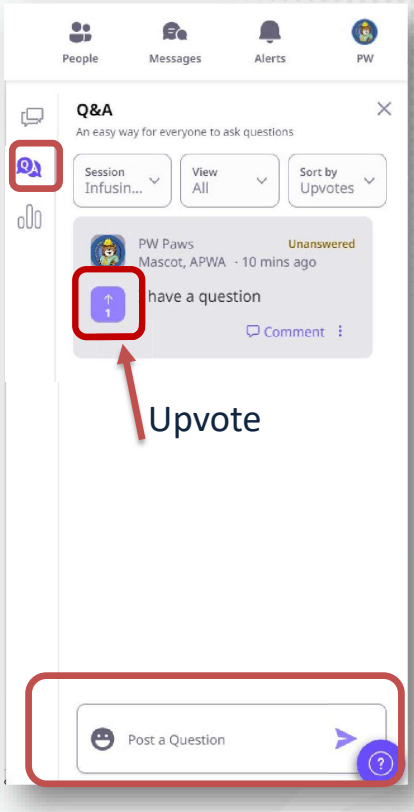

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Please Stay for the Discussion and join us in the Lounge

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Fleet Health and Maintenance Best Practices

William Klous and Vincent Olsen

Learning Objectives

- Implement effective fleet communication protocols
- Learn to conduct through pre- and post- trip inspections.
- Design and execute preventative maintenance plans.

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Fleet Health and Maintenance Best Practices

Today we will discuss and present innovative ways to keep your solid waste fleet on the road and out of the shop. This session will focus on:

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Know the Equipment and it's Working Environment

- Do you distinguish between Recycle, Brush and Collections?
- Are there alleyways or special circumstances that are challenging
- Road capacities vs GVWR
- Get to know your Sanitation Department well
- Understand your political environment

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Implementing an effective fleet communication Protocol

- Know your audience
  - Ops Personnel
    - Fleet Availability
    - Return to Service ?
  - Admin and Budget
    - Impacts of Replacement Cycles
    - Cost per meter

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Implementing an effective fleet communication Protocol

- Types of communication
  - Electronic / Verbal
    - Follow up conversations with a digital records
  - Regular Meetings
    - Assign admin staff to sit in and chronicle these meetings
  - Service Level Agreements
    - Develop meaningful standards rooted in fact

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Pre-trip and Post-trip inspections.

- Why are Pre-trip inspections important?
  - Safety
  - Cost Savings
  - Legal
- Are you doing the pre-trip inspection?
  - If it isn't documented, it didn't happen
- Importance of a post trip inspections
  - You may be exempt from certain rules but, not from liability
  - What are your rules vs *The Rules* for record retention?
  - FMCSA 396.11
    https://csa.fmcsa.dot.gov/SafetyPlanner/MyFiles/SubSections.aspx?ch=22&sec=65&sub=148

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Preventative Maintenance Plans

PM Program, Solve the Matrix to Reduce Downtime and Waste Generation

- Systems Built Services
  - Hydraulics
  - Engine
  - Transmission
  - Fire Suppression
  - Emissions
  - TSB and Recalls

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Predictive Maintenance

- Scheduled Downtime
  - Body Rebuilds
  - Engine Overhaul
  - Transmission Overhaul
- Cost Savings
- Budget Control
- Customer Satisfaction
- Business Decisions
- Perfect Information *(Almost)*

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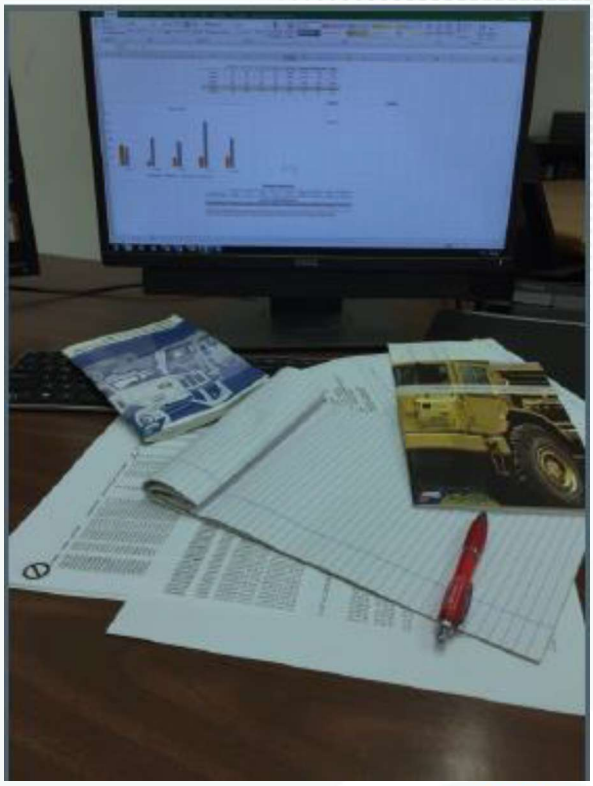
Gather The Data and Analyze

- Define *Effective in a Service Level Agreement*
  - Customer Satisfaction
  - Availability
  - Reliability
  - Sustainability
  - Emergency Response



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Gather The Data and Analyze

- Efficiency is essential but….
  - Efficient performance at an ineffective outcome is counterproductive
  - Find your peak performance and trim back into efficiencies
  - Compromises in quality are often short-term and have long term adverse effects

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Questions

Vincent Olsen
Interim Director
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Transitioning Your Fleet to Alternative Fuels

Paul Sandsted

Director of Technology and Sustainability

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Learning Objectives

- Understand the Steps for Transitioning to an Alternative Fuels Fleet
- Evaluate the Financial and Operational Impacts of Alternative Fuels
- Develop a Transition Plan for Alternative Fuels

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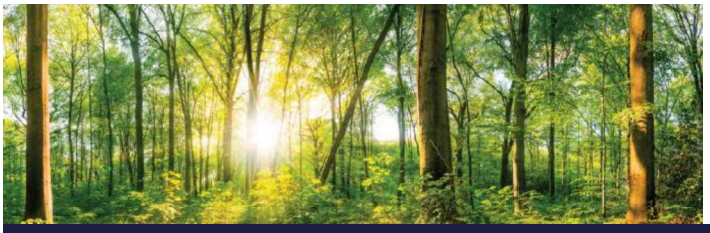
About us...

THE TRANSPORT PROJECT

The Transport Project is a national coalition of roughly 200 fleets, vehicle and engine manufacturers and dealers, servicers and suppliers, and fuel producers and providers dedicated to the decarbonization of North America's transportation sector. Through the increased use of gaseous motor fuels including renewable natural gas and hydrogen, the United States and Canada can help achieve ambitious climate goals and greatly improve air quality safely, reliably, and effectively without delay and without compromising existing commercial business operations. Find out more at: ***transportproject.org***.



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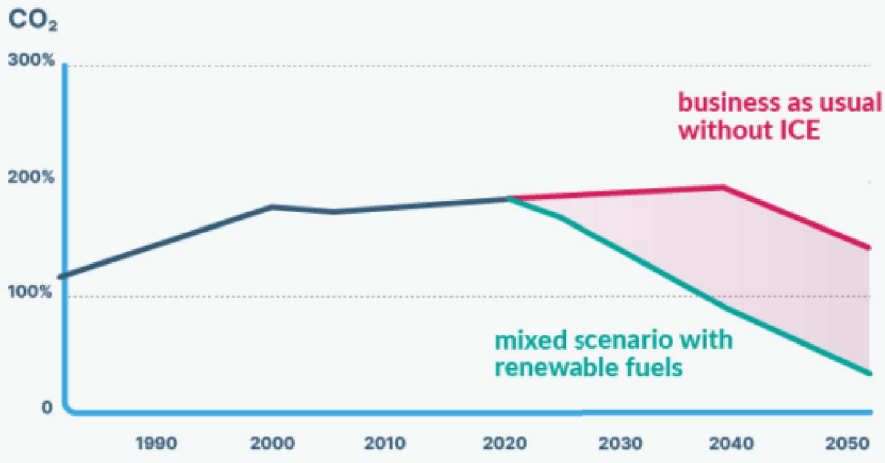
We believe…

- The transportation sector can be cleaner and decarbonized
- Comparative analyses of vehicle fuels, energies, and technologies must be performed on a WTW/lifecycle basis
- No one silver bullet solution
- Pragmatism over idealism
- Time is of the essence

Accomplishing Transportation Sustainability Requires a Fuel Agnostic Approach



42 million tonnes CO_2 saved by 2050

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Source: Gmobility Roadmap to Carbon Neutrality

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Evaluating Alternative Fuel Feasibility for Fleets

- Tailpipe emissions vs. well-to-wheel
- Total lifecycle analysis
- Lower fuel costs
- Accessible and resilient fuel source
- Demands for heavy-duty trucks
  - Torque and power
  - Range
  - Reliability / predictability / consistency
  - Payload (2,000 lb. exemption for NGVs)

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Discussion Topics

I. **Alt Fuel and Powertrain Technologies for HD Trucks**

II. **CNG**

III. **RNG**

IV. **Hydrogen**

V. **Sustainability**

VI. **Cost Effectiveness**

VII. **Case Studies**

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Alternative Fuel Considerations

Powertrain Solutions, Available Technologies, and Commercial Viability

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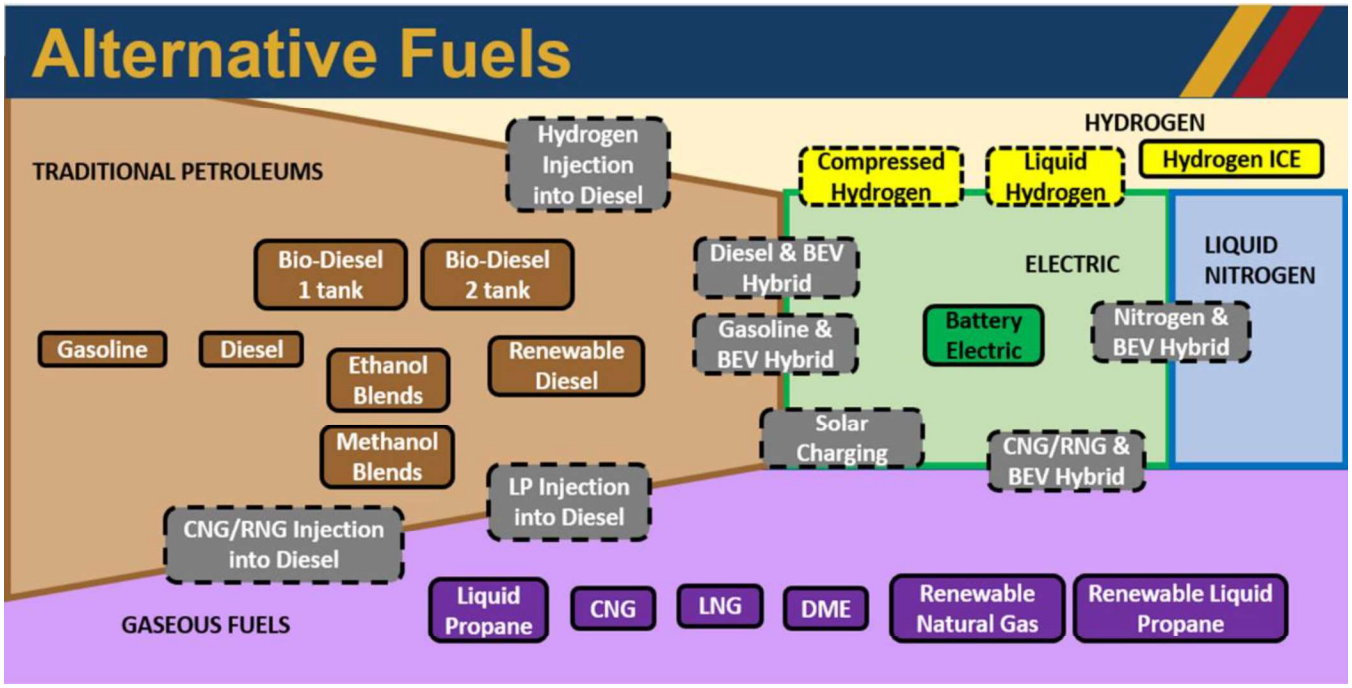

Slide courtesy of Dave Schaller, NACFE

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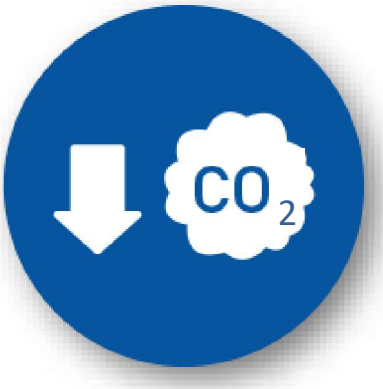
Basic Factors for Considering Alternative Fuels

ECONOMICS

ABUNDANCE



ENVIRONMENTAL

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Technical Considerations for Alternative Fuels

Vehicle Fuel Onboard Storage Example

Gaseous Hydrogen	v.	Liquefied Hydrogen
☐ Energy density		☑ Energy density
☑ Fuel cost		☐ Fuel cost
☑ Fuel availability		☐ Fuel availability
☐ Onboard vehicle storage		☑ Onboard vehicle storage
☑ Long-term storage		☐ Long-term storage
☑ Carbon intensity		☐ Carbon intensity

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The Challenge Faced by HD Truck Fleets

	Works Today?	Allowed * Tomorrow?
Diesel	Yes	No
Biodiesel	Yes	No
LNG	Sort of	No
Bio LNG	Sort of	No
CNG	Yes	No
RNG	Yes	No
Battery Electric	No	Yes
Fuel Cell Electric	No	Yes
Hydrogen ICE	No	Yes

* Allowed tomorrow under EPA / CARB regulations for HD trucks

- **No viable, low risk option to fully decarbonize exists today**
- Truck technology is a business-critical decision – CAN NOT make the wrong choice
- Transitions are disruptive and expensive. Don't want to do more than one.
- Few major truck fleets have made a major commitment to any type of alternative fuel truck
- **Fleet customers are frozen – they don't have a good long-term choice. So, wait and see.**

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An Introduction to CNG

Powertrain Solutions, Well-to-wheel Carbon Footprints, and Emissions Analysis

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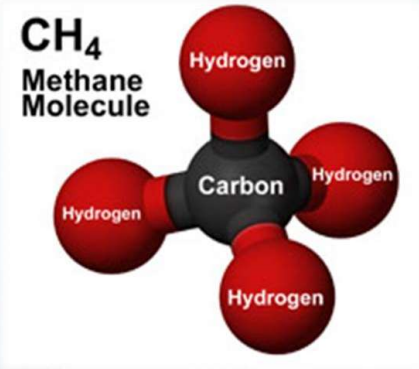
What is Compressed Natural Gas?



CNG is Safe, Non-Toxic, and Lighter Than Air.

- CNG is up to 98% methane
- CNG occupies less than 1% of the BTU-equivalent volume of natural gas or biogas in its uncompressed state
- CNG is a low-carbon fuel
- CNG for engines is 130 octane
- CNG is stored and distributed at a significantly lower cost than gasoline or diesel

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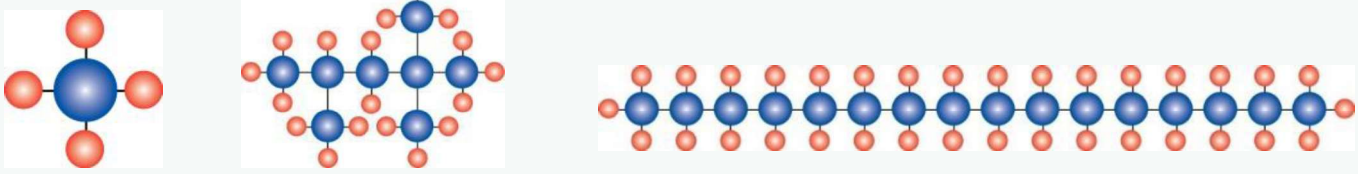
How Does CNG Compare to Other Transportation Fuels?



Methane | Gasoline | Diesel

- **Methane is NOT a complex hydrocarbon like gasoline or diesel**
- Carbon is a major pollutant affecting climate
  - Natural gas has 1 carbon atom
  - Gasoline has 8 carbon atoms
  - Diesel has 16 carbon atoms

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Natural Gas Safety

- **Natural Gas Properties**
  - Colorless, odorless, non-toxic
  - Lighter than air (dissipates when released)
  - High ignition temperature (1,000 to 1,110 F)
  - Limited range of combustion (only burns in 5 to 15% concentration in air)

- **Natural Gas Vehicles**
  - In catastrophic impact or fire, CNG tanks are configured with relief valves to vent gas
  - Regular tank inspections are required

- **Proven Safety Record**
  - Four fatalities in the U.S. in over 60 years caused by breach of a CNG fuel system
  - Fatalities due to non-compliance with safety standards

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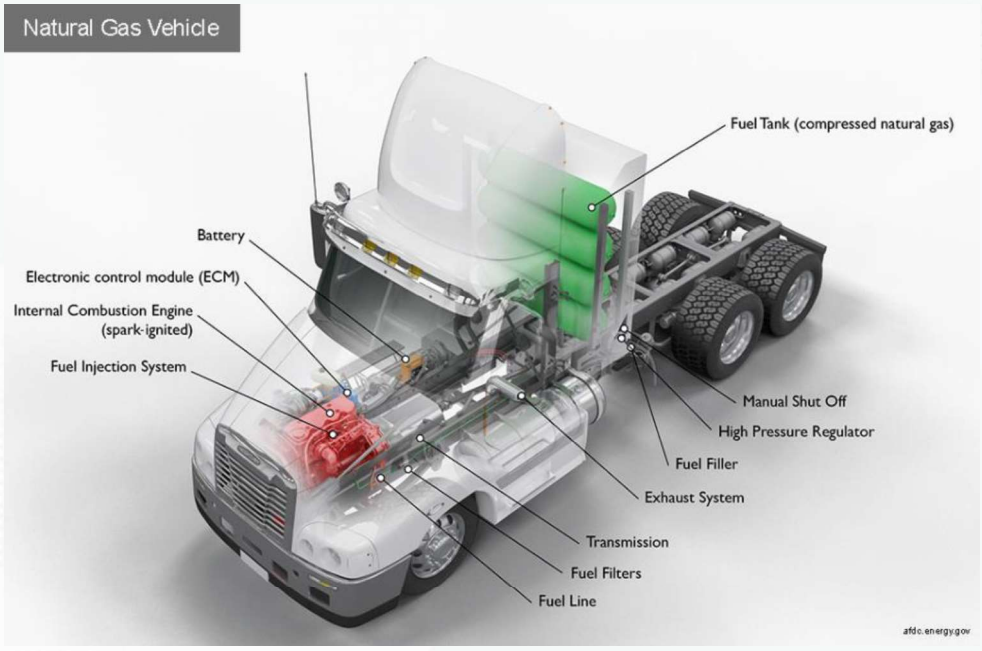
CNG Truck Key Components



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Source: https://afdc.energy.gov/vehicles/how-do-natural-gas-class-8-trucks-work

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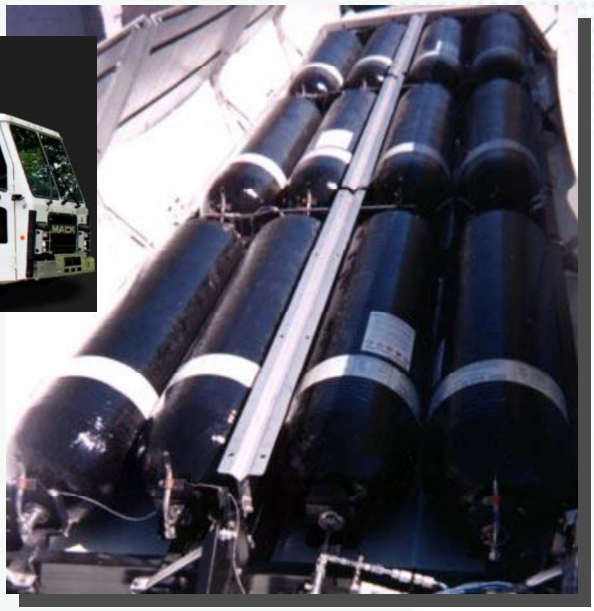
CNG Fuel Storage



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An Introduction to Hydrogen

Powertrain Solutions, Well-to-wheel Carbon Footprints, and Emissions Analysis

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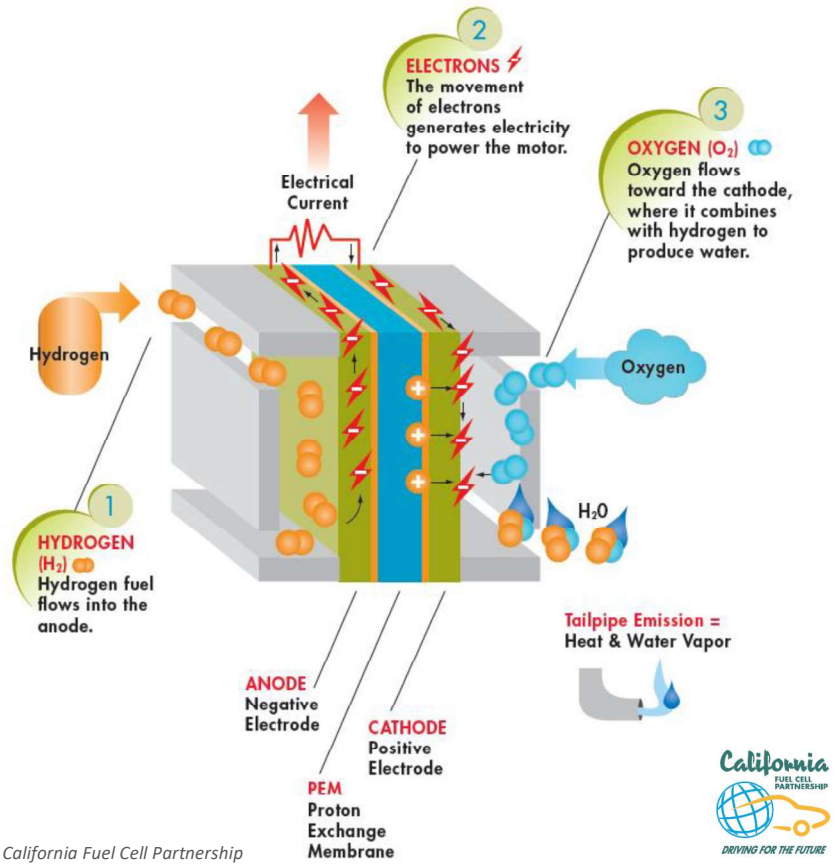
Hydrogen Fuel Cell

BASIC FUNDAMENTAL OPERATION



Source: California Fuel Cell Partnership

Hydrogen Fuel Cell Electric Vehicle (FCEV)

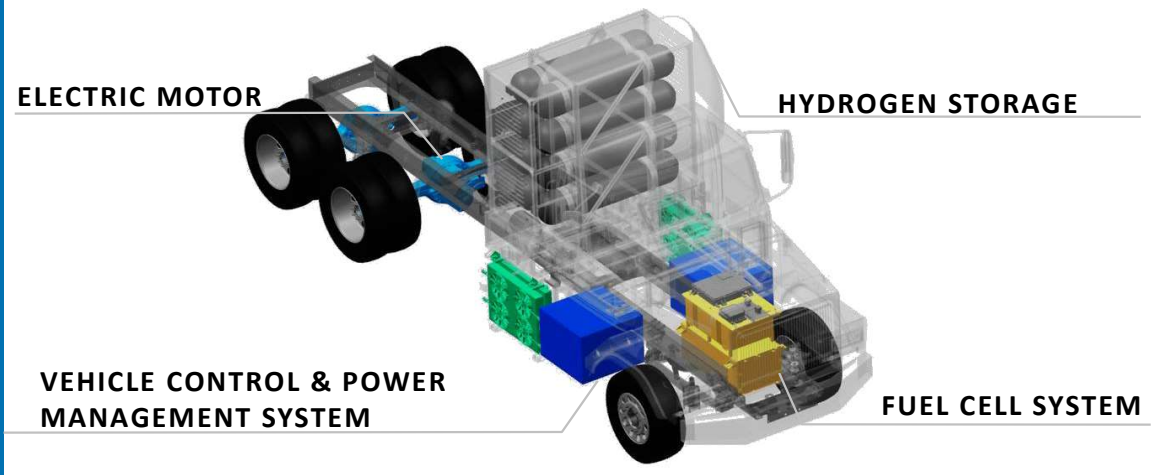
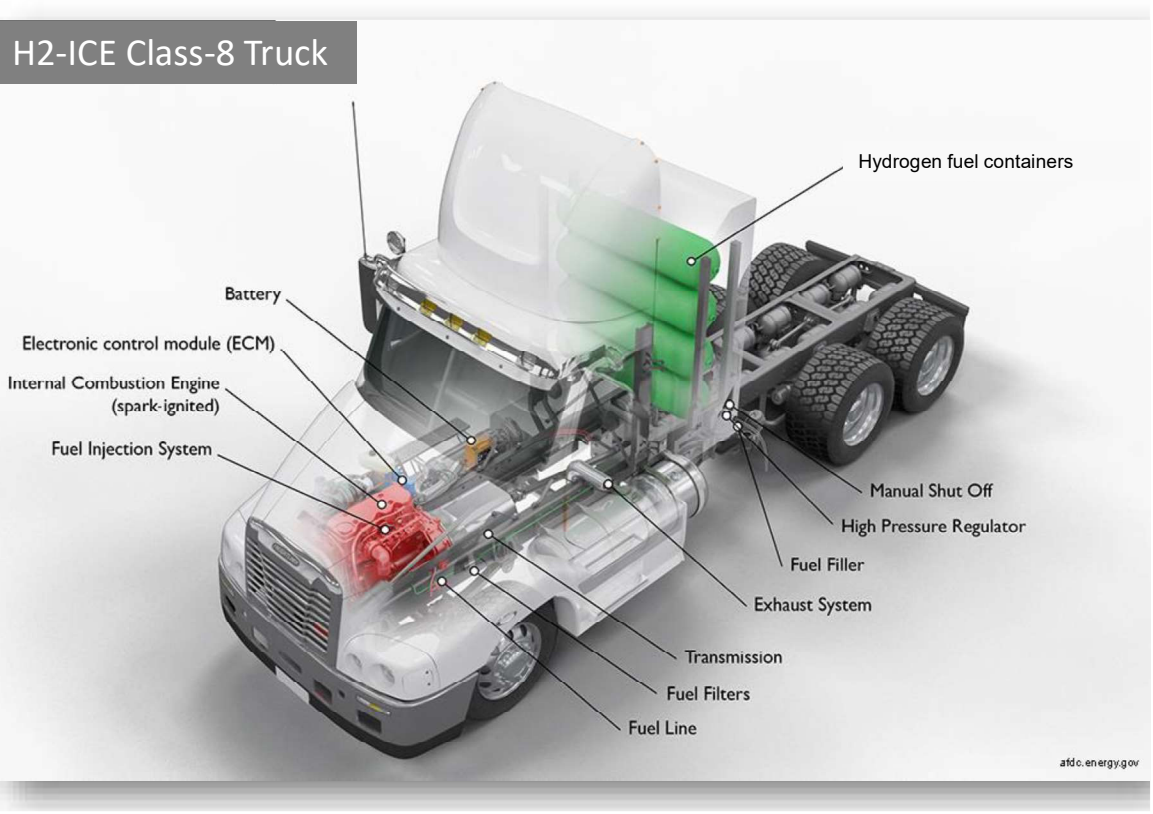


Figure courtesy of Parker Meeks, Hyzon

Hydrogen For Internal Combustion Engines

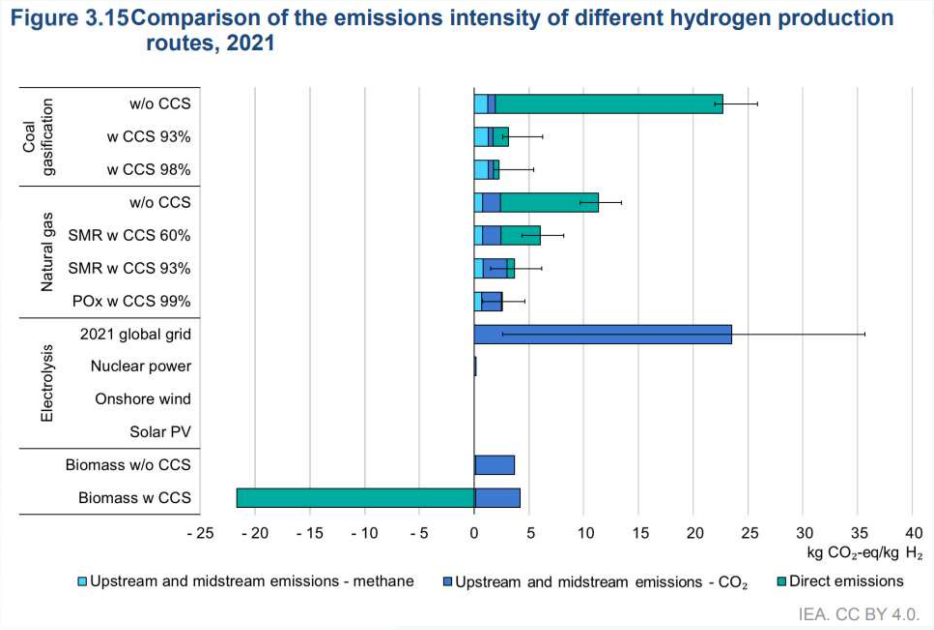
H2-ICE Class-8 Truck



Gaseous Hydrogen Storage

10000 PSI GHG

Hydrogen Production Carbon Intensity



Source: IEA (2023), Global Hydrogen Review 2023, IEA, Paris https://www.iea.org/reports/global-hydrogen-review-2023

Technical Considerations

New, Long-awaited Technology to Market

Cummins On-Highway Renewable Natural Gas Engine Offerings

X15N

ISX12N

L9N

B6.7N

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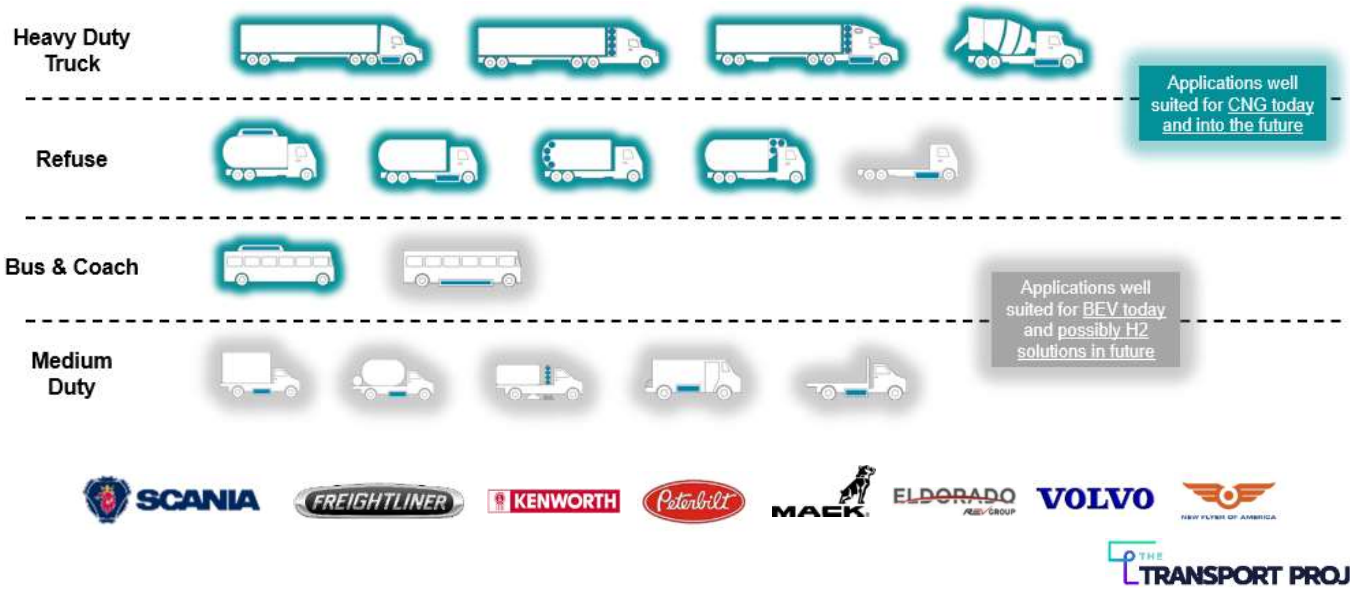
The Natural Gas Solution Features Maintenance Free & Fluid Free Exhaust System

- Lowest cost to operate in urban return to base operations with extended service life
- Similar to catalytic converters found on gasoline powered passenger cars
- Packaged as a muffler with vertical or horizontal mount
- Weighs approx. 100 pounds
- Benefits:
  - Simplicity for increased reliability
  - Maintenance-free, no filters to clean or replace
  - No active regeneration or downtime
  - No DEF fluid, filter or sensor replacement costs

MD + HD Commercial Fleet Options



Only one alternative fuel solution today allows heavy-duty long-haul fleets to adopt at scale and still meet fleet operational demands: RNG

HEXAGON AGILITY

Training is Critical to Ensure Success

		NGV Personnel Responsibility Type							
		Vehicle Drivers and Fuelers	Routine Vehicle Maintenance Technicians	CNG Fuel System Maintenance Technicians	CNG Fuel System Repair Technicians	CNG Fuel System Inspectors	Technicians that Service All Aspects of HD Trucks Except CNG Fuel Systems	Fleet and Dealership Maintenance Support Teams	CNG Refueling Station Maintenance Teams
Recommended Training Course	NGV Driver and Fueler Training	✓							
	Fundamental NGV Technician Safety Training		✓	✓	✓	✓	✓	✓	
	CNG Fuel System Inspector Training			✓	✓	✓	✓		
	CNG Fuel System Inspector Certification				✓	✓			
	HD Truck NGV Maintenance and Diagnostics Training				✓		✓		
	HD NGV Fuel System Repair and Diagnostics Training				✓				
	Defueling, Decommissioning, or Disposal of CNG Fuel Tanks			✓	✓	✓	✓		
	CNG Refueling Station Operation & Maintenance Training								✓

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Sustainability Considerations

Well-to-wheel Carbon Footprints and Emissions Analysis

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The cleanest scalable heavy-duty truck engine in the world is powered by natural gas

Significant public and private capital invested to get to certified .02

The newest natural gas engines with Near-Zero – or Zero Emissions Equivalent – technology exceed stringent new federal NOx emissions standards. Natural gas engines are certified to the CARB Model Year 2024 standard without using credits.

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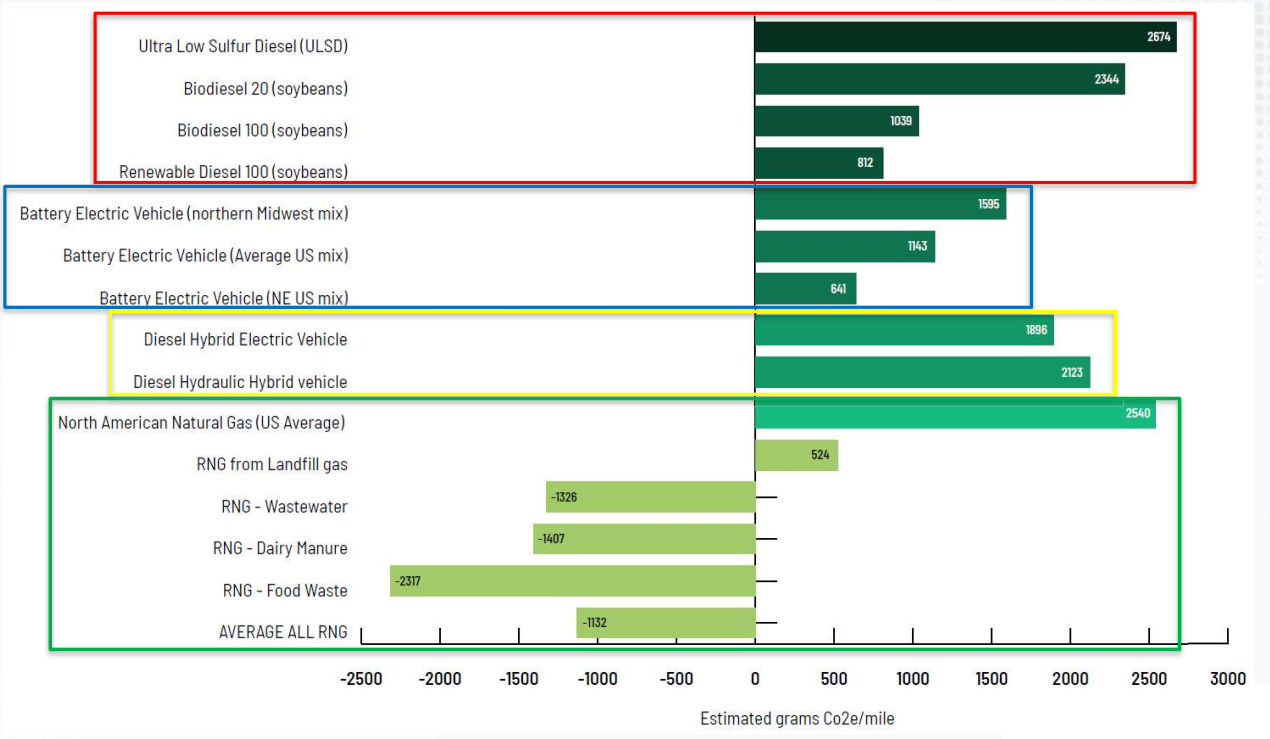
Comparative Lifecycle Greenhouse Gas Emissions of Various Fuels



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Source: Energy Vision report, *The Refuse Revolution – Leading the way to a Sustainable Future*, 2021

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NGVs + RNG:
Proven Sustainability
Cost Effective
Ready Now

The cleanest commercially available path to reduce heavy-duty vehicle emissions for likely a decade or more

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RNG is a Proven Carbon-negative Solution for Fleets

Turn a waste liability into a clean energy asset

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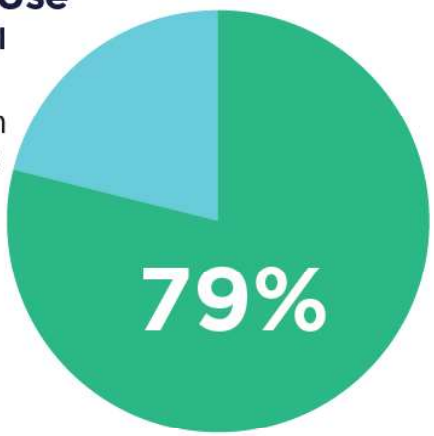
A Fuel in Transition
Increasing Growth Rate of RNG Production Facilities

A Fuel in Transition
RNG is Now the Majority NGV Fuel in the U.S.

2023 NGV Fuel Use
675 Million GGE Total

In 2023, **79%** of all on-road fuel used in natural gas vehicles was RNG.



- Conventional Natural Gas **144 Million GGE**
- Renewable Natural Gas **531 Million GGE**

RNG use as a transportation fuel grew **16% over 2022** volumes, increasing **192%** over the last five years. RNG offset a total of **6.96 million tons** of CO2e in 2023.

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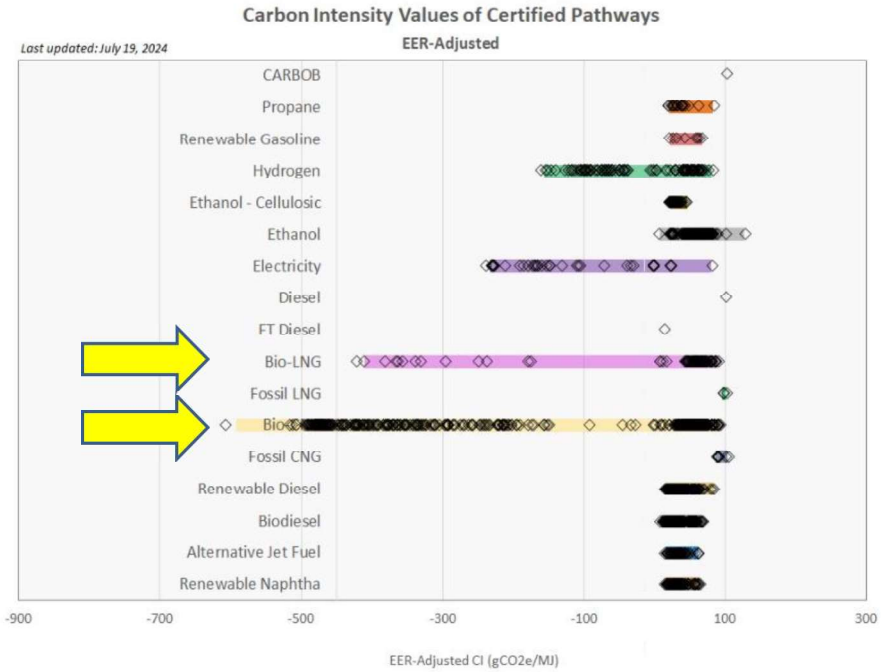
RNG: The Most Sustainable Transportation Fuel Available Today

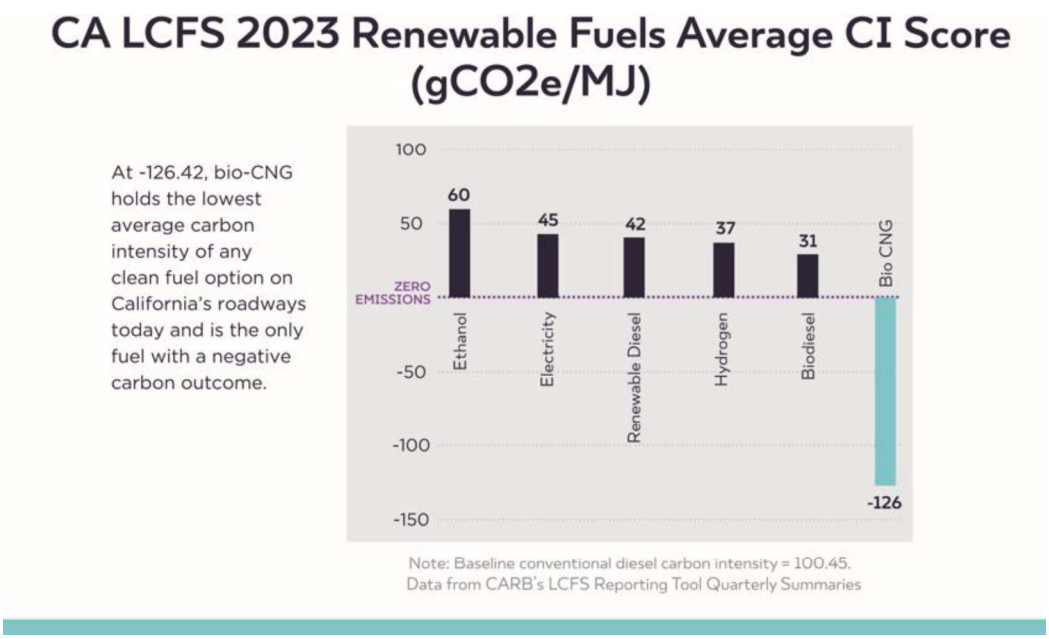
CARB LCFS program data confirms that the annual average CI value of California bio-CNG vehicle fuel portfolio for 2023 was carbon negative and below zero at -126.42 gCO2e/MJ.



Source: EER Carbon-Intensity values based on CARB LCFS program data under CA-GREET 3.0

RNG Better Than Zero

CARB CI REPORTING DATA CONFIRMS THAT BELOW ZERO WTW CARBON INTENSITY IS BEING ACHIEVED TODAY WITH RNG



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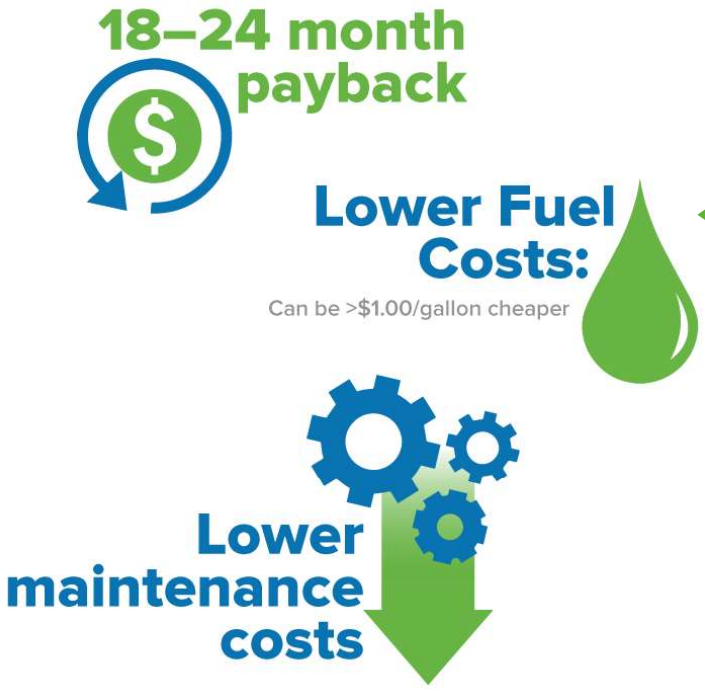
Cost Considerations



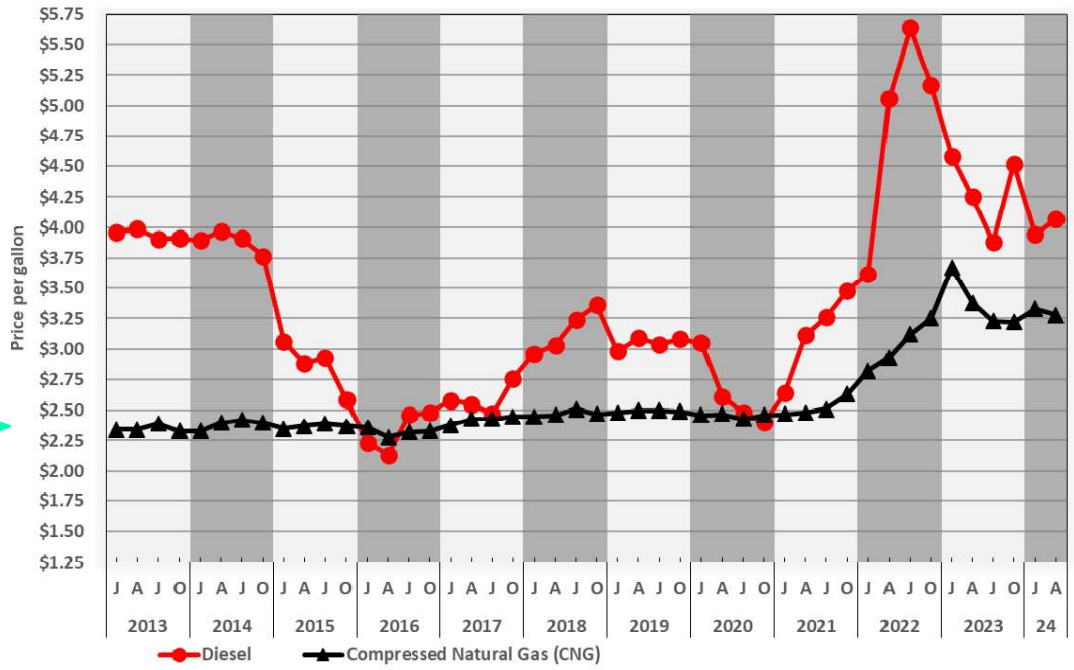
Depending on range and application, fleets can realize a pay back in as little as 18–24 months due to:

- Lower fuel costs
- Lower maintenance costs

Incentives will reduce the pay back time frame

Heavy-duty Truck Fuel Cost Comparison

Advantage: CNG



Source: AFDC Clean Cities Alternative Fuel Price Report, April 2024
https://afdc.energy.gov/files/u/publication/alternative_fuel_price_report_april_2024.pdf

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Natural Gas Provides Long-Term Motor Fuel Cost Savings

TABLE 3
National Average Retail Fuel Prices on an Energy-Equivalent Basis, April 2024 *

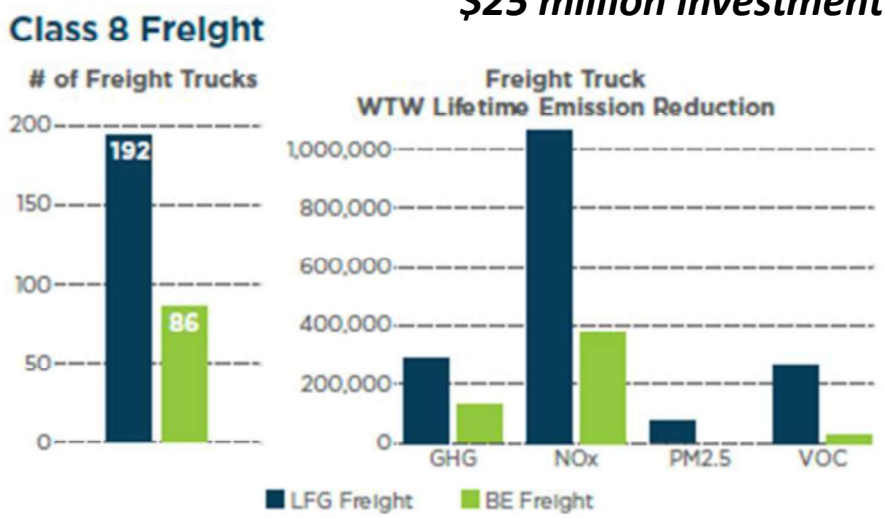
	Per Gasoline Gallon Equivalent ($/GGE)	Per Diesel Gallon Equivalent ($/DGE)	Per Million British Thermal Units ($/MBtu)
Gasoline	$3.65	$4.12	$31.93
Diesel	$3.62	$4.07	$31.62
CNG	$2.90	$3.28	$25.37
LNG	$3.43	$3.85	$29.91
Ethanol (E85)	$3.85	$4.35	$43.95
Propane**	$4.72	$5.31	$56.53
Biodiesel (B20)	$3.55	$4.02	$28.09
Biodiesel (B99/B100)	$4.48	$5.03	$38.26

*Includes public and private stations
**Includes primary and secondary stations

Source: U.S. Department of Energy, Alternative Fuels Data Center, Fuel Price Report, April 2024

Get More Clean HD Trucks and Buses on Road & Have a Greater Environmental Impact

$25 million investment



Note: LFG = landfill gas, or renewable natural gas (RNG) produced from landfill waste. BE = battery electric vehicle. GHG reduction figures in tons. Criteria pollutant (NOx, PM2.5, VOC) reduction figures in pounds. The well-to-wheel (WTW) reductions for criteria pollutants and GHG emissions including benefits associated with landfill gas were calculated utilizing Argonne National Laboratory's AFLEET tool. GHG emission reduction figures will improve dramatically when refueling with RNG derived from agricultural waste.

Access at: https://transportproject.org/wp-content/uploads/2021/02/NGV-Greener-Future-February-2021.pdf

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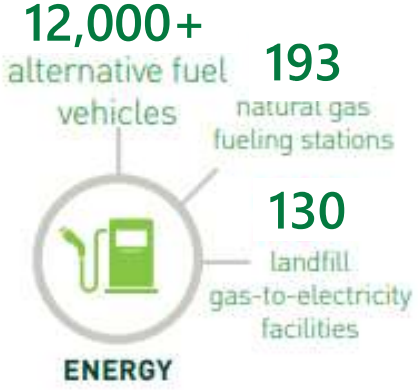
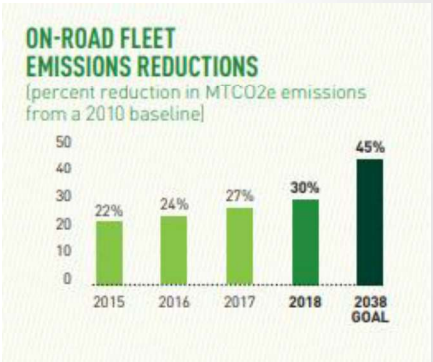
WM Leading the Way for Sustainability





The City of Milwaukee

- Out of 121 total refuse trucks, 68 powered by CNG
- Truck cost ≈ $271,000 each ($39,300 more than comparable diesel models)
- Director of fleet operations plans to convert the entire fleet over to CNG

One of approximately 68 operation CNG collection trucks in the City of Milwaukee's municipal fleet. The vehicles have performed well, including to plow snow in the winter.

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Final Remarks

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NGVs Fueled by RNG Check All the Boxes

- Commercially available at scale TODAY
- Affordable and cost-effective
- Established refueling infrastructure
- Transmission infrastructure/capacity
- Regulatory/emissions compliance
- Carbon negative outcome today
- Near-zero NOx
- Eliminate DPF, SCR, and DEF
- No mid-life overhaul

Additional considerations:

- Domestic security
- Energy security
- Energy poverty
- Labor rights
- Domestic economy
- Mitigate global warming

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Proven, Scalable and On the Road Today: Join the CNG & RNG Movement

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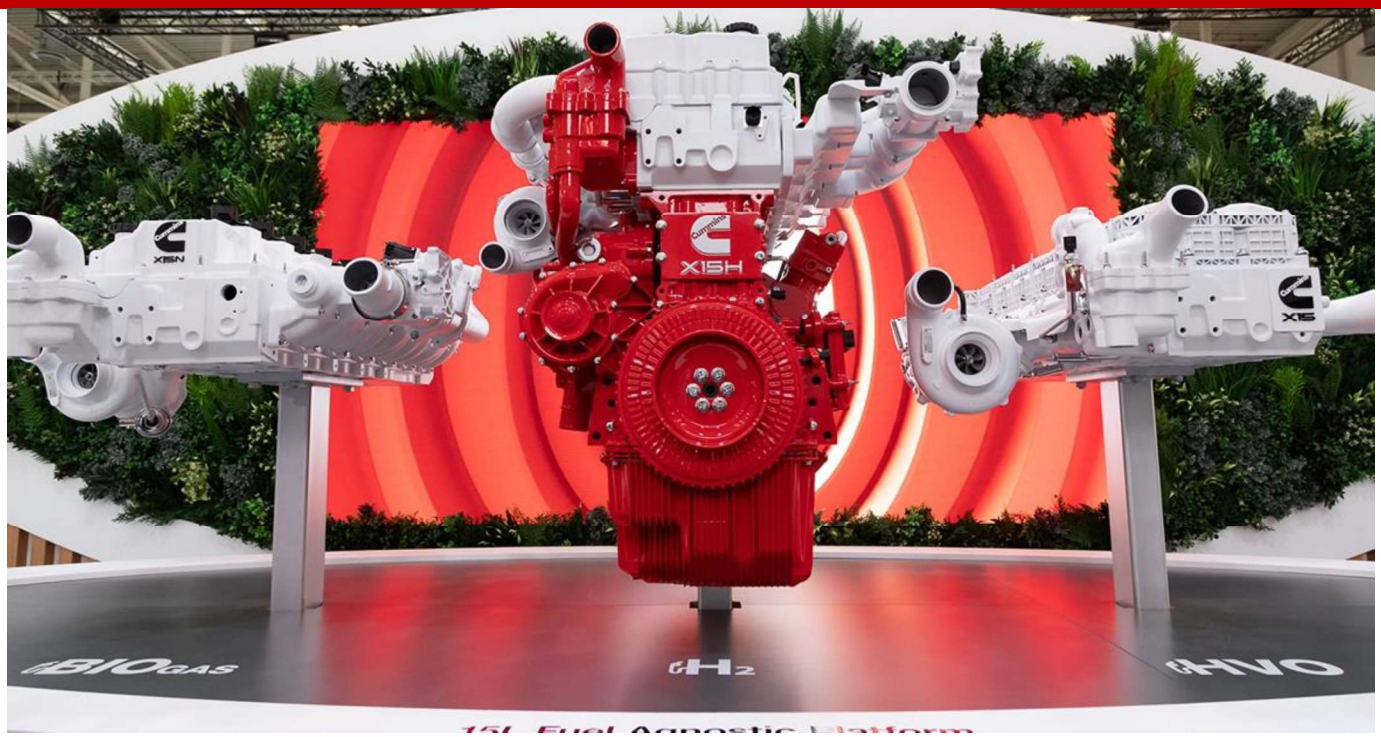
Future Fuel Agnostic Capability of ICEs



Start Now – RNG is How

STARTNOW.
RNG IS HOW!
A Project of NGVAMERICA

https://transportproject.org/rng-is-how/

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Your Go To Resource for CNG Refuse Truck Recommended Practices

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Recommended Practices for CNG Powered Refuse Trucks and the Supporting Facilities for Refueling and Maintenance

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Your Go To Resource for CNG Refuse Truck Recommended Practices

- 100 pages of industry best practices and safety recommendations
  - Comprehensive guidelines to ensure a successful transition and to support operational efficiency for your CNG powered fleet
    - Currently in final draft phase of the development process
    - Publication expected in Q2 2025

- 10 sections covering the following topics:
  - Training
  - Inspections
  - Emergency response procedures
  - Defueling
  - Vehicle decals/labels
  - Hot work
  - Facility upgrades
  - Fire prevention and detection
  - End of life

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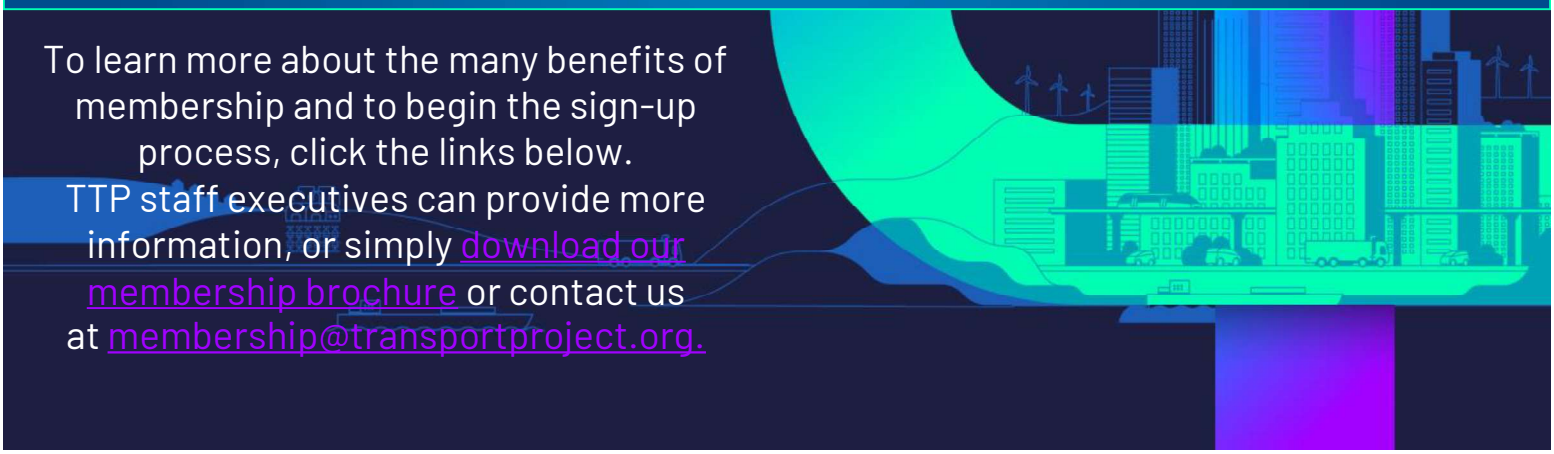
Join Us Today!

Visit: https://transportproject.org/sign-up/

To learn more about the many benefits of membership and to begin the sign-up process, click the links below. TTP staff executives can provide more information, or simply download our membership brochure or contact us at membership@transportproject.org.



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Paul Sandsted

Director of Technology and Sustainability

psandsted@transportproject.org

www.transportproject.org

Appendix

Emissions Reductions and Decarbonization Assessment

- Assess carbon intensity of existing fleet
- Determine decarbonization target
- Compare carbon intensity footprints of conventional and renewable fuels/energies
  - Argonne AFLEET tool
- Compare criteria air pollution with existing fleet with reductions with alt fuel replacements
  - Argonne HDVEC tool
- Assess potential benefits for surrounding EJ communities
  - EPA EJScreen tool

Recent Trending

NG Vehicles in operation at nearly 40 major airports

Approximately 30% of transit buses operate on NG

Over 60% new refuse trucks orders are NG

Heavy-duty truck market continues to transition

Rail industry piloting LNG locomotives

Major marine companies deploying LNG-powered vessels

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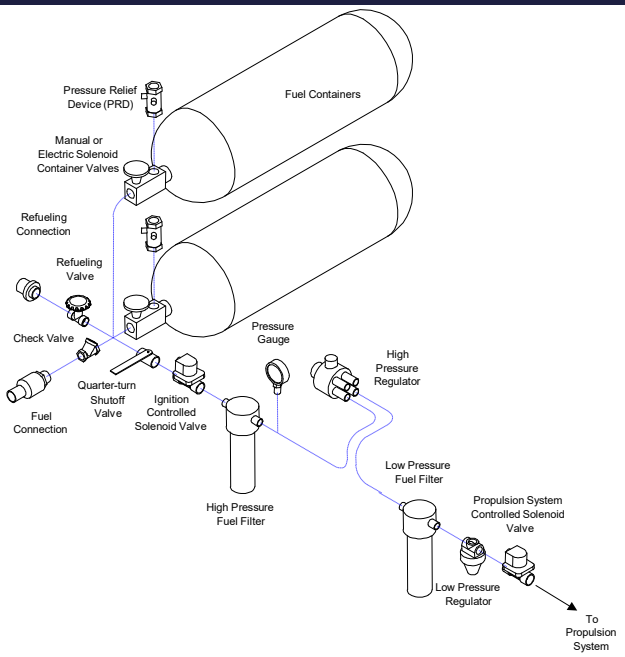
CNG Fuel System



- **Typical CNG Fuel System Includes:**
  - **Fill Receptacle**
  - **CNG container(s) assemblies (containers, solenoid valve, manual valve, etc)**
  - **Pressure relief device (PRD) system**
  - **High pressure filter**
  - **Pressure regulator**
  - **Low pressure filter**
  - **Fuel rail assembly (fuel rail and injectors)**

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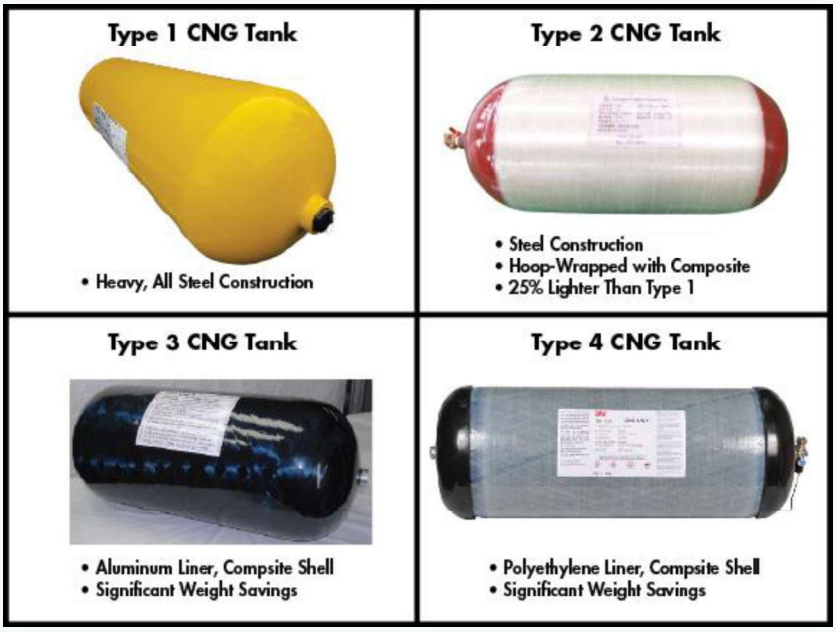
CNG Cylinder Types



Source: https://evmc2.files.wordpress.com/2015/03/04-tanks.jpg

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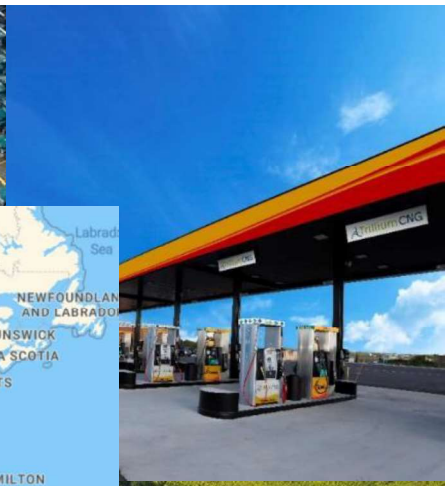
Established Natural Gas Refueling Infrastructure

- ✓ Public stations across North America
- ✓ Mature network of services and suppliers coast to coast



Access at: https://transportproject.org/fuel/

A Complete Natural Gas Refueling System Starter Kit

- **The GoFLO® CNG80 compressor and the GoFILL® refueler provide operators with a completely self-contained natural gas refueling station that runs on low-pressure natural gas.**
  - On-site refueling for CNG vehicle fleets
  - Set up temporary or permanent CNG refueling stations
  - Provide CNG refueling in remote locations
  - Refueling starter kit for fleets that are just beginning to convert their vehicles to CNG/RNG

STEP 5

OPERATE & MAINTAIN

Recommended Practice

Conduct Scheduled Maintenance and Inspections

- ❑ **Following the maintenance schedule specified by engine, fuel system, and vehicle manufacturers is critical for optimum durability, reliability, performance, and longevity of the vehicle**
- ❑ **A general visual inspection of the vehicle's fuel system should be performed as part of every preventative maintenance event**
- ❑ **A detailed visual inspection of the fuel system should be performed on an annual interval for heavy-duty vehicles (GVWR above 10,000 lbs)**
- ❑ **Detailed visual inspections must also be performed by a certified CNG fuel system inspector after every thermal event, after any traffic collision at 5 MPH or above, or when fuel system leakage is suspected**
- ❑ **Refer to TTP's CNG Vehicle Fuel System Inspection Guidance at https://transportproject.org/wp-content/uploads/2022/03/NGV-System-Inspection-Guide-3.7.22.pdf and other notices such as TTP's annual cold weather advisory for more information**

Additional Resources

- CNG for Waste and Recycling Industry White Paper
  - https://transportproject.org/wp-content/uploads/2018/03/Natural-Gas-A-Clean-Safe-and-Smart-Choice-for-the-Waste-Recycling-Industry.pdf
- Natural Gas Refuse Trucks Fact Sheet
  - https://transportproject.org/wp-content/uploads/2018/12/NGV-VW-Refuse-Trucks.pdf
- Energy Vision Report: The Refuse Revolution
  - https://energy-vision.org/wp-content/uploads/2021/12/The_Refuse_Revolution.pdf
- Waste Pro CNG Testimony
  - https://youtu.be/3RgQ97YF2eo?feature=shared&t=1600
- AFDC NGV Case Studies
  - https://afdc.energy.gov/case/search?keyword=Natural%20Gas
- NGV Game Changer Website
  - https://ngvgamechanger.com/
- ANL AFLEET Tool TCO and Emissions Calculator
  - https://greet.es.anl.gov/afleet
- Georgia County's CNG Trucks Increase Uptime
  - https://www.government-fleet.com/10146321/georgia-countys-cng-trucks-increase-uptime

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X15N

Cummins 15L Natural Gas Engine

The Future of HD Natural Gas Power

- ✓ Industry-first & market-defining **Big Bore Natural Gas** engine
- ✓ In full production now
- ✓ Cummins fuel injection system
- ✓ Up to a 10% Fuel Economy/GHG improvement over ISX12N
- ✓ 15L Diesel matching ratings - up to 500hp & 1850 lb-ft of torque
- ✓ Similar footprint as today's 13L diesel engines with 15L displacement & capability
- ✓ Engine weight 500 lb. less than current 15L diesel
- ✓ Potential carbon negative solution when using RNG
- ✓ Meets CARB24/27 and EPA Ultra Low NOx regulations

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Debris Management in a Changing Climate

Alysen M. Abel
City Engineer
Spring Hill, Kansas

Learning Objectives

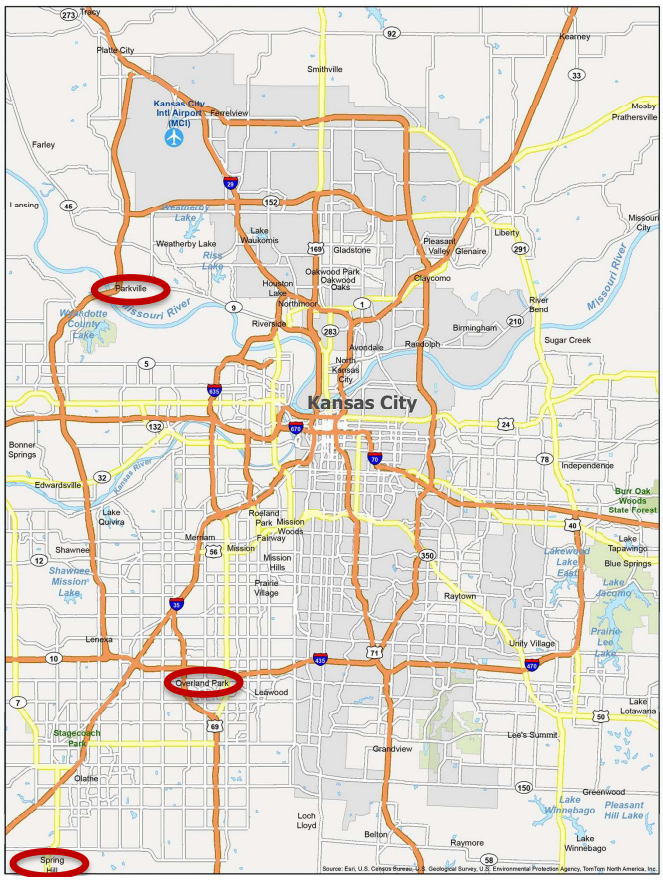
- Analyze the Impact of Climate Change on Debris Collection
- Examine Best Practices in Current Debris Collection Methods
- Develop plan for Future Debris Management Challenges

Municipal Experience

- City of Overland Park, KS
  Senior Civil Engineer
  (2008-2014)

- City of Parkville, MO
  Public Works Director
  (2014-2023)

- City of Spring Hill, KS
  City Engineer
  (2024-Present)



Solid Waste – Compare & Contrast

	Overland Park Kansas – Above and Beyond. By Design.	Parkville Missouri	The City of Spring Hill Kansas
TRASH SERVICE	Residents Contract Separately	Residents Contract Separately	City-wide Contract
LARGE ITEM PICKUP	Included w/ Trash (Annually)	City Holds Event (Annually)	Included w/ Trash (Annually)
YARD WASTE	Included w/ Trash	City Yard Waste Event (Bi-Annually)	Included w/ Trash
WASTE DROP OFF	None	City Holds Event (Annually)	None
GENERAL RECYCLING	City-wide Recycling Center	May be included w/ Trash	Included w/ Trash
ELECTRONICS RECYCLING	Recycling Center (Daily)	Electronics Recycling (5 x year)	None
CONSTRUCTION DEBRIS	City Event (Annually)	None	None
HOUSEHOLD HAZARDOUS WASTE	Access to Facilities	Access to Facilities / HHW Events (Annually)	Access to Facilities
PAPER SHREDDING	None	Paper Shredding Events (5 x year)	None

Parkville Flood of 2019

- In 2019, Parkville had a population of over 7,000
- Parkville is located along Missouri River
- Significant Floods Occurred in 1993 and 2011
- 1st Flood occurred in March 2019
- 2nd Flood occurred in May 2019

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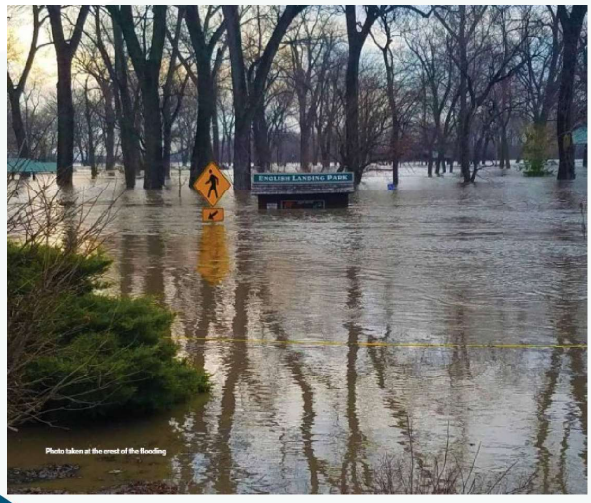
During the Flood



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After the Flood

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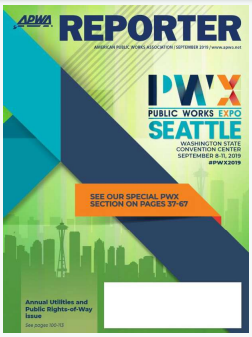
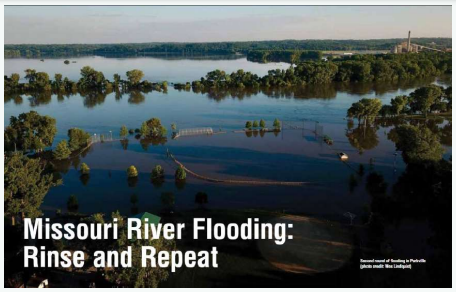
Recent flooding along the Missouri River

SCRC

Alysen M. Abel, PE., Public Works Director, City of Parkville, Missouri, and member, APWA Small Cities/Rural Communities Committee

Article #1 - June 2019





Article #2 - September 2019

SCRC

"Where there is a will, there is a way"

Construction of the English Landing Park Low Water Crossing during the flooding of the Missouri River

Article #3 – April 2020

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Questions

Alysen M. Abel, P.E., MPA
City Engineer
City of Spring Hill, KS
Alysen.abel@springhillks.gov

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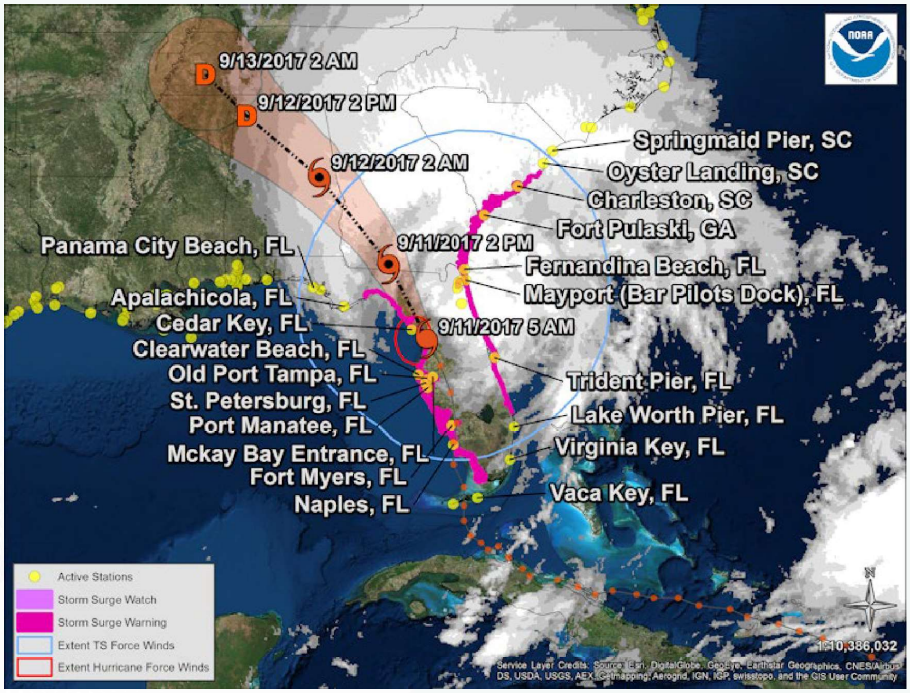
Philip R. Mann, PE
Special Advisor to the City Manager
Gainesville, Florida

Hurricane Irma-2017



Hurricane Irma-2017

- Hurricane Irma approached the southern tip of Florida through the Florida Straits.
- Irma made landfall and traveled north through the peninsula and into southern Georgia.
- Hurricanes usually make landfall on one of the two coasts and either travel across the state or make landfall.
- Rarely does a hurricane travel up the length of the peninsula.

Hurricane Irma-2017

- After Hurricane Irma exited the state, then came the aftermath from the winds and the flooding.
- Municipalities, Counties and the State were all executing their debris management contracts.
- The scale of devastation strained contractors with multiple contracts along the Florida Peninsula.
- Some contractors abandoned contracts to fully cover other contracts.
- Our contractor provided as minimal response as possible. The City was forced to supplement with in-house forces.

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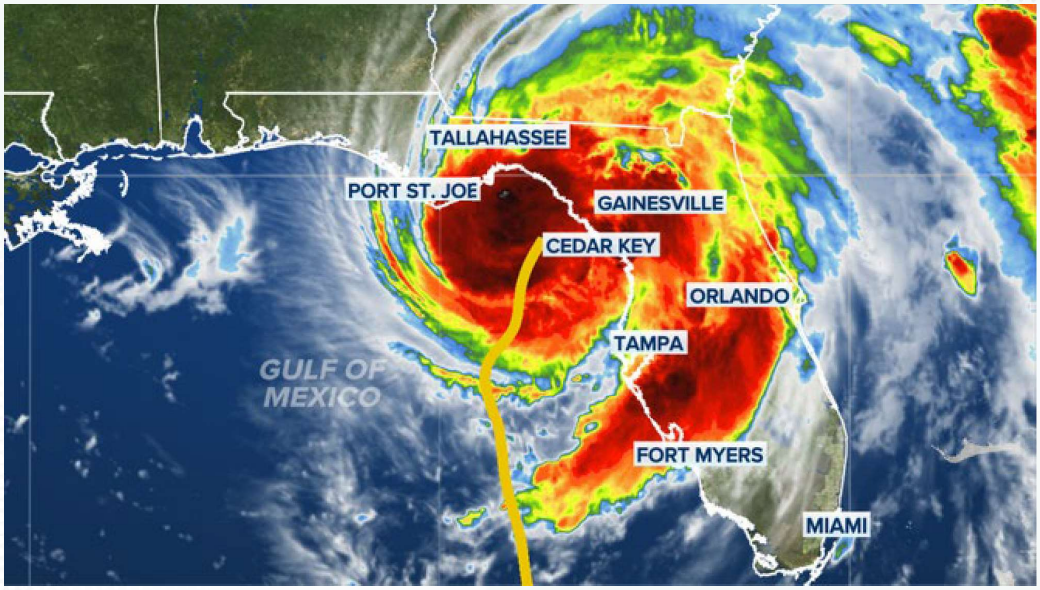
Hurricane Debbie-2024



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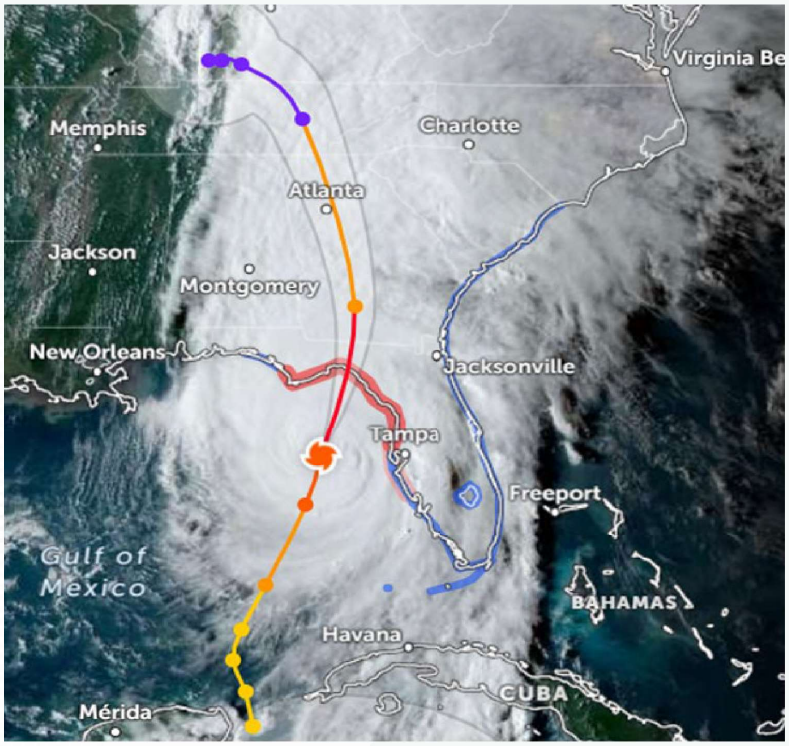
Hurricane Helene-2024



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2024 Hurricane Season

- Seven years after Hurricane Irma, Florida experiences 2 hurricanes that travel the length of the Gulf Coast and impacting inland all the way to the center of the state as they moved north.
- The storms were close enough in time that debris management had just started when Helene made landfall and skirted the west coast.
- Hurricane Milton then make landfall in central Florida and moves east across the state into the Atlantic Ocean.
- Municipalities, Counties and the state again execute their debris management contracts.

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Lessons Learned

- Make sure you also know your own debris management contract.
- Require that the vendors provide a bond for the contract.

APWA

Questions?

- Philip R. Mann, P.E.
- Special Advisor to the City Manager
- City of Gainesville, Florida
- mannpr@cityofgainesville.org

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Crystal Stapley
Sustainability Manager-
Landfill Operations Consultant
LaBella Associates

Proper preparation can help mitigate chaos and streamline recovery efforts

- Assessment of Risks
- Prioritized Response
- Coordination Plans

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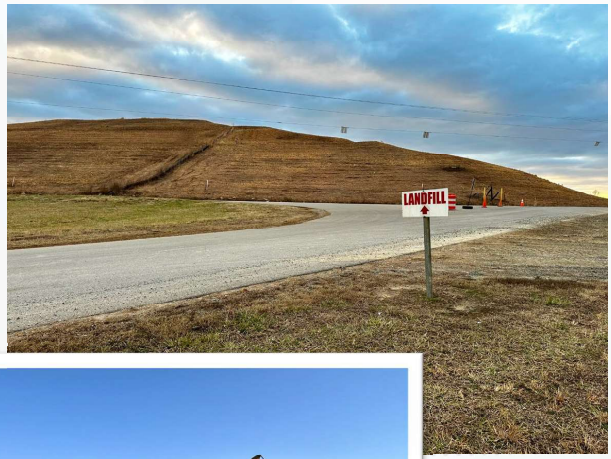
Enhance Capacity and Resources

- Equipment Readiness
- Temporary Staffing
- Storage and Processing Sites



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Train and Educate Teams

- Safety Protocols
- Emergency Drills

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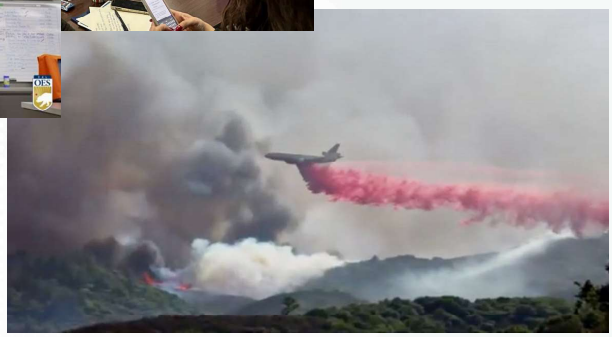
Establish Partnerships



- Government Collaboration
- Private Sector Alliances
- Community Engagement

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Questions

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