



LIQUID FUELS SHORTAGE PLANNING GUIDEBOOK

FOR PENNSYLVANIA LOCAL GOVERNMENTS

FEBRUARY 2020





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INTRODUCTION

Liquid fuels, such as gasoline, diesel fuel, home heating oil, jet fuel, and propane, support transportation systems, residential life, and industrial processes across the Commonwealth daily. Delivery of these fuels relies on a complex supply chain consisting of refineries, pipelines, ports, terminals, and trucks. This supply chain can be strained or disrupted by hazards such as extreme weather and catastrophic disasters, leading to shortages of essential liquid fuels. Extreme weather can disrupt the supply chain through direct impacts (e.g., infrastructure damaged by flooding, wind, flying debris) and indirect impacts (power outages and blocked delivery routes). At the same time that disruptions from extreme weather events impact fuel availability, they also cause a surge in fuel demand from critical fuel users. For example, emergency responders may require increased supplies of vehicle fuel as they work to protect life and property in the wake of the storm, and critical infrastructure facilities may require liquid fuels to power backup generators.

With a changing climate, Pennsylvania expects the frequency and intensity of extreme weather events to increase.¹ Temperature increases associated with climate change are also likely to cause increased demand for cooling in the summer months and an overall higher demand for electricity in the Commonwealth.^{2,3} As heat waves, hurricanes, and flood events become more common and the balance of energy supply and demand shifts over time, anticipating and addressing energy supply chain vulnerabilities will become ever more pressing.

PURPOSE

This *Liquid Fuels Shortage Guidebook for Pennsylvania Local Governments* ("Guidebook") is designed to help county planners and emergency managers anticipate, prepare for, and respond to fuel supply challenges that severely disrupt the fuel supply chain or drastically affect regional fuel demand.

This *Guidebook* focuses primarily on planning for medium-term fuel supply shortages lasting 1 to 3 days. Critical facilities and emergency responders typically have plans and procedures in place to handle short-term emergencies (lasting less than 24 hours), such as those caused by common summer or winter storms. For long-term fuel supply shortages in excess of 3 days, Commonwealth and Federal resources can be mobilized and deployed to provide aid to affected communities; however, these guidelines may also provide assistance during these long-term fuel supply shortages.

Over the medium-term, county emergency management officials may need to aid emergency responders and critical facilities in need of fuel supplies. This aid may involve reaching out to area fuel suppliers that can deliver fuel from outside the county, or drawing on county or local government fuel resources. The *Guidebook* will also help identify additional fuel supplies and proactive strategies to enhance fuel supply and infrastructure resiliency.

The *Guidebook* is laid out as follows:

Section 1 outlines best practices for building energy assurance planning and response teams, and identifying and engaging with energy sector stakeholders.

Section 2 prompts planners to anticipate emergency fuel needs and identify fuel resources in their counties.

Section 3 introduces strategies to strengthen fuel resiliency and mitigate the impacts of fuel shortages.

Section 4 discusses response activities and provides a checklist for emergency management officials to use during events.

The *Guidebook* is accompanied by the *Fuel Shortage Planning Template*, which is an Excel® spreadsheet designed to help officials gather and organize information about critical facilities, emergency responders, emergency fuel demand, fuel resources, and fuel distributors operating in the county. Section 2 of this *Guidebook* contains detailed instructions on how to fill out the *Template*.

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SECTION 1

SECTION 1. ENERGY ASSURANCE PLANNING PRINCIPLES

Emergency response is inherently reactive, and once a disruptive event occurs, local officials are often left scrambling to coordinate resources and response activities. Understanding and preparing for potential disruptions prior to an event can help counties mitigate an event's impact and reduce the scale of emergency response measures necessary.

Counties serve as facilitators for municipalities, energy sector stakeholders, and public sector partners. For example, during fuel shortages, county response activities may include coordinating with neighboring counties to secure alternate fuel supply and communicating with Commonwealth officials on behalf of industry to verify requests for assistance, including regulatory relief via waivers. These actions require knowledge of the relevant stakeholders, easily accessible and up-to-date contact information, and, ideally, pre-established relationships. Working with stakeholders to identify threats and vulnerabilities, align potential resources, and establish communication channels across organizations are crucial steps toward building fuel resilience in the community. This process is referred to as "energy assurance planning."

There are several resources available for communities seeking to begin the energy assurance planning process.

- The Federal Government previously funded local energy assurance planning through grants as part of the American Recovery and Reinvestment Act of 2009. A number of grantee cities completed local energy assurance plans (LEAPs), useful examples of which are linked in [APPENDIX E](#) for reference.
- In addition, the Public Technology Institute (PTI) published the [Local Government Energy Assurance Guidelines, Version 2.0](#) ("Guidelines") in 2011 in collaboration with the U.S. Department of Energy Office of Electricity Delivery and Energy Reliability.⁴ The document outlines a 10-step planning framework to help community leaders prepare for energy emergencies.

Both the PTI Guidelines and completed LEAPs address energy disruptions broadly and do not specifically focus on liquid fuels. This *Guidebook* touches on energy assurance planning principles in [Section 1](#) before focusing on planning and response activities for liquid fuels shortages in [Section 2](#) and [Section 3](#). To ensure comprehensive planning, local planners are strongly encouraged to work through the PTI Guidelines and review the example LEAPs before or in parallel with developing the fuels-focused strategies in this *Guidebook*. In particular, Sections 3.2, 3.3, and 3.4 of the PTI Guidelines may be especially useful for planners starting the process of building an energy assurance team and articulating roles and responsibilities, while Sections 3.7, 3.9, and 3.10 provide additional information on identifying and communicating with stakeholders.

BUILD YOUR COUNTY ENERGY ASSURANCE RESPONSE AND PLANNING TEAM

The first step in the energy assurance planning process is to identify and assemble a team of county-level officials whose work involves fuel supply or fuel acquisition. This document assumes that the primary user of this *Guidebook* is the county official who coordinates this team. This document refers to this person as the "planner."

Although this role will vary by county, in general, the county planner is defined as the county official who is best positioned to coordinate both private and public stakeholders prior to an event, and who has some responsibility for overseeing energy-related preparedness activities. The planner likely works in the county's public safety or emergency management department, although liquid fuels management (and perhaps even energy sector management) may only comprise a fraction of the planner's overall job portfolio.

For the purposes of this document, the emergency management official is the person responsible for coordinating response activities following an event. This person will work with the planner and private and public sector stakeholders to respond to liquid fuels issues. Depending on the county, the roles of planner and emergency management official may be filled by the same individual or by multiple people.

The planner's work should be supported by a working group of colleagues from other county offices, who can share information about fuel needs and supply chains within their county, assist in building partnerships with nongovernmental stakeholders, and execute response activities during events.

RELEVANT COUNTY DEPARTMENTS FOR PARTICIPATION IN ENERGY ASSURANCE PLANNING

- **Emergency Services**, including the **9-1-1 Call Center**, and other emergency response
- **General Services** or other department responsible for facility management
- **Geographic Information Systems** or other department maintaining geospatial data for the county
- **Health Services, Human Services**, or other department responsible for the health and welfare of vulnerable communities
- **Information Technology** or other department that maintains government data centers and secures digital content
- **Local Emergency Planning Committee** for the county or other entity with information about onsite fuels storage at critical facilities
- **Public Information, Public Affairs**, or other department responsible for facilitating communication between the county government and the public
- **Public Safety**, including the **County Sheriff's Office**, and **Corrections Department**, if separate
- **Transportation, Procurement**, or other department responsible for acquiring fuel for government use

IDENTIFY AND COMMUNICATE WITH STAKEHOLDERS

The county planner and emergency management officer serve as the hub of information and communication both prior to and during a fuel supply disruption (see [Exhibit 1](#)). Relationships with stakeholders should include both pre-event communication about preparedness activities and communication during an event about response activities. The various lines of communication will necessitate different degrees and frequency of communication.

The planner should consider which relationships are most relevant for regional fuels resilience and maintain a relationship with at least one point of contact within each stakeholder organization.



Exhibit 1: Stakeholders in Energy Assurance Planning and Response

PUBLIC SECTOR STAKEHOLDERS

Internal Communication

The internal relationship between the planner and other county departments is addressed, in part, by the establishment of the energy assurance working group (see "[Build Your County Energy Assurance Response and Planning Team](#)"). However, the energy assurance working group's activities should be supplemented by coordination with additional departments, as needed. The planner should consider convening periodic tabletop exercises with the energy assurance working group and other departments to practice protocols and anticipate situations that may occur during an event.

In addition, the county planner should maintain relationships with municipalities within the county. Relationships between the county and cities, townships, boroughs, and so forth should include ongoing conversations about fuel needs and semiannual training, as needed.

Communication With Adjacent Counties

Relationships with neighboring counties may already be established through participation in regional coordination activities, such as with Pennsylvania's regional homeland security task forces. These task forces are an important part of the resource request process and provide a mechanism for counties to work together to share assets during disasters.

In addition to maintaining relationships with neighboring counties to coordinate liquid fuels resources, planners should also use knowledge of their county's fuel supply chain to identify additional non-neighboring counties with whom it would be helpful to develop relationships. Counties in which critical supply chain infrastructure is located are particularly useful points of contact during disruptions. For example, planners should consider identifying the location of primary fuel terminals that may supply local critical facilities, and maintain contact information for emergency managers in those counties.

County Contact Information

PEMA maintains a [list of Emergency Management Coordinators and their contact information](#) for every county in the Commonwealth.⁵ Once the planner has identified counties with which to coordinate, use this list to facilitate communication with the relevant officials.

Communication With the Commonwealth

The key Commonwealth agencies that support counties during fuel disruptions are the Pennsylvania Department of Environmental Protection (DEP) Energy Programs Office and the Pennsylvania Emergency Management Agency (PEMA). The Pennsylvania Department of Transportation (PennDOT), Pennsylvania State Police, and the Office of the Governor also play a role in emergency procedures and may interact with county officials.

Prior to an event, planners can build relationships with key points of contact within Commonwealth agencies to ensure that county agencies understand emergency procedures and are positioned to support Commonwealth response activities, as needed.

During an event, a county will communicate with Commonwealth agencies in several capacities as outlined below:

- **Situational Awareness:** Counties should utilize incident management software (e.g., WebEOC, Knowledge Center) to document impacts within their county. Commonwealth agencies use this software for situational awareness to track ongoing incidents and county issues, and to position Commonwealth resources to respond to resource requests.
- **Resource Requests:** When counties need to request resources from the Commonwealth, they should follow the process established by PEMA, utilizing their Logistics section. Counties should notify their area office of the need and work with them to submit the resource request form. Urgent requests in lifesaving situations can be done verbally to either the Area office or PEMA Logistics through the Commonwealth Watch and Warning Center.
- **Waiver Need Verification:** Counties may be called upon to confirm that an emergency situation or liquid fuels shortage exists when waiver requests are received by the Commonwealth from industry. When there is a need to verify the need for waivers, counties will be contacted primarily by DEP, coordinating through PEMA with other Commonwealth agencies. (See [APPENDIX B](#) for additional information about relevant waivers and the county's role in waiver requests.)

As DEP is the Commonwealth agency responsible for coordinating response measures during a liquid fuels supply shortage, counties should contact DEP directly during such events using the list of phone numbers in the box below. Counties should use these phone numbers to communicate fuel needs, fuel waiver requests, or any other Commonwealth assistance requests related to liquid fuels. If the incident involves multiple counties or agencies, DEP will coordinate with PEMA to manage the incident.

Department of Environmental Protection Contact Information

1. DEP Energy Program Office Liaison: 717-783-9713
2. DEP Energy Program Office Main Number: 717-783-8411
3. DEP 24-hour Emergency Response Hotline: 1-800-541-2050

Communication With Federal Agencies

The most relevant Federal agencies for fuel emergencies are the Federal Emergency Management Agency (FEMA), the U.S. Department of Energy (DOE), the U.S. Environmental Protection Agency (EPA), the U.S. Department of Transportation (DOT), and the U.S. Army Corps of Engineers (USACE). The Executive Office of the President also has the authority to declare disasters and lift regulations on multistate regions. Most counties, however, will likely not interact with Federal agencies on a regular basis about fuel shortages, although larger counties may benefit from participating on FEMA task forces. These task forces encourage major cities to share best practices about supply chain management and emergency response procedures.

PRIVATE SECTOR STAKEHOLDERS

Fuels Industry

Energy services vary from other critical infrastructure sectors in that energy infrastructure is primarily owned and operated by the private sector. Thus, cooperation between the county and nongovernmental stakeholders is especially important to ensure continuity of service and alignment of government priorities with private sector activities.

Terminal owners, fuel suppliers, fuel distributors, and fuel carriers each play a distinct role in the fuel supply chain:

- **Terminal owners** own the physical tanks and other infrastructure at an oil terminal, while **fuel suppliers** own the fuel stored at terminals and sell it to distributors.
- **Fuel distributors** purchase fuel from the fuel suppliers and sell it to end-use customers.
- **Fuel carriers** contract with distributors to transport the purchased fuel between terminals and customers. They are solely responsible for the movement of fuel and do not own the product that they carry.

Some companies perform more than one role in the fuel supply chain. For example, while many fuel distributors contract with carriers to deliver fuel to customers, some distributors perform carrier functions themselves by delivering fuel with their own trucks and drivers. Still other distributors deliver fuel through some combination of the two methods, contracting with carriers for some deliveries and using their own fleets for others.

Given how quickly circumstances can change during emergencies and how important it is that key players understand their roles and responsibilities, planners should ensure that private sector stakeholders understand the county's planned emergency response activities and are prepared to support these efforts during an event. For example, county planners may host workshops to ensure that fuel distributors' drivers are familiar with the alternate delivery routes identified for emergency use. County planners may also contact utilities and fuel distributors to discuss prioritization of energy resources across critical facilities. If private entities are unfamiliar with the resource request process, planners should also share additional information on the process from their county's emergency management agency.

Relevant Private Sector Stakeholders for County Coordination

- *Terminal owners*
- *Fuel suppliers*
- *Fuel distributors*
- *Fuel carriers*
- *Industry associations*
- *Utilities*
- *Critical facilities*
- *Citizens*

One of the most important roles of the planner is to maintain situational awareness of fuel needs and supply so that the planner can be in a ready state for an event and relay that information to relevant stakeholders. Section 2 provides further instruction on how to understand and document critical fuel users' associated fuel needs. Planners should also include private sector contacts as potential data sources.

Distributors' Role as an Information Source During Disruptions

Distributors are a valuable resource for planners seeking to understand changing fuel demand and supply during events. Distributors operating in the affected region will usually have a system-level view of customers' immediate needs and current terminal supply. They will also be able to assess whether their delivery capabilities are impacted or will be affected by weather, road restrictions, and driver availability.

There are several ways that distributors receive information on customer demand, and they can use these metrics to gauge regional supply concerns. Some customer facilities have tank indicators that distributors can monitor remotely and observe when supply dips below a set level. Depending on the contract arrangement, this may automatically trigger an order to refill the tank and can indicate when supplies are low across a large percentage of customers. Customers without tank indicators operating under will-call contracts alert distributors directly when they need to be resupplied. A growing backlog of will-call contracts can indicate supply shortages.

Because distributors work directly with terminals to secure fuel, they should also have a sense of whether their primary terminals' operations are affected by the event, and whether terminal supply in the region is sufficient.

Given that relationships with stakeholders are often developed personally and over time, a formal communications plan—through which specific channels and methods of communication with each stakeholder group are documented—can also help ensure that institutional knowledge endures after a planner leaves the position.

The Public

In addition to maintaining relationships with energy sector stakeholders, the county planner should consider how to engage the broader public on issues related to energy shortages.

During an event, providing the public with accurate and timely situational awareness about regional fuel issues can help minimize panic and limit the number of inquiries stakeholders receive from concerned citizens. Among other information, the planner may consider publicizing information on the following:

- The scope, severity, and projected duration of the fuel shortage or power outage
- Resources available to residents experiencing the direct or indirect effects of a fuel shortage, as well as contact information for those resources
- Government contingency plans and actions addressing the disruption⁶

The PTI Guidelines provide additional information on developing a crisis communications protocol and methods to communicate with the public.⁷

Under certain circumstances, the public itself may perform a valuable demand management role in the region. Publicizing information prior to events on the importance of having adequate onsite fuel storage can help reduce the demand for generator fuels during the initial days of a disruption. During events, communicating with the public to encourage voluntary reduction of fuel use (e.g., lowering building temperatures to decrease the need for heating oil, driving less to conserve gasoline) can help stretch scarce resources further.

UNDERSTAND YOUR EMERGENCY AUTHORITIES AND RESPONSIBILITIES

PEMA's [Emergency Support Function Annexes](#) ("Annexes") lay out the counties' authorities and responsibilities under Emergency Support Function (ESF) #12 – Energy. ESFs are a structure set forth by FEMA to coordinate governmental response to disasters by organizing capabilities and responsibilities by sector.⁸ The Annexes state that counties have the following ESF #12 authorities:

- "Regulate utility and energy services and commodities; however, providers remain private enterprises with whom the government usually must negotiate rather than unilaterally compel cooperation."⁹
- "Supplies and equipment will be provided from existing county inventories whenever possible."
- "The county commissioners may issue a declaration of Disaster Emergency which will suspend some of the time-consuming regulations and procedures."¹⁰

PEMA also outlines that a county's role during energy emergencies includes collecting requests for resources from county departments and municipalities, prioritizing those requests, and allocating resources. The county should also assess the scope of damage, inventory resource supplies and needs, and arrange to acquire resources from outside of the county as needed.¹¹ Strategies for executing these activities are contained in Section 2 of this *Guidebook*.

As discussed in the "[Communication With the Commonwealth](#)" section above, the county also has a role in assisting with waivers of Federal and Commonwealth regulations. Under normal circumstances, layers of governmental regulations and restrictions dictate fuel industry operations in order to protect the environment, ensure safety, and collect tax revenue. Under emergency circumstances, however, these regulations can inhibit rapid and efficient distribution of fuels to customers in need. Fuel specifications, restrictions on commercial drivers' hours of service, and penalties related to fuel taxes may all be temporarily waived by the appropriate authorities during emergency circumstances. [APPENDIX B](#) describes these waivers in more detail and provides additional information on the counties' role in securing them.

In addition to the ESF #12 roles stipulated in the Annexes and relevant authorities associated with waivers, each county planner should verify whether their county has additional authorities that could enable them to provide assistance to stakeholders during fuels disruptions.

SECTION 2

SECTION 2. FUEL SHORTAGE PLANNING

Liquid fuels shortage planning is a subset of energy assurance planning that involves establishing plans for how to manage disruptions in the supply of liquid fuels (primarily gasoline, diesel, heating oil, and propane). At the Federal and Commonwealth levels, liquid fuels shortage planning may include plans to facilitate restoration of the supply chain to alleviate the human and economic impacts caused by fuel shortages. At the local level, liquid fuels shortage planning involves managing the impacts on critical facilities and services in the region. Planning activities at the county level include the following:

- Understanding the liquid fuels supply chain, including key fuel transportation and storage infrastructure, the region's fuel quality specifications, fuel supply chain vulnerabilities, and the interdependencies with other critical sectors.
- Identifying and prioritizing the region's critical entities and assessing their liquid fuels needs during emergencies, including both fuels for emergency response vehicles and for running backup generators at critical facilities.
- Gathering contact information for fuel distributors operating in the region in order to help critical entities locate alternate fuel supplies during an emergency.
- Inventorying and documenting government-owned fuel resources that can be drawn on during an emergency, including fuel stored at government sites for non-critical uses, such as transit, school bus, and waste collection vehicle fleets.

Guidelines, tools, and instructions for performing the above planning activities are described in detail in the following subsections of this chapter. Accompanying this *Guidebook* are two key tools for planners:

- The *Fuel Shortage Planning Template*, henceforth referred to as the "*Template*," is an Excel spreadsheet designed to help planners solicit and organize data needed to complete the above planning activities. To receive a digital copy of the *Template*, contact RA-EPENERGYEPL@pa.gov.
- [APPENDIX A](#) provides a description of the Pennsylvania fuel supply chain, including information and maps of key fuel infrastructure, petroleum refineries, pipelines, and storage. The infrastructure maps and information on each of the Commonwealth's storage sites (including primary and secondary terminals) are also included in the *Template*.

UNDERSTANDING THE LIQUID FUELS SUPPLY CHAIN AND VULNERABILITIES

Petroleum products are a crucial component of Pennsylvania's economy, as the Commonwealth has historically been the leading petroleum refiner in the Northeast. Even following the closure of the Philadelphia Energy Solutions refinery in July 2019, Pennsylvania's remaining three active refineries account for nearly 30 percent of the East Coast's refining capacity.¹² Crude oil feedstock for the Pennsylvania refineries is supplied via tanker and pipeline, and is then refined and sent across Pennsylvania and western New York via pipelines, trucks, and rail.¹³

Liquid fuels used in Pennsylvania include gasoline, diesel fuel, home heating oil, jet fuel, and propane. 17 percent of Pennsylvania homes use fuel oil as their primary home heating fuel, and 4 percent use propane.¹⁴ Pennsylvania has nearly 4,000 gas stations across the Commonwealth, and more than 200 million barrels of petroleum products are consumed annually in Pennsylvania, primarily for transportation (gasoline, diesel, and jet fuel).¹⁵

[EIA Report: East Coast and Gulf Coast Transportation Fuels Markets](#)¹⁶

The U.S. Energy Information Administration (EIA) completed a study in 2016 ([East Coast and Gulf Coast Transportation Fuels Markets](#)) that examined and summarized the supply, storage, consumption, and distribution of transportation fuels in the East Coast and Gulf Coast regions of the United States. This resource, in particular the section discussing the central Atlantic sub-region, provides additional information on refineries, bulk terminals, pipelines, marine movements, and other petroleum supply. County planners can utilize this resource in addition to [APPENDIX A](#) to develop an understanding of the petroleum supply chain serving their county.

UNDERSTAND AND DOCUMENT THE FUEL SUPPLY CHAIN

In order to help emergency management officials effectively respond to liquid fuels issues, the planner must understand the regional supply chain and how fuels are produced and moved throughout the Commonwealth to their communities. This includes (1) understanding which bulk petroleum terminals (storage sites) load fuel onto fuel trucks for distribution to retail stations and end users, and (2) understanding how those terminals receive supply.

For example, fuel supply in Blair County is primarily distributed by truck from the Sunoco Logistics and Zenith Energy terminals in Altoona. These terminals, in turn, receive supply via the Laurel Pipeline system, which originates in southeastern Pennsylvania where supply is sourced from Philadelphia area refineries and from pipeline deliveries from the Gulf Coast region or New York Harbor.

[Exhibit 2](#) shows petroleum infrastructure across the Commonwealth of Pennsylvania. There are four operating refineries, three major petroleum product pipeline systems, and approximately 550 terminals located in the Commonwealth. These consist of large, wholesale terminals that store products prior to distribution and secondary terminals that serve as smaller, end-use storage for consumers such as utilities or emergency personnel. See [APPENDIX A](#) for additional information on Pennsylvania's fuel infrastructure.

Planning steps: Understanding the Petroleum Supply Chain

Identifying and documenting the region's petroleum supply chain is the first step toward increasing the resilience of the system. Useful resources for this work include EIA's *East Coast and Gulf Coast Transportation Fuels Markets* report,¹⁷ maps provided in [Exhibit 2](#) and [APPENDIX A](#), and the **Pennsylvania Terminals** sheet, which is included in the *Template*. The data in the **Pennsylvania Terminals** sheet was provided by DEP and includes major storage tanks in the Commonwealth. Note that some of these terminals listed may store contents other than liquid fuels, such as asphalt or industrial chemicals.

Planners are encouraged to document their county's fuels supply chain using the following steps:

1. Identify the names and locations of primary and secondary terminals and pipelines in the county:
 - a. To identify the terminals in the county, the **Pennsylvania Terminals** sheet can be filtered by PEMA region, county, or zip code.
 - b. To identify the petroleum product pipelines serving the terminals, refer to the maps in [APPENDIX A](#).

2. Using these resources, identify the names and locations of supporting infrastructure located in neighboring counties:
 - a. To identify terminals in neighboring counties, refer to the maps in [APPENDIX A \(Exhibit 13, Exhibit 14, and Exhibit 15\)](#). As discussed further in APPENDIX A, each terminal on the map has an identification (ID) number assigned to it, which can be cross-referenced with the "ID" field in the leftmost column of the **Pennsylvania Terminals** sheet.
3. Identify refineries in or near the county, if relevant. As of September 2019, the refineries operating within the Commonwealth are:
 - a. American Refining Group's Bradford Refinery in Bradford, PA,¹⁸
 - b. Delta Air Lines/Monroe Energy's Trainer Refinery in Trainer, PA,¹⁹ and
 - c. United Refining Company's Warren Refinery, in Warren, PA.²⁰
4. Create a reference guide documenting these key elements of the fuel supply chain. Options may include:
 - a. Saving filtered settings on the **Pennsylvania Terminals** sheet in the *Template*,
 - b. Documenting the names and locations of key fuels supply infrastructure in a new sheet at the end of the *Template*, or
 - c. Highlighting and/or labeling the relevant infrastructure on a digital or physical map.

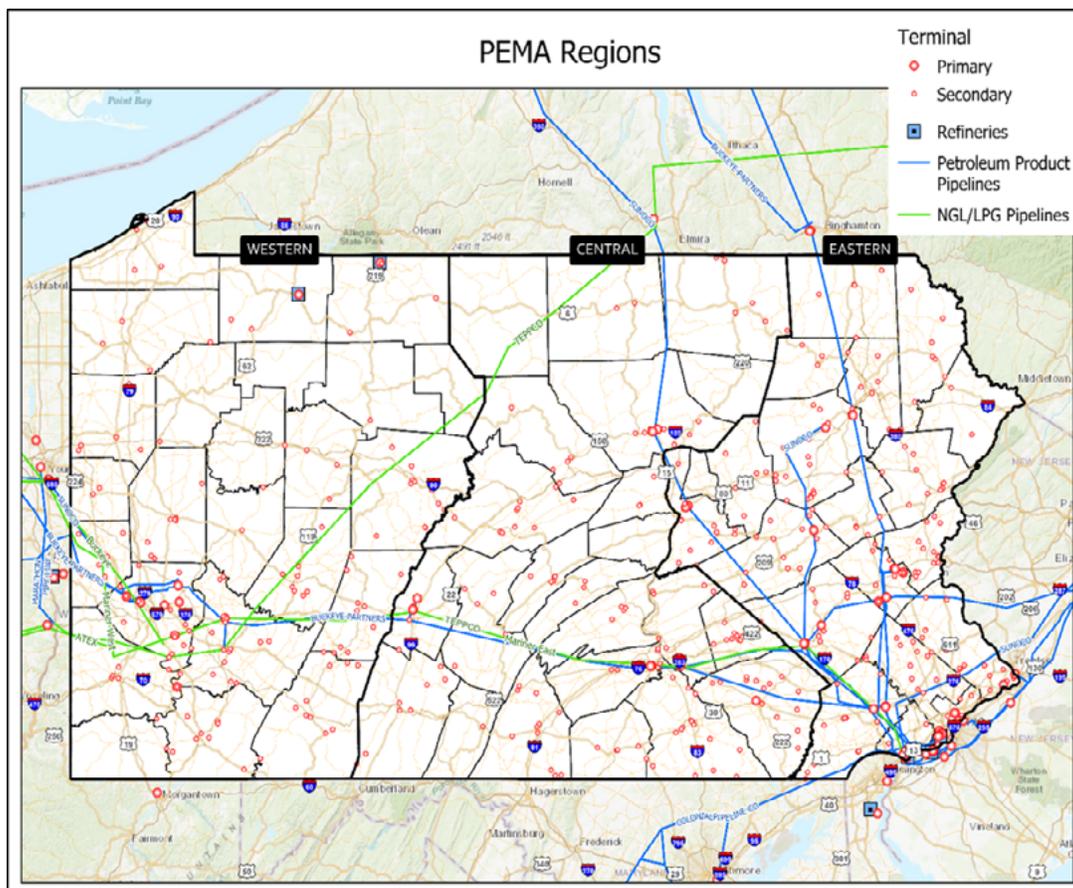


Exhibit 2: Pennsylvania Petroleum Refining and Distribution Infrastructure

UNDERSTAND FUEL QUALITY ISSUES

Local fuel quality specifications may affect the ability to source alternate fuel supplies during a shortage. In particular, gasoline specifications can differ from State to State and from county to county within States. For example, the Clean Air Act requires that southeastern Pennsylvania use reformulated gasoline (RFG), while the rest of Pennsylvania is not subject to these regulations.²¹ New Jersey, Delaware, most of Maryland, and the New York City area of New York also require RFG. Furthermore, in the summertime, conventional gasoline areas in Pennsylvania are allowed to have a Reid vapor pressure of up to 9.0 pounds per square inch.²²

In addition, diesel fuel sold nationwide for on-road use in vehicles is regulated by the EPA to contain no more than 15 parts per million (ppm) sulfur. Although diesel fuel is largely interchangeable with heating oil, its use in vehicles makes it subject to motor fuels taxes. As a result, diesel for off-road use is dyed and stored separately from on-road diesel, and it is illegal to use dyed diesel in on-road vehicles. For additional information about fuel requirements and the counties' role in temporary emergency waivers, see [APPENDIX B](#).

UNDERSTAND LIQUID FUELS SYSTEM VULNERABILITIES AND INTERDEPENDENCIES

Liquid fuels play an important role in maintaining human health and safety in people's day-to-day lives, and supply and demand for petroleum products are incredibly interconnected across sectors. Planners should be aware of the industries and essential services that rely on these fuels, and how events may cause shifts in supply and demand that strain these markets and communities.

Causes of Disruptions

Weather events are the most common cause of power outages and are a significant stressor on fuel availability. In the summer, high winds, debris, and flooding from storms may cause long-term power outages, while ice accumulation and debris on power lines during winter storms can also cause lengthy outages. Outside of storm conditions, malfunctioning equipment has historically caused blackouts, such as the 2003 Northeast blackout.

Often, the same event that disrupts power to a region also damages supporting energy infrastructure. However, physical damage and other disruptions to supply chains can occur independently of storm events. Pipelines, terminals, and refineries can be damaged due to explosions, fires, or equipment failure, reducing the fuel supply available to a region and potentially contributing to long-term fuel shortages. External events, such as disruptions to international supply chains, can affect the broader availability of fuel imports supporting a region and contribute to shortages. See [Exhibit 3](#) for examples of how common disruptions to power supply and physical energy infrastructure can affect fuel availability.

Potential Hazards in Pennsylvania

PEMA identifies the following 11 hazards as "the greatest dangers that have occurred most frequently in the Commonwealth."²³

1. *Transportation accidents*
2. *Fires*
3. *Winter storms*
4. *Tropical storms*
5. *Tornadoes and windstorms*
6. *Hazardous material accidents*
7. *Geological incidents (earthquakes, landslides, and subsidence)*
8. *Nuclear facility accidents*
9. *Dam failures*
10. *Terrorism (including cyberattack)*²⁴
11. *Riots*

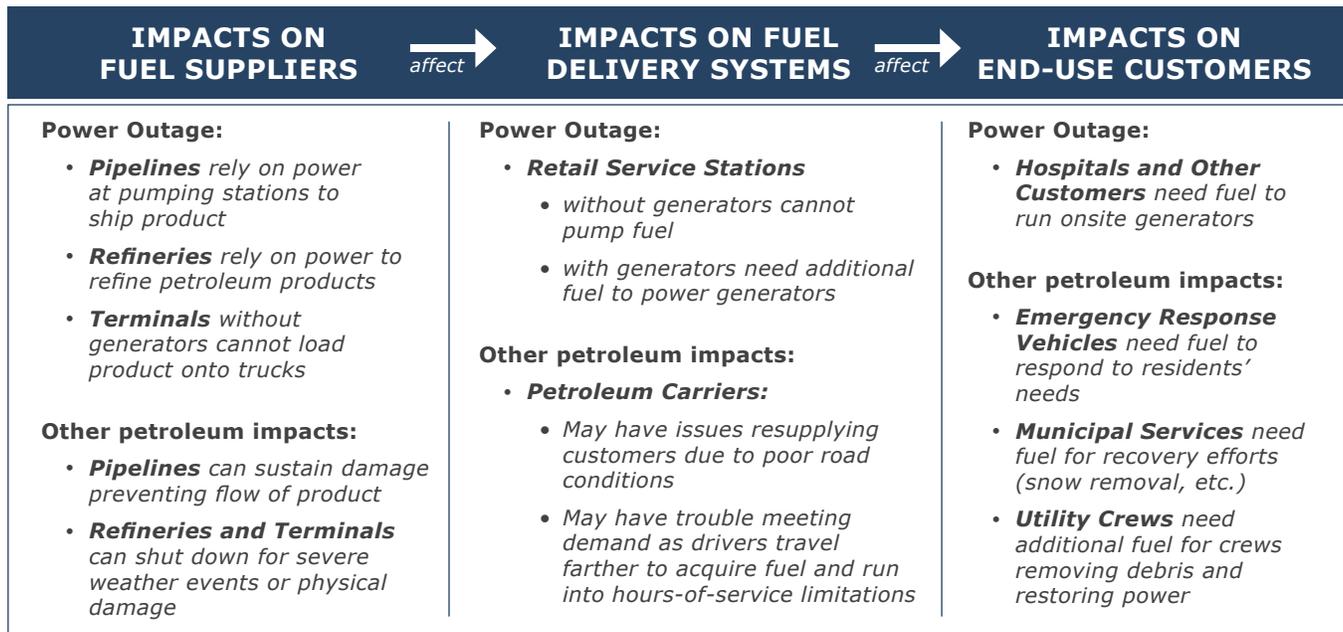


Exhibit 3: Disruptions Affecting Fuel Availability

The length of time a disruption lasts can significantly affect fuel demand over time. For example, diesel fuel demand will continue to increase over a long-duration power outage as hospitals, 9-1-1 call centers, water treatment plants, and other essential services and infrastructure running on backup generators deplete their stocks of backup fuel. The time of year that a disruption occurs can also affect the types of fuel impacted by the event. For example, during winter, demand may spike for home heating oil and propane.

Interconnections across fuel types are also important to anticipate. As an example, during peak natural gas demand periods such as the winter, electric generators with interruptible contracts may be cut off from natural gas supply. These power plants with dual fuel operations would switch operations to diesel fuel to continue producing power. This switch from natural gas to diesel for power generation dramatically increases the regional demand for diesel and instantaneously shifts distributor and carrier demand.

Planning steps: Planning for Disruption

Planners are encouraged to plan for supply disruptions by working through the following list:

1. Apply knowledge of regional fuel supply chain to anticipate threats that could significantly disrupt power or fuel availability in the region:
 - a. Include natural hazards in this analysis, such as hurricanes, snowstorms, and sustained cold spells.
 - b. Include additional hazards, such as pipeline shutdowns or cyberattacks that may stop fuel supply.
2. Anticipate where bottlenecks or single points of failure could occur across supply chains.
3. For a given threat, consider:
 - a. How the duration of the event could vary.
 - b. How the varying durations might affect fuel demand.
 - c. How the time of year would affect demand.
4. Articulate what the “worst case scenario” would be for each event.

5. For each threat, analyze impacts across fuel types:

- a. *Anticipate whether there are interconnections across fuel types that could have cascading impacts during an event, such as the impact of interruptible natural gas contracts on diesel fuel demand.*

PRIORITIZING CRITICAL FUEL USERS AND ASSESSING EMERGENCY FUEL NEEDS

To prepare for liquid fuels shortages, planners should identify critical facilities and services in their counties, prioritize them, and assess their anticipated fuel needs during emergency events.

IDENTIFYING AND PRIORITIZING CRITICAL FUEL USERS

County planners should develop lists of critical users that maintain human health and safety, protect the natural environment, or maintain the economic vitality of the region. These entities should include first responders, such as police, fire, and emergency medical services, and critical facilities, such as hospitals, water treatments plants, and community emergency shelters. Critical users may include both Commonwealth and local government entities, as well as private sector entities that provide critical services to the community. Planners should note that some of these entities—such as police and fire services—may use fuel during normal operations, while others—such as water treatment plants or hospitals—may only need fuel to run backup generators during power outage events. Users may also require several fuels for different purposes, such as diesel fuel for backup generators and gasoline to power vehicle fleets.

Once the planner has compiled a list of all critical users, prioritize the users to help emergency management officials manage requests and allocate limited fuel resources during a fuel shortage or power outage. The [Local Government Energy Assurance Guidelines](#) created by PTI suggest three metrics to prioritize assets:

1. Length of time before the occurrence of serious impacts: Critical facilities that might experience effects from a supply disruption may almost immediately warrant rapid response.
2. Nature of potential impacts: Critical facilities that involve potential public safety impacts may warrant a more rapid response than those with only potential inconvenience impacts.
3. Number and groups of people potentially affected: Critical facilities where a large number of people would be affected may warrant a more rapid response than those where only a few would be affected. Also, critical facilities that serve primarily seniors or children might require more rapid response than those that serve primarily able-bodied adults."²⁵

Examples of Critical Facilities and Services

- *Emergency response infrastructure and activities: Firefighters, police, and emergency medical services*
- *Emergency communications systems*
- *Hospitals and other medical services and infrastructure*
- *Water and wastewater infrastructure*
- *Community emergency shelters*
- *Prisons and detention centers*
- *Infrastructure for vulnerable populations: Nursing homes and retirement communities, schools, or social services*

Publicly available LEAPs indicate that many local governments have chosen to prioritize their assets not as a ranked list, but rather two or three tiers of priority. The Salem, OR, and Visalia, CA, LEAPs linked in [APPENDIX C](#) provide examples of how local governments have chosen to prioritize critical fuel users according to the regions' unique characteristics.

When developing and prioritizing the list of critical users, planners should consider how requests for fuel align with requests for other resources or services. Planners should keep in mind that, depending on the situation, it might not make sense for high-need users to receive priority for all resources, as receiving certain services may negate the need for others. During a power outage, for example, prioritizing a hospital for both priority utility power restoration and priority delivery of liquid fuels for backup power generation may be inefficient if power can be restored before fuel is delivered to the hospital. Once one service is accomplished, the need for the other service lessens or can be eliminated.

Hospital Fuel Requirements and Best Practices

There is no requirement that hospitals in Pennsylvania maintain a certain amount of onsite fuel storage for backup generation, although there are various rules related to emergency operations and backup power issued by the Joint Commission and the Centers for Medicare and Medicaid Services (CMS). The Hospital and Healthsystem Association of Pennsylvania (HAP) also plays an active role in monitoring hospital needs during power outage events.

The Joint Commission requires that hospitals have a plan for up to 96 hours during emergencies. The rule does not require the hospital to be fully functional or for the hospital to have generators with 96 hours of fuel stored onsite, but requires that the facility understand the decisions it will need to make to scale down demand or increase supply in order to function for 4 days.²⁶

In 2016, CMS published the Emergency Preparedness Requirements for Medicare and Medicaid Participating Providers and Suppliers. In addition to requirements that hospitals implement emergency and standby power systems and have generators tested and inspected, CMS requires that hospitals which store fuel onsite must have a plan to keep emergency power systems operational during events. According to CMS's interpretive guidelines, "This would include maintaining fuel onsite to maintain generator operation or it could include making arrangements for fuel delivery for an emergency event. If fuel is to be delivered during an emergency event, planning should consider limitations and delays that may impact fuel delivery during an event. In addition, planning should ensure that arranged fuel supply sources will not be limited by other community demands during the same emergency event."²⁷

CMS also requires participating hospitals to comply with the 2012 edition of National Fire Protection Association (NFPA) codes 110 and 99.^{28,29} Among other requirements, NFPA 110 requires that hospitals must maintain onsite storage of an alternate fuel for generators in locations with a high likelihood of fuel supply disruption. NFPA 110 also requires that facilities located in seismic zones maintain at least 96 hours of fuel supply. No hospitals in Pennsylvania are located in seismic zones.

HAP plays an active role monitoring hospital needs during power outages. As part of HAP's emergency checklist, the organization gathers information from hospitals on the estimated time until their power is restored. Hospitals receive this estimate from their utilities. Based on its understanding of hospitals' criticality and their power and fuel needs, HAP then contacts the Pennsylvania Department of Health and Pennsylvania Public Utility Commission, as needed, to request priority power restoration.

Given HAP's overarching view of critical health facilities, county officials should reach out to HAP during prolonged regional power outages to share information and identify hospitals that do not have enough fuel to operate until the estimated restoration time.

Planners may also consider the interaction *between* the PTI prioritization metrics, including situations in which a user anticipating extreme impacts from supply disruption also anticipates a long period before those impacts begin. For example, prolonged power outages at hospitals can be extremely dangerous for public health and emergency response.

When prioritizing energy response activities, planners should also consider how addressing problems at critical upstream supply facilities can have a positive cascading effect on multiple downstream critical fuel users. For example, rather than focusing efforts on finding and delivering fuel to individual users, planners may prioritize power restoration at bulk petroleum terminals, which may increase overall fuel availability in the region.

Finally, in addition to helping allocate fuel resources during emergencies, establishing a tiered priority system for critical users can also inform efforts to establish targeted preparedness guidelines. For example, the planners might encourage all Priority 1 critical entities to have 72 hours of onsite, or closely accessible, fuel supply.

The following instructions describe the process for recording information on critical fuel users in the *Template*. Following the instructions for filling in information in the *Template* is a mock-up with examples of what types of information may be included. Each county will have their own critical facilities and their own prioritization of fuel based on the needs of that community.

Planning steps: Critical Fuel User Identification

1. Open the **Critical Fuel Users** tab of the *Fuel Shortage Planning Template* and navigate to the "Critical User Information" section. (See [Exhibit 4](#) for a screenshot.)
2. Identify critical facilities and services within the county:
 - a. Begin by identifying all county-owned critical facilities and services.
 - b. Next, identify municipality owned critical facilities and services.
 - c. Finally, identify nongovernmental facilities and services (e.g. nonprofit or for-profit hospitals).
 - d. Acquiring information about critical facilities may require coordination with municipalities and private sector stakeholders.
3. Gather baseline information and contact information on each critical entity and record it on the planning template. Include the following information:
 - a. User type (e.g., hospital, law enforcement)
 - b. Name of entity
 - c. Primary address
 - d. Name of a point of contact within the organization or facility
 - e. Phone number, preferably a 24-hour phone line for use during emergencies
 - f. Email Address
4. If a user requires fuel for both facilities and fleets, place this information on separate lines of the spreadsheet.
5. Using the guidance from the [Local Government Energy Assurance Guidelines](#), assign a priority rank or tier to each entity, and include this information in the "Priority" column.

EXAMPLE Critical User Information						
Priority	User Type	Name of Entity	Primary Address	Point of Contact	Phone Number	Email Address
1	Emergency operations center	Pennsville County Emergency Operations Center	4 Pineview Road, Adamsville, PA	Martha Redding, Emergency coordinator	XXX-XXX-XXXX	
1	Municipal police department-Facility	Washingtonville Police Department	33 Main Street, Washingtonville, PA	Officer Ryan Friendly	XXX-XXX-XXXX	
1	Municipal police department-Fleet	Washingtonville Police Department	33 Main Street, Washingtonville, PA	Officer Ryan Friendly	XXX-XXX-XXXX	
1	Hospital-Facility	Pennsville Regional Hospital	1111 Hospital Way, Adamsville, PA	Robert Hart, VP of Operations	XXX-XXX-XXXX	
2	Hospital-Fleet	Pennsville Regional Hospital Ambulance Corps	1111 Hospital Way, Adamsville, PA	Robert Hart, VP of Operations	XXX-XXX-XXXX	
2	Water treatment plant	Pennsville County Water Treatment Plant	222 River Run Drive, Adamsville, PA	Emily Waters, Plant manager	XXX-XXX-XXXX	
3	Nursing home	Sunshine Senior Living	555 Shady Grove Road, Washingtonville, PA	Paul Livingston, Chief Operating Officer	XXX-XXX-XXXX	

Exhibit 4: Example Template: Critical Fuel Users – Critical User Information

ASSESSING EMERGENCY FUEL NEEDS

Once critical fuel users have been identified and prioritized, planners should gather information from each user on the volume of fuel they anticipate needing during an emergency. These anticipated fuel needs should be classified by fuel type (gasoline, diesel, heating fuel, or propane) and should cover fuels needed for vehicle operations (for first responders), as well as fuel needed to run onsite generators. Fuel assessments for generators should cover both fuel use at facilities with permanent onsite generators and any facilities that anticipate receiving a generator during a prolonged outage.

Planning steps: Critical Liquid Fuels Need Assessments

1. Remaining in the **Critical Fuel Users** tab of the *Template*, navigate to the “Fuel Needs and Storage” section. (See [Exhibit 5](#) for a screenshot.)
2. Survey critical users to gather information on their operations regarding their fuel use and storage capacity.
3. Collect information on the types of fuel used and record this information in the “Type of Fuel” column:
 - a. Remember that fuel used may include diesel for generators, diesel and/or gasoline for fleets, heating oil, propane, and so forth.
 - b. If a user employs more than one type of fuel (e.g., heating oil for facilities and diesel for a backup generator), list each fuel on a separate line of the *Template* so that the critical user has multiple associated lines. Doing this will allow the planner to filter the finished table by fuel type.

4. For each fuel type, record the user's anticipated fuel usage under emergency circumstances. Record this anticipated amount (in gallons per day) in the "Emergency Demand" column.
5. For each fuel type, determine whether the critical user has access to stored fuel. Storage may be located onsite, or it may be in a nearby location offsite but accessible during an emergency. If the user maintains a store of fuel, use the "Available Storage Capacity" column to record the maximum volume of fuel that the storage tanks can hold.
 - a. Many storage tanks are not typically filled to their maximum capacity on a given day under normal operations. Tanks can operate below their maximum capacity for a variety of reasons. Fuel customers may wait until the tank is below a certain threshold before ordering the next shipment in order to maximize the fuel delivered per shipment. In addition, some operators who do not use the fuel on a regular basis may keep their tanks partially full to minimize the cost of fuel and the amount of fuel they will need to turn over in their tanks. If the storage tanks are not typically filled to their maximum capacity, it would be misleading to plan for emergency needs based on a maximum capacity. Therefore, planners should determine the average volume of the critical user's storage tanks and record this number in the "Average Available Inventory" column.
 - b. If the user always maintains its storage tanks at full capacity, copy the value from the "Available Storage Capacity" to the "Average Available Inventory" column.
 - c. Record in the "Notes" column at the end of the sheet whether the stored fuel can be accessed without power.
6. Calculate how many days the user's stored fuel would last during an emergency by dividing the "Average Available Inventory" entry by the "Emergency Demand" entry and record this number in the "Estimated Fuel Reserve Duration" column.
7. Record how frequently the user's fuel storage is typically refilled, and record this value in the "Frequency of Fuel Delivery" column. Over time, facilities can gradually use fuel, depleting their stocks, and once they fall below a given threshold, they will purchase more fuel and refill their tanks. This leads to stock levels within storage tanks operating in a saw-toothed pattern. Knowing how frequently the facility typically receives product will give planners an understanding of the typical non-emergency demand. It also can give an indication of how long the facility can operate between refueling. A facility that only uses fuel for generators is likely not going to have much variability in their stock levels, and will refill infrequently, while a facility that uses fuel for daily use, such as for police cars, may have low stocks of fuel at the start of an event, depending on when the event started.
 - a. If the user relies on a retail station for fuel, use the "Notes" column to capture any additional information about the location, such as whether it has access to a backup generator.

EXAMPLE Critical User Information	EXAMPLE Fuel Needs and Storage						
Name of Entity	Type of Fuel	Emergency Demand (Gallons per Day)	Available Storage Capacity (Gallons)	Average Available Inventory (Gallons)	Estimated Fuel Reserve Duration (Days)	Frequency of Fuel Delivery (Days Between Deliveries)	Percentage of Fuel Needs Met by Offsite Filling Locations
Pennsville County Emergency Operations Center	Diesel	100	500	500	5.0	60	
Washingtonville Police Department	Diesel	120	1,000	800	6.7	30	
Washingtonville Police Department	Gasoline	300	250	200	0.7	N/A	100% of fuel purchased offsite as needed
Pennsville Regional Hospital	Diesel	5,000	15,000	15,000	3.0	45	
Pennsville Regional Hospital Ambulance Corps	Diesel	100	150	100	1.0	N/A	100% of fuel purchased offsite as needed
Pennsville County Water Treatment Plant	Diesel	500	3,000	2,500	5.0	30	
Sunshine Senior Living	Heating oil	150	550	450	3.0	20	

Exhibit 5: Example Template: Critical Fuel Users – Fuel Needs and Storage

GENERATORS

Much of the fuel used at critical facilities during power outage events is used to run backup generators. To gather data on backup generators and potential backup generator needs at critical facilities, county planners should encourage operators of critical facilities to use the U.S. Army Corps of Engineers' (USACE) Emergency Power Facility Assessment Tool (EPFAT).³⁰ Critical facilities with backup generators can use EPFAT to submit key information about their generators (e.g., load size, configuration, fuel type).

Critical facilities that do not have generators can conduct a generator assessment to determine the generator size needed to power essential functions at the facility and enter data from that assessment into EPFAT. Planners should request access to EPFAT data from USACE and incorporate the generator assessment data for facilities in their counties in their planning materials. County planners should encourage operators of critical facilities to confirm that EPFAT data are up to date; this should be done at least once per year.

Resource Toolkit: Emergency Power Facility Assessment Tool

EPFAT was created to help USACE aid FEMA after disasters to expedite generator installation at critical facilities. Facility owners and operators submit information on their generators directly into the portal related to the availability of onsite backup generators at each facility and the ability of alternate generators to be connected via hookup. Additional information on the generator phase and configuration, load size, voltage, number of runs, size, cable size, and ground size are also included.³¹

Emergency response agencies at the city, county, Commonwealth, and Federal levels may access this data. While EPFAT does not specifically collect information on fuel, its information should prove to be a useful starting point for planners to be used over time.

The *Template* collects information on generators to help planners determine their contribution to regional fuel demand. Data from the EPFAT will be a useful starting point for completing this section, although planners will likely need to gather additional information directly from critical facilities. The Generators section is included for ease of reference during fuel shortages and is not intended as a comprehensive generator assessment, which typically contains additional information on generator specifications, locations, and other relevant information for emergency response officials. For counties that have not yet conducted comprehensive generator assessments, the information requested in the *Template* may serve as the foundation for future data-collection efforts.

Planning steps: Generator Assessments

1. Remaining in the **Critical Fuel Users** tab of the *Template*, navigate to the “Generators” section. (See [Exhibit 6](#) below for a screenshot.)
2. Starting with data acquired from EPFAT, gather additional information from critical users to determine their generator capabilities and needs. If a critical user has a generator, record this information in the “Generator Onsite (Y/N)” column. If the user does not have a generator, click “No” in this column, fill the following columns with “N/A,” and proceed to [“Identifying Fuel Availability Fuel Distributors”](#) in the *Guidebook*.
3. Using the dropdown options, identify whether generator power is initiated automatically during an emergency or whether the generator needs to be started manually.
4. Record the generator’s capacity in kilowatts in the “Capacity” column.
5. Determine what fuel runs the generator (likely diesel) and record this in the “Fuel Type” column:
 - a. If the critical user employs multiple fuels (and thus has multiple lines on the **Critical Fuel Users** sheet), include information about the generator on the line matching the relevant fuel type. That is, if the generator runs on diesel fuel, include information about the generator on the line that contains the user’s diesel fuel demand and available storage.
6. Briefly describe the extent of generator coverage at the facility in the “Facility Coverage Description” column. For example, the backup generator may be able to power the full facility, or it may only power critical functions or certain sections of the building.

7. Ask the critical user to estimate the rate at which the generator uses fuel when running at full load. Record this in the “Estimate Burn Rate-Full Load” column.
 - a. If the user is not able to estimate the burn rate, online resources such as the [Diesel Service and Supply “Approximate Diesel Fuel Consumption Chart”](#) can be used to estimate the full load burn rate by generator size.³²

8. From this information, the *Template* will estimate how many hours the generator can run based on the average inventory of fuel. This estimate assumes that the generator is the only source using the fuel. If this fuel is used for vehicle use or non-generator use, the estimate should be revised down accordingly. This value will appear in the “Estimated Run Time” column and is calculated by dividing the “Average Available Inventory” entry by the “Estimated Burn Rate-Full Load” entry.
 - a. Planners should keep in mind that this value is a rough estimate and not necessarily representative of the current situation during an event. Actual stored volumes at the moment an event occurs could be higher or lower than the estimated average volume of fuel.

EXAMPLE Critical User Information	EXAMPLE Generators						
Name of Entity	Generator Onsite (Y/N)	Generator Power Initiated (Manually/Automatically)	Capacity (kW)	Fuel Type	Facility Coverage Description	Estimated Burn Rate-Full Load (Gallons/Hour)	Estimated Run Time (Hours)
Pennsville County Emergency Operations Center	Yes	Yes	100 kW	Diesel	Full facility	7.4	67.6
Washingtonville Police Department	Yes	No	60 kW	Diesel	Critical functions only	4.8	166.7
Washingtonville Police Department	No	N/A	N/A	N/A	N/A	N/A	N/A
Pennsville Regional Hospital	Yes		500 kW	Diesel		35.7	420.2
Pennsville Regional Hospital Ambulance Corps	No	N/A	N/A	N/A	N/A	N/A	N/A
Pennsville County Water Treatment Plant	Yes		150 kW	Diesel		10.9	229.4
Sunshine Senior Living	No	N/A	N/A	N/A	N/A	N/A	N/A

Exhibit 6: Example Template: Critical Fuel Users – Generators

IDENTIFYING FUEL AVAILABILITY

FUEL DISTRIBUTORS

Distributors acquire fuel from bulk terminals and arrange for its delivery to their customers. The number of distributors operating in a county, the scale of their operations, and their flexibility in procuring fuel from multiple locations can all affect regional fuel resilience.

During times of fuel shortage, if critical fuel users cannot obtain fuel from their distributors, emergency management officials can help facilitate communication with alternate fuel distributors in the region. The "[Coordinating Fuel Supply for Critical Fuel Users](#)" section discusses emergency management officials' role in facilitating emergency fuel supply in more detail.

For counties to properly provide assistance during fuel shortages, planners should develop a list of regional fuel distributors that can be quickly referenced. County planners can develop this list of distributors by identifying the distributors supplying the critical facilities and the distributors supplying local government accounts. Contact information for additional distributors operating in the region can be found in the **Fuel Distributors** sheet of the *Template*.

In addition to maintaining the contact information for local fuel distributors within the *Template*, planners should communicate with these distributors to better understand their capabilities and resiliency, and to inform distributors about which facilities are considered to be priorities by the county. The "[Fuel Supply Strategies](#)" section of this *Guidebook* recommends strategies for selecting fuel distributors and assessing their resilience.

Planning steps: Identifying Users' Fuel Distributors

1. Moving to the "Fuel Distributor Supplying User" section of the **Critical Fuel Users** tab, ask the critical users to provide information on the distributors supplying them with fuel. (See Exhibit 7 for a screenshot.) List the name of the distributor in the "Distributor" column and include information on a point of contact within the company in the "Point of Contact of Distributor" and "Phone Number of Distributor" columns.
2. Include any additional information on the distributor's services or the contract terms in the "Notes" column.

EXAMPLE Critical User Information	EXAMPLE Fuel Distributor Supplying Facility			Notes
	Distributor	Point of Contact of Distributor	Phone Number of Distributor	
Pennsville County Emergency Operations Center	Smith Brothers Fuel	Reginald Smith	XXX-XXX-XXXX	Have confirmation that user is priority customer during emergency
Washingtonville Police Department	Smith Brothers Fuel	Reginald Smith	XXX-XXX-XXXX	
Washingtonville Police Department	N/A			Receives fuel from the Sunoco on I-80
Pennsville Regional Hospital	Reliant Fuel	Jessica Vasquez	XXX-XXX-XXXX	
Pennsville Regional Hospital Ambulance Corps	N/A			Receives fuel from the Sunoco on I-80
Pennsville County Water Treatment Plant	ABC Fuels	Tom D'Angelo	XXX-XXX-XXXX	Have backup contract with Reliant Fuels
Sunshine Senior Living	ABC Fuels	Tom D'Angelo	XXX-XXX-XXXX	

Exhibit 7: Example Template: Critical Fuel Users – Fuel Distributor Supplying User

Identifying Government Fuel Resources

During fuel shortages, emergency management officials can provide assistance to critical fuel users in acquiring fuel if their regular suppliers are unable to meet their needs. The first step during a shortage is always for facilities to request additional fuel from their distributor, and if that fails, to attempt to secure fuel from an alternate distributor. Emergency managers can help facilitate finding an alternative distributor through open communication with industry.

Under more extreme circumstances, emergency management officials may facilitate the use of government stores of fuel for critical users. When this occurs, officials should look to the large-scale fuel tanks owned by the county, municipalities, and regional offices of Commonwealth agencies, including facilities that may be operated by government contractors.

Some of these government tanks may be associated with critical government facilities, in which case the fuel storage information should already be captured by the planner in the “Identifying and Prioritizing Critical Fuel Users” section of the *Template*. However, additional fuel storage may be located at facilities not deemed critical during emergencies. These resources may include fuel storage supporting transit agency vehicles, postal service vehicles, waste collection vehicles, or school buses. Some of the fuel sources that support critical activities and are reported under the **Critical Fuel Users** tab may only be critical during certain times of the year. For example, fuel stored for snowplows would only be considered critical during snow events, but otherwise could potentially aid during an emergency.

Planners can help direct emergency responders and other critical fuel users to these additional fuel resources during severe fuel shortages but should keep in mind any limitations that the facility may have. An example of a limitation could be that during a power outage, facilities with fuel may require generators in order to pump the fuel from their tanks to response vehicles.

If no government facilities within the county have available stored fuel, emergency managers should reach out to planners in adjacent counties to identify fuel resources in those counties that could be obtained. [A list of county emergency management coordinators](#) is found on PEMA’s website.³³

Planning steps: Government Fuel Resources Identification

1. Open the **Local Government Fuel Storage** tab of the *Template* and navigate to the “Facility Information” section. (See [Exhibit 8](#) for a screenshot.)
2. Identify county, municipality, and Commonwealth-owned storage facilities, as well as government contractor-owned storage facilities, that could be used as fuel resources during emergencies:
 - a. For underground tanks and aboveground tanks with less than 21,000 gallons of storage, [tank data](#) from the Pennsylvania DEP can be used to generate an initial list.³⁴
 - b. For larger aboveground tanks, county planners should contact government procurement officials and/or facility operators directly to gather information.
 - c. Note that there will likely be some overlap with onsite storage listed under the **Critical Fuel Users** tab (see Exhibit 5 above). Copy any relevant storage listed in the **Critical Fuel Users** into the **Local Government Fuel Storage** tab, as needed, to ensure a comprehensive list.

3. For each storage facility identified, record the following in the relevant columns:
 - a. Facility name
 - b. Facility address
 - c. A point of contact associated with the facility who has the authority to arrange access to fuel storage during emergencies
 - d. A phone number for the point of contact, preferably with 24-hour availability

EXAMPLE Facility Information				
Agency	Facility Name	Facility Address	Point of Contact	Phone Number
Adamsville Department of Public Transit	Adamsville bus depot	Lot 66, Adamsville Industrial Park	Randy McDonald	XXX-XXX-XXXX
Pennsville County Emergency Management Agency	Pennsville County emergency storage	Lot 70, Adamsville Industrial Park	Wendy Liu	XXX-XXX-XXXX
United States Postal Service	Adamsville Postal Service	Lot 50, Adamsville Industrial Park	Dale Mann	XXX-XXX-XXXX

Exhibit 8: Example Template: Local Government Storage – Facility Information

4. Moving to the “Fuel Storage and Contract Information” section, survey facility operators to gather additional information about storage capabilities. (See [Exhibit 9](#) for a screenshot.)
5. Record this information in the “Fuel Type,” “Available Storage Capacity,” and “Average Inventory” columns, respectively.
 - a. If a single facility contains storage for several fuel types, include a line for each fuel at a given facility in the *Template*.
 - b. Record in the “Notes” column whether the stored fuel can be accessed without power and/or whether a backup generator is available onsite that is sufficient to support fueling operations
6. In the “Fuel Contract Volumes” column, record how many gallons the facility receives per month through its resupply contracts.
7. In the “Frequency of Fuel Delivery” column, note how many days the user goes, on average, between fuel resupply.
8. Note any additional relevant information in the “Contract Terms” column, such as whether the facility has any provisions in its contract related to emergency resupply and whether it is considered a priority customer.

EXAMPLE Facility Information	EXAMPLE Fuel Storage and Contract Information					
	Agency	Fuel Type	Available Storage Capacity (Gallons)	Average Inventory (Gallons)	Fuel Contract Volumes (Gallons per Month)	Frequency of Fuel Delivery (Days Between Deliveries)
Adamsville Department of Public Transit	Diesel	10,000	8,000	1,000	10	Will top off prior to storms
Pennsville County Emergency Management Agency	Diesel	500	500	500	30	Automatic guage installed; Resupply triggered when inventory falls below 50%
United States Postal Service	Diesel	10,000	5,000	1,000	15	Automatic guage installed; Resupply triggered when inventory falls below 30%

Exhibit 9: Example Template: Local Government Storage – Fuel Storage and Contract Information

- Finally, for each storage facility, identify the fuel distributor that supplies the fuel, as well as a point of contact within the organization and contact information. Record this information in the relevant columns of the “Fuel Distributor Supplying Facility” section. (See [Exhibit 10](#) for a screenshot.)

EXAMPLE Facility Information	EXAMPLE Fuel Distributor Supplying Facility			Notes
	Agency	Distributor	Point of Contact of Distributor	
Adamsville Department of Public Transit	Reliant Fuel	Jessica Vasquez	XXX-XXX-XXXX	
Pennsville County Emergency Management Agency	Smith Brothers Fuel	Reginald Smith	XXX-XXX-XXXX	
United States Postal Service	Reliant Fuel	Jessica Vasquez	XXX-XXX-XXXX	

Exhibit 10: Example Template: Local Government Storage – Fuel Storage and Contract Information

USING THE COMPLETED TEMPLATE

Planners may find it most efficient to fill out the *Template* in stages, starting with the information that is easiest to acquire and fleshing out the details over time. However, after completing these steps, the planner should have a completed *Template* filled out with county-specific information.

The completed *Template* is a mapping tool that can help planners identify potential vulnerabilities within the county. For example, the *Template* might help reveal that only one distributor supplies all critical users, which increases vulnerability to fuel shortages if that distributor’s supply chain is disrupted. The completed *Template* may also reveal that there is limited fuel storage available to governments and critical users, and it can be used to identify which critical users would most benefit from additional onsite or offsite storage.

The completed *Template* is also a reference document that emergency managers can use during events to help critical users procure additional fuel. [Section 3](#) describes this process in more detail.

SECTION 3

SECTION 3. FUEL SHORTAGE RESPONSE

The previous section of this *Guidebook* provided detailed instructions to county planners on how to gather and assess information needed during a fuel shortage. This section considers how emergency management officials should respond *during* a fuel shortage. As discussed previously, the county's primary role during an event is to facilitate communication among stakeholders. There are several major areas across which emergency managers should coordinate stakeholder actions.

COORDINATING FUEL SUPPLY FOR CRITICAL FUEL USERS

Early in a shortage event or immediately prior to an anticipated shortage event, emergency management officials should reach out to critical fuel users to remind them of the emergency management office's contact information and to encourage them to notify the county if they experience any fuel supply issues. The emergency manager should encourage users to first attempt to acquire additional fuel from their usual distributors or from backup distributors before reaching out to the county for assistance.

If critical fuel users cannot procure additional fuel and thus request aid from the county, the emergency manager's first step should be to contact other regional fuel distributors to determine whether any of them have available fuel. The manager should first use the **Critical Fuel Users** sheet in the *Template* to identify and contact distributors supplying other critical users within the county. Emergency management officials may also contact county officials in neighboring counties, who may be able to refer to their own **Critical Fuel Users** sheet to identify additional distributors.

If none of these distributors can assist, emergency managers may also refer to the **Fuel Distributors** sheet in the *Template* to find the names of additional distributors operating in the region. The list was developed from a Pennsylvania Department of Taxation list of licensed liquid fuels and fuels tax accounts and was last updated in October 2019.³⁵ The **Fuel Distributors** sheet includes contact information for distributors operating in the Commonwealth, as well as locational information about the county in which each distributor is headquartered and distributors' general delivery region (south, central, and/or east Pennsylvania). Planners can filter the list by these parameters and save the list to create a customized reference document for use in future events.

If no distributors are able to fulfill a fuel request, the manager may identify government-owned fuel resources within the county, if any, that can be used.

Once a distributor with fuel is identified, the emergency manager should connect the distributor directly with the critical fuel user to work out the logistics and payment terms for fuel delivery.

Throughout this process, the manager should also communicate with regional distributors to maintain situational awareness about their ability to meet user demand. As needed, the emergency manager may encourage distributors to prioritize fuel delivery to certain critical customers, such as retail stations along evacuation routes, first responder fleets, or electric utility response crews that need fuel to clear debris from power lines.

Fuel for Emergency Response Activities

In many regions, emergency responders purchase fuel for fleet vehicles at local retail gas stations, rather than fueling from municipal storage tanks. Although this method can be more convenient and cost-effective for municipalities, it also leaves emergency responders vulnerable to power outages or supply issues affecting retail stations.

Planners and emergency managers can address this vulnerability in the following manner:

- *Coordinating with emergency response organizations to identify the major gas stations where emergency response vehicles get their fuel. Note that because emergency response fleets may be owned and operated at several different levels of government, planners may need to coordinate with several entities to identify all of the retail service stations. For example, law enforcement activities may be carried out in a given town by municipal police forces, county sheriff's offices, and/or the Pennsylvania State Police.*
- *Communicating with regional corporate representatives for retail chains early in an event to provide them with 24-hour contact information for the emergency management office.*
- *Encouraging regional corporate representatives for retail chains to notify the emergency management office as soon as fuel supply runs low.*
- *Serving as a facilitator to help retail stations acquire more fuel, as needed, including contacting the station's distributor to request priority refueling.*

PRIORITIZING POWER RESTORATION

Planners should communicate with electric utilities³⁶ in advance of an event to identify critical facilities in the county and encourage utilities to prioritize their power restoration. In general, utilities restore parts of their systems using the following prioritization: transmission lines, substations, main distribution feeders, critical facilities, large customer blocks, small customer blocks, and single customers. County planners can help utilities identify prioritization for critical facilities. During an event, emergency management officials should continue this coordination with utilities and remain apprised of outages and restoration schedules in the region.

If electricity restoration for critical assets is not conducted in a timely manner, the emergency management official can elevate concerns to PEMA. For jurisdictional electric distribution companies (the 11 investor owned utilities that serve the vast majority of electric customers in the Commonwealth), the Public Utility Commission (PUC) can step in and work with the companies and county to resolve the issue. While the PUC does not regulate rural electric cooperatives, the PUC does have a relationship with the Pennsylvania Rural Electric Association (PREA) and can reach out to the PREA.

The Commonwealth requires electric utilities to provide reliable service and make repairs in a timely manner.³⁷ As part of this duty, if PEMA or the Governor's Office request priority restoration of assets during emergencies, the PUC has the authority to direct jurisdictional utilities to perform priority restoration as system conditions allow. Utilities also generally follow instructions from county and municipal emergency management officials if local conditions, such as flooding or fire, require parts of the grid to be shut down for safety reasons.

FACILITATING TRANSPORT

Natural disasters and adverse weather conditions often cause fuel demand to increase even as they obstruct the roads used for fuel delivery. Ahead of an event, fuel distributors should take action to prioritize customers based on geography. Distributors could be proactive by filling tanks in regions that are not easily accessible, whether due to difficult access points such as steep roadways, facility restrictions, natural impediments, construction, PennDOT restrictions, or areas with slow road-clearing activities. Distributors should utilize the PA 511 app to be informed about traffic issues and PennDOT interstate access restrictions.

Once roads become obstructed or closed, if a distributor is unable to reach critical customers, emergency managers can provide assistance in coordinating alternate transportation routes. During fuel shortages, emergency management officials should also communicate with municipal and county departments and PennDOT to prioritize road-clearing activities on fuel transport routes.

SUPPORTING WAIVERS

Emergency management officials should support industry waiver requests, as needed. Although waivers requests are usually initiated by industry and are sent directly to Commonwealth agencies, counties may be asked by the Commonwealth to verify the stated fuel demand and emergency conditions. To do this, emergency management officials should maintain situational awareness about critical users' fuel supply throughout the event. (See [APPENDIX B](#) for additional information about fuel waivers and the process for requesting them.)

RESPONSE CHECKLIST

The *Template* contains a list of emergency response activities that emergency managers may perform during a fuel disruption. A copy of the checklist is included below ([Exhibit 11](#)) for reference. The emergency response activities are mostly ongoing, cyclical activities to help ensure adequate fuel supply for critical facilities and to establish communication across relevant stakeholders.

Many of these actions will likely occur in parallel with the county's other emergency response activities unrelated to fuel availability, and some of these actions may complement other emergency response activities. For example, debris removal from major transport routes facilitates both fuel delivery and fire, law enforcement, and medical response activities. Thus, this checklist should be included in the county's broader emergency response plan and followed in parallel with other emergency response activities.

RESPONSE ACTIVITY CHECKLIST FOR EMERGENCY MANAGERS

Actions	When?	"Contact Info (Fill in blanks as needed)"	County Personnel Involved	Notes
SITUATIONAL AWARENESS / INFORMATION SHARING				
Engage members of Energy Assurance Planning / Response Team	Periodically as necessary			
Engage municipalities to gather information on fuel supply issues	Once initially and as necessary			
Engage neighboring counties to share information on fuel supply issues	Once initially and as necessary			
Engage critical fuel users to:	Once at the onset of an event	Listed in the Critical Fuel Users Tab		
Provide county contact info				
Encourage users to contact county if they have fuel supply concerns				
Engage fuel distributors to:	Once at the onset of an event	Listed in the Critical Fuel Users Tab		
Provide county contact info				
Encourage distributors to contact county if they have operational concerns				
Notify DEP and PEMA of fuel supply issues	Upon receipt of fuel supply concern/request	1. DEP Energy Program Office Liaison: 717-783-9713 2. DEP Energy Program Office Main Number: 717-783-8411 3. DEP 24-hour Emergency Response Hotline: 1-800-541-2050		
Engage public via local news, social media, press release, etc. to:	As necessary			
Educate and update the public on fuel stores and availability				
Request public voluntarily reduce usage				
EMERGENCY FUEL SUPPLY MANAGEMENT				
1) Assess critical fuel users' needs	Upon receipt of fuel supply concern/request	Listed in the Critical Fuel Users Tab		
Current fuel inventories				
Expected fuel needs				
Ability to obtain fuel from normal vendors				
2) Prioritize critical fuel requests	Upon receipt of fuel supply concern/request			
3) Identify available fuel resources:	Upon receipt of fuel supply concern/request	Listed in the Critical Fuel Users Tab		
Contact fuel distributors with county contracts re: fuel availability				
Contact neighboring counties re: fuel distributors & fuel availability				
Contact other regional fuel distributors re: fuel availability				
Contact government facilities with fuel stores to identify fuel volumes available to meet county needs				
Contact PennDOT regional office to coordinate fuel sharing for government services				
4) Direct critical fuel user to available fuel resources	Once a fuel resource has been identified	List of PennDOT regional office contact info		

FUELS INDUSTRY OPERATIONS SUPPORT				
Prioritize power restoration to key liquid fuels terminals and service stations used by first responders	Upon operational concern/request			
Contact utilities to request priority power restoration at these facilities				
Provide generators				
Facilitate road clearing on fuel transport routes	Upon operational concern/request			
Support State agencies (as requested) to confirm need for industry waivers	As needed	1. DEP Energy Program Office Liaison: 717-783-9713 2. DEP Energy Program Office Main Number: 717-783-8411 3. DEP 24-hour Emergency Response Hotline: 1-800-541-2050		

Exhibit 11: Response Activity Checklist for Emergency Management Officer

MAINTAINING AND UPDATING THE TEMPLATE

Planners should periodically revisit the *Guidebook* and *Template* to review procedures and check whether key elements (critical facilities, fuels suppliers, and transportation routes) have changed. In particular, planners should verify annually that contact information for facilities and distributors is current and estimates of users’ emergency demand are accurate.

In addition to routine updates to the contact information and other planning materials, it is important to exercise the planning tools and to incorporate lessons learned from exercise and real-world events. The planning tools can be exercised at the same time that county planners exercise local energy assurance plans. Exercising the liquid fuels shortage planning tools is a good opportunity to test the plan’s relevance and train personnel on procedures. After real-world events, planners should gather stakeholders as soon as possible to discuss how well the plan addressed the disruption and whether it should be updated based on new information or unanticipated interdependencies. The [Local Government Energy Assurance Guidelines](#) provide additional information on both ongoing and after-action updates to energy assurance plans. Planners should utilize this feedback and make modifications to their plans, while also sharing their lessons learned with other county planners.

SECTION 4

SECTION 4. FUEL RESILIENCY STRATEGIES

This section introduces strategies that can be implemented by critical infrastructure operators and emergency response agencies during steady-state conditions to either strengthen their fuel supply resiliency during shortages or to mitigate the impact of fuel supply shortages.

FUEL SUPPLY STRATEGIES

CONSIDER RESILIENCE WHEN SELECTING FUEL DISTRIBUTORS

County planners should encourage critical fuel users to take resiliency factors into account when selecting fuel distributors. Fuel distributors may be better positioned to manage fuel supply shortages if they have more trucks and drivers, handle greater fuel volumes, work with more suppliers, and operate out of more terminal locations over a wider geographic range.

Fuel distributors that have drivers credentialed to access fuel at more terminals will have a greater ability to find alternate fuel supplies during a fuel shortage. Fuel loading procedures vary from terminal to terminal, depending on the terminal's layout and other unique factors. To avoid safety problems (and for insurance purposes), terminal operators require that fuel truck drivers who load at their terminals be credentialed to ensure that they have received training on the terminal's specific loading procedures. This means that during an emergency, fuel truck drivers are often prohibited from accessing fuel at terminals where they have not already received the required training. Therefore, the fuel distributors with drivers that are credentialed at many terminals have access to more terminals, likely across a wider region, during a disruption.

Fuel distributors are also better able to manage shortage situations if they have relationships with multiple suppliers. A single truck load of fuel can cost \$20,000 or more, and fuel sellers at bulk terminals (e.g., companies such as Sunoco, Exxon, Shell) will not sell fuel to distributors that have not already established a purchase account and passed a credit check. Companies that have accounts with more suppliers will have greater flexibility in buying fuel from alternate parties during a shortage event. Larger distribution companies (with greater fuel volumes) are also likely to have higher credit limits and have a greater ability to significantly increase fuel purchases during an emergency event when fuel demand can increase significantly.

Critical fuel users should also understand whether the terminals that their fuel distributors normally draw fuel from have backup power capabilities. Fuel terminals typically cannot load fuel from bulk tanks to tanker trucks without electric power to operate pumps and (for gasoline) vapor recovery equipment. Although some terminals can gravity-feed trucks without power, they typically will not do so for safety (and liability) reasons.

Finally, distributors' and carriers' ability to deliver fuel may be affected by adverse weather conditions, and critical fuel users should understand the circumstances under which their fuel delivery may be disrupted. Under certain emergency circumstances, the Commonwealth bans commercial traffic from interstates and the Pennsylvania Turnpike, or sets other vehicle restrictions to ensure safety. Under extreme circumstances, portions of major highways are shut down to all traffic, forcing fuel distributors to find alternate, and potentially more time-consuming, routes to customers. Even without formal road restrictions, some fuel distributors may experience single point of access issues between fuel terminals and customers during extreme weather events.

County planners should have discussions with the county's existing fuel distributors to understand the scale of their operations, including the number of trucks and drivers, total volume handled, number of credentialed terminals, number of supplier accounts, and so forth. A list of questions to ask fuel distributors is in the box below. Non-county critical fuel users should also ask their distributors these questions and take these factors into account when awarding future fuel contracts.

Resiliency Questions to Ask Fuel Distributors

1. How many trucks and drivers do you have? How many additional trucks and drivers can you contract with during an emergency?
2. Are you licensed as an interstate or intrastate company?
3. At which terminals are your drivers credentialed and carded? How far away can you access fuel terminals?
4. How many suppliers do you have?
5. How do you manage supply shortages? What is your allocation process?
6. Do you consider the contract holder to be a priority customer?
7. Does your primary source terminal have a backup generator or a plan to obtain a backup generator during emergencies sufficient to power truck loading operations?
8. Do you anticipate any single point of access issues with the transportation routes between your fuel supply and my facility? How do you plan to deliver fuel if highway restrictions or closures are enacted?

Spotlight on Distributors With Emergency Fuel Management Services

Some distributors specifically market themselves as providers of emergency supplies of fuel. Their emergency fuel management services may include the following:

- 24/7 emergency communication with customers via email, text, and phone, and guaranteed 24/7 service during emergencies
- Fuel for emergency response fleets and repair crew vehicles, including onsite refueling while crews rest
- Fuel for aboveground and belowground storage tanks
- Fuel deliveries to temporary fueling locations or staging areas
- Organizing and operating temporary fuel depots
- Priority refueling supporting evacuation routes
- Access to vehicles designed for adverse weather conditions, including off-road and high-water transport vehicles
- Established contracts with fuel suppliers in neighboring States to ensure access during an event

Emergency management services oftentimes are established as "on-call" contracts; however, government agencies (typically States) should initiate accounts well in advance of an event so that they can be activated, as needed, during an event. Note that a county's existing distributors may also be able and willing to provide some or all of these services, even if they do not specifically market themselves as providing emergency fuel services.

OPEN REDUNDANT ACCOUNTS WITH MULTIPLE FUEL DISTRIBUTORS

Opening redundant accounts with multiple fuel distributors can help a county obtain fuel when a regular fuel distributor is unable to provide supply. These will-call contract accounts would not typically be utilized during normal circumstances and are free to open, but they can be accessed, as needed, during fuel shortages. Opening accounts ahead of time helps users streamline the sale of fuel during emergencies, as payment processes will have already been established and credit checks already completed. Distributors may require periodic (typically annual) credit checks on dormant accounts.

In addition to facilitating redundant accounts for county government fuel users, the planner should encourage non-governmental fuel users to consider setting up backup accounts as well. The *Template's Fuel Distributors* tab lists fuel distributors operating in Pennsylvania by region, and may be a helpful resource for critical fuel users seeking to identify backup distributors.

NATURAL GAS-POWERED GENERATORS

Natural gas generators have been found to be more reliable than diesel generators and less likely to fail during long-duration power outages.³⁸ Natural gas generators are also subject to fewer environmental regulations than diesel generators.³⁹

Natural gas-powered generators can be supplied gas by local distribution companies or, in areas without gas service, via trucks delivering compressed natural gas (CNG). In recent years, several CNG trucking operations have emerged in the Commonwealth to serve customers who do not have access to existing natural gas distribution infrastructure—a practice informally referred to as a “virtual pipeline,” although the term is officially trademarked by the company Xpress Natural Gas.^{40,41,42} Virtual pipelines are emerging across the Northeast and are used, for example, to truck CNG from Pennsylvania’s Marcellus shale region to towns in upstate New York.⁴³

The emergence of virtual pipelines has increased the flexibility of gas distribution, providing an opportunity for expanded use of natural gas-fired generators for fuel resilience.

ALTERNATIVE FUEL VEHICLES

To reduce dependence on petroleum fuels, emergency responders may consider transitioning vehicle fleets to alternative fuels. For example, a vehicle fleet that runs on compressed natural gas or propane would be less vulnerable to a shortage of gasoline and diesel. U.S. EPA has developed resources that counties can reference when considering alternative fuels.⁴⁴

Federal Resource Toolkit: Clean Cities Coalition Network

The Clean Cities Coalition Network, run by U.S. DOE’s Office of Energy Efficiency and Renewable Energy, provides information and assistance for transportation stakeholders interested in converting fleets to alternative fuels.⁴⁵ In Pennsylvania, there are two Clean Cities coalitions: Pittsburgh Region Clean Cities⁴⁶ and the Eastern Pennsylvania Alliance for Clean Transportation.⁴⁷ The coalitions are comprised of State and local government agencies, businesses, fuel providers, utilities, and community organizations.⁴⁸ The program also includes Tiger Teams that provide technical assistance on vehicle operations, infrastructure, and project feasibility to stakeholders.⁴⁹

Note, however, that alternative fuels such as natural gas and propane have their own supply chains that may not be any more resilient than the petroleum supply chain during an emergency. Similarly, electric vehicles reduce the demand for fuel during normal conditions, but they may still require a diesel generator to charge them during a power outage.

***Commonwealth Resource Toolkit:
Pennsylvania's Alternative Fuels Incentive Grant (AFIG)***

AFIG invests in projects that promote and build markets for alternative energy technology in transportation. The program focuses on the development of alternative fuels and technologies, as well as the deployment of alternative fuel vehicles and fleets. Fact sheets on the program, annual reports, resources on alternative fuel vehicles, and announcements of prior grant recipients can all be found on the DEP website.⁵⁰

Eligible applicants include political subdivisions, school districts, municipal authorities, nonprofits, LLCs and LLPs, and corporations. Eligible projects include vehicle retrofit or purchase projects, alternative fuel refueling infrastructure projects, and innovative technology projects.⁵¹

FUEL STORAGE STRATEGIES

ESTABLISH CENTRAL OR MOBILE FUELING LOCATIONS

As an alternative to refueling vehicles at retail stations, counties can establish central fueling locations reserved for emergency responders. Some Pennsylvania counties noted that they have used PennDOT facilities for this purpose during emergencies.

A variation on this practice is to establish mobile fueling (or “wet hose fueling”) locations to facilitate vehicle-to-vehicle fueling operations from tanker trucks directly to responder vehicles. Mobile fueling is a common practice, and there are many companies that routinely travel to customers (usually businesses) to fill up trucks onsite, usually overnight. Some companies include vehicle-to-vehicle refueling during disasters as part of their emergency management services.

ADD OR INCREASE FUEL STORAGE CAPACITY AT CRITICAL FUEL USER SITES

Adding or increasing fuel storage capacity at critical fuel user sites ensures that fuel supply is available during an emergency. The greater the fuel storage at a site, the longer the user may be able to maintain operations before fuel resupply is needed. Note that fuel (particularly gasoline) cannot be stored indefinitely as the fuel’s quality will deteriorate and become unusable over time, even with stabilizing additives. Fuels kept in tanks must thus be rotated out periodically. One recommended method for rotating fuel is to test and utilize the generators periodically.

ESTABLISH RETAIL PARTNERSHIPS FOR EMERGENCY RESPONDERS

If emergency response vehicles are routinely or exclusively fueled at retail stations during events, local governments may investigate establishing partnerships with individual retail stations or retail chains, or at least have conversations with the fueling station about limitations during emergency situations.

Partnerships may involve reserving pumps to allow emergency response vehicles with a fleet card to expedite refueling operations when there are long lines. Partnerships may also entail requesting that fuel be set aside at specific locations for responder use. However, not all stations will have the ability to reserve fuel, and those that do may be reluctant to forgo selling fuel to regular customers and thus incurring the economic impact associated with that practice.

Users should determine how a power outage might disrupt the retail station's ability to provide fuel. In addition to understanding whether fuel can be pumped during an outage, also discuss whether payment equipment supporting credit card transactions can operate without power.

For retail stations that do not have backup generation, retail station partnerships may also require that backup generators be installed at partnered retail stations, or that partnered stations have a plan to acquire and hook up a backup generator during emergency events.

PRE-POSITION FUEL TANKERS AT CRITICAL FACILITIES AHEAD OF DISASTER EVENTS

For emergency events with prior warning, such as hurricanes or blizzards, emergency management officials can contract with fuel distributors to pre-position full tankers at or near critical fuel user sites prior to an event so that they are ready to deliver fuel, if needed. Under this arrangement, the customer gives a service payment to the distributor for the driver, tanker, and fuel, and the tanker provides fuel to the customer as needed. The fuel remaining in the tanker after the event is returned to the distributor. These arrangements are often used by commercial entities with critical facilities that cannot afford service interruptions, such as cell phone towers or data centers. However, these emergency fuel services are expensive and are likely cost-prohibitive for most counties.

ELECTRIC POWER RESILIENCY STRATEGIES

ENCOURAGE POWER RESILIENCY AT BULK FUEL TERMINALS

Local fuel distributors purchase and load fuel from suppliers at bulk fuel terminals. Fuel terminals typically cannot load fuel from bulk tanks into tanker trucks without electric power to operate pumps and (for gasoline) vapor recovery equipment. Although some terminals can gravity-feed trucks without power, they typically will not do so for environmental, safety, and liability reasons. During a power outage, the inability to pump fuel at bulk terminals can lead to a local or regional fuel shortage. County planners should work with local bulk terminals to ensure that they either have backup generation capabilities or have a plan to obtain backup generators sufficient to power fuel loading operations during emergencies. Alternatively, the county planner can work with the local power utility to ensure that critical fuel terminals are adequately prioritized for power restoration.

UTILIZE DISTRIBUTED ENERGY RESOURCES

Utilizing distributed energy resources (DER) can allow an electricity-dependent critical facility to continue operating during a power outage and can reduce or even eliminate the facility's need for petroleum fuels to run backup generators. DER includes fuel cells, energy storage such as batteries, solar systems, and microgrids.

Microgrids are energy systems that are typically connected to the grid but can disconnect, as needed, and operate independently. When disconnected from the main grid, microgrids generate their own energy to power connected users. Microgrids may generate power through backup generators, batteries, and/or renewable resources.⁵²

Planners seeking additional information on developing microgrids in their county may utilize Pennsylvania State University's [CHP-Enabled Renewable Energy Microgrids in Pennsylvania: A Guidance Document for Conceiving Feasible Systems](#).⁵³ Planners may also find S&C Electric Company's three-part series ([Is a Microgrid Right for You?](#),⁵⁴ [How to Build a Microgrid](#),⁵⁵ and [The Short- and Long-Term Care of Your Microgrid](#)⁵⁶) to be helpful. The nonprofit [Microgrid Resources Coalition](#)⁵⁷ also has documents and webinars that may be of interest to planners.

Energy storage allows energy to be stored and used later. Energy storage technologies allow many types of energy to be stored:

- Chemical energy, stored used batteries (see below)
- Mechanical energy, stored using compressed air, pumped hydropower, or flywheels
- Thermal energy, stored by heating water, minerals, earth, or other materials^{58,59}

Energy storage technology is still an emerging field, especially with respect to storing electricity generated from renewable resources. In 2017, the United States had 431 megawatt-hours (MWh) of energy storage available, compared to 4 billion MWh of energy generated.⁶⁰

However, energy storage can be a valuable part of energy resilience. It can address problems of intermittency with renewable resources; save money by storing energy during low-rate, off-peak periods; and provide backup power during power outages.

Solar plus batteries are one type of energy storage, involving a battery that is charged by connected solar panels. The most popular batteries are lithium-ion batteries.⁶¹ Routine use of solar batteries is becoming more attractive as time-of-use pricing becomes more common, creating a financial incentive to store energy when power is cheap and discharge it when power from the grid would be expensive.⁶² Solar battery storage also provides a short-term source of backup energy during power outages, although the duration and amount of backup energy will vary by battery type and number. Without connected battery storage, grid-connected solar arrays will usually not provide power during an outage.⁶³

EPA's [Renewable Energy Project Development Resource Directory](#) can be filtered to show all resources available to solar projects.⁶⁴ Additional resources that will guide planners through solar storage development include SolSmart's [Solar + Storage: A Guide for Local Governments](#)⁶⁵ and U.S. DOE's informational [Solar-Plus-Storage 101](#).⁶⁶

Hydrogen fuel cells create electricity from the chemical energy created by a fuel (usually hydrogen) and an oxidizer. Hydrogen fuel cells create clean, emission-free energy and can be used to power both small and large systems.⁶⁷ Fuel cells are currently used in buses, backup power systems, combined heat and power applications, and large-scale power plants.^{68,69}

Fuel cell backup generators are available commercially and usually include a start battery and additional compressed hydrogen fuel storage, which can be delivered to the facility via bottle, truck, or pipeline.⁷⁰ Because of their reliability and ability to operate for long periods of time, fuel cells are often recommended for supporting emergency response communications networks and cell tower signal relay sites.^{71,72} Fuel cells used for backup power usually range from 1 to 100 kilowatts, although larger scale fuel cells can also be used for distributed generation and transportation.⁷³

Although investing in DER usually involves high capital costs, DER can lower energy bills over a long period of time, and often complements broader initiatives to increase the use of renewable energy and reduce carbon emissions.

In addition, there are many Federal, State, and even industry incentives to help communities invest in renewable energy, energy efficiency, energy storage, and distributed generation technologies.

Resource Toolkit: Database of State Incentives for Renewables & Efficiency® (DSIRE)⁷⁴

DSIRE maintains a comprehensive list of financial incentives for renewable energy available by State. As of 2019, there are 80 programs available within Pennsylvania. The Federal, State, and commercial incentives on the list include loans, grants, rebates, and tax credits for a variety of renewable energy and energy efficiency activities. DSIRE is funded by U.S. DOE and is operated at North Carolina State University.

Crucially, most DER technology does not simply ensure backup power during disruptions—it also reduces the baseline need for fuels within a region. Technology such as solar with storage and hydrogen fuel cells fundamentally reduces the demand for direct fuel use (e.g., in generators) and electricity generated by petroleum product combustion.

COMBINING RESILIENCE STRATEGIES

Strategies in this section provide a starting point for improving fuels resilience; however, planners should think about the entire fuel supply chain when considering ways to increase resiliency. The vulnerability assessment conducted in [Section 2](#) may be a valuable resource for identifying elements of the supply chain (e.g., distributor access to terminals, transportation routes, onsite storage) in need of additional resilience. Planners should take their findings and build relationships with the relevant stakeholders to discuss ways to improve fuel resilience.

Planners should consider utilizing multiple resilience approaches, as many are complementary. Setting up redundant accounts with multiple distributors is a quick and low-cost method for increasing resilience at key facilities. Pairing this with longer term and more expensive investments would ensure that counties are best equipped to handle events.

Finally, planners should revisit the question of fuel resilience periodically. As planners update the *Template* every few years and after events, the updated information in the *Template* can be used to reassess county vulnerabilities. Planners should also stay informed about new developments in fuel resilience technology and Federal and Commonwealth incentives so that as local circumstances change, the county is poised to take advantage of new opportunities.

APPENDIX

APPENDIX A. PENNSYLVANIA'S PETROLEUM SUPPLY CHAIN

OVERVIEW

This Appendix provides information on petroleum product pipelines, refineries, and storage terminals across Pennsylvania, and includes four maps of fuel infrastructure at the end of the Appendix. In addition to a map of the entire Commonwealth ([Exhibit 12](#)), detailed maps of fuel infrastructure in western ([Exhibit 13](#)), central ([Exhibit 14](#)), and eastern ([Exhibit 15](#)) Pennsylvania are provided for ease of use and additional clarity. The divisions in the regional maps align with the three PEMA regions. These maps are complemented by the **Pennsylvania Terminals and Out-of-State Terminals** tabs in the *Fuel Shortage Planning Template* Excel spreadsheet.

GASOLINE AND DIESEL

The Philadelphia area acts as the main hub for gasoline and diesel consumed in Pennsylvania. It is the location of the 190,000-barrel per day (b/d) Monroe Energy Trainer Refinery (the largest of the three active refineries in Pennsylvania), as well as the origin point for the three main pipeline systems that run throughout the State, including Buckeye's Laurel Pipeline, Buckeye's Eastern Products Pipeline, and Sunoco Pipeline. Gasoline and diesel consumed in Pennsylvania are produced at refineries near Philadelphia, which include the Monroe Energy Trainer Refinery, the 160,000-b/d PBF Paulsboro Refinery in New Jersey, and the 182,200-b/d PBF Delaware City Refinery in Delaware, or it is transported into the area by marine vessel or transported from the Gulf Coast via the Colonial Pipeline.

Colonial Pipeline is a pipeline system that transports petroleum products from the Gulf Coast refineries to markets up the East Coast. From the Philadelphia hub, products are shipped by connecting pipelines to terminals across Pennsylvania or are trucked to nearby retail gas stations or secondary terminals. Pipelines distributing fuel in Pennsylvania include the following:

- Buckeye's **Laurel Pipeline**, running horizontally across the State from Philadelphia to Pittsburgh, has been used to transport gasoline and diesel westward from Philadelphia to central and western Pennsylvania. Gasoline and diesel shipped on the Laurel Pipeline can be sourced from Philadelphia area refineries, including the Monroe Energy Trainer Refinery, PBF Delaware City Refinery, PBF Paulsboro Refinery, PES Philadelphia Refinery (closed as of July 2019), Philadelphia Sunoco Eagle Point marine terminal, Buckeye's Linden Hub in New York Harbor, and Colonial Pipeline. In addition, supply can arrive by several pipelines (owned by Marathon, Buckeye, and Sunoco) from midwestern refineries into the Pittsburgh market. Starting in October 2019, Laurel Pipeline will operate bidirectionally to allow gasoline and diesel shipped from the Midwest to flow as far as Altoona in central Pennsylvania, in addition to the current origin points in the Philadelphia area. See [Exhibit 13](#), [Exhibit 14](#), and [Exhibit 15](#) for maps of the Laurel Pipeline.
- The **Buckeye Eastern Products Pipeline system**, flowing north into upstate New York, delivers gasoline and diesel to Allentown and Scranton in eastern Pennsylvania. The pipeline can source the products from Philadelphia area refineries, Colonial Pipeline, and Buckeye Linden in New York Harbor. See [Exhibit 15: Eastern Pennsylvania Fuel Infrastructure](#), for a map of the Buckeye Eastern Products Pipeline system.

- The **Sunoco Pipeline** moves fuel from Philadelphia area refineries and the Colonial Pipeline to the Allentown, Scranton, Williamsport, and other smaller central Pennsylvania markets. This pipeline can also receive product from Buckeye's Laurel Pipeline in Sinking Springs, PA, for delivery along the pipeline. See [Exhibit 14](#) and [Exhibit 15](#) for maps of the Sunoco Pipeline.

In addition, the 65,000-b/d United Warren Refinery in Warren, PA, and the 11,000-b/d American Refining Group Bradford Refinery in Bradford, PA, make relatively small amounts of gasoline and diesel that are directly trucked from the refineries to retail gas stations and secondary terminals in western Pennsylvania.

PROPANE

Propane is commonly used in residences for cooking and heating water, although fewer than 4 percent of Pennsylvania homes use propane as their primary heating fuel.⁷⁵ The daily demand for propane across the Commonwealth is approximately 1.4 million gallons per day.⁷⁶ In Pennsylvania, residential customers typically receive propane deliveries every 30 days and can last up to 45 days between deliveries during normal winter weather.⁷⁷

Propane is produced from both crude oil refining and natural gas processing. Along with other natural gas liquids (NGLs), propane is a byproduct of Marcellus and Utica shale production in the Appalachian region, which is mainly transported on the Mariner East pipeline system to the Marcus Hook Industrial Complex near Philadelphia for fractionation.

Whether produced at one of the Commonwealth's refineries or from natural gas processing facilities, propane is trucked to distribution terminals and then loaded onto small trucks for delivery to end users. Propane is also transported by rail directly to bulk storage locations or to intermediate terminals. In addition, Enterprise's TEPPCO Pipeline, originating from the Gulf Coast, has delivery points for propane batches across Pennsylvania near Pittsburgh, Lebanon, Reading, and Philadelphia.

ETHANOL AND BIODIESEL

Ethanol and biodiesel are biofuels that are blended into finished gasoline and diesel to meet government requirements or incentives. Approximately 495 million gallons of ethanol were consumed in Pennsylvania in 2017, but the only ethanol production plant in the Commonwealth has a maximum capacity of 128 million gallons per year.⁷⁸ Therefore, at least 75 percent of the ethanol demand in Pennsylvania is transported by rail or truck, originating from the Midwest where most of the U.S. ethanol is produced.

All diesel fuel sold in Pennsylvania must contain at least 2 percent biodiesel.⁷⁹ After the August 2019 closure of the World Energy biodiesel plant in Cumberland County, Pennsylvania's sole biodiesel refinery is Lake Erie Biofuels, which is capable of producing 45 million gallons per year.^{80,81}

Ethanol and biodiesel are typically stored separately from the petroleum-based fuel at the bulk terminals and then are blended into gasoline or diesel when trucks pick up fuel for delivery to retail gas stations.

For more information about transportation fuel markets and logistics, review EIA's [East Coast and Gulf Coast Transportation Fuels Markets](#) report.⁸²

GUIDE TO PENNSYLVANIA TERMINALS

In the event of a fuel shortage, emergency managers can use the maps below, in conjunction with the **Pennsylvania Terminals** and **Out-of-State Terminals** tabs in the *Template*, to better understand the infrastructure supporting their fuel supply chains and identify potential vulnerabilities. The data in these sheets was provided by DEP and includes major storage tanks in the Commonwealth and neighboring states. Note that some of these terminals listed may store contents other than liquid fuels, such as asphalt or industrial chemicals.

On the maps in [Exhibit 13](#), [Exhibit 14](#), and [Exhibit 15](#), each terminal is assigned an identification (ID) number. Note that due to the high concentration of terminals in certain locations, a single ID number may be associated with multiple terminals clustered near one another.

Emergency managers should refer to the relevant map for their region and determine the ID number(s) for the storage facilities in or near the county. The "ID" column in the leftmost column of **Pennsylvania Terminals** can be used to match these ID numbers to storage terminal names, allowing managers to acquire contact information for each location.

Planners should also note whether their region is densely or sparsely populated with terminals. Regions with relatively few terminals may be more vulnerable to disruption than regions with many terminals, and planners in those regions, in particular, should consider discussing emergency plans with distributors, investing in onsite storage, and performing other activities to increase fuel resilience.

In addition, the **Out-of-State Terminals** tab in the *Template* provides information on terminals located in neighboring States. Although it does not contain detailed contact information for all out-of-State suppliers, it can serve as a jumping-off point for emergency managers to acquire fuel in extreme, Commonwealth-wide emergencies or to identify terminals in counties located along a State border. In cases of extreme fuel shortage, contacting a terminal directly may allow emergency management officials to identify distributors that operate out of the terminal, although this method is less efficient than contacting neighboring county planners.

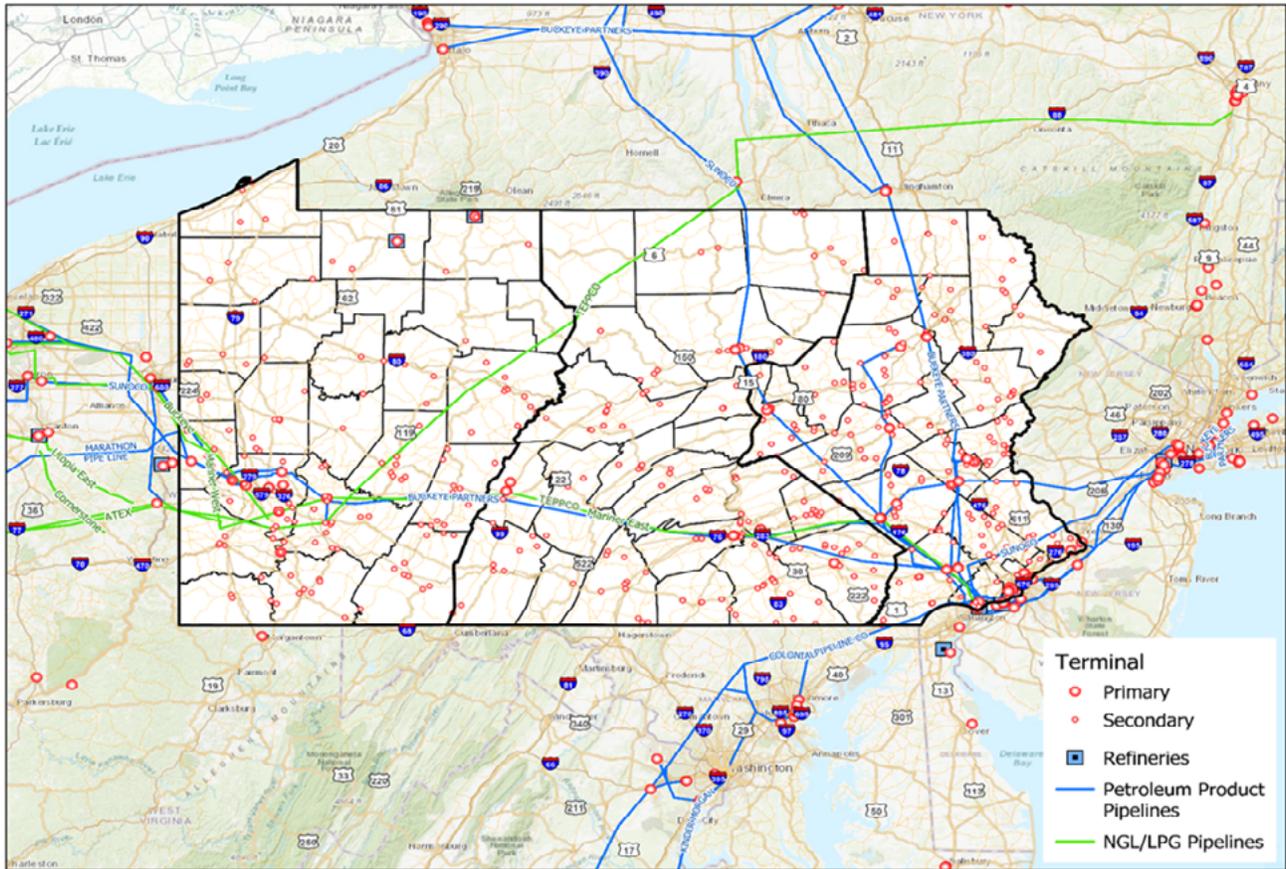


Exhibit 12: Fuel Infrastructure in Pennsylvania

Western PEMA Region

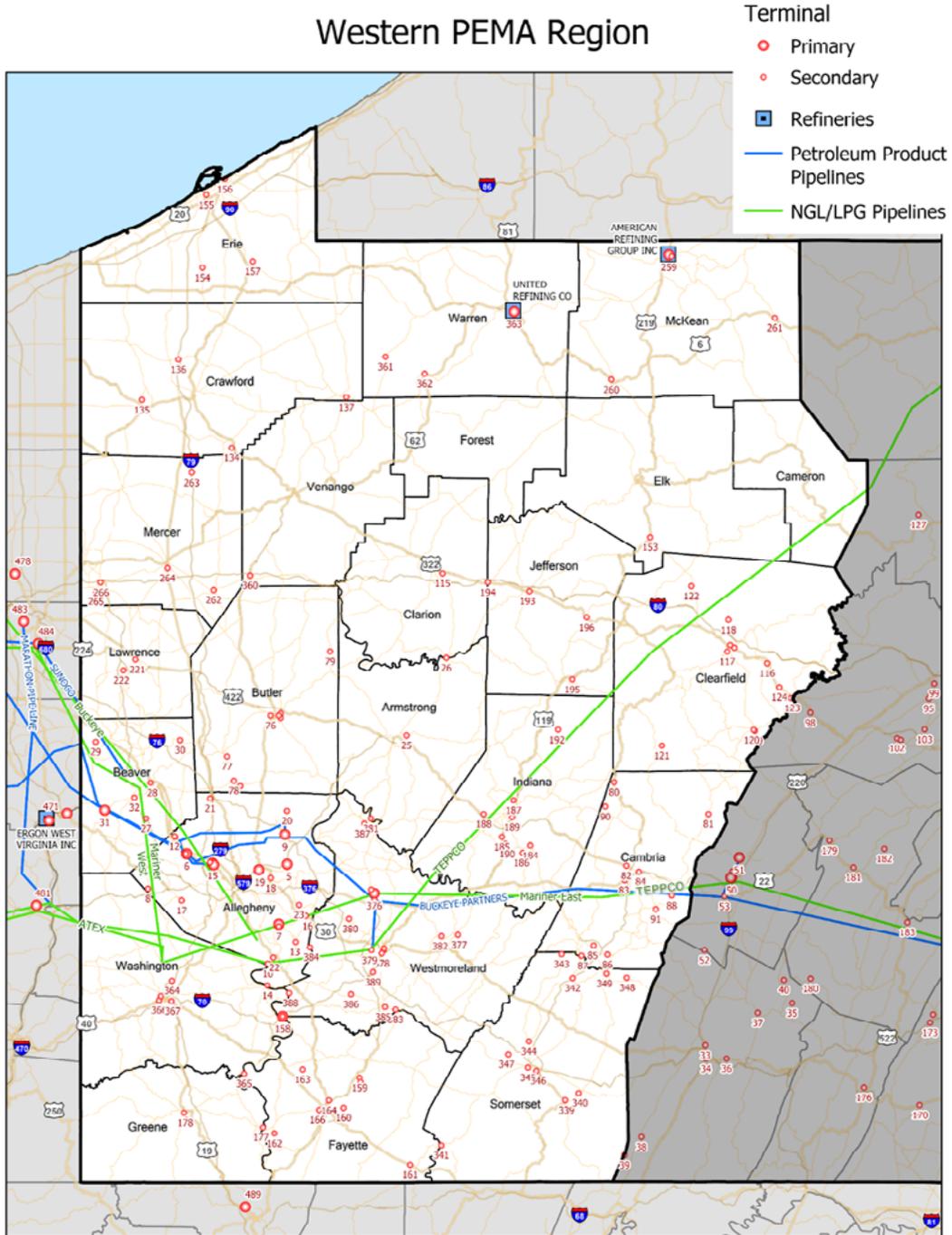


Exhibit 13: Western Pennsylvania Fuel Infrastructure

Terminal

- Primary
- Secondary

■ Refineries

— Propane Pipelines

— Petroleum Product Pipelines

Central PEMA Region

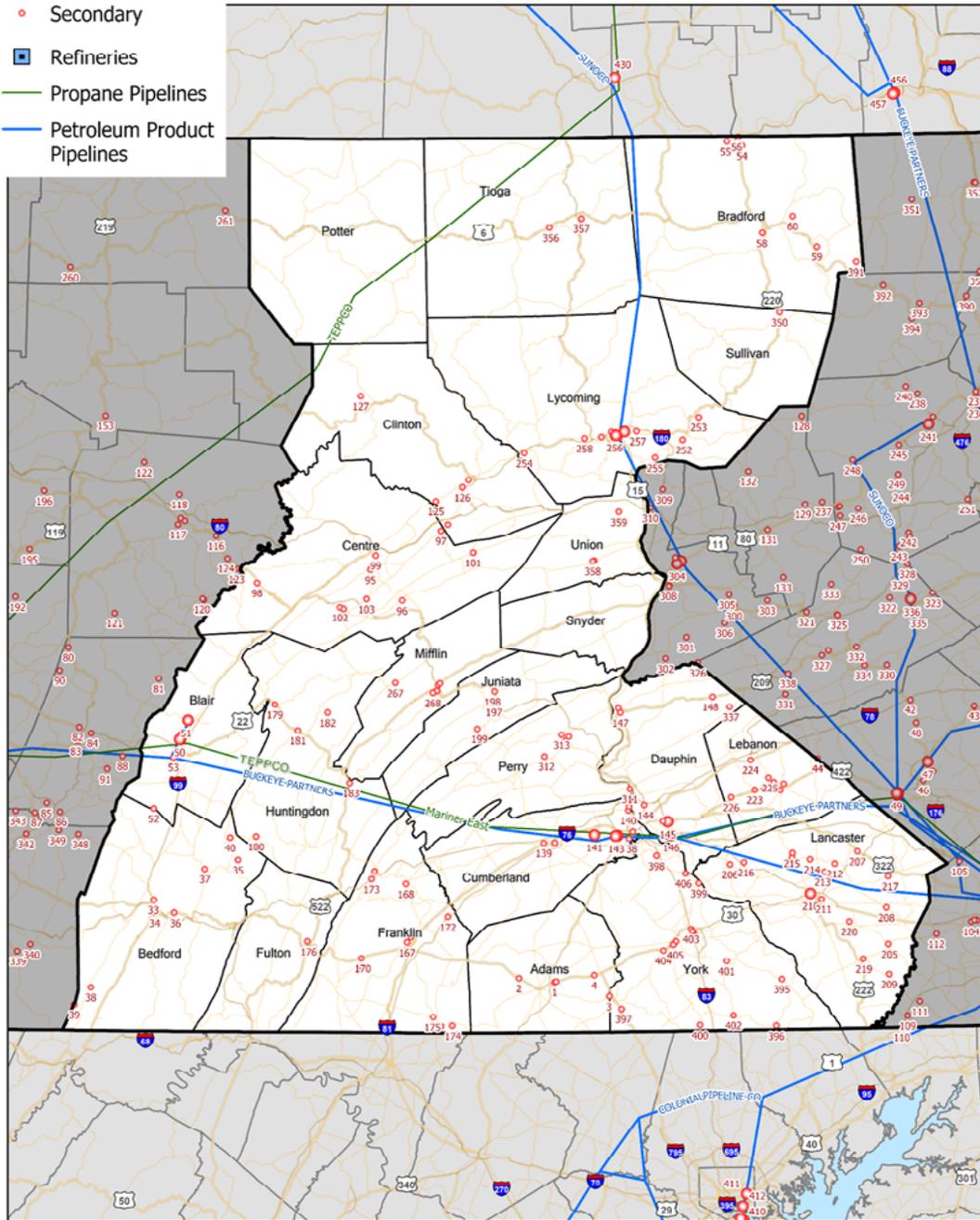


Exhibit 14: Central Pennsylvania Fuel Infrastructure

Eastern PEMA Region

- Terminal
 - Primary
 - Secondary
- Refineries
- Petroleum Product Pipelines
- NGL/LPG Pipelines

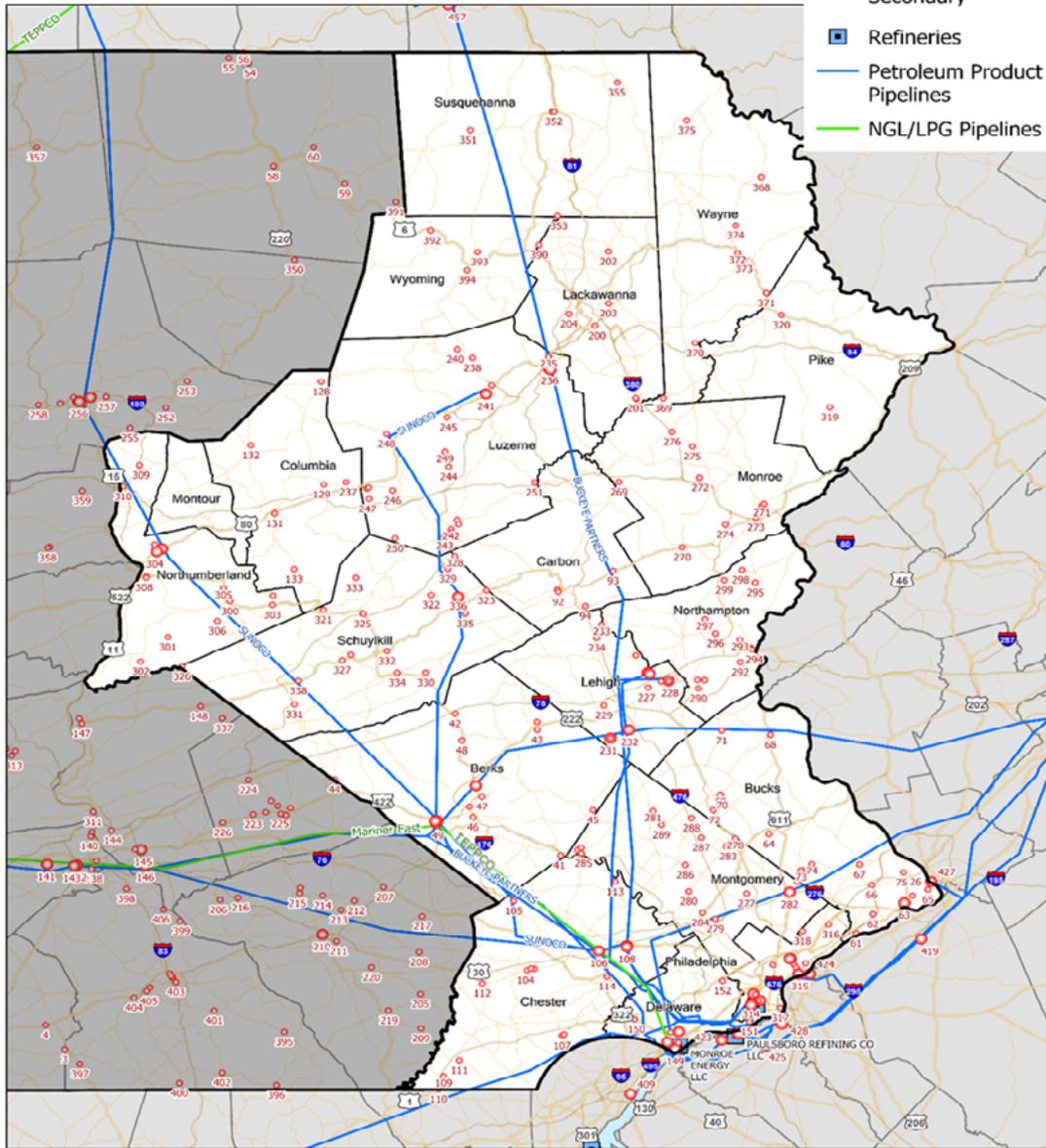


Exhibit 15: Eastern Pennsylvania Fuel Infrastructure

APPENDIX B. WAIVERS

Under normal circumstances, there are many Federal and Commonwealth requirements on fuel composition, sales, and delivery to ensure employee safety, protect the environment, and collect tax revenue. Many of these regulations, however, can be waived during emergency circumstances to speed up and ensure the delivery of fuel to customers. Waivers are usually precipitated by disaster declarations, which can suspend time-consuming regulations and initiate funding mechanisms that increase flexibility in buying fuel. Disaster declarations can be issued by the President of the United States, the Governor of Pennsylvania, or county commissioners, and they can apply to a county, group of counties, or the entire Commonwealth, and can be issued in advance of an incident or as it develops.

This Appendix outlines several major regulations and describes the process for waiving them and the county's role in supporting industry requests for waivers. Note also that waivers are generally issued only to address temporary fuel supply shortages caused by events such as natural disasters. They cannot be issued to mitigate the effects of localized shortages or high prices.

REQUIREMENTS THAT CAN BE WAIVED

Transportation waivers: Commercial truck drivers are subject to Federal regulations under the Federal Motor Carrier Safety Administration (FMCSA). **Hours of Service (HOS) regulations** restrict how many hours drivers may drive in a given time period before resting.^{83,84} Under emergency circumstances, States can waive regulations for drivers, providing direct emergency relief, by waiving the regulations laid out in Title 49 of the Code of Federal Regulations, Parts 390–399.⁸⁵ For example, during an extreme cold spell that causes heating oil shortages, drivers that deliver heating oil may be allowed to increase their road hours as specified in a waiver.

Commercial vehicles are licensed as either interstate or intrastate trucks, depending on their routes. FMCSA regulates **interstate licenses** and States regulate **intrastate licenses**; under emergency circumstances, both sets of regulations can be waived for vehicles assisting in emergency response.⁸⁶

Process for waiving transportation regulations: In Pennsylvania, the waiver process proceeds as follows: In the event of a supply emergency, a representative from the fuel industry (such as the Pennsylvania Petroleum Association) must send a formal letter to DEP requesting relief from the relevant waiver(s). DEP may contact the regional DEP offices or industry or local government contacts to verify industry information about the scope of the event. DEP provides recommendations to relevant Commonwealth agencies (including PEMA, the Governor's Office, Pennsylvania State Police, and PennDOT) on whether weather conditions and customer needs merit a waiver.

If PennDOT grants a waiver, it is fuel specific but not location specific. For example, an HOS waiver during a cold spell might apply to heating oil only, but would be applicable throughout the Commonwealth (and not just in the affected region).

Federal HOS waivers may also be issued directly by FMCSA if a multistate region is affected by an event. When implemented, these Federal waivers supersede the Commonwealth waiver process.

The counties' role in acquiring these waivers is to understand and stay informed about critical users' need for fuel as an event unfolds, so that emergency management officials can provide accurate information to Commonwealth agencies about fuel needs and resources.

Diesel fuel specifications: There are two major regulations associated with diesel fuel. First, the U.S. Internal Revenue Service (IRS) collects 24.4 cents per gallon as an excise tax on diesel fuel purchased for highway use. The Commonwealth of Pennsylvania collects an additional 74.1 cents as a tax on on-road diesel fuel.⁸⁷ These taxes are *not* levied on off-road dyed diesel fuel. The U.S. Environmental Protection Agency (EPA) also regulates sulfur content for diesel fuels.

However, under emergency conditions, EPA and the IRS can temporarily waive these restrictions to ensure fuel availability, especially for emergency response vehicles. For example, in response to undyed diesel fuel shortages caused by Hurricane Michael, the IRS announced that it would not impose a penalty on dyed diesel fuel sold or used for emergency response vehicles in Florida. Customers were required to pay the standard highway diesel fuel tax (which is not normally applicable to this fuel), but the additional penalty for using off-road diesel in highway vehicles would not be enforced. In this instance, the IRS waiver was accompanied by an additional EPA waiver also allowing higher sulfur fuel on the roads.

Process for waiving red-dyed diesel fuel restrictions for highways use: The Pennsylvania Department of Revenue has authority over waiving penalties for using dyed diesel fuel in on-road vehicles. Other relevant parties include the IRS, the Pennsylvania Department of Revenue, PEMA, DEP, and the Governor's Office. The waiver process is initiated when a representative from the fuels industry submits a letter to DEP and the IRS. If it finds sufficient cause to grant a waiver, DEP will coordinate with the Pennsylvania Department of Revenue to grant the waiver.

The counties' role in acquiring these waivers is to understand and stay informed about critical users' need for fuel as an event unfolds, so that emergency management officials can provide accurate information to Commonwealth agencies about fuel needs and resources.

Gasoline specifications: Under the Clean Air Act, EPA regulates gasoline to minimize pollution and toxic emissions. For example, EPA requires the use of reformulated gasoline (RFG) in urban areas, including the southeastern counties closest to Philadelphia. RFG has stringent requirements for reducing the volatile organic compounds that create smog.⁸⁸

Under emergency conditions or other disruptions to fuel supply, EPA can waive regulations and temporarily allow the sale of gasoline with higher vapor pressure. As an example, EPA temporarily waived gasoline regulations in Allegheny County in May and June 2019 in response to damage to the Buckeye Laurel Pipeline.⁸⁹ Later in the year, Allegheny County finalized relaxing their 7.8 Reid vapor pressure gasoline requirement so that it aligned with other counties in the Commonwealth.⁹⁰

Process for waiving diesel fuel and gasoline environmental specifications: EPA grants waivers with concurrence from U.S. DOE in response to a formal letter from the fuel industry to DEP. Conditions for a fuel waiver are listed in the Clean Air Act and are generally only applicable when a region is facing a general supply shortage, rather than a local shortage or price spike. In addition to DEP, PEMA, the Governor's Office, and the Pennsylvania Public Utility Commission should also remain apprised about the waiver request.

The counties' role in acquiring these waivers is to understand and stay informed about critical users' need for fuel as an event unfolds, so that emergency management officials can provide accurate information to Commonwealth and Federal agencies about fuel needs and resources.

Biodiesel waivers: Pennsylvania law states that all on-road diesel fuel sold in the Commonwealth is required to contain at least 2 percent biodiesel.⁹¹ The Pennsylvania Department of Agriculture (PDA), however, can temporarily waive this requirement under emergency circumstances.

Process for waiving diesel fuel and gasoline specifications: PDA is responsible for granting biodiesel requirement waivers. Other relevant Commonwealth agencies in the process are DEP, PEMA, and the Governor's Office. The waiver process is initiated when a representative from the fuels industry submits a letter to DEP, which verifies the need for the waiver, and coordinates with PDA, as needed, to authorize it.

The counties' role in acquiring these waivers is to understand and stay informed about critical users' need for fuel as an event unfolds, so that emergency management officials can provide accurate information to Commonwealth and Federal agencies about fuel needs and resources.

Information That Industry Will Likely Be Asked To Provide When Requesting a Waiver⁹²

- 1. Type of assistance requested (Motor Carrier regulatory relief or other). Include the timeframe of the relief requested and the geographic area.*
- 2. Identify the type(s) of fuel for which a shortage exists.*
- 3. Factors believed to be causing customers' shortages, supply problems, or barriers to prompt delivery, including, but not limited to, (a) unordinary wait times for supplies, delays, or inability to obtain propane, fuel oil, or equipment from customary suppliers; (b) terminal, refinery, or pipeline disruptions; (c) allocation programs; (d) lack of or inadequate transportation facilities; or (e) extreme increased demand.*
- 4. Areas of the State affected, transportation services affected, fuel oil/propane distributors affected, and categories of consumers that will be affected (e.g., agriculture, commercial customers, residential customers, or a combination thereof).*
- 5. Status of the situation (e.g., anticipatory cold period, imminent storm, current challenge).*
- 6. For motor carrier regulatory relief, indicate the percentage of drivers in the emergency affected region who are or will be out of service within the next week.*
- 7. Is weather sufficiently severe that fuel use by significant numbers of households will outstrip the ability of transportation services and propane/fuel oil distributors operating under normal hours-of-service limitations to replenish fuel tanks?*
- 8. Average day(s) of supply in current secondary inventory (propane/fuel oil distributor inventory) and estimated time to resupply that secondary inventory once exhausted.*
- 9. Explain the impact of external and unpredictable factors on the ability to supply fuel oil/propane.*
- 10. Whether qualified drivers have exhausted or will exhaust their hours of availability under normal hours-of-service limitations.*

REQUIREMENTS WITHOUT A FORMAL WAIVER PROCESS

In addition to the requirements outlined above, there are also certain requirements that emergency managers may encounter that do not have a formal waiver process.

For example, [Section 4](#) describes how fuel terminals usually require that carriers' drivers accessing the terminal receive several days of training in terminal procedures and safety protocol. Only these "carded" drivers who have completed training at the terminal are allowed to load product at the terminal. Terminals also typically require that fuel distributors doing business with the terminal pass credit checks.

These industry standards cannot be formally waived; however, during times of extreme need, some terminals may be willing to expedite their usual processes (such as fast-tracking credit checks for new distributors) and/or allow loopholes in their processes (such as allowing carded drivers to wait onsite and load fuel for uncarded drivers).

These exceptions are not, however, standard practice, and emergency managers should not depend on them as a means for acquiring additional fuel supply. The U.S. Department of Homeland Security has additional requirements for truck drivers loading fuel at ports and requires that these drivers apply for and receive a Transportation Worker Identification Credential (TWIC) card. Receiving a TWIC card involves undergoing a background check, and it can take many weeks for drivers to be cleared. Although this requirement has never formally been waived, there is some question as to whether this process could also be expedited under extreme circumstances.

APPENDIX C. FUEL SHORTAGE PLANNING TEMPLATE WORKSHEETS

The following worksheets are provided in the accompanying *Template* and are reproduced here for ease of reference.

Critical User Information						Fuel Needs and Storage					
Priority	User Type	Name of Entity	Primary Address	Point of Contact	Phone Number	Type of Fuel	Emergency Demand (Gallons per Day)	Available Storage Capacity (Gallons)	Average Available Inventory (Gallons)	Estimated Fuel Reserve Duration (Days)	Frequency of Fuel Delivery (Days Between Deliveries)

Exhibit 16: Critical Fuel Users Sheet of the Template, Part 1

Generators						Fuel Distributor Supplying Facility				
Generator Onsite (Y/N)	Generator Power Initiated (Manually/Automatically)	Capacity (kW)	Fuel	Facility Coverage Description	Estimated Burn Rate-Full Load (Gallons/Hour)	Estimated Run Time (Hours)	Distributor	Point of Contact of Distributor	Phone Number of Distributor	Notes

Exhibit 17: Critical Fuel Users Sheet of the Template, Part 2

Facility Information						Fuel Storage and Contract Information					
Agency	Facility Name	Facility Address	Point of Contact	Phone Number	Fuel Type	Available Storage Capacity (Gallons)	Average Inventory (Gallons)	Fuel Contract Volumes (Gallons per Month)	Frequency of Fuel Delivery (Days Between Deliveries)	Contract Terms	

Exhibit 18: Local Government Fuel Storage Sheet of the Template, Part 1

Fuel Distributor Supplying Facility			Notes
Distributor	Point of Contact of Distributor	Phone Number of Distributor	

Exhibit 19: Local Government Fuel Storage Sheet of the Template, Part 1

APPENDIX D. RESOURCES

Organization	Title	Description	Link
Public Technology Institute	Local Government Energy Assurance Guidelines, Version 2.0	This document is referenced throughout this <i>Guidebook</i> . It provides a detailed framework for communities beginning the energy assurance planning process.	https://www.naseo.org/Data/Sites/1/documents/energyassurance/documents/pti_local_government_energy_guidelines.pdf
Public Technology Institute	Local Government Energy Assurance Planning	PTI provides additional resources for local governments beyond the Guidelines listed above. PTI's Local Government Energy Assurance Planning website also contains best practices, publications, and past webinars.	http://www.energyassurance.us
U.S. Department of Energy	Local Awards for Energy Emergency Preparation	The American Recovery and Reinvestment Act of 2009 provided funding for 43 cities to develop local energy assurance plans (LEAPs). This link lists the recipient cities, many of whom have published their LEAPs publicly.	https://www.energy.gov/sites/prod/files/oeprod/DocumentsandMedia/FINAL_Local_Awards_for_Energy_Emergency_Preparation_2010_12_29.pdf
Salem, Oregon	Salem Local Energy Assurance Plan	Of the cities with publicly available LEAPs, Salem, Oregon, and Visalia, California, have particularly detailed LEAPs, which may be useful examples for county planners performing their own energy assurance planning.	https://scholarsbank.uoregon.edu/xmlui/bitstream/handle/1794/12201/LEAP_Final.pdf?sequence=1&isAllowed=y
Visalia, California	Visalia, California, Energy Assurance Plan	Of the cities with publicly available LEAPs, Salem, Oregon, and Visalia, California, have particularly detailed LEAPs, which may be useful examples for county planners performing their own energy assurance planning.	https://www.visalia.city/civicax/filebank/blobdload.aspx?blobid=12512
Pennsylvania Emergency Management Agency	Local Emergency Operations Plan Toolkit	PEMA's website provides resources to help communities increase their emergency preparedness. These resources include checklists and toolkits.	https://www.pema.pa.gov/planningandpreparedness/communityandstateplanning/Pages/Local-Emergency-Operations-Plan-Toolkit.aspx

APPENDIX E. GLOSSARY AND REFERENCE GUIDE

Carrier – A carrier is the entity that moves fuel products. Carriers usually own fleets of trucks and simply arrange for transportation of the product between two points on behalf of their clients. A carrier does not purchase or sell the product itself. Some distributors are also carriers because they transport product in addition to distribution activities, although this is not the case for all distributors.

Diesel – Diesel fuel is primarily used in heavy-duty vehicles, including trucks, buses, tractors, trains, and construction equipment. Emergency response activities rely heavily on diesel fuel, with snowplows, fire trucks, ambulances, and roadway maintenance vehicles all typically powered by diesel fuel. Large backup generators with onsite storage typically run on diesel fuel or natural gas. Like gasoline, diesel is also sold at retail service stations; however, distributors may also arrange to deliver it directly to high-volume customers with onsite storage.

For the purposes of emergency management, there are two important categories of diesel fuel:

- On-road diesel is used in vehicles that drive on highways. It is available at regular retail service stations and is subject to Commonwealth and Federal road taxes.
- Off-road diesel is used for generators, agricultural vehicles that do not drive on highways, construction equipment, and generators. Because it is not taxed, it is illegal to use off-road diesel for highway vehicles. The fuel is usually dyed red (“dyed diesel”) to distinguish it from the taxable on-road diesel. Both on- and off-road diesel fuel sold in Pennsylvania is required to be ultra-low-sulfur diesel, with a maximum legal sulfur content of 15 ppm.

During emergencies and fuel shortages, restrictions on diesel fuel may be lifted to allow some or all vehicles to use off-road diesel fuels.

Distributor – A distributor purchases fuels from a supplier and sells the product to the end user. A distributor often purchases fuels at a terminal and then either transports it to the client or contracts with a designated carrier to move the product. Examples of major distributors in Pennsylvania include Buckeye and Guttman. Wawa and Sheetz also perform distribution functions for their own retail stations.

Gasoline – Gasoline is primarily used in smaller vehicles and purchased by customers at retail stations. Gasoline composition can vary seasonally with winter and summer blends, but also regionally with reformulated gasoline blends in densely populated areas. Within counties, gasoline may be used by police cars and ambulances, as well as individual consumers fueling personal vehicles. Portable generators generally run on gasoline as well, although these are typically quite small.

Heating oil – Heating oil is used to power furnaces and boilers in buildings, and nearly 20 percent of Pennsylvania households use heating oil as their primary heating fuel.⁹³ Accordingly, heating oil use is highly seasonal, although some buildings may use smaller quantities to heat water throughout the year.

Heating oil is closely related to diesel fuel—so closely related that some heating oil can be used in vehicles during fuel shortages. Under normal circumstances, this practice is illegal, as heating oil is a tax-exempt dyed fuel that is not sold for on-road use. During emergencies and fuel shortages, tax penalties and environmental regulations can be waived to provide flexibility in powering emergency response vehicles.

Propane – Propane is commonly used in residences and commercial facilities for space heating, cooking, and heating water. More than 190,000 Pennsylvania homes heat with propane. Propane is part of the liquid fuels portfolio covered in this document. Propane is also used as an alternative transportation fuel for school buses and delivery vehicles.

Reformulated gasoline (RFG) – RFG is a cleaner burning gasoline designed to reduce smog in urban areas. It was first introduced in the Clean Air Act of 1990 and its use is required in major cities and optional in other regions. In Pennsylvania, the five counties surrounding Philadelphia use RFG.⁹⁴ These limits on volatility are even stricter than the normal low-volatility summer gasoline otherwise required. RFG requirements can be temporarily waived by EPA during fuel shortages, as occurred in May 2019 after the failure of the Buckeye Laurel Pipeline.

Retail service station – A retail service station is the fueling point for many end customers, including municipalities. The average gas station has a storage capacity of 30,000 to 40,000 gallons,⁹⁵ but they can vary significantly in capacity. Some stations are operated by large chains with significant control over their supply (e.g., Wawa and Sheetz), while smaller local retail stations have less storage capacity and increased dependence on distributors.

Supplier – A supplier sells fuel at terminals.

ENDNOTES

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