

Optimizing the Propane Supply Chain in the State of Iowa

Iowa Propane Industry Working Group
Process & Recommendations

November 2018

quèt•ica



Contents

1	Background and Purpose	1
1.1	Iowa Propane Industry Working Group	1
2	Working Group Priorities and Deliberations	2
2.1	Communication across Stakeholder Groups	4
2.2	Situation Monitoring and Key Metrics	5
2.3	When to Declare an Emergency	8
2.4	Hours of Service and Mitigating the Impact of Emergency Declarations	9
2.5	Exploring Pipeline Terminal Reservation System	11
2.6	Incentives to Drive Behavior and Investment	13
2.7	Other Discussion Topics	14
3	Critical Implementation Paths.....	15

1 Background and Purpose

In 2016, the Iowa Department of Transportation (Iowa DOT) released a report on the results of its Propane Supply Chain Optimization Study¹, initiated to address significant concerns resulting from the 2013-2014 propane crisis.

In the winter of 2013-2014, residential, agriculture, and commercial users of propane in Iowa and other Midwestern states were challenged by a severe propane shortage and sharp price increases driven by increased competition, global markets, and other changes in the propane supply chain and its supporting infrastructure. These issues, however, are not isolated to a single year or event. Based on changing demand, markets and supply chain infrastructure, emergencies and shortage situations occur at different levels of severity every few years. In the winter of 2017-2018, Iowa experienced its first emergency declaration since 2013-2014 to ensure the ability to meet heating demand for Iowa residents and businesses.

To adapt and manage through these ongoing changes and ensure that propane reaches end users where and when it is needed at a reasonable cost, the State of Iowa took a unique, scientific approach to addressing these challenges using a Supply Chain Optimization Methodology. The focus of the effort was to understand the root causes of issues that resulted in the propane shortage. Then, leveraging this knowledge, potential risks and opportunities were objectively analyzed to better manage Iowa's propane supply chain, in order to:

- Be better informed when demand for propane reaches critical levels, and Iowa faces potential shortages; and
- Proactively define viable contingencies to better manage extreme fluctuations and disruptions in propane supply in the future.

The propane study effort was an extension of Iowa's Statewide Freight Transportation Network Optimization Strategy, leveraging private sector best practices in supply chain optimization to evaluate short- and long-term optimization scenarios to better handle fluctuations in propane supply and demand, identify contingencies, and recommend optimization strategies. The analysis focused on ensuring a consistent supply of propane to residential and agricultural users in Iowa, understanding the economic impact of supply chain changes, and working to avoid emergency declarations for longer delivery truck driver work hours where alternatives exist. The study provided an overview of these supply chain analytics and insights into the relative impact of improvement opportunities and recommended actions, including:

- Monitoring market conditions and infrastructure;
- Communicating and educating on changes, risks and recommended actions;
- Incenting behavior change; and
- Incenting infrastructure investments.

After the study, Iowa DOT's efforts shifted to operational execution, working collaboratively with the propane industry and end users, to refine and implement high-priority recommendations resulting from the study.

1.1 Iowa Propane Industry Working Group

One of the first steps in executing against the optimization strategy was the establishment of an *Iowa Propane Industry Working Group*. The purpose of the working group was to:

- Drive communication between stakeholders;
- Refine recommendations based on subject matter input; and
- Implement the prioritized solutions.

¹ <http://www.news.iowadot.gov/newsandinfo/2016/07/iowa-dots-propane-supply-chain-optimization-strategy-report.html>

The group was comprised of a diverse mix of state agency representatives, propane industry participants, and other key stakeholder groups, including:

State Agency Representatives	Iowa Propane Industry Participants	Other Key Stakeholders
<ul style="list-style-type: none"> • Iowa Department of Transportation • Iowa Department of Agriculture and Land Stewardship • Iowa Department of Human Rights • Iowa Department of Public Safety • Iowa Economic Development Authority • Iowa Homeland Security and Emergency Management • Iowa Utilities Board • Iowa Governor's Office 	<ul style="list-style-type: none"> • Iowa Propane Gas Association • Marketers <ul style="list-style-type: none"> ○ Multistate ○ Cooperatives ○ Independents • Propane Wholesalers • Propane Transporters <ul style="list-style-type: none"> ○ Truck ○ Rail • Pipeline and Storage Operators 	<ul style="list-style-type: none"> • Federal Motor Carrier Safety Administration • Iowa Corn Growers Association • Agribusiness Association of Iowa • Iowa Institute for Cooperatives • Iowa Motor Truck Association • Iowa State University

The first meeting of the working group occurred in November of 2016. Much progress had been made throughout the Iowa propane industry, since the shortage in winter of 2013-2014. The goal of the working group was to continue those efforts by sharing learning, industry updates and changes, while working collaboratively to avoid future shortages or mitigate its impact. Since the outcomes are not determined by the actions of one individual or group, all participants play a role in meeting these objectives.

A key objective of the group was to better understand the impact of the supply chain recommendations on the different stakeholder groups. In the inaugural working group meeting, the participants focused on reviewing and prioritizing the study recommendations and underlying issues. Discussion included consideration for additional qualitative factors to supplement the quantitative analytics, as well as understand the impact, implementation considerations and timing for execution.

Once the recommendations were prioritized, five additional working sessions were conducted from March 2017 to September 2018 to collaborate and define the game plan for execution against high priority tasks. The working group process in each session included:

- Brainstorming prioritized topics to define issues and potential solutions;
- Developing an action plan or identifying the need to investigate an issue further;
- Reviewing progress against action plans in future meetings; and
- Revisiting any changes in and/or additions in top priorities.

The overall focus was on working cooperatively between industry stakeholders and being responsive to avoid an emergency or mitigate its impact.

2 Working Group Priorities and Deliberations

The key priorities that the working group addressed included:

- Communication across stakeholder groups
- Situation monitoring and key metrics
- When to declare an emergency
- Hours of service and mitigating the impact of emergency declarations
- Exploring pipeline terminal reservation system
- Incentives to drive behavior and investment

In addition, each session addressed ongoing changes in the Iowa propane industry, as well as a corresponding review of marketplace changes. Figure 1 provides a recap of key recommendations with detailed commentary provided in the following sections.

Figure 1 – Recap of Key Recommendations from Iowa Propane Industry Working Group

Category		Recommendations
2.1	Communication across Stakeholder Groups	<ul style="list-style-type: none"> • Conduct cross-industry meeting before peak season to discuss Iowa forecast, season expectations and industry changes. • Continue to leverage IPGA as a central coordination point in event of supply chain issues, disruptions and/or an emergency. • Work through reciprocal state agency procedures for internally identified risks and integrate into risk escalation processes. • Develop public communication templates for key supply events in event of emergency or seasonal best practices. • Integrate process updates, recommendations and best practices into Iowa Energy Assurance Plan. Leverage propane industry working group best practices for other energy sectors.
2.2	Situation Monitoring and Key Metrics	<ul style="list-style-type: none"> • Monitor dynamics between Midwest and Gulf Coast stocks, prices and exports. • Assess demand and disruptions in neighboring states that influence the Iowa propane market. • Evaluate ability to add regional “Days of Supply” metric. • Support efforts to enhance data specific to Iowa and increase timeliness with EIA and other reporting authorities. • Explore sharing of non-proprietary, private sector data to enhance risk management reporting.
2.3	When to Declare an Emergency	<ul style="list-style-type: none"> • Integrate input on questions to be asked in event of a propane fuel shortage into Iowa Energy Assurance Plan and emergency declaration procedures. • Provide support for regional vs. state-level declarations, while providing regional context when requesting action.
2.4	Hours of Service and Mitigating the Impact of Emergency Declarations	<ul style="list-style-type: none"> • Support Federal regulation change for more limited emergency declaration or an alternative measure to restrict HOS waivers; Propose Iowa pilot. • Explore new hours of service exemption to address truck transport from pipeline terminals/sources to marketers.
2.5	Exploring Pipeline Terminal Reservation or Notification System	<ul style="list-style-type: none"> • Seek additional input on the reservation / notification system strawman from additional transport carriers. • Discuss concept and implementation considerations with additional pipeline operators. • Finalize high-level system concept and processes based on input to explore technology and operational options for execution across multiple terminals.
2.6	Incentives to Drive Behavior and Investment	<ul style="list-style-type: none"> • Focus on summer fill and pricing education vs. incentives with residential propane users to bring inventory into Iowa. • Explore ability to reutilize large agricultural storage tanks for marketer storage outside of peak grain drying demand.

2.1 Communication across Stakeholder Groups

A critical component of each recommendation area in the optimization study was communication. Dialogue between state agency representatives and industry participants, including marketers, wholesalers, pipeline operators, transport companies and the Iowa Propane Gas Association, as well as end users and other industry stakeholders, is vital to share learning, industry updates, infrastructure and marketplace changes.

Communication and collaboration is essential to better understand the impact of the supply chain recommendations on different stakeholders, and thus a key driver of the formation of the industry working group itself. Qualitative factors discussed amongst the members are key to supplement the quantitative analytics, as well as understand the impact, implementation considerations and timing for execution. In addition, better, more proactive communication will increase the likelihood of avoiding or mitigating an emergency during shortages, demand peaks and/or supply chain disruptions in the future. In the working sessions, the group discussed how to formalize communication processes across industry stakeholders, state agencies and public audiences.

The Iowa Propane Gas Association (IPGA)² is the focal point for coordinating communication across stakeholder groups. Today, the IPGA Board of Directors holds monthly conference calls during the harvest and heating season, facilitating communication and coordination during peak demand periods amongst its members. IPGA, the National Propane Gas Association (NPGA)³ and other Midwest propane gas associations participate in Midwest Governor's Association⁴ conference calls during the same period to share information across regions and with state agencies.

In the event of supply chain issues or disruptions (e.g. terminal lines, outage), IPGA will typically be notified by a wholesale supplier, marketer or transporter of the situation. IPGA will seek input from other suppliers or transporters to validate and understand the nature of the issue. Depending on the severity, IPGA will initiate and coordinate communication and actions between state agencies and propane industry regarding the issue.

Based on the deliberations of the working group, it was recommended that IPGA should continue to act as an effective coordination point between industry stakeholders and state agencies. However, the points of contact across other agencies and organizations needed to be updated. During the propane shortage of 2013-2014, a small core group came together to work through the emergency. The severity of the situation and broader changes in the supply chain required the involvement and education of additional agencies and stakeholders to work towards resolution. With ongoing changes in personnel and evolving organization roles based on lessons learned, the working group identified a broader network of individuals for proactive communication and risk mitigation. This action included much greater representation across the state agencies (see section 1.1 for participating agencies) to address broader impacts and perspectives. In addition, it sought to increase communications with pipelines and involve additional truck carrier contacts outside of the regular IPGA membership and industry representatives.

The format and frequency of communication was a core part of the working group discussion. Forums, like the Midwest Governor's Association Meetings, promote cross-industry and state agency communication. However, the meetings are not frequent enough to handle a rapidly changing risk situation during high demand periods and shortages. Conversely, the working group did not feel that there should be regular, more frequent meetings or checkpoints during the peak season between industry stakeholders and state agencies. The predominant viewpoint was that an emergency or shortage could evolve so quickly that regular meetings wouldn't necessarily get the group ahead of the issue and could detract from core efforts to meet end user propane needs. During a current or pending emergency, IPGA will initiate and coordinate contact with all industry and state stakeholders, at a frequency and timing warranted based on events.

² <http://www.iapropane.org/>

³ <https://www.npga.org/>

⁴ <https://www.midwesterngovernors.org/>

The working group meetings themselves greatly facilitated communication amongst the diverse stakeholder groups, allowing for education, sharing of industry updates and different viewpoints, as well as developing cross-industry relationships. In 2017-2018, these communication processes were exercised, when state and regional emergencies were declared in December. The consensus was that the group's efforts facilitated the swift response to manage through the first state and regional emergency since 2013-2014.

The group also discussed the type and nature of high priority communications to propane end users and public audiences. Topics included what to communicate in the event of an emergency, as well as best practices to avoid end user supply issues. Communications were implemented to educate consumers and encourage summer fills and adoption of pricing programs by state agencies, reinforcing propane association and marketer communication efforts to end users. Due to the cyclical nature of propane demand surges and supply shortages, these best practices need to be reinforced on an annual basis. The impact of shortages and price spikes are often forgotten by end users as time passes from the last emergency and the risks are not top of mind.

The Iowa Propane Industry Working Group has also helped to foster intra-Iowa communication between state agencies and advancement of initiatives within the Iowa Energy Assurance Plan⁵. Outputs of the discussions have developed resources, such as a library of waivers, as well as tested processes, such as piloting after-action reporting after the 2017-2018 emergency declaration. The goal would be to leverage best practices from the Propane Industry Working Group and apply it to other energy sectors within Iowa.

Recommendations

With the continuing priority to be responsive in the event of an emergency, the working group recommendations are also focused on more proactive communication, including:

- Conducting a cross-industry call/meeting before or at the start of the peak season to discuss the forecast and expectations for upcoming high demand period in Iowa (similar to EIA Midwest webinars to share pre-season information) and to discuss any infrastructure or market changes affecting the supply chain.
- Continuing to leverage IPGA as a central coordination point to initiate and manage communication between state agencies and industry stakeholders, in event of supply chain issues, disruptions and/or an emergency.
- Having state agencies work through reciprocal procedures if they identify potential risk factors in forecast data or from internal sources that has not been already escalated by the propane industry – and integrate risk escalation processes with emergency declaration procedures (see Sections 2.2 and 2.3).
- Developing communication templates for key supply events to facilitate public communication in event of emergency or seasonal best practices, ensuring end user communications are timely and effective. Provide electronic access to critical information during an emergency with ability to subscribe to updates.
- Integrating process updates, recommendations and best practices into the Iowa Energy Assurance Plan. Leverage propane industry working group best practices and outputs across other Iowa energy sectors.

2.2 Situation Monitoring and Key Metrics

To support effective and timely communication, the study recommendations included monitoring of the current situation within the propane industry, identifying potential risks and taking proactive action to mitigate those risks and/or avoid an emergency. Each meeting of the working group included a discussion of key changes in the industry (including implementation of best practices and market dynamics), preparation for upcoming peak seasons and/or an after-action review of recent events. It also included a discussion of systemic monitoring of propane industry and situational metrics. Being able to respond to shortages, outages or other supply chain issues in a timely manner is essential to avoid propane shortages with the severity of 2013-2014. The working group examined how and what should be monitored in its deliberations.

⁵ <http://www.iowaenergyplan.org/>

A key challenge of any analytical effort is access to the right data to effectively track the situation and potential changes. The working group looked at both public and private sources of data. The consensus from the discussion is that the U.S. Energy Information Administration⁶ (EIA) data is the best source available for “public” propane data across the industry that can be utilized and shared by state agencies and public audiences for reporting. But, EIA data has some limitations including timeliness, level of detail or geographic scope for some datasets, as well as the potential for improvement in data collection and/or calculation methodologies for others. In utilizing this data, the group noted the need to document and understand the data sources and limitations used in monitoring, as well as support NPGA and other efforts to increase quality and transparency of data through EIA, as well as across the industry and energy sector. In addition, agriculture data from the Iowa Department of Agriculture and Land Stewardship (IDALS) and USDA data services was recognized as a valuable resource historically to help supplement EIA data for fall grain drying demand.

In addition, established practices of industry stakeholders (e.g. marketers, wholesalers, pipeline operators, etc.) for monitoring and forecasting as a part of running their own businesses were discussed. These organizations have made investments in proprietary data and reporting processes that are key to their business’ competitiveness within the propane industry, as well as for day-to-day management of operations. Although these private data sources represent the best and most timely source of industry data, the proprietary nature of the data, and thus competitive concerns, continue to be an obstacle for sharing this data with external audiences.

It was clarified that the propane monitoring effort was not intended as a replacement for private sector reporting and forecasting. It is designed as a mechanism for Iowa state agencies to determine when they should start a dialogue with industry stakeholders around demand and infrastructure changes, applying insights from the working group regarding private sector reporting practices. The information is intended to help state agencies:

- Quantify and provide justification for state involvement in the event of a shortage or market disruption;
- Make informed decisions in performance of their duties, including emergency management; and
- Provide justification for incentives and other investments to help support industry and state constituents.

In its deliberations, the working group discussed making the Iowa propane monitoring data available online or by subscription to end users or other interested parties as a byproduct of the effort. However, it was recommended that interpretation of the data be left to the recipient of the information, with any formal public communication around best practices and emergencies following the recommendations in Section 2.1.

The question of what to monitor and how to interpret it is complex. It is not just one factor that determines if there will be an issue outside of the normal scope of seasonal demand fluctuations. The working group discussed the combination of these market factors that drive risk, as well as their context considering current supply chain events. The main monitoring focus is on the short-term factors that drive the risk assessment and the potential for an emergency including:

- Demand and supply metrics as an indication of propane consumption;
- Inventory and stock metrics as an indication of industry preparedness for peak season; and
- Propane prices as an indication of market dynamics and stability.

The group also discussed that a review of short-term factors should also be supplemented by monitoring longer-term trends that influence risk levels in the future.

From the working group’s perspective, monitoring propane stock levels at both the Conway, Kansas and Mt. Belvieu, Texas market hubs is important. Since 2013-2014, a new “normal” has been established for hub stock levels with the continued and ongoing growth in U.S. propane exports. Midwest propane stock levels fell below the 5-year average in 2017, as propane flowed to the Gulf Coast and international markets in the offseason. Thus,

⁶ <https://www.eia.gov/>

a key trend to watch is the rebound of Midwest stock levels in late summer in preparation for fall and winter propane demand.

Price data is also important as an indication of market changes. The market has not seen a repeat of 2013-2014 price extremes, when the price spiked in response to the propane shortage situation in January 2014. However, even in times of greater price stability, the group noted that price differentiation between Conway and Mt. Belvieu, as well as between domestic and international propane markets, will drive whether supply flows to the Midwest or Gulf Coast and provide an indication of likelihood of continued growth in propane exports⁷.

The working group reviewed the use of propane sales and supply data as a proxy for propane demand and consumption in monitoring. The time lag in EIA data between propane sales and data publication diminishes the value of this dataset as an indicator of immediate term surges in demand, based on feedback from the working group. Agencies will have to rely on feedback from industry stakeholders for demand surges. However, the data can be used as an input to a forecasting model to project the demand outlook for the coming period.

Given the effect of out-of-state marketer utilization of Iowa pipeline terminals on the supply chain situation, the working group advised on the importance of monitoring the demand situation in surrounding states, like Minnesota and Wisconsin, to track impact on Iowa markets. The group is also in favor of a new “days of propane supply” metric implemented by NPGA that looks at the relationship between inventories and demand in the U.S. and provides a much better indicator of supply chain risk.

The group recommended that metrics should be compared to a five-year range of values for trend analysis, consistent with EIA data practices. The group felt that when metrics fall within 10% of five-year minimums or maximums was a good starting threshold to initiate dialogue on the current situation across stakeholder groups. Waiting until a metric reaches a new five-year low or high was viewed as too late to effectively act.

Deliberations also included a review of the influence on both short-term and long-term risks of market and infrastructure changes. Investments in storage in Iowa, as well as new rail terminals to bring propane in from Western Canada, have contributed to the capacity across the Iowa propane supply chain. However, continued increases in exports with facility expansion, as well as new propylene production facilities, puts further pressure on the domestic propane supply chain. With these recent industry changes (including new hub inventory levels), the group advised that supply chain trends are harder to interpret than in the past. Exports also complicate interpretation of previously used, high-quality indicators, like corn drying and temperature data.

The consensus from the working group was that the industry was able to work through demand peaks and supply chain limitations in recent years based on current practices and investments, despite some supply chain disruptions. However, the group warned that if higher export demand (as was expected) had coincided with domestic propane demand peaks and disruptions, the propane situation in Iowa may have been very different. These changes reinforce the need for ongoing review and discussion on impacts to the regional supply chain.

Recommendations

The group recommends assessing both short and long-term factors, including:

- Monitoring the dynamics between Midwest and Gulf Coast stocks and prices, as well as export levels and infrastructure changes;
- Assessing demand and disruptions in neighboring states that influence the Iowa propane market;
- Evaluating the ability to add a regional “Days of Supply” metric to Iowa propane monitoring;
- Supporting efforts to enhance data detail specific to Iowa and increase data timeliness from EIA and other reporting authorities; and

⁷ It should be noted that many propane pricing datasets are only available through proprietary, fee-based data services. As such, public distribution of pricing metrics is likely limited to public pricing statistics available through EIA.

- Continuing to explore the ability to share non-proprietary, private sector data (e.g. terminal wait times) to enhance risk management reporting.

2.3 When to Declare an Emergency

In March 2018, the working group conducted an after-action review of the propane situation and corresponding emergency declaration actions in the preceding winter months of 2017-2018. The session included a discussion of what happened, the factors contributing to need for an emergency declaration, and lessons learned.

These emergency actions were the first that directly affected Iowa since the 2013-2014 shortage. North and South Dakota declared emergencies in the fall due to extremely low inventories of petroleum products, resulting from a late harvest, weather-related market disruptions and supply outages. Iowa, Minnesota, and Wisconsin declared emergencies in the last week of December, when a mild fall followed by severe cold and winter storms in December led to accelerated consumption and delayed fills. Minnesota and Wisconsin also cited harvest and anhydrous ammonia demand, terminal and driver shortages, as well as infrastructure outages, as reasons. The next day, the Federal Motor Carrier Safety Administration (FMCSA) made a regional emergency declaration.

In hindsight, all stakeholders in the group agreed that an emergency declaration was warranted that winter, and helped Iowa manage through the demand and supply chain challenges. Iowa transporters had exhausted their hours for service needed to make deliveries. The proclamation allowed them to work overtime, keep pace with accelerated consumption, and maintain market stability. But the process to evaluate situation severity in advance, and to determine if there is sufficient evidence to warrant a declaration, is difficult and complex. It should consider both safety and economic impact on public welfare. In 2017, NASEO published guidance for state petroleum shortage response planning⁸, including an extensive list of factors and questions that should be considered before declaring an emergency and waiving FMCSA safety rules. The working group reviewed this guide and provided input on key issues specific to propane in Iowa and the Midwest region. Highlights include:

Weather Considerations

- Snow, ice and severe weather alone are not a reason for a declaration. But sustained cold weather across Iowa can exacerbate supply problems and contribute to the severity of other factors.
- Poor supply and inventory planning by marketers or end users in advance of cold weather is not justification for an emergency.
- Agriculture/harvest demand data, including corn drying information related to crop progress and weather, provides an indication of consumption rate and potential issues.

Market Conditions, Supply Shortage, and Infrastructure Damage Considerations

- Whether pipeline terminals have product (not whether there is a line of trucks) is a key consideration.
- Whether a pipeline is on allocation is not a determinant, but it can cause stress on the overall supply chain during peak times and can increase travel time applicable towards hours of service limitations.
- Isolated pipeline outages for short durations is a normal part of operations. Sustained outages and/or outages in combination with other issues drives severity.
- Hours of service is an issue if transporters must go to out-of-state sources or terminals in severe shortages.
- The changing export situation and days of supply within an area are key factors affecting the situation.

Transportation Considerations

- Driver shortages and/or equipment shortages with anhydrous ammonia conversion result in supply chain issues. But all available resources are used in the event of an emergency.
- Terminal lines consume hours of service and are an issue. But, the inverse is not true. The absence of a line could be a question of product availability and timing, which is more complex to manage on batch pipelines.
- Lines at northern Iowa terminals could be indication of issues in neighboring states that indirectly affect Iowa.

⁸ <https://www.naseo.org/petroleum-shortage-response-planning>

The group discussed the regional scope of emergencies. Cold-related emergencies or heightened demand usually affect multiple states in a geographic area. During shortages, neighboring states may draw supplies from a state that is less affected by the same problem. Transporters cross state lines to source product and lines at terminals increase, consuming hours of service. Regional declarations are desirable because they allow for uniformity in hours of service requirements and provide states facing similar issues with equitable relief.

Recommendations

The working group's input on the questions to be asked in the event of a propane fuel shortage should be integrated into the Iowa Energy Assurance Plan and adopted by State officials when evaluating whether to declare an emergency.

The group supports regional declarations over state-level declarations for their broader impact and efficiency. State officials should integrate regional context when requesting action in the event of an emergency, creating greater visibility to both safety and economic impacts in Iowa and the region.

2.4 Hours of Service and Mitigating the Impact of Emergency Declarations

Ultimately, the goal is to avoid an emergency. However, in instances where avoidance is not feasible, the aim shifts to mitigating its impact. In the case of a propane shortage, the primary objective of an emergency declaration is to temporarily waive hours of service (HOS) regulations⁹, which establish maximum driving limits for commercial motor vehicle drivers transporting propane, allowing motor carriers to assist with the emergency relief efforts. The intent is to mitigate the damaging effects of a shortage by increasing the amount of propane transported throughout the state and/or region.

However, during an emergency, sections 390 through 399 of the Federal Motor Carrier Safety Regulation (FMCSR)¹⁰ (not just section 395 related to hours of service regulations) are temporarily suspended, waiving broader safety regulations and inspection requirements. The working group engaged in multiple sessions reviewing the root causes of hours of service issues, as well as options to enact a more limited scope of regulatory relief in the interest of public safety.

Hours of Service regulations include limiting truck driver on duty time to 14 hours and driving time to 11 hours, as well as other restrictions. The primary concern during a propane shortage is that available drivers will not be able to transport sufficient propane from terminals and other supply sources to marketers in Iowa, within these hours of service windows. During peak demand or shortages, hours of service can be unproductively consumed sitting in lines at terminals, travelling longer distances and/or out-of-state to source propane. In addition, shortages of qualified HazMat drivers (see section 2.6) further exacerbate the issue.

All stakeholders agree that limiting the scope of regulatory actions, and thus the safety impacts, is in the best interest of the public and all parties. When hours of service limits are waived in an emergency, most transporters will set their own internal limits and policies to maintain safe operation of their fleet. However, the concern lies with firms who might be rare exceptions and disregard responsible standards and procedures during a shortage.

Since intra and interstate HOS limits are defined in the federal regulations, process changes require legislative action. Although NPGA has been pursuing changes to these federal regulations for many years, the group agreed that concurrent support from multiple states would increase the likelihood of change. The working group explored multiple approaches to pursuing hours of service modifications. Current regulations allow for "variances" (i.e. changing rules as they are defined) and "exemptions" (i.e. waiving rules or certain parameters). Each approach represents different levels of risk, as well as complexity to implement.

⁹ 49 CFR 395: Hours of Service of Drivers. (Federal Motor Carrier Safety Administration)

¹⁰ 49 CFR 390.23: Relief from regulations. (Federal Motor Carrier Safety Administration)

States are required to have regulations compatible with federal regulations. However, for intrastate commerce, variances can be pursued within existing pre-defined, tolerance guidelines¹¹, as well as seek new variances with substantially the same purpose as the federal regulation and with no adverse impact on safety¹². The working group reviewed the possibility of extending HOS limits in Iowa for intrastate operations. FMCSR allows intrastate variances to extend on duty limit from 14 to 16 hours and driving limit from 11 to 12. After deliberation, the opinion of the workshop attendees was that extending on duty and driving hour limits to this level would not have been sufficient to avoid an emergency declaration in the winter of 2017-2018.

The group also discussed pursuing a new intrastate variance in Iowa to limit the scope of an emergency declaration to hours of service only. Although all the stakeholders agreed with restricting waivers to hours of service, there were concerns raised that regional emergency declarations might become more commonplace in the future (see section 2.2). If so, an “intrastate” approach would be nullified, because full regional or federal emergency declarations would override a restricted, state-level declaration. In addition, an intrastate waiver wouldn’t apply when transporters are required to go out-of-state to source propane during a shortage. As a result, the group focused their efforts on how to help facilitate a federal regulation change with state level support that could apply to both intra and interstate transportation, including a potential pilot in Iowa.

States also have an option to pursue new intrastate exemptions for State laws and regulations for a specific industry, which could apply in high demand, but non-emergency, situations. The group reviewed similar exemptions in other industries (e.g. fireworks display transport for the Independence Day holiday), the criteria for exemptions, as well as the associated risks of the approach.

Recently, FMCSA implemented an agriculture exemption that provides exceptions from HOS rules¹³ for the transportation of agricultural commodities within a 150-air mile radius for harvesting and planting. The agriculture exemption applies to delivery of supplies and equipment for agricultural use from wholesale or retail distribution point. As a result, it has helped the propane industry with the high demand during harvest season and covers most propane transportation needs from the marketer-to-end user via bobtail trucks. However, pipeline-to-marketer truck transportation is outside the scope of the exemption. Because the propane is delivered to a marketer vs. end user, it cannot be determined if propane is destined for agricultural use.

Recommendations

With Iowa as a suggested pilot, the group supports a Federal regulation change allowing for a more limited emergency declaration or an alternative measure to restrict waivers to Hours of Service regulations only. The restricted or limited scope meets safety goals and received overall support across stakeholders. The approach should consider the need to create a distinction between a restricted HOS scope for a fuel shortage versus the need for a full emergency declaration during a disaster recovery situation.

The working group also supports exploration of a new hours of service exemption to address truck transport from pipeline terminals or other sources to marketers, including all energy products and not just propane, outside the scope of the current agriculture exemption.

Next steps include reviewing proposed recommendations with relevant legislative authorities or legal experts, as well as with industry stakeholders at national and regional meetings.

¹¹ See Federal Motor Carrier Safety Regulation (FMCSR) 49 CFR 350.341

¹² See Federal Motor Carrier Safety Regulation (FMCSR) 49 CFR 350.345

¹³ See FMCSR 49 CFR 395.1(k)

2.5 Exploring Pipeline Terminal Reservation or Notification System

One of the highest priority recommendations across all public and private sector stakeholder groups was exploring the development of a propane terminal reservation or notification system.

The capacity of all transportation modes is critical to meeting the demand for propane with each mode playing an interrelated role. Truck capacity to pick up propane at Iowa pipeline or rail terminals and move it to marketer storage is critical during peak demand periods. For the most part, truck loading at pipeline terminals is conducted on a first-come, first-served basis. There is no prearranged time for pickup between the shipper and the transport carrier, like a traditional commercial transportation management process. A transport company can pick up propane during any terminal operating hours. A terminal operator, while responsible for managing the facility, has no role in scheduling truck pickups at the pipeline terminal.

The group started by reviewing the underlying issues, current terminal processes and participants, as well as similar systems and business models. The challenge arises during times of high propane demand or when a disruption occurs in the supply chain. In these situations, the demand for propane loads at the terminals exceeds the capacity of the pipeline and/or terminal. During these peak periods, trucks from multiple wholesalers, transporters and/or marketers begin lining up at terminals at the start of the day to secure a one of a limited number of loads. While sitting idle in line, the drivers' hours of service are consumed, affecting downstream capacity and economics in the supply chain, as well as exacerbating shortage issues for qualified drivers. The terminal might also be underutilized in off-hours, assuming propane is available to be loaded, without a coordinated reservation process. In addition, terminals may not be built to accommodate high volumes of trucks, presenting safety issues when lines extend into adjacent roadways.

The capacity of pipeline and their terminals is finite. In 2016, propane service was added to an existing pipeline terminal in Rock Rapids, Iowa. But given the regional demand and economics of new pipeline development, no new propane pipelines are planned. With investments in storage in Iowa since 2014, industry stakeholders believe that the grace period with current storage levels has increased from three to seven days. However, spot issues still exist in peak demand situations. And, ongoing increases in out-of-state marketer usage of Northern Iowa pipeline terminals with the closure of the Cochin pipeline has had a ripple effect across the Iowa propane supply chain. In addition, competition for pipeline capacity for other products on batch pipelines, and/or permanent reutilization of pipelines for other commodities, has a significant impact on pipeline transport capacity for propane. Thus, most efficient utilization of pipeline as a transportation mode is essential for Iowa, with a high reliance on pipelines for transport from regional primary storage sites, like Conway, Kansas.

The system could take on a variety of different forms ranging from:

- A simple notification or queuing system, where a driver is notified of wait times/terminal status; and/or assigned a spot in line and is notified (via text or an app) when they have reached top of queue and should return for loading.
- A more robust queuing system that assigns specific times for loading, given when a driver entered the queue.
- A full reservation system where a loading time is prescheduled in advance of arrival at the terminal.

The only reservation systems identified as in use in the propane industry in Iowa today are at rail terminals. With the permanent reversal of the Cochin pipeline in 2013, the propane industry has established rail terminals to deliver propane from Western Canada supply sources to the Midwest region previously serviced by the Cochin. At these rail terminals, specific appointment times/windows are typically scheduled the afternoon before pickup, with the process being highly dependent on the inbound rail delivery schedule and a much smaller volume of available propane truck loads for pickup vs pipeline terminals.

The group looked at three different types of appointment/reservation systems as potential business models:

- **Transportation Management Systems (TMS)** – A common commercial transportation tool used to request and schedule specific pickup and delivery times, coordinating available windows between shippers, carriers, and third-party logistics providers. The TMS system is typically owned by one of the parties, like the shipper.

- **Queue Management System (QMS)** – Focuses on better managing (vs. eliminating) a line, including communication of key metrics, such as number of trucks in line, average wait time, etc., often linked to a mobile application for real-time visibility. A QMS is used request a spot in line or notify of spot availability.
- **Truck Appointment Systems (TAS)** - Combines aspects of both TMS and QMS systems, including appointment scheduling, estimated wait/flow times, inbound shipment schedules, facility notices and statuses, as well as truck registration processes. Container terminals at ocean ports are early adopters of TAS systems to reduce traffic congestion and air pollution, increase terminal capacity and reduce operating costs.

The application of TAS systems was most similar to pipeline terminals, where the shipper and transportation carrier are separate entities, operating independently from the terminal operator. However, container terminals also deal with increased complexity from coordinating inbound cargo schedules, managing multiple transportation modes at ocean ports, as well as dealing with higher terminal operating costs.

Using the concept of a TAS system as a guide, the working group defined attributes and implementation considerations for a propane pipeline reservation system. A key discussion was how to create greater visibility to terminal status. Key metrics to communicate included number of racks open, number of trucks in line (on-site or in a virtual line), wait and loading times, number and timing of loads available, changes in terminal operating status, etc., to help reduce driver idle time. However, it is important to note that the status information alone would not be a guarantee of product availability, since this is proprietary information communicated by the product owner, not the pipeline. Some terminal communication and reporting is provided today by pipeline operators. However, the information varies by pipeline and location and is not real-time.

Scheduling and loading considerations are also essential to potential system design. Scheduling specific appointment times, the day before or the same day, could assist with driver scheduling and dispatch, as well as increase the likelihood of picking up a second load within a driver's hours-of-service window. The process would need to address the duration of pickup windows, operating rules if times were missed or in the event of a terminal outage, driver operating procedures (for staffed and unstaffed facilities) and apply universally to all terminal users (in and out-of-state) to function efficiently and fairly. The process benefits would be similar to when a pipeline goes on allocation. But, it would have broader applicability beyond this exception process during shortages or spikes in demand.

This type of system could potentially help transporters utilize multiple driver shifts during shortages to leverage pipeline capacity after hours. With today's process, the predominant viewpoint or perception is that terminal inventory is depleted during core business hours, thus the economic and safety trade-offs outweigh the supply impacts from implementing multiple driver shifts to mitigate an emergency.

Recommendations

One of the greatest challenges of a terminal reservation system is the involvement of disparate groups with varying needs. Working across these groups is key to design and implementation of viable terminal reservation systems and processes. The recommended next steps are to:

- Seek additional input on the system strawman from additional transport carriers (including dedicated carriers, wholesalers and marketers) and resources directly involved in dispatching and scheduling propane shipments and loads.
- Discuss concept and implementation considerations with additional pipeline operators, including terminal management personnel.
- Based on received input, finalize high-level, terminal reservation and/or notification system concept and processes, in order to explore technology and operational options for execution across multiple terminals and pipelines.

2.6 Incentives to Drive Behavior and Investment

In the optimization study recommendations, incentives were identified as a potential tool to drive investments, key behaviors and/or adoption of best practices. The focus of the working group discussion was on reviewing different types of incentives and their potential benefits for:

- Building propane storage capacity within Iowa;
- Acting as a mechanism to overcome transportation capacity issues; and
- Reducing the volume of propane to be transported to meet demand during peak periods.

The discussion included an examination of the types of incentives (past and potential) and their target audiences, as well as the mechanisms to deliver.

A key assumption from the study was that end-user or tertiary storage investments would have the greatest impact to drive scale and bring more propane into Iowa prior to peak demand periods. Options included retroactive incentives to end users and/or marketers to (a) increase end user residential and agricultural storage for winter heat or (b) right size farm storage based on grain drying needs. It also looked at behavioral incentives, such as driving early tank fill on farms before grain drying or committing to supply and/or pricing contracts.

Past incentives in the propane industry have focused more on propane utilization and energy conservation, including safe installation of propane appliances, industry incentives to include propane in new construction, as well as rebates for investments in high-efficiency propane furnaces, water heaters and grain dryers. There were no previous incentives identified to invest in inventory storage capacity or other supply chain issues.

After deliberation, there were mixed opinions from the working group participants on the value of incentives. Many marketers proactively invested in their own secondary storage and worked with end users to add tertiary storage after the winters of 2013-2014. The challenge with end user storage investments is that just because an end user has a large tank, it does not mean that they will fill the tank to capacity. If propane is not in a storage tank in Iowa at the time of a demand peak or shortage, the transportation constraints to bring enough propane from out-of-state, primary storage facilities into Iowa still exist. The mere existence of inventory capacity does not guarantee that the capacity will be utilized. This issue is especially relevant for agricultural propane users who will not fill their tanks until they determine there is a need. Due to tight profit margins, agriculture users don't want to invest in filling propane tanks in advance if the demand for grain drying will be low in that year.

On the marketer side, the challenges in investing in incremental storage are different. Marketers storage investments do help alleviate some short-term constraints. But, marketers cannot invest in enough storage capacity to meet end user demand in a sustained shortage. They simply cannot build to that scale. Where they do make investments, the challenge turns to zoning issues and finding a location where they can place new tanks.

Recommendations

There were two key recommendations from the working group on incentives. For residential heating demand, the group recommended focusing on education versus incentives. Education with residential users on the value of summer fills to fill tanks early, take advantage of lower prices and bring inventory into Iowa was thought to be more impactful. For agricultural demand, the group recommended exploring the ability to reutilize large farm storage for marketer secondary storage, outside of peak grain drying demand. The concept would increase marketer inventory levels within Iowa and provide an alternate use for underutilized agricultural storage capacity. For example, if marketers could reutilize ten 30,000-gallon agriculture propane tanks, 300,000 gallons of extra secondary storage capacity could be added in Iowa. Recommended next steps look at feasibility and implementation considerations of the concept including:

- Cost-benefit of investments to modify agriculture tanks to pump out propane safely
- Potential metering of farm usage of propane
- Regulatory (e.g. code compliance, zoning) and insurance implications for commercial vs. agricultural use

2.7 Other Discussion Topics

The following topics were also examined as part of the working group's efforts.

Timing for LIHEAP Applications

For many years, the Low Income Home Energy Assistance Program (LIHEAP)¹⁴ in Iowa has implemented processes to retain a portion of funds from the prior program year to take advantage of marketer summer pricing programs. Although pricing programs can help mitigate the impact of price spikes by locking in costs before the peak demand period, it does not mitigate risks inherent in transportation constraints by bringing inventory into Iowa. For LIHEAP users to benefit from summer tank fill best practices, current year recipients of LIHEAP funding would have to be identified before the October/November LIHEAP program application start date. A marketer's ability to fill residential tanks by the end of September is highly beneficial to avoid issues or shortages during peaks.

An earlier program start date would require a federal legislative change to implement. Most industry stakeholders support efforts to change the timing. However, decentralized Iowa LIHEAP offices are funded and staffed to coincide with the current fall program application start dates. As a result, an earlier application period would require funding changes for office staffing to be feasible in Iowa, as well as address the requirement for LIHEAP funds to still be used for its intended purpose, winter heating.

Truck and Driver Availability

Issues of truck and qualified driver availability were discussed during multiple working sessions on demand preparedness and hours of service. The number of tankers available for propane transport impacts transportation capacity in the supply chain. In recent years, many transporters have acquired and/or modified tankers for both propane and anhydrous ammonia use to increase asset utilization in the offseason. Used for fertilizer, recent shifts in anhydrous demand from spring to fall has caused overlapping demand with propane grain drying for truck assets. Once converted to anhydrous for the season, tankers are no longer available for propane distribution.

There is also a shortage of truck drivers across the transportation industry, as well as for qualified HazMat drivers to transport propane. The commercial driver's license (CDL) age minimum of 21 prohibits new drivers from entering the job market. There are many young, qualified, responsible drivers who grew up in the agriculture communities and have experience despite their age. However, they are lost to other job markets due to age restrictions. The group supports efforts to begin recruiting and training for CDL's at 18¹⁵, with the potential to convert to HazMat at 21, after 3 years of driving experience. However, transporters may also face challenges obtaining insurance for drivers under 23, regardless of CDL changes.

Electronic Driver Log Data

In 2017, regulations came into effect that require drivers to log hours (driving, on duty, etc.) using electronic logging devices (ELD's) to ensure compliance with hours of service regulations¹⁶. There were some initial questions raised within the industry, as to whether new ELD's processes would have any adverse impact during fuel shortages or emergencies. However, it was found that ELD's simply make the existing process for logging hours electronic versus prior paper processes. It doesn't change underlying requirements to track and log hours.

ELD's capture driving statistics from trucks automatically, store it and make it available to enforcement officials on demand. By making the process electronic, the new devices have created greater visibility to wait times in lines at terminals and brought corresponding hours of service issues to the forefront. With electronic data capture, there is also the future potential to centrally collect the data and use it to monitor and identify potential issues in the supply chain. Better data may help reduce or mitigate the risk of an emergency. Although transport firms have

¹⁴ <https://humanrights.iowa.gov/dcaa/liheap>

¹⁵ The DRIVE-Safe Act introduced into U.S. Senate in August 2018 seeks to address driver shortage issues, including CDL age requirements for interstate travel. <https://www.congress.gov/bill/115th-congress/senate-bill/3352>

¹⁶ <https://www.fmcsa.dot.gov/hours-service/elds/electronic-logging-devices>

the option to consolidate driver data in a private analytical tool, there is no central repository for ELD data across organizations. State Motor Vehicle Enforcement officials and FMCSA only receive a sampling of driver log data from roadside checks. However, in the future, changes in the capture and utilization of ELD data could enhance supply chain risk monitoring efforts by delivering better more systemic data.

3 Critical Implementation Paths

In September 2018, the Working Group convened to review the summary report and progress against the group's initiatives. The final recommendation of the team was to transition the action items from the Industry Working Group to stakeholder organizations for execution and/or further development. Proposed responsibility for the critical implementation activities are as follows:

3.1 Iowa Propane Gas Association (IPGA) with support from Iowa Department of Agriculture and Land Stewardship (IDALS)

IPGA will continue to take the lead on communication between industry private stakeholder groups and state agencies, with continuing support from IDALS for coordinating state agency involvement. Responsibilities include:

- IPGA acting as a central coordination point for identification, communication and escalation of potential supply chain issues from private sector and state agencies;
- IPGA monitoring supply chain status, risks and developments in neighboring states through counterparts in other state associations;
- IPGA and IDALS working together to coordinate 1 to 2 conference calls per year between private industry and state agencies to discuss winter preparedness, industry risks, changes and progress against initiatives; and
- IPGA and IDALS ensuring ongoing communication to and adoption of best practices by end users and stakeholder organizations (including summer fills and reutilization of marketer storage¹⁷).

In addition, as part of the communication efforts, IPGA will continue to pursue opportunities to enhance sharing of non-proprietary, industry data (e.g. terminal status) across private sector stakeholders, where feasible.

3.2 National Propane Gas Association (NPGA) with support from Iowa Propane Gas Association (IPGA)

With the support of Iowa public and private stakeholders, the working group believes that NPGA as a national association is in the best position to drive:

- Public data enhancement initiatives, including development of a regional days of supply metric for PADD2¹⁸, as well as enhancements to EIA data quality, timeliness, regional detail and transparency; and
- Regulatory change initiatives, including a more limited emergency declaration or a new hours of service exemption, as well as the potential to pilot changes within Iowa.

The regional and/or national scope of these issues necessitates involvement beyond the scope of the Iowa working group. The group recommends providing the necessary support to help drive increased progress against these initiatives through NPGA.

¹⁷ As of the date of this report, the Working Group believes that both best practices have been implemented in practice and will continue to support their adoption.

¹⁸ PADD 2 is the Petroleum Administration for Defense District for the Midwest, used in reporting of petroleum product supply and movements. Refer to <https://www.eia.gov/todayinenergy/detail.php?id=4890>.

3.3 Iowa Energy Assurance Plan Stakeholder Agencies and the Iowa Governor's Office

Several recommendations have been identified for integration into the Iowa Energy Assurance Plan for implementation and adoption, including communication templates and best practices, procedures for monitoring, managing and escalating risks, as well as key questions and factors to review when assessing situation severity and potential risks. The working group recommends that the cross-agency committee responsible for the Plan drive the integration efforts. The committee is led by the Iowa Utilities Board (IUB) with participation from multiple members of the propane working group including Iowa Department of Transportation (Iowa DOT), Iowa Economic Development Authority (IEDA) and IDALS.

The efforts require close coordination with the Governor's office, who has ultimate responsibility for decisioning situation severity and taking emergency actions, as needed, at the state level. Emergency assessment procedures should be updated for recommended questions, as well as integrating contextual factors into justifications for regional and/or state level declarations.

3.4 Iowa Department of Transportation (Iowa DOT) and Working Group State Agencies

Iowa DOT, as the lead agency for the Propane Working Group, will continue to own key initiatives around propane monitoring and a potential terminal notification or reservation system. Input from the working group will be integrated into propane monitoring efforts, as it is deployed to state agencies to help make more proactive and informed decision-making in the event of a shortage, market disruption or emergency. In addition, due to the complexities of pursuing a pipeline terminal status notification or reservation system across industry stakeholders, pipeline users and owners, Iowa DOT will pursue next steps to solicit additional input from industry subject matter experts. Based on this feedback, a determination will be made on feasibility and the potential to move the initiative forward.

Overall, the Iowa Propane Industry Working Group has played a vital role in communicating and coordinating efforts to become better prepared and informed to manage future fluctuations and disruptions in Iowa's propane supply chain. These efforts will continue through stakeholder ownership of these initiatives and ongoing cooperation across the public and private sector participants.