

# Climate Change Advisory Committee Meeting

October 24, 2017





## What is Clean Cities?

- Sponsored by the DOE's Office of Energy Efficiency and Renewable Energy's Vehicle Technologies Program (EERE)
- **A Public/Private Partnership for Clean Fuel Vehicles and Fuel Efficient Technologies**
- **Provides a framework for businesses and governments to work together as a coalition to enhance markets**
- Coordinate activities, identify mutual interests, develop regional economic opportunities, and improve air quality

# Why Clean Cities?

## Clean Cities

advances the energy, economic, and environmental security of the United States by supporting local actions to cut petroleum use in transportation.

Reduced petroleum consumption

Reduced greenhouse gas (GHG) emissions

Reduced dependence on imported petroleum

# Portfolio



**Eliminate**

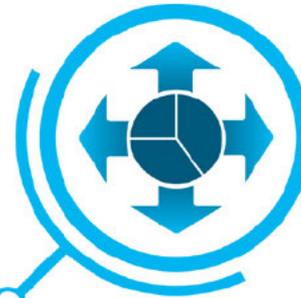


# Complementary Framework

**Local & National Partnerships**



**Information & Education**



**Clean Cities Activities**

**Competitively Awarded Financial Assistance**



**Technical & Problem Solving Assistance**



**Clean Cities coalitions are locally based with the ability to tap national resources.**

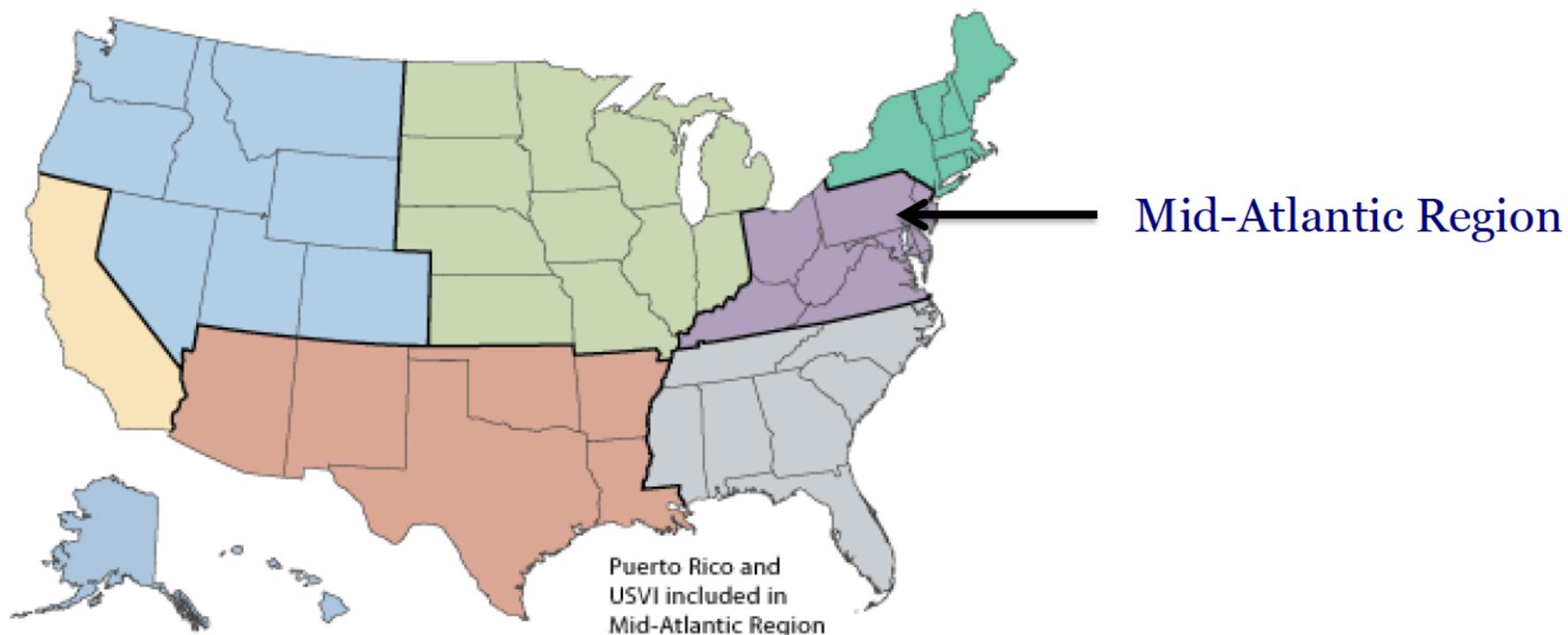
# Program Goal



**Goal: 2.5 Billion Gallons of Petroleum  
Reduced Annually by 2020**



# Where is: EP-ACT



 *Brett Aristegui, Acting, Northwest*

 *Trev Hall, Southeast*

 *David Kirschner, North Central*

 *Neil Kirschner, South Central*

 *Erin Russell-Story, Northeast*

 *Brett Aristegui, California*

 *Darren Stevenson, Mid-Atlantic*

# EP-ACT

## Where, is EP-ACT



# National Partnerships: Clean Fleets Partnership



- Helps **large private fleets** significantly cut their petroleum use
- Provides fleets with **tools, expertise and technical support** to incorporate alternative fuels and fuel-saving measures into their operation
- Positions Partners as **pace-setters** for other fleets to follow

## More Than 25 Partners



More up-to-date information may be available. See the Clean Cities website: <https://cleancities.energy.gov/fleets>



U.S. Department of Energy

# Clean Cities: Making the Connections



# Who is: EP-ACT?



- Non-profit 501 (c) (3) organization
- Comprised of Public and Private Companies
- Assist with grants/writing/ Project Management
- Education and Outreach
- Tiered Levels of Stakeholder Membership



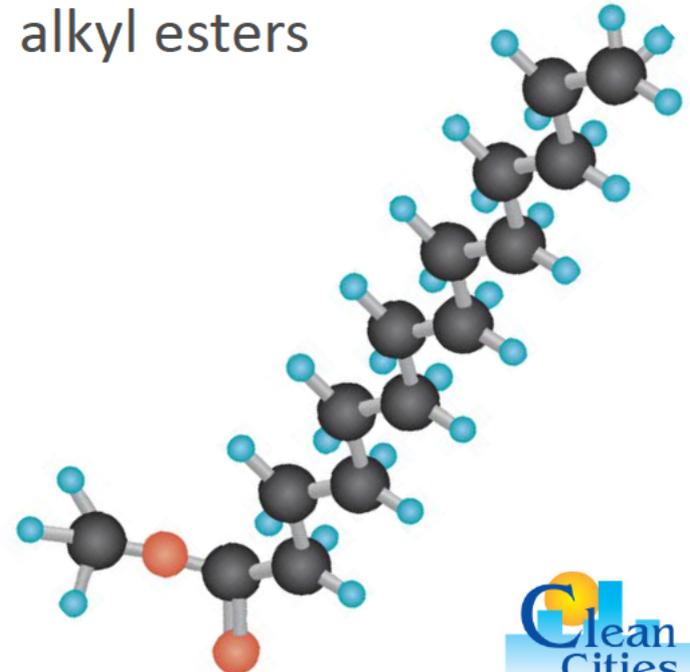
# Portfolio of Supported Alternative Fuels



# Biodiesel



- Domestically produced, renewable fuel
- Manufactured from vegetable oils, animal fats, restaurant grease
- Reduces greenhouse gas (GHG) emissions
- Biodegradable
- Cleaner-burning replacement for diesel fuel
- Fatty acid methyl esters (FAME), fatty acid alkyl esters, long-chain mono alkyl esters



# Biodiesel Use

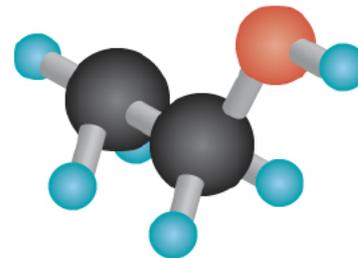
- Can be blended and used with diesel in many concentrations: B2, B5, B20, B100.
- B20 is the most common blend in the United States.
- All manufacturers approve the use of B5 and many accept the use of B20.
- Similar payload capacity, range, horsepower, and torque as diesel.
- B20 suitable for nearly all unmodified diesel engines.





## 16,546 FFV's in PA

- Renewable fuel produced from plant materials (biomass)
- Same chemical compound in alcoholic beverages
- Comes from starchy feedstocks (corn, sugar cane, sugar beets) and cellulosic feedstocks (yard waste, grasses, poplars)
- Blended at low levels into more than 95% of gasoline sold in the United States
- Increasingly available as E85, for use in flex fuel vehicles
- High-octane fuel
- Reduces GHG emissions

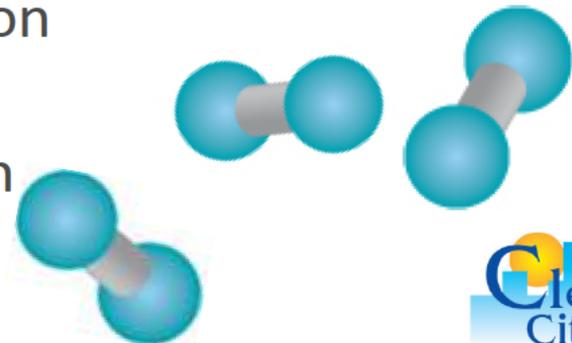


# Hydrogen



~ 10 in PA

- Exists in water, hydrocarbons (such as methane), and organic matter.
- Steam reforming of methane (natural gas) accounts for ~95% of hydrogen produced in U.S.
- About 9 million tons of hydrogen is produced in the U.S. each year.
- The energy in 2.2 lb of hydrogen gas is about the same as the energy in 1 gallon of gasoline.
- Fuel cell vehicles powered by hydrogen can be 2-3 times more efficient than conventional vehicles.

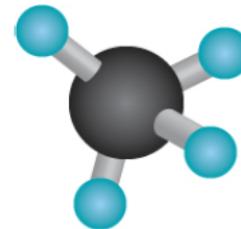


# Natural Gas



959 vehicles in PA

- Hydrocarbons, predominantly methane ( $\text{CH}_4$ )
- High octane rating
- Noncorrosive and noncarcinogenic
- Not a threat to soil, surface water, or groundwater
- Conventional natural gas is extracted from gas and oil wells
- Renewable natural gas can be produced from landfills and livestock operations
- Existing pipeline distribution system



# Natural Gas: CNG and LNG

## Compressed Natural Gas (CNG)

- Stored in onboard tanks under high pressure
- Fuel economy similar to gasoline
- 1 GGE = 5.7 lb CNG

## Liquefied Natural Gas (LNG)

- Kept at cold temperatures
- Stored in double-wall, vacuum-insulated pressure vessels
- Heavy-duty vehicles
- 1 GGE = 1.5 gal LNG

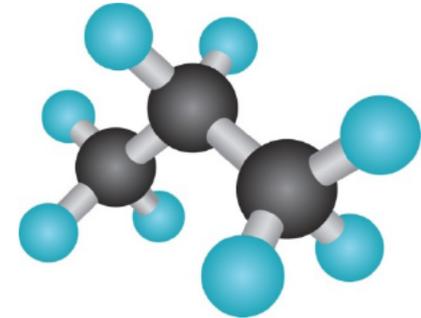


# Propane



- Also known as liquefied petroleum gas (LPG)
- Colorless, odorless liquid (when stored under pressure)
- High octane rating
- By-product of natural gas processing and crude oil refining
- Less than 2% of propane used in U.S. used in transportation
- Lower GHG emissions

754 vehicles in PA



# Hybrid and Electric Drive Vehicles



Electricity

24,795 hybrids in PA

3,599 EV's in PA



## Hybrid Electric Vehicle (HEV)

- Powered by an engine and electric motor
- Does not use electric vehicle supply equipment (EVSE) to charge the battery



## Plug-In Hybrid Electric Vehicle (PHEV)

- Powered by an electric motor and engine
- Uses EVSE to charge the battery



## All-Electric Vehicle (EV)

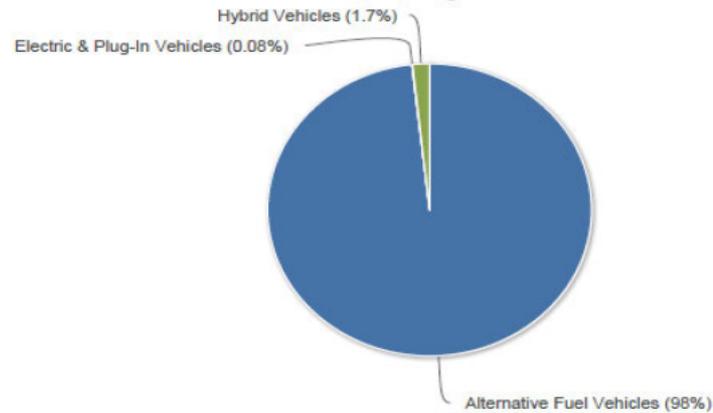
- Powered by an electric motor
- Uses EVSE to charge the battery

# Charging EVs and PHEVs

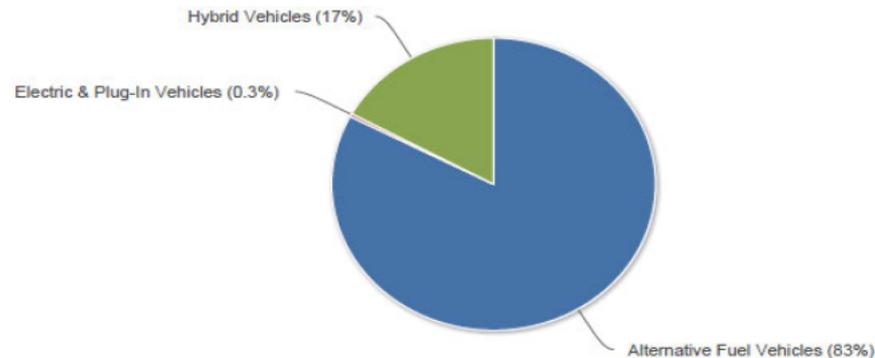
	Current Type	Voltage (V)	Charging Time	Primary Use	Connector
<b>Level 1</b>	Alternating Current (AC)	120V	2-5 miles of range per hour of charging	Residential	
<b>Level 2</b>	AC	240V	10-20 miles of range per hour of charging	Residential Commercial	
<b>Level 3 (Pending Industry Consensus)</b>	<i>Undefined</i>	<i>Undefined</i>	<i>Undefined</i>	<i>Undefined</i>	
<b>DC Fast</b>	Direct Current (DC)	480V	60-80 miles of range per 20 minutes of charging	Commercial	
<b>Wireless</b>	AC	240V	10-20 miles of range per hour of charging	Residential Commercial	

# Petroleum Reduction, Deployment of Vehicles, & Infrastructure is our END GAME...

**2016 Gallons of Gasoline Equivalent Reduced**  
3,922,532 gallons



**2016 Greenhouse Gas Emissions Reduced**  
4,763 tons



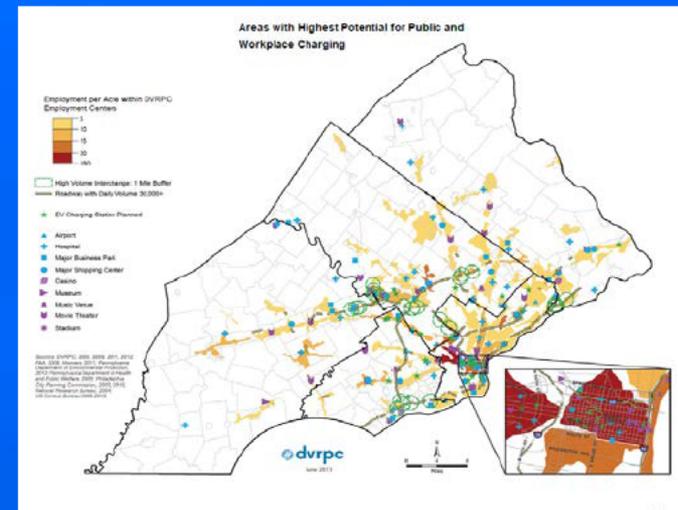
# EP-ACT Projects

- E-85 Corridor Project
- Public Electric Charging 1<sup>st</sup> in State



- Ready to Roll

- iRev – Disaster Planning Tool



# EP-ACT Projects

## iREV – Disaster Planning Tool

The screenshot displays the iREV Tracking Tool interface. At the top left is the NASEO logo. The main header includes the title "iREV Tracking Tool", a "Home" button, and a "Log Out" button. Below the header, there is a navigation bar with "Location Lookup" set to "United States of America", "Pennsylvania", and "Lancaster", and a "Location Search" field with a "Search" button. The central part of the interface is a map of Pennsylvania, densely populated with blue and orange icons representing fueling stations. On the left side, there is a sidebar menu with sections for "MAP", "EVENT", "USER", "DATA", and "HELP", each with a "HIDE" button. The "MAP" section includes options like "New", "Open/Delete", "Save", and "Export KML". The "EVENT" section includes "Draw Event" and "Remove Event(s)". The "USER" section includes "Your Profile". The "DATA" section includes "Upload Data" and "Data Template". The "HELP" section includes "User Guide" and "Data Collection". On the right side, there is an "Available Datasets" panel with sections for "Emergency Services" (EWS, Fire, Hospital, Police), "Fueling Stations" (Real-Time, Offline), and "Uploaded Data" (Custom, Fueling Station, Charging Station, Vehicle). A "Delete: Custom Data from Map" button is located at the bottom of the "Uploaded Data" section.

# CNG Projects Vehicles Deployed

*The Montgomery County NGV Conversion Initiative*

**32 Various dedicated CNG deployed**

**COMPLETED**

*The Keystone State LNG Conversion Initiative*

**20 LNG Class 8 Tractors**

**COMPLETED**

*The Southeastern PA CNG Vehicle Conversion Initiative*

**30 dedicated CNG under 14000 GVW**

**COMPLETED**

*The W.W. Transport and Easton PA CNG Vehicle Conversion Project*

**5 dual fuel, 25 dedicated CNG**

**COMPLETED**

*The Northeast Extension CNG Conversion Initiative* seeks to spur the acceptance of utilizing compressed natural gas

**18 dedicated CNG vehicles deployed**

**COMPLETED**

**CNG Delivery Truck Project**

**40 CNG Delivery Trucks**

**COMPLETED**

**170 CNG Vehicles on the road in past 3 years**

# Propane Projects Vehicles Deployed

*The Eastern Pennsylvania Propane School Bus Conversion Initiative*

**37 BUSES CONVERTED**  
**2 STATIONS INSTALLED**  
**4 SCHOOL DISTRICTS**  
**2 PRIVATE COMPANY'S**

*The Tinicum Township Conversion Project*

**20 SHUTTLE BUSES**  
**1 STATION INSTALLED**  
**4 COMPANIES**

*The Hatboro-Horsham School District Propane School Bus Conversion Project*

**5 BUSES CONVERTED**

*The Upper Moreland Township School District Propane School Bus Conversion Project*

**41 BUSES CONVERTED**  
**1 STATION INSTALLED**

*The Haverford School District Propane School Bus Conversion Project*

**10 BUSES CONVERTED**

*The East Stroudsburg Area School District Propane School Bus Conversion Project*

**52 BUSES CONVERTED**  
**1 STATION INSTALLED**

*The Centennial School District Propane School Bus Conversion Project*

**5 BUSES CONVERTED**

**170 Propane Vehicles on the road in past 3 years**

# EP-ACT is Involved with:

## Drive Electric Pennsylvania

- **OEM's, EVSE Manufacturers; Planning Organizations; Universities; Public, Private, Municipalities, Utilities- PUC**
- **State Departments – DEP- DOT- DCNR- DGS- DCED**



The mission of the coalition is to drive wide scale adoption of Electric Vehicles ( EV's) throughout Pennsylvania-

- Planning
- Implementation
- Deployment

### 3 Committees

- Education & Outreach
- Procurement
- Infrastructure

# Alternative Fuel Technical Assistance Program

## What is the Alternative Fuels Technical Assistance program (AFTA)?

AFTA is a new program offered by the PA Department of Environmental Protection (DEP) that provides technical assistance to eligible organizations to maximize the benefits of alternative fuel use in PA. AFTA is not a grant program. Rather, it is a program through which a qualified, professional consulting firm is assigned by DEP to work directly with eligible organizations for the purpose of developing technically viable and economically sustainable alternative fueling strategies. Alternative fuels considered under this program may include natural gas, electric, propane, hydrogen, hythane, ethanol, methanol, and other advanced biofuels.

## Who is eligible to apply for assistance under AFTA?

Organizations eligible to apply include political subdivisions, nonprofit entities, municipal authorities and school districts in PA. An eligible entity can apply alone, or it can team up with other eligible project partners for a multi-organization project that can enhance the energy, economic, and environmental benefits of alternative fuels. To be considered under AFTA, vehicle fleets must be based in and operate in PA, and the applicant may not have any outstanding, unresolved obligations to the Commonwealth.

## How does the technical assistance process work?

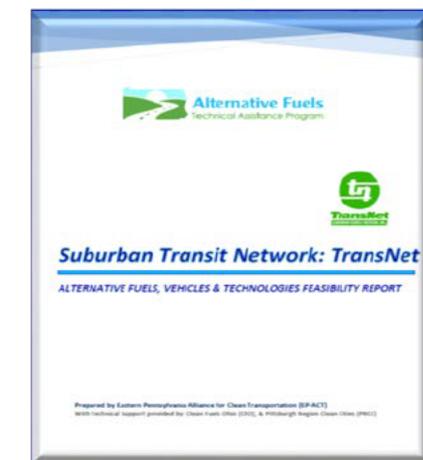
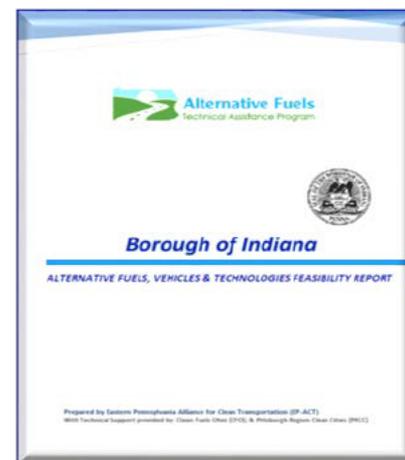
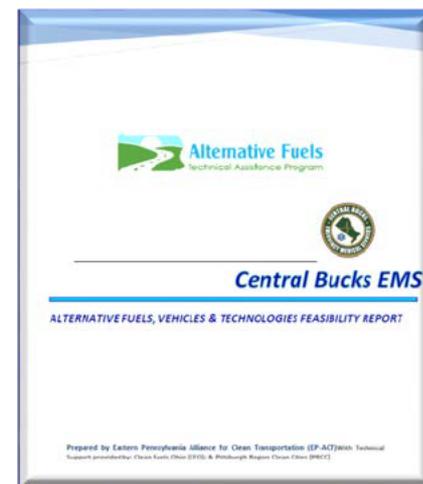
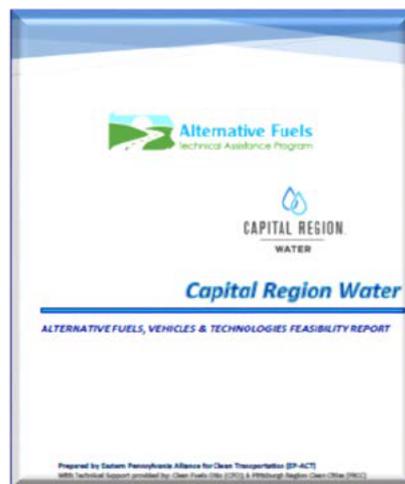
Eligible organizations apply to receive technical assistance by submitting an AFTA application form to DEP. An application completeness and applicability review will then be conducted by DEP. Upon acceptance into the program, DEP will assign a technical assistance provider with relevant experience and expertise. The applying organization will work directly with that provider to develop a suitable scope of work and provide all vehicle and operational information necessary to complete the analysis. The provider will then evaluate the technical and economic considerations of various alternative fueling strategies specific to the circumstances of the vehicles and organizations involved.

## What is the end product of the technical assistance work?

The technical assistance project will result in a final report that will identify fueling options and recommended strategies based on technical and economic considerations specific to the circumstances of the organizations involved, their vehicle needs, and their operating profiles. The report is not expected to include detailed project designs or engineered site plans, but will provide analysis and recommendations needed for the applying organization(s) to make informed decisions that will, hopefully, result in the implementation of an alternative fueling project. Please note that final project reports will be publically available on DEP's website.

## Where can I get additional information or application assistance?

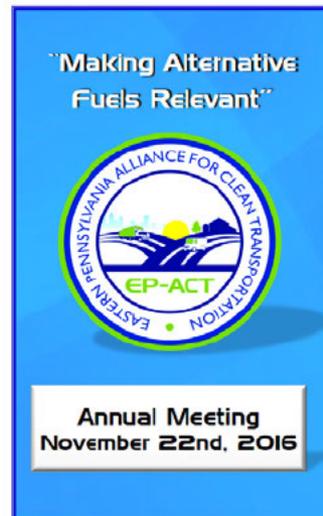
Please contact Alternative Fuels program staff at 717-783-8411 or email [RA-AFIG@pa.gov](mailto:RA-AFIG@pa.gov)



# Upcoming EP-ACT Events

November 8<sup>th</sup>-  Workshops

November 21<sup>st</sup> – Annual Stakeholders Meeting



## What can we do for You?

- Workshops/ educational seminars
- Training
- Fleet Analysis
- Facility Analysis
- Informational Resources
- Market Research
- Incentives
- Grant Writing
- Grant Administration
- Project Management



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