ENERGY, ENVIRONMENT AND TRANSPORTATION

Safe and Reliable Pipelines

A Primer for State Legislatures

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Introduction

Petroleum products provide around 65% of the energy used in the United States, with oil and natural gas representing the largest share. Oil and gas pipelines provide the cheapest and safest method for transporting these products to market, which make them important sectors of the nation's critical energy infrastructure.

The ability to safely deliver oil and gas by pipelines is essential to the security of the United States, and a fundamental aspect of modern life, with significant economic and public health implications. The federal government, through the U.S. Department of Transportation's Pipelines and Hazardous Materials Safety Administration (PHMSA), oversees pipeline safety in coordination with state agencies. In fact, states have a significant role in regulating, implementing and enforcing pipeline safety initiatives.

State legislatures are positioned to take several steps that can help reduce the risks associated with pipelines, including:

- Updating damage prevention laws to account for best practices, in coordination with PHMSA's guidance.
- Enabling state utility commissions to promote pipeline safety programs and replace older infrastructure through cost-recovery mechanisms.
- Establishing and promoting pipeline safety standards, including funding for state inspection and oversight activities.
- Establishing and funding emergency planning and management activities, in addition to public education campaigns.

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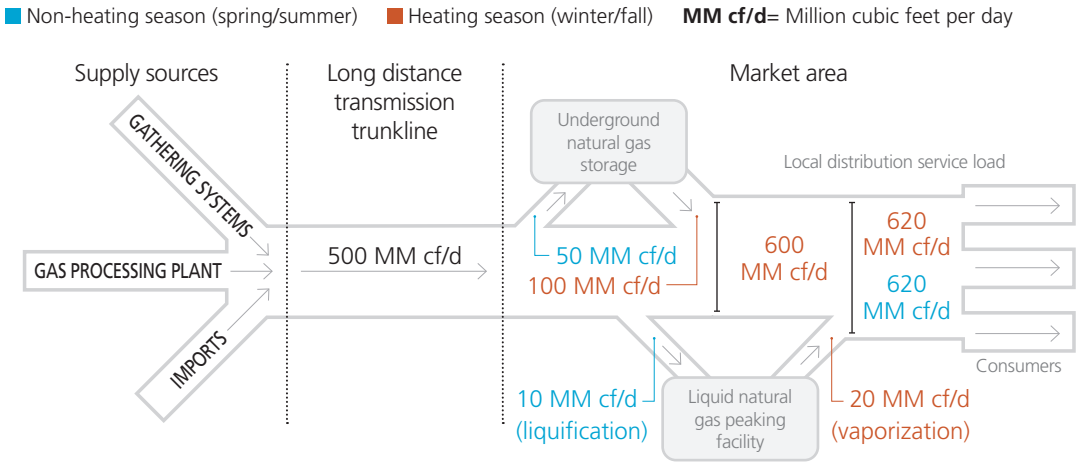
Figure 1. Natural Gas Pipeline Capacity Design Schematic



Source: U.S. Energy Information Administration

Basics of Pipeline Infrastructure

The nation's transportation infrastructure for natural gas and hazardous liquids—such as crude oil, gasoline, diesel, ethanol and propane, among others—is comprised of a vast network of interconnected pipelines, storage facilities, compressor stations, refining facilities and production sites. There are more than 2.7 million miles of pipelines that deliver trillions of cubic feet of natural gas and hundreds of billions of tons of oil every year. The bulk of that system—more than 2.5 million miles—is comprised of the natural gas system, while 218,000 miles of liquid petroleum pipelines make up the balance.

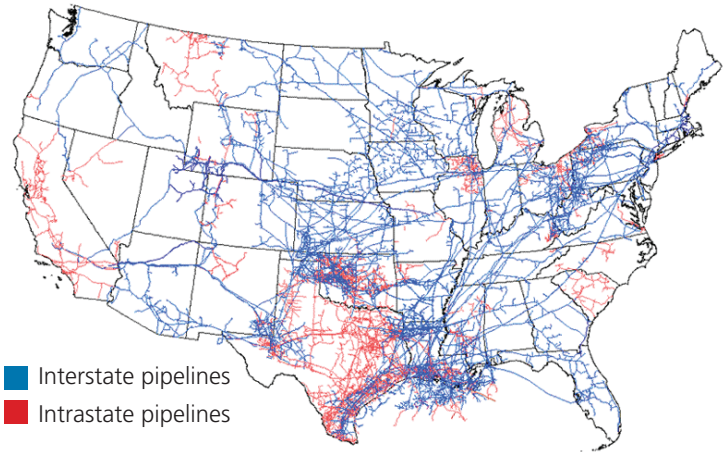
Even within the natural gas system, the majority of miles—more than 2.2 million—are made up of natural gas distribution lines that deliver gas to homes and businesses. However, the gas often travels long distances between production sites and the point of consumption, with over 300,000 miles of transmission lines and nearly 18,000 miles of gas-gathering lines in service across the country.

The pipeline system includes:

- **Gathering lines** that collect and move products from the point of production, such as wells or offshore rigs, to storage or processing.
- **Transmission lines** that transport large quantities of natural gas or hazardous liquids over long distances, ultimately connecting production to markets. Natural gas transmission lines move gas from gathering lines, storage facilities or processing facilities to distribution centers, regional storage facilities, power plants, industrial customers and municipalities. Petroleum transmission lines deliver crude oil to refineries, before moving the refined products to market. Most transmission pipelines are located underground and move gas under high pressure, usually operating at between 200 pounds to 1,500 pounds per square inch (psi).
- **Distribution lines** that take gas from the transmission system and deliver it for final consumption. Distribution systems are made up of larger-diameter main lines and small-diameter service lines that operate at lower pressures. Main lines deliver gas to industrial users and large consumers, while service lines move the gas to homes and businesses. While main lines may operate closer to 200 psi, by the time the gas reaches a customer's home the system pressure has usually been reduced closer to one-quarter psi.
- **Interstate pipelines** that move products across state lines. Approximately two-thirds of the lower 48 states are dependent on interstate pipelines, which link natural gas production areas with consumption centers. Nearly all interstate pipelines are transmission lines, and interstate transmission pipelines account for more than two-thirds of all transmission lines in the U.S.

- **Intrastate pipelines** that operate only within a state's boundaries. Texas has, by far, the largest intrastate pipeline network, with 45,000 miles of intrastate transmission pipelines in service.
- **Storage and peak-shaving facilities** that help balance daily and seasonal variations in demand. There are over 400 underground natural gas storage facilities across 28 states—largely consisting of depleted natural gas production wells—in addition to peak-shaving facilities located closer to consumption centers. These facilities offer pipeline operators the ability to store reserve supplies in order to meet shifts in demand.

Figure 2. U.S. Natural Gas Pipeline Network



Source: U.S. Energy Information Administration

- **Gas pipeline commodities** are the marketable byproducts of natural gas production, including natural gas, hydrogen, propane and synthetic gas. Distribution and transmission systems are comprised almost entirely for natural gas, although some are used to transport hydrogen and propane.
- **Liquefied natural gas (LNG)** is natural gas that has been cooled to around -260 degrees Fahrenheit in order to make the product easier to transport via rail, road or sea. In the liquefied state, the product takes up around one-sixth of the volume of pipeline quality gas. LNG facilities are primarily positioned to move domestic gas into foreign markets.

Regulation: The Federal and State Roles

Both state and federal agencies are responsible for pipeline oversight and safety. Interstate pipelines fall under the jurisdiction of the Federal Energy Regulatory Commission (FERC) and the U.S. Department of Transportation (DOT). In broad terms, FERC oversees the commerce side of interstate pipelines, while DOT oversees on-the-ground operations. When it comes to pipeline safety and the purpose of this report, PHMSA is the federal agency working in collaboration with state agencies to reduce the risks posed by pipelines. While PHMSA is responsible for developing and enforcing safety regulations, the agency works closely with state agencies, which perform most of the inspections.

Most intrastate pipelines are regulated by state public utility commissions (PUCs) or other state regulatory authorities.

FEDERAL AGENCIES

FERC has authority to approve new pipeline projects, including the siting, permitting and oversight of commercial operations for interstate pipelines, related natural gas storage facilities and LNG facilities. FERC regulates rates and services and oversees the operation of pipelines and LNG facilities at all U.S. points of entry for imports and exports. There is no federal authority over the siting or permitting of new interstate hazardous liquid pipelines, and state siting regulations vary significantly.

Once a pipeline, storage or LNG facility is in operation, PHMSA is responsible for regulating, monitoring and enforcing pipeline safety regulations. Much of that work falls on PHMSA's Office of Pipeline Safety, which develops and implements policy initiatives and regulations that govern the safe operation of the pipeline network. The office manages the national pipeline safety inspection and enforcement program through a collaborative process with partnering state agencies to ensure pipeline safety, security, monitoring and compliance.

The Office of Pipeline Safety also directs PHMSA's education and outreach initiatives to promote the increased adoption of safety programs by state and local governments, pipeline operators and the general

public. PHMSA's mandate has been renewed every five years since the adoption of the Pipeline Inspection, Protection, Enforcement and Safety (PIPES) Act of 2006. The most recent PIPES Act update came in 2016, and the 2021 reauthorization is currently under discussion. However, the federal government's involvement in pipeline safety initiatives spans decades, dating back to the first Pipeline Safety Act, which was passed in 1968.

In addition, PHMSA recently published three final rules in the Federal Register to address congressional mandates and incorporate recommendations from the National Transportation Safety Board, the Government Accountability Office and the public.

- The first rule revised federal pipeline safety regulations to improve the safety of onshore gas transmission lines, including integrity management requirements that operators must follow to determine the maximum allowable operating pressure. The focus of this rule is on untested transmission lines and lines made from certain materials in "high consequence areas," such as areas that are densely populated.

- The second rule makes changes to improve the safety of hazardous liquids pipelines by extending the reporting requirements to incorporate certain hazardous liquid gravity and rural gathering lines. It requires lines impacted by extreme weather to be inspected and integrity assessments on certain segments of the system to be conducted at least every 10 years.

- The third rule outlines the secretary of transportation's emergency order authority, establishing procedures for issuing emergency orders to address unsafe conditions or practices that represent an imminent hazard to public health and safety or the environment.

STATE AGENCIES

Although PHMSA develops much of the pipeline safety regulations across the nation, most of the inspections are performed by state agencies. Federal law establishes state responsibility to regulate, inspect and enforce safety standards for intrastate pipelines, although states must receive federal certification to operate those safety programs.

Each year, PHMSA's Office of Pipeline Safety certifies state agencies to perform these inspections and oversight duties. All states, excluding Alaska and Hawaii, participate in the pipeline safety program. The program allows states to assume safety authority over intrastate gas pipelines, hazardous liquid pipelines and underground natural gas storage, thereby granting states authority over more than 80% of the infrastructure under PHMSA's safety authority. In order to execute this role, PHMSA provides grants reimbursing up to 80% of total costs for personnel, equipment and oversight activities. In certain cases, states have received PHMSA's authorization to inspect interstate pipelines as well. The following states are currently authorized to act as interstate agents: Arizona, Connecticut, Iowa, Michigan, Minnesota, New York, Ohio, Washington and West Virginia.

In order to qualify for certification, state regulations must be at least as stringent as the federal regulations. However, states can and have implemented stronger oversight than is required federally. In some cases, this has resulted from high-profile pipeline accidents that led to loss of life and property.

Pipeline explosions in California and Pennsylvania in 2010 intensified the regulation and oversight of pipeline operations, while recent explosions in Kentucky and Massachusetts renewed public concern over the aging pipes that make up the nation's oil and gas infrastructure.

In September 2018, a series of fires and explosions in the Merrimack Valley in northeastern Massachusetts damaged over 130 buildings, killed one person and sent nearly two dozen people to local hospitals. According to the National Transportation Safety Board's (NTSB) final report, the incident occurred when high-pressure natural gas was released into a low-pressure distribution system. The preventable incident was the result of weak engineering management, planning and practices by the distribution utility, Columbia Gas of Massachusetts, while replacing an older cast iron distribution main, in addition to inadequate overpressure protections for the system.

To address the Merrimack Valley gas explosions, the Massachusetts Senate has considered two separate bills to increase safety in the immediate response to pipeline emergencies. First, SB 1967 would require the department of utilities to create a task force, comprised of department and gas company representatives, to create emergency response plans specific to all foreseeable causes of a gas pipeline failure. Similarly, SB 1966 would create an oversight board to make recommendations to the governor with respect to gas safety, facility inspection, the qualifications of inspectors and engineers who oversee pipeline construction and maintenance, and emergency response protocols for gas-related incidents. Both these measures reinforce the idea that a prepared response is the most effective response to a pipeline emergency.

In August 2019, a transmission pipeline ruptured in Lincoln County, Kentucky, releasing around 66 million cubic feet of natural gas. The gas ignited and the resulting explosion killed one person and hospitalized six. It destroyed five nearby homes, damaged another 14 and prompted the evacuation of 75 residents from a nearby mobile home park. The pipeline is owned and operated by Enbridge Inc. While NTSB is still investigating the incident, a preliminary report noted this was not the first time this particular section of pipeline, which had been in service since 1957, has breached; it had previously ruptured near Moorhead, Ky., in 2003.

Pipeline Safety Trends

Pipelines are the safest and most cost-effective ways to transport natural gas and hazardous liquid products. However, aging infrastructure and outdated materials threaten that safety standard. Pipelines constructed of cast and wrought iron, and bare steel, largely installed over 60 years ago, pose the biggest threat to continued safety. As a result of these dangers, 22 states and Puerto Rico have eliminated cast or wrought iron natural gas distribution lines within their borders and, nationally, cast and wrought iron distribution main mileage has decreased by 42% from 2005 to 2018. (Figures for 2019 were not available at the time of publication.)

Changes in these materials have helped to decrease overall fatalities associated with pipeline incidents, but significant pipeline incidents are still occurring and causing disastrous damage.

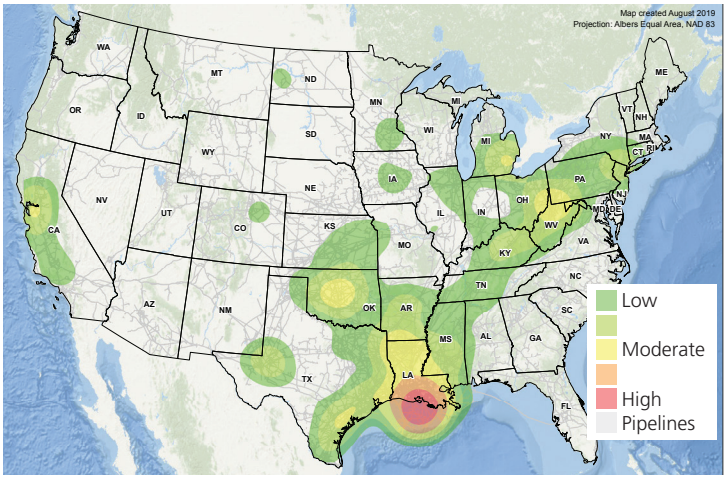
PHMSA defines significant incidents as ones that include any of the following conditions:

- A fatality or injury requiring in-patient hospitalization.
- $50,000 or more in total costs, measured in 1984 dollars.
- Highly volatile liquid releases of five barrels or more, or other liquid releases of 50 barrels or more.
- Liquid releases resulting in an unintentional fire or explosion.

Federal reporting standards are similar throughout the United States and, although states do not submit incident reports to PHMSA, pipeline operators are required to report incidents directly to PHMSA. The data cited in this report comes from PHMSA's Data and Statistics.

Figure 3. Natural Gas Transmission Pipeline Incident Density

2010-present



Source: U.S. Department of Transportation

On average over the past 10 years, the number of deaths associated with significant pipeline incidents has fallen roughly 31% per year compared to the yearly average from 1999 to 2008. However, although fewer deaths are occurring on average, it is difficult to make broad generalizations with certainty that overall pipeline safety has significantly improved. On an average annual basis, from 2009 to 2018, the number of incidents, injuries sustained, and the yearly costs associated with pipeline incidents all rose compared to annual averages from 1999 to 2008.

Over the last 20 years, PHMSA has recorded 5,712 significant incidents classified under these parameters. These incidents have resulted in 291 deaths and 1,267 injuries. The total cost of all significant incidents over the last 20 years is estimated to be more than $9 trillion.

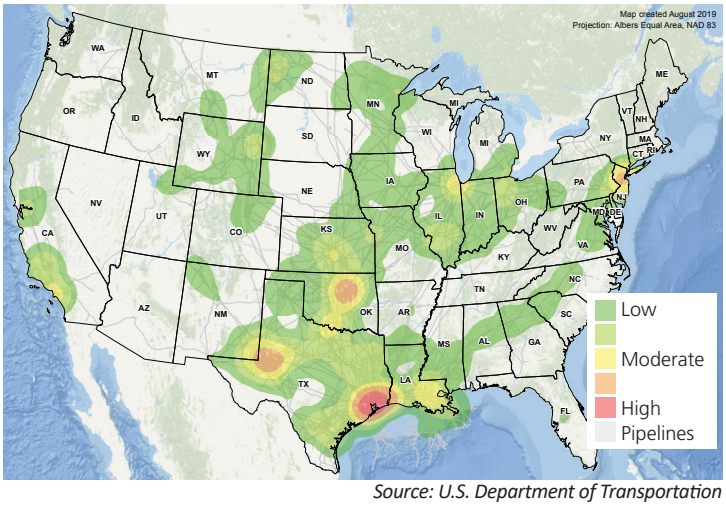
When yearly fatalities are examined in five-year intervals, a positive and encouraging trend becomes evident. In general, deaths from pipeline accidents are statistically decreasing. From 1999 to 2003, there were 91 total deaths, for an average of 18.2 per year. From 2004 to 2008, there were 81 total deaths, with 16.2 occurring on average per year. From 2009 to 2013, there were 61 total deaths, an average of 12.2 a year. The last five years, 2014 to 2018, there have been 58 total deaths, at an average of 11.6 a year. PHMSA has not recorded more than 20 deaths in a single year in over 14 years, and total fatalities have failed to reach double digits in four of the last six years.

The number of significant incidents, however, reveals a more troubling trend. On average, the number of incidents per year is increasing. From 1999 to 2012, an average of 276.9 incidents occurred per year. In the past six years, however, the number of incidents has increased greatly both in totality and per year. From 2013 to 2018, there were an average of 306 incidents per year. Less than 300 incidents occurred only one year in that six-year period. By comparison, in the 14 years prior, there were only two years where there were more than 300 incidents in a given year. Furthermore, despite having the fewest number of total incidents in the past six years, 2018 still had more incidents—291—occur than all but three of the previous 14 years, from 1999 to 2012.

Although the data indicates that risk of death in the operation of a pipeline is objectively decreasing, the data on the overall risk of injury is less decisive. Despite an encouraging five-year period from 2004 to 2008, where a little over 47 injuries occurred on average per year, across the last 20 years there have been 63 injuries on average per year associated with pipeline incidents. In the last five years, from 2014 to 2018, there were an average of 70 injuries per year. By comparison, from 1999 to 2004, there were 74 injures on average per year. In those same time intervals, the average number of yearly deaths decreased by around 44%, yet injuries decreased by only about 5%.

Figure 4. Hazardous Liquid Pipeline Incident Density

2010-present



Source: U.S. Department of Transportation

Sorted by system, several trends become apparent. First, incidents on the distribution system are clearly the most dangerous, largely due to the fact that distribution systems are located in close proximity to where people live and work. Although encompassing only 25% of all significant incidents, distribution incidents account for 71% of all fatalities and 78% of all injuries in the last 20 years. Second, within distribution systems, cast and wrought iron pipelines are particularly problematic, with 10% of all the serious distribution incidents originating on the 2% of distribution pipeline constructed from cast iron.

In addition, 38% of all fatalities and 17% of all injuries on gas distribution mains involved cast or wrought iron pipelines. Moreover, about 38% of incidents involving cast and wrought iron pipelines cause a fatality or injury. By comparison, pipelines constructed from other materials were far less dangerous. Pipelines constructed from other materials recorded a fatality or injury on only 20% of incidents.

Third, the costs associated with incidents is directly proportionate to the number of incidents. For example, 24% of all incidents across the last 20 years are classified as transmission system incidents. Those incidents also comprise 25% of the total cost across all incidents the last 20 years. Similarly, hazardous liquids pipelines account for 48% of all incidents and about 48% of all cleanup costs during the last 20 years. Likewise, the distribution system encompasses roughly 25% of all incidents and about 22% of the total cost in the last 20 years.

Finally, incidents across gathering systems and natural gas storage are expensive, but do not often result in injury or death. In the last 20 years, PHMSA has recorded 146 total incidents relating to gas gathering or storage facilities. No fatalities have been recorded and only seven injuries have resulted from those incidents. Altogether, these incidents have caused nearly $450 million in damage and make up about 4.8% of all incident costs.

The Role of State Legislatures

State legislatures play a significant role in promoting pipeline safety by overseeing state regulators and passing state laws. They can direct state regulators to adopt pipeline safety standards that are more stringent than federal requirements and financing mechanisms that offer incentives to replace older pipelines, particularly those made of cast and wrought iron or bare steel. They can also update state statutes on excavation damage prevention and enhance civil penalties and state enforcement, or require that pipeline operators meet certain emergency planning requirements.

The impetus to make these changes can come in a variety of forms, such as federal oversight and penalties, reaction to high-profile pipeline incidents that result in loss of life and property, or in consultation with regulators, industry, the public and other stakeholders.

PREVENT EXCAVATION DAMAGE

Excavation damage is one of the leading causes of pipeline damage in the U.S., with only corrosion and equipment failure accounting for more incidents. Because more than 2.2 million miles of distribution pipelines are located primarily in more densely populated areas, the distribution system, while only representing a quarter of all serious incidents, accounts for close to three-quarters of fatalities and injuries resulting from serious pipeline incidents. This is the reason it's so important to present excavators with the most accurate information possible to avoid accidental ruptures that could result in significant damage to individuals, property and local economies.

Over the past two decades, states have been working to reduce the prevalence of these incidents through damage prevention laws—often referred to as "one-call laws" or "811 laws." Every state has its own one-call law. Such laws establish safety requirements for excavators and operators of underground infrastructure, along with the structural and procedural protocols for the state. However, the specific requirements and the level of enforcement can vary significantly.

To date, the laws have contributed to a reduction in the number of significant incidents caused by excavation damage, a decrease of about 30% since 2005. However, additional progress can still be made and PHMSA has been working to ensure state one-call laws are up to the task.

Through the PIPES Act of 2006, PHMSA was granted authority to enforce civil proceedings against excavators in states deemed to have inadequate excavation damage enforcement programs. In the ensuing years, PHMSA reviewed state programs to determine adequacy. As of December 2019, seven states and the District of Columbia were deemed to have inadequate enforcement. Those states include Alabama, California, Colorado, Delaware, Florida, West Virginia and Wisconsin.

At least 12 states—Alabama, Arkansas, Colorado, Maryland, Michigan, Missouri, North Carolina, North Dakota, Ohio, Oklahoma, Pennsylvania and Tennessee—have revised their one-call laws since 2010. Several others, like Indiana and Kansas, did so earlier.

The primary elements of effective laws include:

- **Excavator Notice:** This requires the excavator to provide notice of a project to all operators of underground infrastructure prior to beginning excavation work. In nearly all cases, this is as simple as notifying the state one-call center (by dialing 811). In other cases, the excavator must contact operators directly.
- **Operator Response:** Once notified, operators of underground infrastructure must locate and mark their facilities. Most states require operators to mark facilities within two working days of receiving notice.

- **Positive Response:** This requires an operator to communicate to the excavator, prior to excavation, that any underground infrastructure has been located and marked. While this is viewed as an important piece of "closing the loop" between both parties, it is not a universal element of state one-call laws. In 33 states, the law allows the markings made by operators to constitute positive response. In some states, like Ohio, the operator must contact the excavator directly to communicate the presence or absence of underground infrastructure on the site.
- **Damage Notification:** Every state requires that excavators who damage underground infrastructure notify either operators or the one-call center as soon as possible. Meanwhile, three states do not require excavators to call emergency service upon the release of hazardous materials, although federal law does require an excavator to call 911 as soon as possible.
- **Standards:** State laws establish standards by which excavators and operators are required to perform their work, including restrictions on the type of equipment that can be used within a "tolerance zone," indicated by a locator's markings.
- **Enforcement:** This has been the missing piece for many states. Without adequate enforcement mechanisms, there's no disincentive for negligent excavators and operators. PHMSA has encouraged states to increase fines to discourage violation of the law, and to designate a state agency to investigate and bring enforcement action.

For more information on state damage prevention laws, visit NCSL's online resource, "How States Protect Pipelines from Excavation Damage."

PROMOTE EFFECTIVE RATE REGULATION

State regulators are tasked with protecting ratepayers in more ways than one. It's their job to ensure that rates remain reasonable for everyone—to ensure everyone has access to products deemed vital to modern life. But they're also responsible for protecting ratepayers in a much more literal sense, because their regulation of pipeline operators and the revenues they receive includes programs tied to pipeline safety, such as system maintenance and infrastructure replacement initiatives.

In order for pipeline operators—often referred to as local distribution companies (LDCs)—to be able to fund these safety initiatives, public utility commissions must give them an opportunity to recover the associated costs. LDCs file rate cases with utility commissions that outline the company's operations, and they are limited to what the utility commission approves.

It's the role of utility commissions to balance public safety and cost. This is not always an easy task. If safety were the only concern, utility commissions would approve massive near-term rate increases to fund a sweeping effort to replace the riskiest pipes. But safety isn't the only consideration, given that drastic rate increases would make natural gas—a staple commodity that's relied upon for cooking and heating—unaffordable for many people. Commissions are bound to keep rates "just and reasonable."

In the aftermath of the 2011 pipeline accidents, the National Association of Regulatory Utility Commissioners (NARUC) published a report that touches on the issue of ratemaking as it relates to pipeline safety. The report concluded that there are four potential problems areas for PUCs:

- Insufficient funding of safety activities (due to concerns over raising rates), which result in suboptimal safety.
- Excessive funding (without proper concern over raising rates) for a given level of safety.
- Inadequate incentives for a utility to perform safety activities.
- An imbalance between safety and other regulatory objectives.

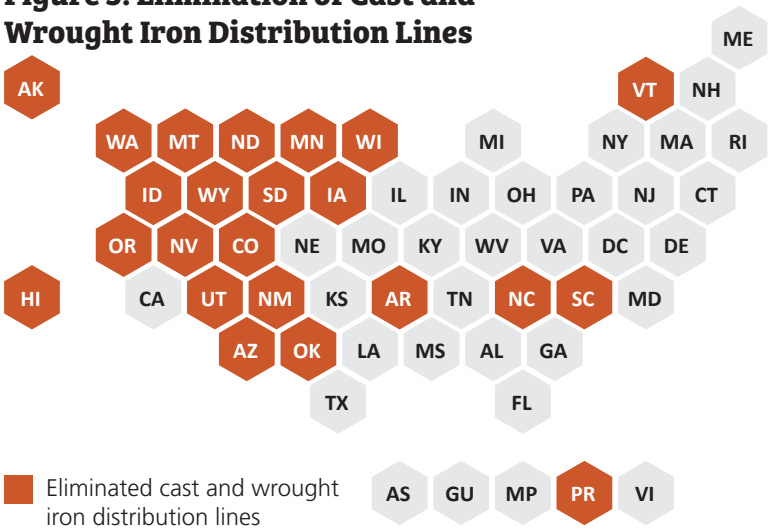
The key, the paper argues, is to ensure that balance is maintained by providing a combination of performance incentives. Such a balance would allow LDCs to earn a return on their investment in safety activities through cost-recovery mechanisms while ensuring, through the commission's regulatory oversight, that they don't overspend on those activities. It's the role of PUCs to ensure the money allocated to safety activities is being spent efficiently, and that it increases the social net benefits.

Promote Replacement of Older Infrastructure

Replacing older pipes constitutes a significant element of LDC safety activities. Over the past decade, concern has grown over the age of many of the nation's pipelines. After several high-profile explosions in 2011, PHMSA issued a "call to action," urging the nation's operators of natural gas pipelines to accelerate the repair, rehabilitation and replacement of the highest-risk sections of pipes. The primary factors for determining risk has to do with age, material and location—whether the pipe runs near densely populated areas that could pose an elevated risk, compared to a similar pipe in a more rural area.

The types of pipes that pose the highest risk were constructed with cast and wrought iron or bare steel. Cast and wrought iron pipeline, in particular, are some of the oldest pipelines in the country, many of which were built more than 60 years ago, yet they're still being used to deliver gas to homes and businesses. Since these pipes were first installed, the industry has enhanced the safety of its system significantly through research and development into advanced materials, advanced manufacturing, joint design and seam welding techniques, construction methods and maintenance practices. However, these older cast and wrought iron pipes—which are at higher risk of breaching due to their age and a lack of protective coating—are still in service. The degrading nature of iron alloys puts people in close proximity to these pipes at elevated risk. According to PHMSA data, the frequency of incidents on these pipes is four times higher than those made of other materials, and they are twice as likely to result in a fatality or injury. Additionally, uncoated steel natural gas and hazardous liquid pipelines, known as bare steel, were used extensively until the 1960s. Without the outer coating that protects the steel from the environment, bare steel pipelines are subject to corrosion and present a high risk of failure.

Figure 5. Elimination of Cast and Wrought Iron Distribution Lines



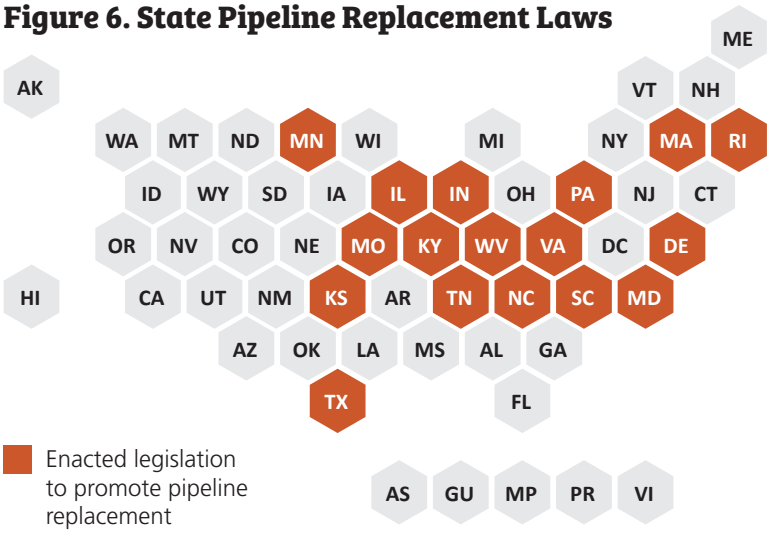
Source: PHMSA, 2019

Many companies, utility commissions and states are requiring or implementing accelerated replacement of rehabilitation of bare steel, along with cast and wrought iron pipelines. As of the 2018 report, 22 states and one territory have completely eliminated cast and wrought iron distribution lines. According to PHMSA, around 97% of natural gas distribution infrastructure in the U.S. consisted of either plastic or steel pipes by the end of 2018. The remaining 3% was made up of iron pipes.

As of 2018, the nation still had over 250,000 miles of distribution mains in service that were either built before 1960 or their original installation date is unknown, while more than 11 million distribution service lines fell into a similar category. Notably, some of the states with the highest population density—including historic cities that have a higher concentration of older infrastructure—are not included on that list. For example, nearly 60% of the District of Columbia's gas distribution mains were installed before 1970, and 23 states had more than one-third of their active gas distribution mains installed before 1970.

To address this issue, the District of Columbia Public Service Commission approved a 40-year Accelerated Pipe Replacement Plan. The LDC expects to spend over $100 million to replace nearly 40 miles of cast iron and bare steel mains, along with an undetermined number of service lines. In Pennsylvania, the General Assembly enacted legislation that provides for a distribution system improvement charge (DSIC), which allows utilities to recover the costs of replacing old pipelines through a monthly rider on customer bills. One LDC estimated it would spend $950 million from 2016 through 2020 on its replacement program.

Figure 6. State Pipeline Replacement Laws



Source: NCSL, 2020

Alternative rate mechanisms are often deployed to expedite replacing older pipelines. These rates must be approved by state utility commissions, but state legislatures have enacted policies to facilitate that process through state law. Delaware is the latest state to take this step. In 2018, the legislature enacted a law to allow utilities to apply for interim DSIC rates to replace infrastructure that had reached the end of its service life.

Seventeen state legislatures have enacted measures to promote pipeline replacement. During the 2019 legislative session, at least four states considered more than a dozen bills to enhance pipeline replacement activities on the part of LDCs, of which only Texas enacted a new law.

Texas HB 866 grants rulemaking authority to the Railroad Commission of Texas (RRC) to enhance its regulation of pipeline operators as it relates to replacing at-risk pipes. The new law prohibits installing new pipes made of cast iron, wrought iron or bare steel. It directs the RRC to promulgate a rule requiring LDCs to develop and implement a risk-based program for the annual removal and replacement of at least 8% of the most at-risk pipes in the system. Additionally, the law requires LDCs to focus initially on known cast iron pipes and directs those pipes to be removed and replaced by Jan. 1, 2022.

In at least 20 additional states and the District of Columbia, the PUCs have approved some form of pipeline replacement initiative without the legislature directing them to do so: Alabama, Arkansas, California, Colorado, Connecticut, Florida, Georgia, Iowa, Louisiana, Maine, Michigan, Mississippi, Nevada, New Hampshire, New Jersey, New York, Ohio, Oregon, Utah and Washington.

Promote Effective Safety Standards

PHMSA is the federal authority for ensuring the safe, reliable and environmentally sound operation of the nation's pipeline infrastructure. The Office of Pipeline Safety, together with state partners, regulates near-

ly 3,000 companies operating 2.8 million miles of pipelines. PHMSA also requires federal and state inspections of LNG and underground natural gas storage operators.

The District of Columbia, Puerto Rico, and all states except Alaska and Hawaii participate in PHMSA's pipeline safety program, with another 10 states also participating in PHMSA's underground natural gas storage program. In order to participate in these programs, states must adopt the minimum federal pipeline safety regulations. These federal minimums include regulations for:

- Materials used.
- Design and construction of pipelines.
- Welding or joining materials to the pipeline.
- Testing and regular maintenance requirements.
- Corrosion control.
- Qualification standards of pipeline personnel.
- Reporting requirements.
- Employee drug and alcohol programs.
- Risk-based integrity management programs.

However, states are free to enact their own, more stringent regulations on pipeline and underground natural gas storage. PHMSA measures the performance of these programs with on-sight inspection, compliance, incident investigation and training, and by evaluating excavation damage prevention records and activities. PHMSA maintains public information regarding each state's pipeline safety program, and its performance metrics, which can be found on its State Pages website.

Additionally, states can operate their own pipeline safety program, provided the program receives certification from PHMSA. Once certification is received, the state program assumes responsibility for compliance inspections and failure investigations. As a result, individual state pipeline safety programs are responsible for inspecting over 80% of the pipeline infrastructure under federal safety authority.

PHMSA-certified states operating their own pipeline safety program must maintain an adequate, base-level number of pipeline safety inspection activity days. The level of inspection an approved state program requires is based on an operator-by-operator analysis, and reflects the base number of inspection days a state must undertake to remain compliant under PHMSA standards. As a result, each state's inspection activity day requirement is formulated based on the size and scope of the pipeline operations within the individual state.

While PHMSA takes the lead on establishing the floor for pipeline safety standards, states have chosen to adopt stricter standards or formally adopt the federal standards in order to prioritize safety. The 2019 legislative session saw several states take steps in this direction.

New Jersey enacted SB 679 in January 2019, which increased civil penalties for certain natural gas or hazardous liquid facility safety violations to the federal limit under PHMSA. Specifically, the bill allowed persons determined by the Board of Public Utilities to have violated natural gas pipeline safety standards to be fined $200,000 for each violation for each day the violation persists, and set a maximum civil penalty at $2 million for any related series of violations.

In March, the South Dakota Legislature enacted SB 18, which officially adopted the federal pipeline safety standards relating to the design, installation, inspection, testing, construction, extension, operation, replacement and maintenance of gas pipeline facilities. The bill also increased maximum civil penalties for certain pipeline safety violations to federal levels, and created a state pipeline safety inspection program.

Similarly, Iowa Senate Study Bill 1174 (pending) would remove the current maximum civil penalties under state law, currently $100,000 for each violation and $1 million for any related series of violations, and re-

place those with applicable federal standards. In addition, this bill would replace the annual set inspection fee of 50 cents per pipeline mile in Iowa and allow annual inspection fees to be determined by the actual cost incurred by the Iowa Utilities Board in conducting inspections.

Several other states—including California, Connecticut, Massachusetts, New York and Pennsylvania—considered changes to state law that would enhance pipeline safety standards. These bills aimed to address several issues, including: requiring training and certification for distribution system workers; requiring the study of state pipeline systems and the potential incentives that could enhance system safety and encourage pipeline replacement; limiting the siting of larger-diameter pipelines near certain facilities, such as schools; and enhancing LDC maintenance program reporting requirements.

Massachusetts, attempting to address the tragic events of the 2018 Merrimack Valley gas explosions, saw a flurry of proposed bills addressing pipeline safety last year. HB 1810 (pending) would add additional safeguards to proposed subdivisions located within 75 feet of existing high-pressure gas transmission pipelines. HB 2845 (pending) would establish, within the Department of Public Utilities, an energy infrastructure oversight board that would make recommendations to the governor in order to promote increased gas and pipeline safety. In addition, several bills would increase transparency in pipeline repairs. HB 2847 (pending) would authorize a certification program for contractors and employees repairing or performing work on public utility infrastructure. HB 2850 (pending) would require creating emergency response plans, updated every three years, specific to all foreseeable causes of a gas pipeline failure.

In addition to these proposed bills, Massachusetts passed emergency legislation at the end of 2018, immediately following the Merrimack Valley gas explosions, that requires a certified professional engineer to review major natural gas projects before the project can receive regulatory approval.

Emergency Management

PHMSA recognizes that each state is unique and has its own set of challenges in protecting the public and the environment from the risk associated with pipeline transportation. In 2014, PHMSA endorsed the Georgia Pipeline Emergency Response Initiative and has since encouraged other states to develop similar individually tailored programs. Georgia's initiative is specifically designed to enhance communications among first responders, pipeline operators and regulators, something PHMSA views as critically important to effective and efficient emergency management response.

In addition, PHMSA promotes information-sharing to encourage pipeline operators to work with emergency officials to create emergency plans capable of coordinating planned and actual responses to developing emergencies.

States have taken PHMSA recommendations and have also pushed their own legislation in several areas. Specifically, states have attempted to change operating procedures for planning emergency response protocols and have created emergency response funds to set aside money to respond immediately to an emergency situation. Both these legislative goals support the idea that the best response to an emergency is immediate and cohesive.

To improve the regulation and safety of hazardous liquid pipelines, California currently has a bill (SB 169) in committee that would authorize the state fire marshal to require the owner or operator of a pipeline to establish and maintain records and reports, and provide information the fire marshal reasonably requires. Some California lawmakers believe this would expedite the fire marshal's ability to make quick, decisive

and informed decisions in the face of emergency situations. They argue it would cut down the time required to assess the severity of the emergency and allow the marshal more immediate access to critical information about the infrastructure in question.

Massachusetts is considering two additional bills to increase safety in the immediate response to pipeline emergencies. First, SB 1967 (pending) would require the department of utilities to create a task force, comprised of department and gas company representatives, to create emergency response plans specific to all foreseeable causes of a gas pipeline failures. Similarly, SB 1966 (pending) would create an oversight board to make recommendations to the governor with respect to gas safety, facility inspection, the qualifications of inspectors and engineers who oversee pipeline construction and maintenance, and emergency response protocols for gas-related incidents. Both these measures reinforce the idea that a prepared response is the most effective response to a pipeline emergency.

In New Jersey, proposed legislation has taken a different direction. SB 668 (pending) would direct public utilities and pipeline operators to reimburse municipalities for emergency services after responding to emergencies involving a pipeline. The bill would require municipalities to be reimbursed at a rate equal to the hourly wages of the emergency services personnel. In addition, AB 2616 (pending) would require public utility employees be trained on the roles, responsibilities and anticipated sequence of actions for emergency response personnel. It would require public utility employees to immediately call 911 to report any emergencies associated with their work.

Along similar lines, several other states have attempted to address the issue by creating emergency response funds to allow the state to immediately combat disasters by reserving funds specifically for that purpose. In South Dakota, SB 190 was enacted in March, establishing a fund authorized to pay "administrative costs and extraordinary expenses incurred by the state, arising out of or in connection with pipeline construction."

Conclusion

Given the important role pipelines play in delivering valuable energy resources in a reliable and cost-effective way, many lawmakers are working to ensure they are protected from damage by third parties. They are also acting to make sure pipelines are maintained and upgraded to ensure public safety and environmental security. Through continued collaboration with PHMSA, states have the opportunity to partner with federal authorities to enhance the safe and reliable operations of the nation's pipeline system.

State legislatures, in particular, play a significant role in establishing the parameters within which state agencies operate. In recent years, state legislatures have pursued that initiative with new and updated legislation to enhance safety standards and requirements, strengthen enforcement mechanisms, balance regulatory oversight, and offer incentives to replace aged infrastructure and bolster emergency planning.

Resources

- Pipeline and Hazardous Materials Safety Administration – Federal government agency responsible for pipeline safety regulatory oversight and collaboration with state partners.
- Federal Energy Regulatory Commission – Federal energy regulator responsible for reviewing and approving new pipeline projects, and overseeing commercial operations for interstate pipelines and related facilities.
- Pipeline Safety Trust – A nonprofit public charity promoting pipeline safety through education and advocacy.
- National Association of Pipeline Safety Representatives – The national association representing state pipeline safety personnel across the United States.
- Common Ground Alliance – A member-driven association of 1,700 individuals, organizations and sponsors involved in the underground utility industry, working to prevent damage to underground infrastructure through effective damage prevention practices.

The National Conference of State Legislatures is the bipartisan organization dedicated to serving the lawmakers and staffs of the nation's 50 states, its commonwealths and territories.

NCSL provides research, technical assistance and opportunities for policymakers to exchange ideas on the most pressing state issues, and is an effective and respected advocate for the interests of the states in the American federal system. Its objectives are:

- Improve the quality and effectiveness of state legislatures.
- Promote policy innovation and communication among state legislatures.
- Ensure state legislatures a strong, cohesive voice in the federal system.

The conference operates from offices in Denver, Colorado and Washington, D.C.

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