Tragedy of Errors

The Peoples Gas Pipe Replacement Program is a Poorly Designed, Mismanaged, Bad Investment for Chicago

Illinois PIRG Education Fund

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Illinois PIRG Education Fund

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Executive summary

PEOPLES GAS LIGHT & COKE, the gas distribution utility serving homes and businesses in Chicago, has run some form of a gas main replacement program for the last 38 years, since 1981, when a study first recommended a 50-year dedicated program to replace a specific subset of at-risk, leak-prone cast iron pipes.

Over the decades, Peoples Gas has failed to design and implement a program that effectively accomplishes the public safety purpose of removing pipes made of aging legacy materials.

Today, through the System Modernization Program, or SMP, *Peoples Gas is spending more money on pipe replacement than ever but not mitigating risk in any proportion to its massive outlay of capital.*

The SMP fails to protect public safety primarily due to two fundamental flaws:

- Despite its public safety justification, the SMP prioritizes broader system improvement objectives over public safety objectives. The SMP is a comprehensive, accelerated effort to upgrade the entire Peoples Gas distribution system to medium pressure.[1]
- The SMP is not managed based on credible long- or short-term plans based on empirical analysis to achieve program objectives. Instead, the SMP is in constant flux and overly reactive to third parties. As a result, the SMP consistently fails to hit annual work targets or control costs.

Chicago skyline. Credit: Handel Tejada

A Brief History of Peoples Gas Pipe Replacement

After a large number of cast iron pipe leaks and breaks in the Peoples Gas distribution system during the severe 1976-1977 winter, a 1981 engineering study recommended that Peoples Gas initiate a 50-year dedicated program to replace a specific subset of at-risk cast iron pipes.[2] Outside audits in 1988 and 1994 found the program never got on course.[3]

A series of events – including a 1992 explosion that killed four people, a follow up engineering study, and new federal regulations – prompted Peoples Gas to adopt a new, scientifically driven approach to at-risk pipe replacement.[4] This approach, in place from the mid-1990s through most of the 2000s, was effective at targeting at-risk pipes for replacement, but replaced fewer miles of at risk pipe.[5]

In 2007, Peoples Gas proposed an accelerated and expanded program more focused on medium pressure upgrade work -- making changes to the Peoples Gas distribution system to allow distributing gas at medium, rather than low, pressure. Finally launched in 2011, Peoples Gas started spending significantly more and performing more work each year in order to, in theory, complete pipe replacement faster.[6] The acceleration "overwhelmed the management of [Peoples Gas], its resources, talent, and capabilities,"[7] prompting the Illinois utility regulator, the Illinois Commerce Commission, to order an audit of the program, performed by Liberty Consulting Group.[8]

In 2013, the Illinois General Assembly passed legislation granting Peoples Gas and other Illinois gas distribution utilities statutory authority to continue at-risk pipe replacement and medium pressure work. The new law better guaranteed and accelerated the recovery of associated costs and profits through a bill rider on customer monthly bills.[9]

The Liberty audit, which began in 2014, with implementation monitoring running through 2017, highlighted substantial management failures.[10] Rather than engage in the difficult work of fixing the program, however, Peoples Gas management rejected key audit recommendations and doubled down on the profitable status quo.

THE SYSTEM MODERNIZATION PROGRAM IS A BAD DEAL FOR CHICAGO

The SMP does not prioritize public safety

- The SMP is an accelerated medium pressure program, not an at-risk pipe replacement program. The scope and design of the SMP emphasizes upgrading to medium pressure over protecting public safety.
- Peoples Gas does not collect quality information, measure risk, or analyze its performance in a manner that would allow it to effectively prioritize safety.
- Existing evidence, such as leak rates, indicates that the program is failing to mitigate risk in any proportion to the massive outlay of capital.
    - Liberty found the failure of leak rates to decline alarming, making it a topline finding of its audit, and writing "failure of leaks to trend significantly downward for a number of years calls into question the process used to select highest-risk mains."[11]
    - According to the analysis of an expert hired by the Office of the Attorney General in 2017, leak rates *increased* during the early years of acceleration and remained high.[12]

- Current reporting from Peoples Gas shows little or no apparent relationship between neighborhoods with high leak rates and the schedule of neighborhood work.[13]

Peoples Gas has mismanaged the SMP

- Management problems are enduring and endemic. The same or similar management problems, documented in 1988, 1994, 2008, and 2015 audit reports, persist from the early 1980s to today.[14]
- The 2015 Liberty audit report found management did not understand and could not explain "(a) likely overall program costs, (b) likely program duration relative to targeted completion of leak-prone pipe replacement by 2030, and (c) the reasons why leak rates have not fallen significantly after four years of accelerated replacement of cast iron and ductile iron mains."[15]
- Program cost estimates grew from $1.4 billion to as much as $11 billion between 2007 and 2015.[16] Peoples Gas still does not have a credible cost estimate.
- Instead of creating and following a credible long-term plan based on empirical analysis to achieve program objectives, Peoples Gas works off of short-term plans based on available capital and takes too many opportunities to perform more expensive, reactive work, for example, by responding to City of Chicago public improvements. As a result, Peoples Gas consistently falls short of annual work targets while spending more than budgeted per unit of work.
  - Peoples Gas replaced 52 miles of pipe in 2018, compared to its plan to replace 74.9 miles of pipe.[17] Peoples Gas also fell short of replacement targets in 2017[18] and 2016.[19]
  - In 2018, Peoples Gas spent $5.7 million per mile of pipe retired, significantly more than the $1 million per mile it spent in 2006, prior to acceleration.[20]
  - This cost per mile is also significantly higher than peer utilities like New York City's Consolidated Edison and Baltimore Gas & Electric which spent $3.4 million and $2.4 million per mile, respectively, in recent years.[21]

The Illinois Commerce Commission has failed to hold Peoples Gas accountable

- Despite announcing an investigation with great fanfare at the end of 2015, the Commission excluded expertise from the investigation, failed to answer the questions it posed, and ultimately declined to take action, citing a questionable legal argument.
- The Commission failed to leverage a $5.7 billion merger in 2015 to ensure new management was prepared to assume responsibility for the program, and unnecessarily limited multiple investigations into management malfeasance.
- The Commission has allowed Peoples Gas to continue profiting off of the SMP despite the company's failure to produce basic information and analysis to justify the program and its costs.

The affordability burden Peoples Gas is placing on Chicagoans is unjustified and unnecessary

- The pace of investment has greatly increased since acceleration. This pace drives customers' monthly bills and represents a greater harm to them than the overall cost of the program. Peoples Gas plans to increase capital spending even further in coming years, from $1.3 billion between 2016 and 2019 to $1.9 billion between 2019 and 2021.[22]

- Between November 2018 and March 2019, the average Peoples Gas customer paid over $806 to heat their home, $324 more than the average suburban Chicago customer served by Nicor Gas, even though the average suburban customer consumed 6 percent more gas.[23]
- Average residential customers paid more than $75 for the program in 2018 out of a total annual bill of $1,219.[24] Customers could be paying ten times that by 2040, creating affordability problems for hundreds of thousands of Peoples Gas customers.[25]

Climate change means gas system improvement investment should slow, not accelerate

- Science tells us that to prevent the worst impacts of global warming we need to transition off heating our homes by burning fossil fuels in the next 30 years, well within the lifetime of the new pipes, and possibly before the SMP even finishes. [26]
- Accelerated replacement increases the potential for billions in stranded assets.

Peoples Gas and Illinois policy makers have saddled Chicagoans with increasing monthly bills for work that may have limited value in the decades to come, creating customer affordability problems that are wholly unjustified and unnecessary.

To protect public safety and customer affordability, policy makers should:

- Force Peoples Gas to create and implement a credible plan for pipe replacement that prioritizes risk mitigation based on an empirically justified scope, design, and pace.
- Slow down and comprehensively re-evaluate gas distribution utility system improvement investments by requiring comprehensive, transparent, integrated distribution system planning, revoking the blanket statutory authority to make accelerated investments with minimal regulatory oversight, and removing utility incentives to over-invest.
- Proactively study decarbonization and its implications for gas distribution utilities, including creating or expanding gas efficiency and electrification incentive programs and preparing to "reskill" the gas workforce.

History and Current Status of Peoples Gas Pipe Replacement

INTRODUCTION

This report presents a case that the Peoples Gas accelerated pipe replacement program is a bad investment for Chicago. First, for context, this chapter outlines *why* Peoples Gas is doing this program, *what* work constitutes the program, *how* the company is implementing the program, the *work that has been performed* to date, and the *regulatory context*.

While this chapter includes historical context, it primarily describes the work as it exists today, the current System Modernization Program (SMP), as approved by the Illinois Commerce Commission in January 2018.

Trench truck on street. Credit: author photo

The purpose of this work should be protecting public safety by mitigating the specific risk posed by the pipe material most likely to leak, crack, or break, primarily cast and ductile iron.

PROGRAM PURPOSE

Similar to other older gas utilities in cities across the country, Peoples Gas has performed work under various types of programs for decades to address public safety risks posed by legacy materials in its distribution system, primarily cast and ductile iron pipes.[27]

The purpose of this work should be protecting public safety by mitigating the specific risk posed by the pipe material most likely to leak, crack, or break, primarily cast and ductile iron.

Peoples Gas is not implementing its SMP to achieve this purpose, however. While it invokes public safety to justify its program, this justification is in conflict with the actual work Peoples Gas is doing – a much broader

modernization program of its entire system that includes both replacing high- and low-risk pipes and as it upgrades its entire system to medium pressure.[28]

This disconnect between stated purpose and performed work stems from the company's practice of combining *at-risk pipe replacement work* with work it was *already doing or is required to do*, such as pipe replacements dictated by third parties[29], and work it *wants to do*, converting its entire system from low to medium pressure.[30]

Peoples Gas "experienced a high level of cast iron pipes breaking during the severe winter of 1976-1977 which prompted the initiation of an investigation to determine the condition of the cast iron pipe in its distribution system,"[31] culminating in a 1981 engineering study by Zinder Engineering Inc (ZEI). The ZEI study recommended a targeted program to replace a subset of small diameter cast iron pipes in clay soils over a period of 50 years.[32] Through the 1980s, while Peoples Gas replaced many miles of main, it did not do so through any identifiable plan nor did it track progress towards achieving the goals outlined in the 1981 study.[33] Instead, according to a 1994 management audit, Peoples Gas pipe replacement work was driven by City public improvements and the company's work upgrading its system to medium pressure.[34]

In 1992, over-pressurized pipes in the River West neighborhood caused explosions, killing four people and bringing Peoples Gas under increased public and regulatory scrutiny.

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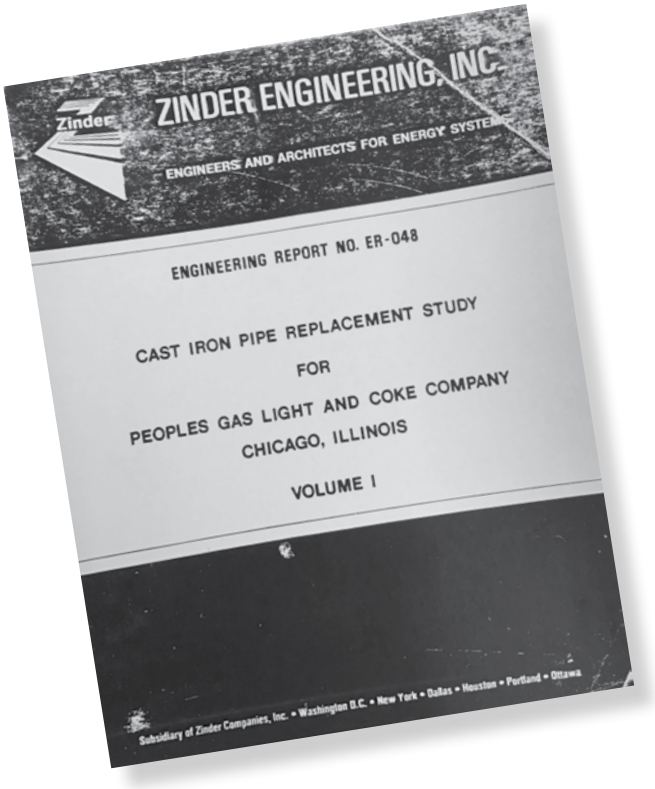


Zinder Engineering report, 1981. Credit: Author photo

At the time, Peoples Gas stated its plan to upgrade its entire distribution system to medium pressure by 2033.[35]

Based on the recommendation of a 1994 follow-up ZEI engineering study, Peoples Gas adjusted its publicly stated objective from replacing a *subset* of cast iron pipe to the replacement of *all* cast iron and ductile iron pipe from its system.[36]

After the explosions, audit, follow-up engineering study and new federal regulatory requirements, the company created a risk ranking index, now known as the Uniform Main Ranking Index (UMRI), which uses the historical performance of pipe, repair statistics, and engineer observations, to create a score to represent a proxy for the riskiness of each and every segment of pipe and prioritize the riskiest segments of pipe for earliest replacement.[37] The work that followed, from the mid-1990s to most of the 2000s, was slower, more targeted, and the most successful in reducing the risk posed by aging pipes, as measured by the rates of leaks, breaks, and cracks.[38]

A scene from the 1992 explosion. Credit: WMAQ NBC 5 Chicago

In 2007, Peoples Gas proposed an accelerated program, to spend more money and perform more work each year. Along with acceleration, the company proposed changing the program's scope and design, moving from a targeted approach to a zonal approach to better incorporate medium pressure upgrade work. Under this new approach, removing at-risk cast and ductile iron pipe would be only one of three scope areas of the program.

As this report documents, this acceleration, which Peoples Gas launched as the Accelerated Main Replacement Program (AMRP) in 2011, is most accurately understood as an acceleration of medium pressure upgrade work, not an acceleration of work to address the specific safety risk posed by cast and ductile iron pipes. Like the AMRP, the SMP, which began in 2016, is a comprehensive modernization program to upgrade Peoples Gas' entire distribution system, replacing virtually all of its pre-1980 pipes, not just the at-risk ones, on an accelerated basis.[39] The SMP scope, design, and schedule prioritizes system modernization over addressing the specific risk presented by deteriorating pipes.

Peoples Gas has refused to adequately quantify risk or use empirical data or analysis for planning or evaluating the SMP.[40] When proposing the program in 2007, 2009, and when defending the program in the recent commission investigation, the company did not even attempt to empirically support the inclusion of work outside of removing cast and ductile iron pipe in the scope of the SMP.

PROGRAM SCOPE

The Commission-approved SMP scope contains three primary categories of work: "(1) the replacement of leak-prone [cast and ductile iron] pipe; (2) increasing system pressure from low to medium; and (3) relocating meters from inside to outside customers' premises."[41]

Replacing at-risk cast and ductile iron mains and services with plastic

During the Commission investigation, Peoples Gas Vice President of Construction Andrew Hesselbach described its distribution system:

> "Peoples Gas' natural gas distribution and transmission system extends over 4,500 miles. A large portion of the system is made up of tens of thousands of aging short segments of cast and ductile iron material, a substantial portion of which were installed over a century ago. Many parts of the system are in various stages of deterioration, resulting in leaks, cracks, interruptions in service and a greater potential for dangerous incidents."[42]

Peoples Gas Vice President of Construction Andrew Hesselbach. Credit: WLS ABC 7 Chicago

Peoples Gas is replacing iron pipes with plastic. Credit: Author photo

Before World War II, most of the gas distributed in the United States was manufactured gas, created "from a process that made a flammable gas from coal, coke, or a special grade of oil."[43] Manufactured gas includes tar and other liquid byproducts that coat and protect iron mains, reducing leaks and cracks. So-called "natural" gas, used since World War II, is comparatively dry, removing some of the protection manufactured gas gave cast and ductile iron mains.

Cast and ductile iron degrade and weaken over time, increasing the incidence of breaks and leaks.[44] These failures "present great risk because their failures can prove both unpredictable and catastrophic in nature."[45] The "smaller [the] diameter, the higher the risk based on likelihood of breaking."[46]

Peoples Gas is replacing cast and ductile iron mains with plastic (polyethylene). Plastic resists deterioration and has numerous performance and operational advantages.[47]

The potential that cast and ductile iron mains and connecting bell joints will leak, crack, or break is the "risk" a dedicated pipe replacement program should exist to mitigate.

Replacing mains involves both installing new mains and retiring old mains. An old main is not retired until the newly installed main is fully operational and all customers have been transferred from the old to the new main.[48] Generally speaking, in company documents and this report, the terms "retiring" and "replacing" are interchangeable.

Peoples Gas is also replacing services that deliver gas from mains to homes and businesses. The percentage of services made from at-risk material is low, representing less than 3 percent of all services in 2014.[49]

Upgrading from a low-pressure to a medium-pressure system

As Mr. Hesselbach explained during the Commission investigation, older gas distribution systems operate at "low pressure (one quarter pound per square inch)."[50]

Upgrading the distribution system to medium pressure involves replacing all low-pressure pipe including pipes of all materials and both high- and low-risk pipe, relocating meters outside, and upgrading the transmission system. Upgrading to medium pressure has a number of other safety and performance benefits, including:

- allowing the use of excess flow valves, which can automatically stop the flow of gas in case of a leak,

- reducing damage caused by water infiltration,
- allowing for customer adoption of more efficient appliances,
- eliminating the need for booster pumps for certain facilities such as schools and hospitals, and
- allowing for smaller diameter pipe, which reduces installation costs, simplifies installation in congested areas, and reduces the likelihood of damage from other parties.[51]

Upgrading to medium pressure also increases risk in some ways. For example, because medium pressure means more gas can escape from a leak or break more quickly, the consequences of accidents, when they occur, can be more severe.[52]

Over the decades, the company has always conducted some pressure work in conjunction with risk-driven pipe replacement work. This was the case even during the period between the mid-1990s and mid-2000s when the program was most successful at mitigating risk. A 2007 engineering study analyzing this period found that Peoples Gas completed 60 percent of its pipe replacement work in conjunction with other, primarily medium pressure, work.[53]

When Peoples Gas accelerated pipe replacement in 2011, it shifted away from a risk-driven "segment" approach to a "zonal" approach to more efficiently conduct pressure work.[54]

- Peoples Gas has refused to track or analyze the cost impact of adding medium pressure work to at-risk pipe replacement.[55] Company testimony indicates pressure work is a large contributor to the ballooning costs of the SMP.[56]

Relocating meters outdoors

The majority of Peoples Gas customers' meters are indoors, requiring Peoples Gas to perform challenging safety inspections of the meters and upstream piping inside customer homes. In 2006, the Commission imposed a $500,000 civil penalty on Peoples Gas for its failure to comply with state and federal meter inspection laws.[57]

As of 2017, the Illinois Administrative Code requires outside gas meter installation "unless outdoor installation is not possible or would make the meter installation financially infeasible."[58] The Commission also required Peoples Gas to, where feasible, move meters from indoors to outdoors in 2014[59] and 2015.[60]

While relocating meters does not address the risks associated with aging cast iron and ductile iron material, it does provide a number of other safety and performance benefits, including:

- eliminating a pathway for leaks to directly enter a home or business,
- when meter leaks occur, releasing gas into the atmosphere, rather than home or business,
- allowing Peoples Gas to address leaks without needing customer permission to enter their home or business,
- making meter inspections less intrusive and disruptive to customers, and
- deterring meter tampering.[61]

Relocating meters is not part of Peoples Gas' federally mandated Distribution Integrity Management Plan, its comprehensive plan for addressing safety risks on its distribution system.[62]

PROGRAM DESIGN

The System Modernization Program, as described by the company during the recent Commission investigation,[63] is divided into four categories of investment, or four programs:

- Neighborhood Replacement Program,
- Public Improvement / System Improvement Replacement Program,
- High Pressure Installation Program, and
- Transmission Upgrades

Because they don't address at-risk pipe but rather exist to support the medium pressure work, this section will not further describe the relatively small High Pressure Installation and Transmission Upgrade investments. These relatively small programs cost over $19 million in 2018.[64]

The Neighborhood Replacement Program and Public Improvement / System Improvement Program are distinguished not by the type of work performed - both include all three scope categories - but by their planning and sequencing: neighborhood work is planned in advance, while PI/SI work is responsive to third parties, unanticipated reliability or capacity needs, and urgent or pending hazards. In its quarterly and annual SMP reports, Peoples Gas primarily reports by program, not by scope category.[65]

Neighborhood Replacement Program

The Neighborhood Replacement Program is the SMP's planned work. As it targets neighborhoods rather than specific segments of pipe, the Neighborhood Program is designed to perform medium pressure work.[66] Peoples Gas argued during the recent Commission investigation that it could not accomplish medium pressure work without the neighborhood approach.[67]

The auditor found the earlier neighborhood ranking system had not led to decreased leak rates, over-emphasized the age of pipe as a risk-indicator, and was biased in favor of larger neighborhoods.

When proposing an accelerated program in 2009, Peoples Gas proposed a zonal approach, arguing for it primarily as a better approach to making pressure upgrades, and secondarily as a way to reduce costs and improve coordination with the city.[68] Under the first zonal approach, used between 2011-2013, zones were set using engineering criteria, including UMRI segment scores, available pressure and capacity, and condition of mains and services in order to address "hotspots" in the system.[69]

The company adopted the Neighborhood Program in 2013, which completes work neighborhood by neighborhood, within 228 neighborhood boundaries defined by the City of Chicago.[70] Findings in a 2015 audit forced Peoples Gas to make several changes to the neighborhood rankings and weightings in order to, in the words of the company's director of gas operations planning, "redirect our focus on risk."[71] The auditor found the earlier neighborhood ranking system had not led to decreased leak rates, over-emphasized the age of pipe as a risk-indicator, and was biased in favor of larger neighborhoods.[72] As the audit found, the first neighborhoods worked on were primarily "the largest neighborhoods in each shop area."[73]

In its current form, to help determine the sequence of work, neighborhoods are ranked annually using a weighted five-factor formula. The formula includes performance data (the main ranking index, UMRI, as well as pending non-hazardous leaks) and materials data (percentages of medium pressure cast and ductile iron main, small-diameter cast iron pipe, and services constructed of vulnerable materials).[74]

The neighborhood ranking alone, however, does not ultimately determine the sequence of Neighborhood Program work. As Peoples Gas states, "Factors other than the neighborhood rankings may also influence the order in which neighborhood work is completed."[75] These factors may include gas flow analysis, coordination with other infrastructure projects in Chicago, conflicts with other projects in city streets, timeliness of permits and other authorizations, and "other engineering feasibility considerations."[76] In 2018, Peoples Gas started work in neighborhoods it ranked at 17th and 23rd, while not starting on neighborhoods it ranked 3rd, 4th, 6th and 7th.[77]

The Neighborhood Program constituted 66 percent of the 2018 SMP budget.[78] At the end of 2018, 38 neighborhoods have been completed and 10 are currently in progress.

Peoples Gas' use of a zonal approach, while not unique, is not used by a majority of its peers. Three of five peer utilities to which Peoples Gas compared its program during the Commission investigation use a segment approach and a fourth uses a combination of neighborhood and segment approach to pipe replacement.[79]

Peoples Gas does not have a long term plan for neighborhood work. Instead, the "SMP is planned and managed on a rolling three-year basis.[80] This means the SMP, a multi-decade project, is planned only three years into the future, and the plan is updated annually.

Public Improvement / System Improvement Replacement Program

The Public Improvement / System Improvement Replacement Program (PI/SI) performs similar work as the Neighborhood Program, but its sequencing and schedule is responsive to third parties, immediate and imminent hazards, and emerging system "capacity and reliability concerns," rather than planned in advance.

Because the work is reactive rather than proactive, PI/SI work is disruptive and impedes the company's ability to perform its planned work. Peoples Gas pipe replacement efforts have struggled with this for almost 40 years; early audits highlighted that Peoples Gas pipe replacement work was overly reactive to Chicago public improvements.[81]

PI/SI involves numerous types of work and the authors have not found a concise definition in company documents or testimony. The auditor that examined the program from 2014-2017 also found problems with PI/SI definition.[82] PI/SI appears to consist of four types of work, one which is responsive to third-party work, one which is a catch-all including opportunistic work and work responsive to third parties, and two of which are responsive to immediate or imminent hazards:

Because the work is reactive rather than proactive, PI/SI work is disruptive and impedes the company's ability to perform its planned work.

1. Public improvements: replacements *required* by third-party public improvements.

2. System improvements: a catch-all category including replacements *responsive to but not required* by third party public improvements, and work performed to address reliability or capacity concerns.

3. Hazardous and potentially hazardous leaks - Class 1 leaks (immediate hazard) and Class 2 leaks, (not considered hazardous, but requiring expedited replacement).

4. Highest risk pipes - Pipes that the UMRI classifies at the highest levels of risk.

Mr. Hesselbach described PI/SI in the recent Commission investigation:

> In most cases, Peoples Gas undertakes these investments in response to a third-party request to relocate or replace facilities due to conflicts with a public improvement project or in concert with work needed to address capacity or reliability concerns.[83]

In later testimony, Mr. Hesselbach spoke separately of Public Improvements and System Improvements. Public Improvements, he said, "consist of work done in coordination with projects being undertaken by third parties where conflicts with Peoples Gas' facilities exist and *relocation is required*"[84] [emphasis added].

System Improvements, on the other hand, address "capacity and reliability concerns" that would otherwise be performed through the Neighborhood Program but, according to Mr. Hesselbach, "If these types of pipe will need to be replaced as part of the SMP, it makes sense from our customers' and City residents' perspectives to do the work in the near term"[85] when a third party has already opened the streets. As the SMP aims to replace almost all of the Peoples Gas distribution system, broad "capacity and reliability" concerns could prompt System Improvement work almost anywhere, for any reason.

Because PI/SI work is inefficient and much of it is mandatory, there is no reason to provide Peoples Gas an incentive, in the form of the favorable cost recovery it currently gets, to perform it.

In recent years, a significant amount of PI/SI work has been responsive to the Chicago Office of Water Management, which is in the middle of its own water main replacement program.[86]

PI/SI also includes work responsive to immediate or potential hazards:

> … It is important to note at the outset that hazardous (Class 1) leaks are repaired immediately, wherever they occur on Peoples Gas' system, and without regard for the neighborhood rankings … Class 2 leaks are repaired or replaced within one calendar year, not to exceed 15 months, and pipe with a UMRI rating of 6 or a UMRI of 5 in a high consequence area is repaired or replaced within one year. While these leaks are classified as less hazardous, they nonetheless pose safety concerns that require focus beyond the neighborhood ranking approach.[87]

Class 1 leaks are defined as "A leak that represents an existing or probable hazard to persons or property, and requires

immediate repair or continuous action until the conditions are no longer hazardous."[88] Class 2 leaks are defined as a "leak that is recognized as being nonhazardous at the time of detection, but must be rechecked and re-evaluated once every 30 days until repaired," and "should be repaired or cleared no later than 15 months from the date the leak was reported as a grade 2."[89] Class 1 and 2 leak repair work would continue with or without the SMP and the amount of this work has remained stable at around 10 segments each year.[90]

The size of PI/SI programs in the entire SMP budget varies from year-to-year, usually a smaller portion than the Neighborhood Program. PI/SI constituted 11 percent of the planned SMP budget for 2018.[91] In 2016, the year Peoples Gas transitioned to new ownership, PI/SI was budgeted for significantly more than the Neighborhood Program (though ended up costing less).[92]

PI/SI is less efficient than the Neighborhood Program, as the projects are responsive to third parties, not planned as far in advance, and performed at a smaller scale. This inefficiency is reflected in the planned cost per mile installed, which in the 2018-2020 plan submitted by Peoples Gas during a recent Commission investigation was $1.88 million per mile installed for the Neighborhood Program and $2.04 million per mile installed for the PI/SI program.[93]

Because PI/SI work is inefficient and much of it is mandatory, there is no reason to provide Peoples Gas an incentive, in the form of the favorable cost recovery it currently gets, to perform it. Work that is truly mandatory should not require any encouragement. Further, all inefficient work should be minimalized and only performed if justified by rigorous analysis.

As discussed more in Chapter 4, Peoples Gas' inclusion and maximization of PI/SI work in the SMP significantly harms program implementation. Because of its disruptive nature, this work should not be included in the SMP and its harm to the program in terms of cost, schedule, and resources, should be closely tracked, analyzed, and minimized.

CHANGING GOALS, TIMELINE, AND COST

The recommended amount of pipe to replace and timeline for replacement has changed multiple times since the original 1981 ZEI engineering study recommended Peoples Gas replace 1,679 miles of cast iron mains in certain soils over 50 years.[94]

A follow up ZEI study in 1994 dropped the soil requirements and updated the program to encompass replacement of all 3,450 miles of cast and ductile iron main in the system. The 1994 study also pushed back the recommended end date from 2030 to 2050.[95]

Throughout this time Peoples Gas also had a stated desire to upgrade its entire distribution system to medium pressure.[96]

The most recent study, in 2007, by Kiefner and Associates, recommended Peoples Gas prioritize the replacement of cast and ductile iron pipe with 8 inch or smaller diameters, as those were responsible for over 90 percent of instances of breaking or cracking.[97] The Kiefner study recommended a 2036 end date for replacing 8-inch and smaller diameter pipe and recommended larger diameter pipes be replaced at a slower pace, finishing between 2050 and 2080, depending on diameter size, unless the risk ranking score for a segment recommended earlier replacement.

Between 2012 and early 2015, cost estimates climbed to $4.5 billion and then to over $8 billion - almost doubling twice in less than three years. By the end of 2015 new cost estimates put the figure as high as $11 billion.

While little cost data is available from the early decades of the program, program cost estimates have ballooned dramatically since 2007, when the Kiefner study estimated it would cost $1.4 billion to replace all cast iron and ductile iron pipes in the Peoples Gas distribution system.[98]

The Kiefner study reported that Peoples Gas "spent more than $32,000,000 in capital cost replacement of [cast iron and ductile iron] pipe in addition to nearly $6,000,000 in operations and maintenance cost in 2006 to retire 47.24 miles of this pipe."[99] This translates to $48 million in 2018 inflation adjusted costs, meaning Peoples Gas spent roughly $1 million per mile of pipe retired. In 2018, the SMP spent $5.7 million per mile of pipe retired.[100]

In 2009, Peoples Gas proposed a new, accelerated program, and the Commission ordered a 2030 end date for all pressure upgrades and replacement of at-risk pipe. Peoples Gas told the Commission that this iteration of the system-wide upgrade would cost $2.47 billion. A Peoples Gas executive later acknowledged that this estimate only included costs associated with at-risk pipe replacement, despite the fact that their proposed program scope was much larger.[101]

Between 2012 and early 2015, cost estimates climbed to $4.5 billion and then to over $8 billion - almost doubling twice in less than three years. By the end of 2015 new cost estimates put the figure as high as $11 billion.[102]

At the conclusion of the SMP investigation in January 2018, the Commission approved an end date range of 2035 to 2040.[103] Cost estimates during the investigation ranged between $7 billion and $11 billion.[104] The company's 2018 year-end report estimated the cost of completing the SMP's neighborhoods, not including costs to date, at $5.7 billion.[105]

There is still no official cost estimate.

It is impossible to know whether a more targeted program like the one recommended by Kiefner would have concluded on time and within the original cost estimates, but undoubtedly it would have replaced at-risk pipe faster and cost less than the SMP.

TABLE 01

Year	Total System Miles	MIles of CI/DI Pipe	Percent CI/DI Pipe
1981	4,031	3,450	86%
2017	4,414	1,408	32%

PROGRESS TO DATE

Over the 37 years between 1981 and 2018, the authors calculate that Peoples Gas has replaced 2,171 miles of cast and ductile iron main.[106]

In 1981 there were 3,450 miles of cast and ductile iron main in the Peoples Gas distribution system[107] out of a total system of 4,031[108] miles of distribution main, meaning cast and ductile iron mains constituted 86 percent of the distribution system.

At the end of 2017, there were 1,408 miles of cast and ductile iron remaining out of a total system of 4,414 miles of distribution main[109] meaning cast and ductile iron mains constituted 32 percent of the distribution system.

The 2007 Kiefner study recommended replacement of cast and ductile mains with 8 inch or smaller diameter by 2036 - while larger diameter pipes could be replaced between 2050 and 2080. At the beginning of 2011, when accelerated work began, there were 1,344 miles of this smaller diameter cast and ductile iron pipe in the Peoples Gas distribution system. At the end of 2017, 987 miles of smaller diameter cast and ductile iron pipe remained.[110]

The company has never stated how many additional miles of pipe it needs to replace due to the inclusion of medium pressure work. Comparing the miles Peoples Gas would need to replace to meet the Kiefner recommendation with the miles the company plans to replace through the SMP demonstrates that *the expanded scope of the SMP has nearly doubled the miles of pipe to be replaced in the coming decades.*

Over the decades, the company's pace of pipe replacement has varied greatly from year to year, reaching its zenith in 1991 at 101 miles and nadir in 2002 at 7 miles.[112]

In 2007, the Kiefner study calculated an overall pace, between 1981-2006, of 56.62 miles per year. The pace during the years of acceleration, 2011-2018, was 66.47 miles per year. Peoples Gas replaced 52 miles of main in 2018.[113]

REGULATORY CONTEXT

Peoples Gas provides an essential service – fuel for home heating and cooking – for the public good. As a natural monopoly--it is infeasible to have duplicative, competing gas distribution systems in Chicago -- the company is regulated and prices for its captive customers are set by regulators.

Peoples Gas operates within a robust and long-running regulatory structure overseen at the state level by the Illinois Commerce Commission. The Public Utilities Act grants the Commission broad powers and authority to govern, among other things, utility operations, cost recovery, and profit.

State and federal law and Commission regulations profoundly shape company incentives and operations. One of the most important considerations is how the utility recovers its costs for the services it provides. Between 1981 and 2013, the costs of Peoples Gas pipe replacement work were recovered through the traditional rate setting process.

TABLE 02[111]

	Target for replacement	End date	Miles of target remaining as of 1/1/2018
Kiefner Study	Small diameter CI/DI pipe	2036 (for small diameter pipe)	987
SMP	All CI/DI and all low pressure pipe	2035-2040	1,853

Since 2014, costs associated with accelerated pipe replacement have been recovered through a separate mechanism, a special bill surcharge, known as a rider.[114]

Under either regime, because Peoples Gas is allowed to recover all prudently incurred capital investments along with a return on that investment, or profit, the company makes more money as it spends more money. This provides utility managers an incentive to over-invest, or "gold-plate," its system.

Under traditional rate regulation, a utility typically spends money before asking to recover costs of the investment, promoting more conservative investments. Because the rider allows Peoples Gas to begin recovering investments immediately and automatically, it gives management further incentive to make higher levels of and more risky investments. Outside auditors found evidence of this dynamic in 2014-2015, concluding that annual budgets were driven less by a long-term master plan to reduce the risk posed by aging cast and ductile iron pipes and more by the limits of annual rate recovery.[115]

Traditional Rate Regulation

At a basic level, public utilities take on long-term debt to make large investments in infrastructure and then slowly, over decades, collect back what they paid for those investments, along with profit, through customers' monthly bills. The process in which the Commission determines how much a utility aims to recover through ratepayers' bills (the "revenue requirement") as well as how the revenue requirement is split up among different classes of customers (e.g., residential, business, heavy industrial, etc.) is known as a rate case. After a rate case, the levels that a company is allowed to charge on customers' bills are set until the company elects to return to the Commission for another rate case. A company can increase profits either by achieving operational efficiencies or by filing another rate case.

The process of setting rates through a rate case does not guarantee a utility it will recover its costs or make a profit. For Peoples Gas, a particularly warm winter may mean residents use less fuel, lowering their monthly bills' volumetric charges and in turn the amount of revenue Peoples Gas collects.

Generally, to be recovered from ratepayers, an investment must meet two standards. It must be "used and useful" (i.e., it is in service and being used) and it must be "prudently incurred."[116] The prudence standard is "that standard of care which a reasonable person would be expected to exercise under the same circumstances encountered by utility management at the time decisions had to be made."[117] That is, could a "reasonable" person make the same decision with the information the utility manager had (or should have had) at the time they made the decision -- not whether or not it was the best or right decision. The utility has the burden of proof to demonstrate its investments meet these standards.

Therefore, in traditional rate regulation, utilities generally must first make investments and then prove those investments are both used and useful and reasonable and prudent to the Commission before they can begin recovering those costs. This places the risk of a bad investment on the utility: if it makes an investment that is not used and useful, or it cannot demonstrate the investment was reasonable and prudent, it may not be allowed to recoup the investment from ratepayers. This provides incentives to utility managers to exercise caution and ensure investments are reasonable before making them. In practice, this also means that utilities typically present plans for large, non-routine investments to regulators for thorough investigation before spending significant amounts on them.

Riders

Rate cases are time- and resource-intensive for utilities, the Commission and other stakeholders. All parties share an interest in not engaging in frequent rate cases. To allow for some variation in cost recovery between rate cases, bill riders allow for changes in cost recovery outside of the rate case process, and are often used for highly variable or unpredictable costs, such as fuel.

Utilities appreciate riders. A rider, when coupled with a backward-looking accounting reconciliation to true-up what the company should have recovered in a given year, essentially guarantees a utility a certain level of funding for projects. This is in contrast to traditional rate cases which only offer the opportunity, but not guarantee, to recover the correct amount based on long-term forecast averages.

Because Peoples Gas pays for the materials, labor, overhead, and other costs for the SMP as the expenses occur but recovers the investment cost and yearly profits slowly over the entire life of the resulting assets, it must borrow money to make investments. Earlier and automatic recovery lowers the cost of financing, which is appealing to utility managers.

Between 1981 and 2013, Peoples Gas recovered costs associated with its main replacement work through levels set during rate cases. In 2013, the Illinois General Assembly approved a rider called Rider Qualified Infrastructure Plant, or Rider QIP, which Peoples Gas has used since 2014.[118]

Through Rider QIP, once a qualified investment is in use (e.g., a newly installed pipe is being used), Peoples Gas can immediately and automatically begin recovering the costs to install it through a bill surcharge. In December 2018, the monthly Rider QIP surcharge was $7.36 for the average Peoples Gas residential customer. Over the course of 2018, the QIP charge accounted for 6 percent of the average residential customer's bill.[119] These costs do not fully capture what customers are paying for the program, as significant program costs were added to base rates through four rate cases between 2007 and 2013.[120] These costs are recovered through customers' distribution charges, including the large fixed customer charge, which for many customers starts near $40 before even using a therm of gas.[121] These substantial costs are separate and distinct from costs recovered through the QIP rider.

Out of concerns for maintaining affordability, the Illinois General Assembly limited the amount of investment Peoples Gas can recover to an annual increase of 4 percent of utility base rate revenues on average, not to exceed 5.5 percent in any one year.[122] After each year, Peoples Gas initiates a formal docket for QIP investments to undergo an accounting and prudency review known as reconciliation.[123] Any investments not disqualified will continue to be collected monthly through the rider until the company's next rate case, when the remaining amounts are added to the revenue requirement and the 4 percent cap is reset based on the resulting higher base rates. Coupled with frequent rate cases, a Rider QIP extending out 20 years could easily double distribution rates.

Rather than protect affordability, the General Assembly has authorized Peoples Gas to increase rates at an unaffordable pace for an ill-defined program with dubious benefits.

While the same "used and useful" and prudence standards apply in reconciliation as in rate cases, the Commission has been less willing in practice to disallow and seek refunds for investments through the reconciliation process. First, while the public interest merits of capital programs and investments are routinely adjudicated in rate cases, the categories of "qualified"

investments and other contested issues for riders are typically worked out when creating the rider and its specific parameters, making reconciliation more of an accounting exercise.

Second, it is difficult for the Commission or an intervenor to prove an investment was imprudent in the reconciliation process, especially when Peoples Gas can argue that the Illinois General Assembly gave it carte blanche to invest in the "qualified investments" named in the Rider QIP statute[124] and when the company doesn't collect enough data to properly judge the efficacy or inefficacy of its qualified investments.

Overall, immediate, automatic collection and backwards-looking reconciliation reduce the risk of investment, incentivizing management to be less conservative in the type and volume of expenditures made.

Rider QIP to date

The QIP reconciliation process has proven slow and ineffective in dealing with problems. The reconciliation for 2014 was not finalized until February 2018,[125] and 2015, 2016, 2017, and 2018 reconciliations are ongoing.

The 2014 reconciliation provides an excellent demonstration of the limits of the process. The highly critical Liberty Phase One audit report primarily studied work performed in 2014. The report found, among many management failures, that management did not know how much it should be paying for construction.[126] Of all years, this should have been one in which significant investments could be disallowed as imprudent, since the company did "not sufficiently understand and quantify major cost drivers,"[127] and thus could not properly support its spending as prudent.

Based on that thoroughly documented mismanagement, Commission staff recommended that 20 percent, or $36 million, of the company's spending be disallowed as imprudent.[128] If the Commission adopted the proposal, $1.38 million would be refunded to ratepayers and Peoples Gas would miss out on recovering the remainder of the $36 million and corresponding yearly profits over the ensuing decades.[129]

The company's arguments in response, while the authors do not agree with them completely, demonstrates the challenges of disallowing costs through the reconciliation process:

> ... to order a disallowance based on this alleged imprudence would require the Commission to: (1) conclude that not moving the cost estimating function from one group (engineering) to another (project controls) within Peoples Gas' organization was imprudent; (2) conclude that this structure caused Peoples Gas to incur costs in excess of those it incurred with the function in the engineering group; (3) conclude the excess costs were incurred in and recovered under Rider QIP in 2014; and (4) calculate an amount to disallow.[130]

The Commission suffers from informational asymmetry when the company is in charge of collecting and maintaining the information needed to make a negative finding. To make a disallowance, the Commission needs information about unreasonable company operations it can only get from the company. This often means, in practice, that the information the Commission needs to make a negative finding is either missing or only the company "knows where to look".

If the Commission were somehow able to overcome this information gap, it would then need to prove the company made an

imprudent decision based on the information it had or should have had at the time, and further prove a specific cost of that decision.

This is all the more challenging when pipes are in the ground and operational and the Commission is trying to calculate how much the mismanaged program overpaid instead of just writing off entire investments or calculating how much it should have cost in a regular rate case.

In the end, even with significant insight into the program's many failings in 2014, the Commission approved an agreed-to settlement negotiated off the public record, disallowing 3 percent of the expenses rather than the staff-proposed 20 percent.[131]

The 2015 reconciliation, currently in progress, provides further evidence of the inadequacy of reconciliation to police the SMP. This year was also one of project turmoil, in which the primary project contractor was fired mid-year. Over the course of the year, Peoples Gas issued 682 change orders, each "an authorization by the company to increase the previously approved cost amount for a specified work order or project cost."[132] These change orders increased 2015 costs by $37.3 million. During the reconciliation proceeding, the Office of the Attorney General and CItizens Utility Board hired an expert to evaluate all 682 change orders for imprudence, concluding that the incremental cost increases of 71 change orders were unjustified and should not be recovered from customers.[133]

In its Draft Order, released March 28, 2019, the Commission agreed "it is evident that some of the [change orders] were a result of poor planning, management, or communication issues on behalf of Peoples Gas" and highlight "the problems and extent of Peoples Gas' failure to adequately oversee and manage AMRP/SMP."[134]

The Commission draft order argued, however, that these agreed-on failures do not mean the change orders were "necessarily imprudent."[135] Even though the purpose of the reconciliation is to evaluate specific investments for imprudence, in this case the Commission simply declined to do so, saying "Ultimately, the Commission is not going to make individual assessments on the prudence of each contested [change order]."[136] The Commission provided no justification for not making the "individual assessments" the reconciliation process specifically exists to do. Remarkably, the Commission declined to "adopt any proposed adjustment disallowing specific costs related to the change orders."[137]

The Commission cannot address systemic issues that raise costs across the board for the SMP through the reconciliation process, and apparently will not even address specific documented instances of imprudent changes.

The incentives for management are clear: spend as much as you can recover under the statutory rate caps and reap the rewards. The company's management culture reflects this. The outside auditor found this approach to investment in their review of the program in 2014-2015:

> Spending up to the budget, but not over it emerged repeatedly as the mindset driving program management, and in turn those responsible for reporting cost performance. One must consider what role the limits on accelerated rate recovery have played in producing this focus.[138]

Rather than protecting affordability, the statutory limits on QIP recovery have provided the target for annual investment.

Peoples Gas and its System Modernization Program do not prioritize public safety

DESPITE DECADES OF WORK to replace aging gas mains, safety risks remain in the Peoples Gas distribution system. The 2015 Liberty Audit found "high amounts of cast iron and ductile iron piping and the bare steel services remaining in the system create a significant safety risk for Peoples Gas, its customers, and the general public."[139]

Peoples Gas repeatedly invokes public safety and the urgent need to reduce risk to justify the SMP and its accelerated pace, but does not properly prioritize risk reduction in the scope or design of the SMP.

The Liberty Phase One final report describes how a project the scale the SMP requires "a sophisticated approach to the assessment of safety risk" and a "structured and comprehensive set of methods for prioritizing repair and replacement efforts."[140]

After initially agreeing to develop a more sophisticated approach to assessing and addressing risk during the implementation phase of the audit, Peoples Gas abandoned the effort and later testified before the Commission "[a]ttempting to quantify safety improvements in more granular detail is little more than makework."[141]

Given its disregard for quantifying risk and designing an effective risk-mitigation program, it is no surprise that Peoples Gas is investing incredible levels of capital while not achieving proportional risk reduction outcomes. Multiple third parties have found that the pre-acceleration program, despite costing significantly less, more effectively reduced the risk posed by at-risk pipes, as measured by leak rates, than the accelerated program has.[142]

Peoples Gas work site. Credit: Author photo

The SMP:

- Accelerates system modernization, not replacement of at-risk pipes.
- Is designed to prioritize medium pressure upgrades over protecting public safety.
- Is not analyzed using risk mitigation metrics that would enable the company to prioritize safety effectively.
- Has not delivered results in terms of reduced hazardous leaks or lower operations and maintenance costs.

THE SMP ACCELERATES SYSTEM MODERNIZATION, NOT REPLACEMENT OF AT-RISK PIPES

The scope of the SMP is much broader than the replacement of at-risk pipe. Its accelerated pace aims to complete its entire expanded scope on a short timeline recommended only for the riskiest subset of pipes, small diameter cast iron and ductile iron pipes.

The SMP has a broad system modernization scope

When first formally proposing an accelerated program in 2007, Peoples Gas did not propose to accelerate its existing pipe replacement program, but rather to create a new, complementary, accelerated program[143] with "the flexibility to perform a full system upgrade,"[144] primarily by replacing low-risk pipes close to high-risk pipes in order to facilitate medium pressure upgrades.

The Commission noted the emphasis of system improvement over risk reduction when turning down Peoples Gas' first acceleration proposal in 2007:

> Peoples Gas did not choose to commit to *accelerated main replacement*. Insofar as Peoples Gas would like to quicken the pace of *system modernization*, it is free to craft a concrete and sustainable proposal for doing so, and to request base rate recognition of associated investments.[145] (Emphasis added)

After Peoples Gas won approval for acceleration in 2009, it began work in 2011 under a Project Execution Plan which clearly articulated its scope as a full system upgrade to medium pressure:

> Peoples Gas Light and Coke company has typically replaced 40 to 50 miles of gas mains per year throughout the City of Chicago. Replacement of the remainder of the low-pressure distribution system as well as the medium pressure cast iron and ductile iron mains will be replaced with medium-pressure plastic and cathodically protected steel pipe over 20 years.[146]

The current scope of the SMP was proposed by Peoples Gas management after the 2015 merger. Despite packaging their proposal as a "fresh look," the SMP's scope is essentially identical to its predecessor, including the medium pressure work.[147]

Despite its initial reaction to "soundly reject" this status quo proposal, at the conclusion of its subsequent investigation, the Commission approved this expanded scope. Without any analysis of the impact of the additional scope elements, the Commission concluded that, because the General Assembly had included the type of work in the additional scope elements in the Rider QIP law and the company had presented some possible, while unquantified, categories of safety benefits, the additional scope elements belonged in the SMP.[148]

Peoples Gas aims to complete the SMP on a timeline recommended for a much smaller subset of work

The last engineering study of the Peoples Gas distribution system was performed in 2007 by Kiefner and Associates. The study recommended Peoples Gas continue to use the UMRI to prioritize at-risk pipes for replacement. Kiefner further recommended staggered completion dates for the replacement of pipes, depending on their diameter.[149]

TABLE 03. KIEFNER STAGGERED TARGET COMPLETION DATES

Pipe Diameter	Target completion date
4", 6", 8"	2036
10", 12"	2050
16" +	2080

Kiefner's recommendation included the replacement of all at-risk pipes and recommended a 2080 completion date. The SMP, on the other hand, includes the replacement all at-risk pipes, all low-pressure pipes, moving meters outside, and the completion of related transmission upgrades, and aims to complete all of this work as early as 2035. Just considering miles of distribution main to replace (not the other expanded scope elements) the SMP is, from the end of 2017, attempting to replace 1,853 miles of main by 2035-2040[150] compared to the Kiefner-recommended 987 miles by 2036.[151]

The SMP's greatly expanded scope and aggressive timeline demonstrate how it is an accelerated system modernization program.

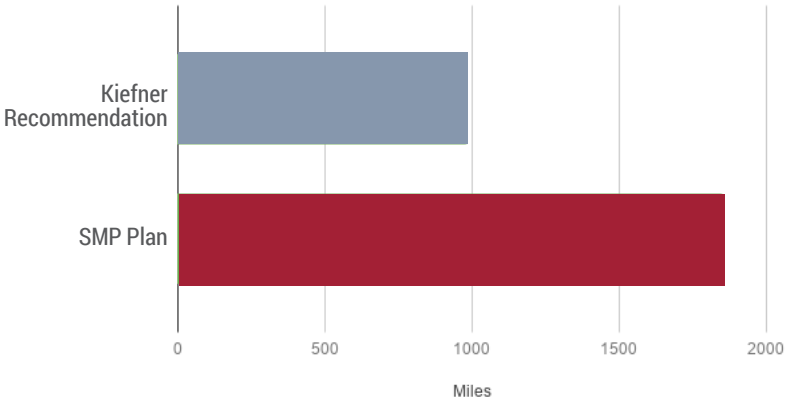
The SMP's expanded scope harms its effectiveness in achieving its public safety justification

The Liberty Phase One final audit report succinctly outlined one problem with a broadened scope: "Combining leak-prone pipe replacement with pressure increase and meter relocation work promotes installation efficiency, but **raises concerns about prioritizing pipe replacement work**."[152] [emphasis added] The auditors continued in a follow-up report: "One challenge will be to ensure that clear public safety goals, which formed the core justification for the original [accelerated program], do not become diluted."[153]

Peoples Gas has failed to meet this challenge. The expanded scope makes the program more complicated, more expensive, and more difficult to manage. The inclusion of medium pressure work not only dilutes the public safety goals that form the core justification of the SMP, Peoples Gas has reorganized the overall design of its program to prioritize system modernization goals over public safety goals.

FIGURE 01

Replacement Goals 2036-2040



THE SMP IS DESIGNED TO PRIORITIZE MEDIUM PRESSURE UPGRADES OVER PROTECTING PUBLIC SAFETY

When Peoples Gas began accelerated work in 2011, it replaced its segment-targeted approach, which specifically addressed the riskiest pipe in its system segment-by-segment, with a zonal approach, which replaces entire areas, including both high- and low-risk pipes together at the same time.[154]

In 2013, Peoples Gas changed its method for planning its zonal approach, naming it the Neighborhood Replacement Program.[155] The Neighborhood Program ranks every neighborhood in Chicago according to both risk and non-risk metrics and schedules neighborhoods for work based in part on this ranking.[156]

The Liberty Phase One Final Report gave the broad construct of the Neighborhood Program qualified approval, saying it was a "sound construct for efficiently replacing high-risk pipe, while contemporaneously increasing the delivery pressure and moving meters outside."[157] Notably, this conclusion approves the neighborhood approach as an *efficient* approach to *system moderniza-*

tion, not an *effective* approach to *risk reduction*. When it came to risk reduction, the auditors raised several red flags.

The auditors found many problems in the details of the Neighborhood Program's design. Liberty auditors raised concerns with the neighborhood ranking methodology, including a lack of data quality control, excluding relevant materials data in the risk model, over-weighting the age of pipe as a risk indicator, and exhibiting a bias towards larger neighborhoods. Critically, auditors found that the "failure of leaks to trend significantly downward for a number of years calls into question the process used to select highest-risk mains."[158]

Liberty recommended Peoples Gas make numerous changes to its neighborhood ranking model. In order to do so, Liberty recommended that the company "engage in a structured, comprehensive, and analytically-driven review of other weighting, parameters, and additional inputs to its Main Ranking Index and its neighborhood rankings."[159] Peoples Gas responded to these recommendations by pledging to, in its words, "redirect our focus on risk"[160] by amending its neighborhood risk ranking model, creating the model in use now.

Despite these changes, the SMP is still designed to prioritize efficient system replacement over effective risk reduction. Allen Neale, an expert hired by the Office of the Attorney General in the recent Commission investigation, highlighted the problem of giving system configuration measures more weight (60 percent) than performance measures (40 percent).

> … the Company's main ranking index -- a formula based on performance data to identify risky mains – is not the sole or even predominant driver of ranking a neighborhood. At 30% weighting, this asset performance-based measure has an equal weighting to the operating pressure based metric (the % CIDI medium pressure metric)). In fact, the generally performance-based metrics (pending leaks and mean MRI) at a total of 40%, are weighted less than the system configuration measures (pipe pressure, pipe diameter, and service type) at 60% of the total possible score.[161]

Sixty percent of the neighborhood ranking treats all medium pressure cast and ductile iron pipe, services with at-risk materials, and smaller diameter pipe the same whether or not its scientific risk ranking index ranks it as riskier than other pipe in the same category. While the neighborhood ranking model was improved after the Liberty audit, it continues to prioritize system configuration metrics over main performance metrics.

Because the Neighborhood Program averages the performance-based risk metrics over entire neighborhoods, and because these metrics constitute only 40 percent of the neighborhood's score, elevated-risk pipe segments could languish for years or decades waiting for replacement based on the characteristics of pipes in its vicinity. This is not prioritized risk mitigation.

The Neighborhood Program, the planned work of the System Modernization Program, is designed to prioritize system modernization, not risk reduction.

THE SMP IS NOT ANALYZED USING RISK MITIGATION METRICS THAT WOULD ENABLE THE COMPANY TO PRIORITIZE SAFETY EFFECTIVELY

Gas distribution infrastructure will never be completely safe. As a company witness stated during the recent Commission investigation, "Natural Gas is a flammable and non-breathable gas; therefore, the transportation of natural gas will always have some

inherent risk."[162] Protecting public safety requires measuring, achieving and maintaining an acceptable level of risk. The final Phase One report from the Liberty Audit states that a project like the SMP requires "a sophisticated approach to the assessment of safety risk" and a "structured and comprehensive set of methods for prioritizing repair and replacement efforts."[163]

Peoples Gas defines risk as "a relative measure of the likelihood of a failure associated with a threat and the potential consequences of such a failure."[164] Peoples Gas measures risk in various ways. It tracks and ranks categories of risk to its distribution system in its federally mandated Distribution Integrity Management Plan (DIMP).[165] It measures the inherent risk of each and every segment of pipe in its gas distribution system with the UMRI.[166]

In its 2015 audit, Liberty recommended Peoples Gas adopt several more metrics to quantify risk and the costs and benefits of risk reduction measures to help evaluate the value proposition of the SMP, including:

- recalibrating the neighborhood risk ranking model,
- measuring risk at a system and neighborhood level,
- determining an acceptable level of risk,
- predicting changes in risk level with replacement, and
- relating costs incurred and replacements made with risk mitigation produced in order to assess "the amount of risk reduction achieved for the money spent."[167]

According to Liberty's 2016 3rd Quarter report tracking implementation of audit recommendations, Liberty and Peoples Gas management agreed on four metrics to quantify system risk on an ongoing basis:

"Metrics:

1. Company overall average leak rate (both replaced and to be replaced mains, [leak prone pipe (LPP)]) using current leaks
2. Company overall average leak rate using only LPP pipe and current leaks
3. Neighborhood average leak rate using only remaining LPP and current leaks
4. Normalized neighborhood historic average leak rate using leaks on LPP for the past two years, on a rolling basis (normalized for weather, incorporating all class two leaks except third party damage)."[168]

However, during the Commission investigation the following year, Peoples Gas' new management abandoned the metrics they had recently agreed to, stating "it is not possible to create a metric that quantitatively tracks the SMP's impact on safety or risk in a meaningful way"[169] and "using a metric such as leaks per mile or remaining leak-prone pipe to determine public safety provides little value but rather sets up additional points of debate regarding what is a quantifiable approach to public safety or risk."[170]

> *"Using a metric such as leaks per mile or remaining leak-prone pipe to determine public safety provides little value but rather sets up additional points of debate regarding what is a quantifiable approach to public safety or risk."*
>
> *– Peoples Gas*

Instead, Peoples Gas proposed reducing the entire evaluation of whether or not their program is effective or efficient in reducing risk to an overly-simple drawdown curve, arguing the "true indicator of increased safety for our customers" is simply the number of miles of cast iron, ductile iron, and low-pressure main replaced through its system-wide upgrade to medium pressure.[171] Rather than representing the amount of risk removed from the system, the drawdown curve shows the total number of miles Peoples Gas has retired, whether they are risky or not.

The drawdown erroneously treats as equal the replacement of less risky pipe to upgrade to medium pressure with the replacement of at-risk pipe, creating a false metric of safety. It also removes the opportunity to meaningfully hold the company accountable for how well, or poorly, it spends its customers' money to mitigate risk. Compared to the granular metrics recommended by Liberty and initially agreed to by Peoples Gas, this single, broad metric is insufficient to analyze the performance of a historically troubled, $11 billion public safety program.

The lack of appropriately detailed measurements and assessments of risk not only limits the ability of the company to understand the performance of its program, it also limits the ability of regulators to oversee the program.

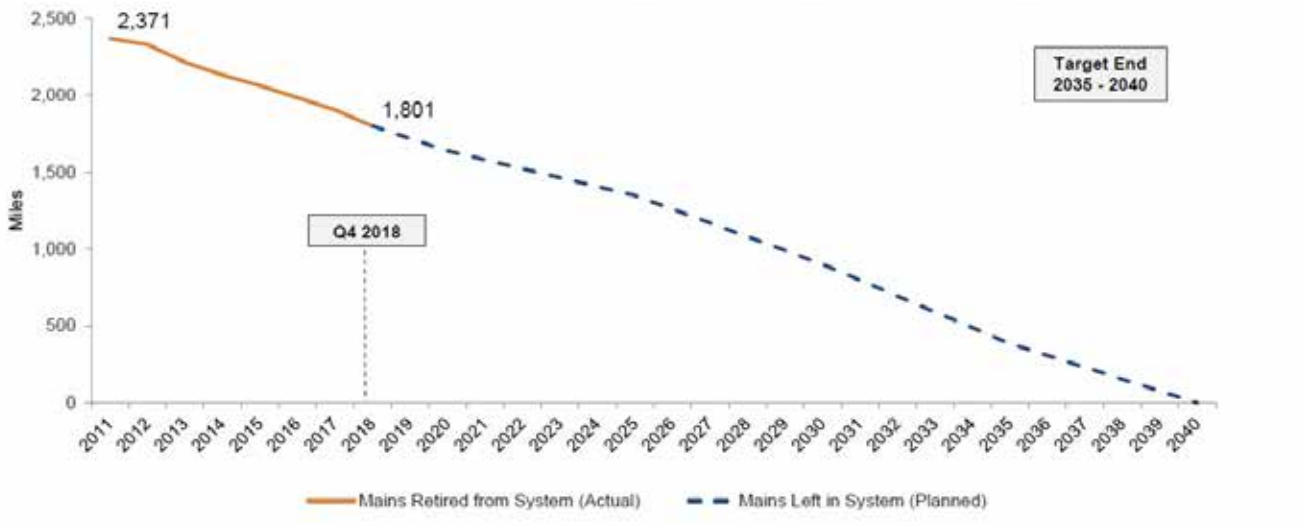
THE SMP HAS NOT DELIVERED RESULTS IN TERMS OF REDUCED HAZARDOUS LEAKS OR LOWER OPERATIONS AND MAINTENANCE COSTS

Liberty auditors recommended Peoples Gas develop a robust set of metrics to measure and evaluate its success in risk mitigation, but after Peoples Gas reneged on its commitment to develop those metrics, overall leak rates represent some of the best empirical evidence available to gauge performance.

Leak rate analysis performed by multiple third parties demonstrates that the SMP, and its immediate precursor, the AMRP, have failed to achieve risk mitigation proportional to the dollars spent

In 2014-2015, Liberty auditors found the failure of leak rates to decline, and management's lack of understanding as to why,

FIGURE 02. PEOPLES GAS MAIN REPLACEMENT DRAW-DOWN CURVE AT THE END OF 2018[172]



alarming, making it a topline finding of its audit.[173] According to the analysis of an expert hired by the Office of the Attorney General in 2017, leak rates remained high.

Leak rate analysis presents a number of challenges, and similar to other data regarding the SMP, Peoples Gas has not been forthcoming with clear, transparent information about leak rates in its system.[174] See Appendix D for a more detailed discussion.

One analysis available to outside experts, based on information reported to the Pipeline and Hazardous Material Safety Administration (PHMSA), is of the most hazardous, Class 1, leaks. Because of their acute, immediate hazard, utilities must repair Class 1 leaks immediately, unlike less hazardous leaks which can go years before repair. Reviewing year-to-year Class 1 leak data gives one some sense in the health of the system and its relative performance over time.

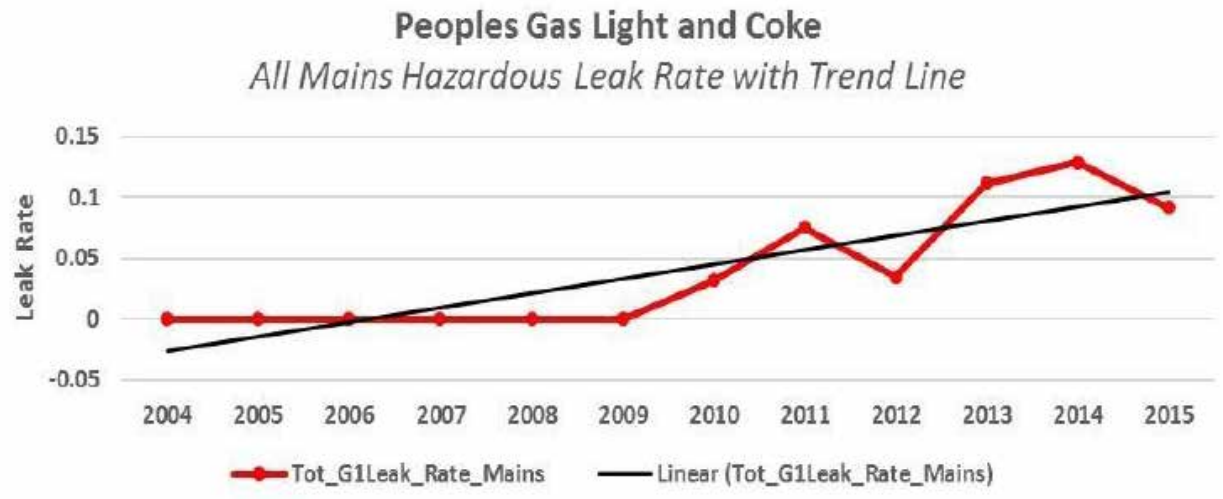
During the 2016-2017 Commission investigation, the expert witness for the Office of the Attorney General, Allen Neale, presented analysis of Class 1 leaks.

While the trend of Class 1 leaks levels off some starting in 2013, this analysis shows an increase in the most hazardous leaks since the beginning of accelerated work and the failure of the accelerated program to achieve the lower and relatively stable leak rate experienced between 2004 and 2009.[176]

In its 2018 year-end report, the company includes leak data showing a decrease in leaks for 2018. The presentation of the data, however, raises more questions than it answers, for example presenting "to-be-replaced mains" as 1,362 miles whereas earlier the same report presents a figure of 1,801 remaining miles to be replaced.[177] The presentation compares "both replaced and to-be-replaced mains" with "only to-be-replaced mains" without further explanation of what is included in either figure or what this comparison demonstrates.

Information in the annual SMP report on neighborhood-level leak trends demonstrates a lack of relationship between neighborhood prioritization and leak rates.[178] Some of the highest leak rates are found in neighborhoods not slated to start work until the very end of the SMP.[179] A 2019 report on

FIGURE 03. PEOPLES GAS HAZARDOUS LEAK RATES[175]



a pilot program testing new methane detection technology demonstrated a similar lack of relationship between areas with high leak rates and the schedule for neighborhood work.[180]

While of limited value, Peoples Gas' first Operations and Maintenance Report shows rising, not declining, costs

In theory, and according to Peoples Gas,[181] operations and maintenance (O&M) costs should decline over the course of the SMP, as older pipes requiring more maintenance are replaced with new pipes requiring less maintenance.

In May, 2019, Peoples Gas submitted its first "Estimated O&M Impact from SMP work" report as required by the Commission in January 2018. While the report is of limited value because it simply compares 2017 to 2018 costs without providing any baseline or cost expectations, nor provide more years of data to give context and identify trends, it does show an increase of $6.5 million in O&M costs between 2017 and 2018. Further, while other O&M savings lowered the overall increase, "Leak Repair and Maintenance" costs, the specific costs that should be most impacted by the SMP, rose by $6.8 million.[182]

Peoples Gas spent close $1 billion on accelerated programs between 2011 and 2015[183] and is closing in on spending another billion since[184], but has failed to deliver leak reductions or improve system performance in proportion to the massive investment.

The System Modernization Program generally, and the neighborhood ranking model specifically, has failed to significantly mitigate the risks posed by aging cast and ductile iron pipe because that is not what it is designed to do.

Peoples Gas has mismanaged the System Modernization Program

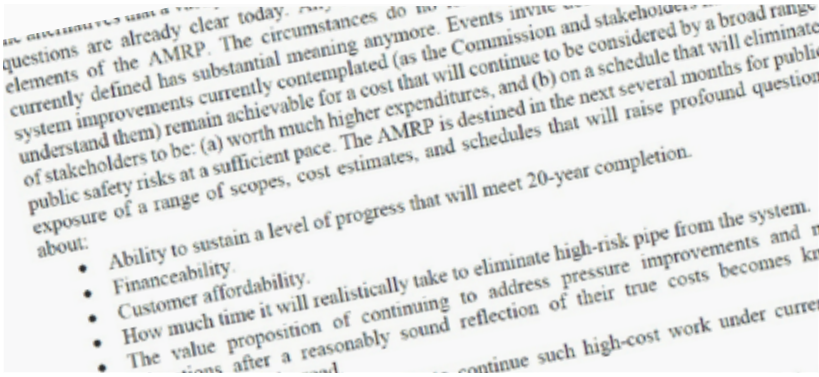
WHEN LIBERTY, THE AUDITOR hired by the Commission to investigate Peoples Gas' accelerated program, released its Phase One final report in May 2015, it described significant, widespread management failures, highlighting three topline findings:

> Liberty's year-long investigation disclosed a lack of management expression or understanding of: (a) likely overall program costs, (b) likely program duration relative to targeted completion of leak-prone pipe replacement by 2030, and (c) the reasons why leak rates have not fallen significantly after four years of accelerated replacement of cast iron and ductile iron mains.[185]

Peoples Gas management did not have a handle on three fundamentals of project management: cost, schedule, and progress towards primary objectives.

Contributing to these problems were failures to adequately define the program; create and follow a comprehensive, long-term program master plan; collect, track and analyze data; identify opportunities for improvement; plan for variances and properly manage a change control process;[186] or to simply control costs.

In reaction to Liberty's negative findings on program cost, scope, and risk mitigation, Peoples Gas refused to create a new cost estimate, stopped long-term planning, and testified that it could not quantify risk mitigation despite doing so with its UMRI and DIMP.[187]


questions are already clear today.
elements of the AMRP. The circumstances
currently defined has substantial meaning anymore. Events
system improvements currently contemplated (as the Commission and
understand them) remain achievable for a cost that will continue to be considered by a broad
of stakeholders to be: (a) worth much higher expenditures, and (b) on a schedule that will
public safety risks at a sufficient pace. The AMRP is destined in the next several months for
exposure of a range of scopes, cost estimates, and schedules that will raise profound
about:

- Ability to sustain a level of progress that will meet 20-year completion.
- Financeability.
- Customer affordability.
- How much time it will realistically take to eliminate high-risk pipe from the system.
- The value proposition of continuing to address pressure improvements and
- The reasonably sound reflection of their true costs becomes
- continue such high-cost work under

An expert from a Liberty quarterly report. Credit: Author photo

A review of Peoples Gas' management of the SMP shows:

- Management problems are enduring and endemic. Despite multiple ownership changes, management changes, and program reboots, a theme of management failures connects work from the early 1980s to today.
- Instead of creating and following a credible long-term plan designed to achieve a fixed set of appropriate program objectives, Peoples Gas works off of short-term plans based on available capital and is overly-reactive to City of Chicago public improvements.
- People Gas' poor data collection and analysis means its cannot evaluate program impact, limits its ability to successfully manage the SMP, and limits the Commission's ability to protect customers from imprudent costs.

MANAGEMENT PROBLEMS ARE ENDURING AND ENDEMIC

Project management problems are as old as Peoples Gas' pipe replacement work itself

Over the last 38 years, Peoples Gas pipe replacement efforts have been a subject of four audits, two investigations into improper conduct, and a series of bitterly fought rate cases —during which time the program was a main driver in increasing Peoples Gas' distribution rates by more than 70 percent.[188] During this time, Commission staff and other parties have recommended denying Peoples Gas the ability to recover and profit off hundreds of millions of dollars of investment due to mismanagement.[189] The company has been fined or denied dozens of millions of dollars due to its failures.[190]

Audits in 1988 and 1994 found pipe replacement work quickly went off track, or perhaps never got on a proper track.[191] A Commission staff report in 1993 found there was "no tracking record or apparent follow-up to the 1981 Zinder report, which the company commissioned to identify portions of the cast iron system in need of replacement."[192]

The program has also been a contentious issue in two separate corporate acquisitions of Peoples Gas. In each case, new management promised to improve struggling pipe replacement efforts. In its 2006 application to acquire Peoples Gas and become its new parent company, WPS Energy touted accelerating the main replacement program as a benefit of its proposed merger.[193] The program was hotly debated during the 2015 merger, and new management's failure to comply with a merger condition to produce timely, credible plans prompted a new Commission investigation.[194]

Almost 40 years after it began, the Peoples Gas pipe replacement program suffers from the same management problems auditors identified in the 1980s and 1990s.

The 2011 acceleration overwhelmed management capabilities

When Peoples Gas began its accelerated program in 2011, it disregarded the recommendation of its primary contractor to ramp up work over five years, instead choosing "to be aggressive during the first construction year, hoping to build momentum quickly."[195] Auditors later concluded "the company did not understand, and certainly did not respond fully to, the magnitude of the challenges involved in ramping up to very high levels of production and sustaining them across twenty years."[196] The accelerated program began failing almost immediately.

In 2012, alarmed by the poor performance of the accelerated program after just one year, Commission staff recommended the Commission initiate an audit. The Program Manager of the Safety and Reliability Division of the Commission's Energy Engineering Program testified:

Audits in 1988 and 1994 found pipe replacement work quickly went off track, or perhaps never got on a proper track. A Commission staff report in 1993 found there was "no tracking record or apparent follow-up to the 1981 Zinder report, which the company commissioned to identify portions of the cast iron system in need of replacement."

> There is no reason for the Commission to believe that Peoples can complete its AMRP in 20 years as it convinced the Commission it should back in 2009 and no way for the Commission to know what the completed AMRP will cost. Peoples' AMRP is encountering problems with scheduling, materials delivery, government permits, and underground utility locating ... There is no evidence in this case that Peoples can or will solve its AMRP problems.[197]

The Commission adopted its staff's recommendation, later hiring Liberty Consulting to perform a comprehensive audit of the program. As Liberty began its audit in 2014, it found so many problems "in core elements of effective AMRP oversight, management, and control,"[198] that in January 2015 it issued an unplanned interim report, intended to prompt immediate reform.

Liberty released its voluminous 350-page Phase One final report in May 2015. Liberty found so much wrong with the program that fixing it would require a "massive" effort.[199] The report documented the many ways management of the AMRP from the "board of directors down to the field supervision level has not been effective,"[200] concluding "the management of the AMRP falls short of good utility practice."[201] To address these profound problems, Liberty made 95 recommendations, which it would monitor implementation of over the next two years, issuing quarterly progress reports -- Phase Two of the audit.

Complicating this monumental task was the $5.7 billion acquisition of Peoples Gas by Wisconsin Energy, approved by the Commission in June 2015, one month after Liberty issued its Phase One report.[202]

The management transition, coupled with the 95 audit recommendations, presented Peoples Gas the opportunity to thoroughly study its program and make a clean break with the problems of the past - instead, after the Phase One report in May and merger approval in June, Peoples Gas' new management stumbled out of the gate and doubled down on the status quo

In July 2015, one month after the merger was approved, Peoples Gas' new management sent a letter to the Commission informing them that it had learned of a previously undisclosed $8 billion cost estimate, and had decided to terminate the contract of the primary AMRP contractor, Jacobs Engineering. As a result, new management would not be able to fulfill a condition of merger approval, producing four transition plans by a 75-day deadline. Specifically, new management would not produce the two required plans dealing with scheduling and cost.[203]

In September 2015, new management submitted two of four required AMRP transition plans. Subsequent Commission staff analysis found "very broad discussions of changes underway at Peoples, but any detail of a plan for transitioning AMRP seamlessly and avoiding diminishing customer service is absent." Peoples Gas further admitted to Commission staff that its implementation plan lacked Liberty's five characteristics of an "effective and monitorable" implementation plan.[204]

Later in September, Liberty issued its first Phase Two quarterly report tracking audit implementation, observing not the "seamless transition on "Day 1""[205] promised by Wisconsin Energy to secure the merger, but rather "organizational change and turmoil."[206] Liberty reported that, after firing Jacobs Engineering, the contractor largely responsible for day-to-day AMRP management, new management realized that "reconstitution of the AMRP program management team [had] proven much more difficult and time consuming than anticipated."[207]

The implementation report raised the alarm over new management's approach to audit recommendations. New management presented auditors with a multitude of reasons it believed it did not need to focus on short-term implementation of the 95 actionable audit recommendations. Instead, new management argued "AMRP improvement can better be measured by results improvement than through addressing the 95 Phase 1 recommendations in detail."[208] *Rather than the rigorous implementation of specific recommendations under the watchful eye of an expert third party, new management argued for more time, less scrutiny, and to eventually be judged only on broad and unspecified program outcomes.*

Liberty concluded the quarterly report with a section ominously titled "Mission Threats" highlighting new management's unwillingness to appropriately engage with or address the AMRP's many well-documented failures:

> The disconnect of greatest concern involves understanding and acknowledging the past performance gaps that drove the long and complex change agenda represented by the 95 Phase 1 recommendations. Even with massive executive- and director-level changes, those performing and supervising the work day-to-day remain largely the same. However different new management's philosophy and approach may be and however compelling its past successes may prove, it cannot be effective to approach the management of the change process without understanding what has been and how it should differ from what is to be.[209]

Liberty predicted that new management's forthcoming plans would "confirm what is already largely known – that an appropriate, consensus long-range vision, scope, and plans for the AMRP do not exist," and emphasized "***the need for a fundamental revisit of AMRP scope, cost, and schedule.***"[210] [emphasis in original]

As predicted, rather than being a new and improved "fresh look", the plans Peoples Gas eventually submitted in November 2015 repackaged the status quo. Further, the "fresh look" distinguished itself by moving away from audit recommendations, proposing no fixed target end date.[211] By December 2015, the Commission rejected the company's status quo proposal and launched an urgent investigation of the accelerated program.

The Commission investigation allowed Peoples Gas to avoid implementing crucial audit recommendations

Running from early 2016 through January 2018[212], the Commission investigation largely overlapped with the implementation-monitoring Phase Two of the Liberty Audit, which ran from June 2015 through July 2017.[213] While two concurrent outside investigations of the company's pipe replacement work could have combined to produce real accountability and reform, Peoples Gas management used the two efforts against each other.

On multiple key issues, such as risk mitigation metrics discussed earlier in this report, Peoples Gas did enough to close audit findings only to, once clear of the audit, revert back to the old practices.[214] On others, Peoples Gas simply told auditors that it was not closing audit recommendations because the underlying issues were being adjudicated through the Commission investigation.[215]

As discussed in the next chapter, the Commission ultimately balked, claiming it lacked legal authority to order changes to the SMP. The Commission blessed essentially the same status quo program it had previously rejected, allowing Peoples Gas to avoid implementing multiple, critical audit recommendations, and evading the auditor-recommended fundamental revisit to the cost, scope, schedule and impact of the program.

The Commission rejected the proposal, finding "Peoples Gas presented this Commission with no quantitative evidence, no benefit-cost analysis, and no plan as to why or how a $1.0 billion dollar, forty- to forty-five-year investment, should be completed at a much faster rate."

INSTEAD OF CREATING AND FOLLOWING A CREDIBLE LONG-TERM PLAN DESIGNED TO ACHIEVE A FIXED SET OF APPROPRIATE PROGRAM OBJECTIVES, PEOPLES GAS WORKS OFF OF SHORT-TERM PLANS BASED ON AVAILABLE CAPITAL AND IS OVERLY-REACTIVE TO CITY OF CHICAGO PUBLIC IMPROVEMENTS

Liberty wrote in its Phase One report that the "AMRP should operate under a comprehensive and credible long-term plan that addresses all major components in a complete and consistent fashion."[216] The topline Liberty audit findings highlighted two missing, basic components of a long-term plan: an achievable fixed end date and a credible cost estimate.

Peoples Gas management did not have these components, and still does not have them, because its accelerated program is, and has always been, short-term and reactive rather than long-term and intentional. Instead of following a comprehensive plan directed towards achieving clear long term objectives, the SMP plan is recreated annually[217] and is regularly altered in response to third-party work and other non-risk considerations.

Peoples Gas has never developed a credible long-term plan for its accelerated program

When Peoples Gas first proposed an accelerated program in 2007, company testimony focused not on the case of acceleration or its plan for the program, but on its proposal for cost recovery. The Commission rejected the proposal, finding "Peoples Gas presented this Commission with no quantitative evidence, no benefit-cost analysis, and no plan as to why or how a $1.0 billion dollar, forty- to forty-five-year investment, should be completed at a much faster rate."[218]

Peoples Gas management also failed to produce an adequate plan when it returned two years later with a second acceleration proposal, this time during the company's 2009 rate case. Peoples Gas eventually produced a plan near the end of the proceeding that was, in the words of its own witness, "preliminary" and an "initial phase evaluation."[219]

When Liberty reviewed the program starting in 2014, it found no high-level master plan for the AMRP. Liberty found "Peoples Gas has equated a plan with a list of work."[220] While Peoples Gas had initially created a more granular implementation plan, which Liberty characterized as a "strong initial effort," the implementation plan "fell quickly into disuse" and "does not appear to have a continuing, vital role in addressing overall AMRP planning."[221]

Both Phase Two of the audit and the Commission investigation intended to establish a quality long-term SMP plan. Neither did.

The SMP does not have a fixed, definite end date on which to base schedules and measure performance

When Peoples Gas first proposed an accelerated program in 2007, it proposed a five-year end date window, rather than a definite end

date.[222] When the Commission ordered the program in 2009, it ordered a 2030 end date.[223] When new management proposed its "fresh look" in 2015, it first proposed removing a fixed end date altogether, later falling back to a five-year end date window, just as it originally had in 2007.[224]

This end date window does not meet industry best practices recommended by Liberty, which noted in its final Phase Two implementation report:

> … management has recommended leaving the program completion date as a variable parameter. Instead, a five-year window was defined as a "target." This approach has effectively eliminated long-term schedule commitments, and removed the ability to track against a fixed objective … The outcome does not conform to our recommendation.[225]

While Liberty was dissatisfied with this response, writing "short-term performance has no context in terms of adequacy unless considered within the framework of long-term objectives for public safety and schedule,"[226] it left further consideration to the Commission investigation.

Liberty presented that industry best practice for a project of the size, scale, and importance of the AMRP requires clear definition and credible long-term plans.[227] Peoples Gas' new management claims that those exact same attributes, the very size and complexity of the project, made long-term planning unwise if not impossible.

During the Commission investigation, Peoples Gas Vice President - Construction, Mr. Hesselbach testified, "There are simply too many moving parts to comprehensively schedule with meaningful detail a program of the scope and complexity of the SMP over its entire term."[228] Peoples Gas proposed, and in 2018 the Commission approved, the same five-year target completion range Peoples Gas proposed in 2007 and Liberty cautioned against.[229]

Without a fixed target end date, it is impossible for Peoples Gas or regulators to properly track and evaluate program performance.

Peoples Gas has failed to produce a credible cost estimate

Liberty found Peoples Gas management did not know what the program would cost and could not adequately control costs. The Liberty Phase One Audit Report devoted an entire chapter to cost estimates, beginning:

> Managing a program such as the AMRP requires current, comprehensive, and reasonably accurate cost estimates at the individual project level and at the program level. The primary function of cost estimating is to provide a standard or baseline for control and for managing performance. Meeting this critical need requires credible and rigorously executed estimating processes and outputs. Lack of a strong cost estimating capability creates a major impediment to effective cost management.[230]

The lack of a credible cost estimate is directly tied to the company's well-documented failure to control program costs. *This failure is perhaps the most obvious: program cost estimates grew from $1.4 billion to more than $8 billion between 2007 and 2015 and could now be as high as $11 billion.*[231] No official long-term cost estimate exists.

One reason cost estimates have grown so dramatically is that earlier estimates only included the cost of replacing at-risk mains, not the full expanded program scope Peoples Gas was actually proposing. According to Mr. Hesslebach, "Earlier program cost estimates, including the estimate presented in Peoples Gas' 2009 rate case, were not based on a comprehensive cost and schedule

model. Rather, they analyzed the effects of accelerating replacement of at-risk mains."[232] Echoing findings from 1988 and 1994 audits, Liberty's Phase One report found AMRP cost planning operated on an annual budget basis, driven not by the program's purported goal of risk reduction, but by available capital:

> Spending up to the [annual] budget, but not over it emerged repeatedly as the mindset driving program management, and in turn those responsible for reporting cost performance. One must consider what role the limits on accelerated rate recovery have played in producing this focus.[233]

Liberty expressed concern that this short-term approach would delay the replacement of at-risk pipe and harm management's ability to identify performance improvements.

To respond to Liberty's recommendations and fulfill merger conditions, Peoples Gas hired the engineering firm Burns & McDonnell to create a new cost model and estimates. Liberty was concerned with the new model for multiple reasons.

First, Peoples Gas continued to avoid clearly defining the program and setting uniform work quantities.[234] Second, short-term plans did not correspond with the company's cost models and long-term estimates.[235] Liberty expressed concern that "management has prepared an estimate on one basis, but plans to manage the program on another basis."[236]

When the company was asked by the Office of the Attorney General during the Commission investigation to demonstrate how well it had achieved the cost savings necessary to achieve its long-term cost estimates over the course of their work in 2016, the company responded that it "does not track SMP efficiencies according to the categories listed"[237] and the cost savings "are expected to be achieved over the course of the program and not necessarily intended or appropriate for a project baseline or to be treated as annual metrics."[238]

Charles Matthews, CEO, Peoples Gas. Credit: WLS ABC 7 Chicago

Remarkably, Peoples Gas proposed it could achieve aggressive long-term cost savings without short-term plans to achieve or measure those cost savings. This logic conflicts with the company's stated reasons for forgoing long-term planning, which it contends is less accurate[239] and "not helpful."[240] In this circumstance, calculating program costs, Peoples Gas flips its position to prefer long-term and forgo short-term planning, as the long-term cost estimate reflects better on the company and its SMP.

Ultimately, during the Commission investigation, Mr. Hesselbach rejected industry best practices, testifying that "long-term cost estimates for large and complex construction programs like the SMP are of limited value."[241] In a recent ABC7 interview, Peoples Gas CEO Charles Matthews again claimed long-term cost estimates were impossible or not meaningful, saying of its most recent cost estimate:

> I don't know if it's going to be higher, don't know if it's going to be lower. Don't know the cost of labor in the next 20, 30 years, we're guessing at that when we do the forecast. We don't know the other cost components that go into this program.[242]

Neither the Liberty Audit and the Commission investigation achieved the goal of a reasonably accurate long-term cost estimate. In its final implementation monitoring report, Liberty warned "total long-term costs remain unknown."[243] After two years of formal and informal proceedings investigating the SMP, the Commission does not know how much the program will cost.

In its first Phase Two quarterly report, Liberty warned that ballooning costs could make achieving program goals impossible:

> Any number in the current [$8 billion] "ballpark" moots key defining elements of the AMRP … Events invite debate about whether the gas system improvements currently contemplated … remain achievable for a cost that will continue to be considered by a broad range of stakeholders to be: (a) worth much higher expenditures, and (b) on a schedule that will eliminate public safety risks at a sufficient pace. The AMRP is destined in the next several months for public exposure of a range of scopes, cost estimates, and schedules that will raise profound questions about:
>
> - Ability to sustain a level of progress that will meet 20-year completion.
> - Financeability.
> - Customer affordability.
> - How much time it will realistically take to eliminate high-risk pipe from the system.
> - The value proposition of continuing to address pressure improvements and meter relocations after a reasonably sound reflection of their true costs becomes known, sometime down the road.
> - The commitment of Peoples Gas to continue such high-cost work under current rate recovery methods and limits."[244]

Nearly four years later, these profound questions remain.

Peoples Gas is overly reactive to City of Chicago public improvements

The 1988 program audit, the first outside review of Peoples Gas' pipe replacement work, found:

> The majority of this activity is being driven by outside public agency improvements of streets and sewer facilities. The company's role in this activity is reactive rather than proactive, possibly causing limited capital dollars to be applied in a suboptimal manner.[245]

"Events invite debate about whether the gas system improvements currently contemplated … remain achievable for a cost that will continue to be considered by a broad range of stakeholders to be: (a) worth much higher expenditures, and (b) on a schedule that will eliminate public safety risks at a sufficient pace."

— Liberty Consulting Group

The 1994 audit found remarkably similar patterns:

> There is no formal [Peoples Gas] long-term system development or replacement plan … Possibly because of the lack of a coordinated master plan, the City's public improvement projects appear to exert an undue influence on [Peoples Gas'] replacement decisions … the [auditors] found no compelling reason to abandon scientifically determined replacement priorities to accommodate non-mandatory public improvements.[246]

According to Liberty, the degree to which the AMRP reacted to City of Chicago public improvements was harmful to achieving risk-reduction goals:

> Coordination of AMRP work with City of Chicago street work also has potentially significant AMRP implications … A substantial increase in City work thus threatens to delay higher-risk gas main replacements further.[247]

The disruptive and inefficient nature of performing work dictated by third parties impedes Peoples Gas' ability to execute its planned work. Peoples Gas repeatedly falls short of its plans for completed work and the cost-per-unit of work.[248]

Peoples Gas itself highlighted this dynamic in its 2018 annual report, to explain why it was behind-schedule and over-budget. Peoples Gas credited PI/SI work for the "quarter-to-quarter and year-to year variability" with respect to both "costs and installed/retired main and meters when compared to its 2018 plan" and explained that this reactive work "deferred planned neighborhood work from one year to the next as resources were rebalanced."[249]

If Peoples Gas followed industry best practices and created a long-term program plan, it would have a baseline expectation of fixed cost and schedule targets for the entire program and each component of the plan. Based on this baseline expectation, when events prompt adjustments, management should be able to compare the impacts of changes on schedule and cost. This knowledge allows for trends analyses and implementing potential improvements.

Without a proper baseline for comparison, however, neither Peoples Gas nor regulators know the impact of these continuous changes, and specifically what the work done off-schedule was expected to cost or how long it was expected to take.

It is unclear if Peoples Gas has adopted this opaque approach to avoid accountability, but the consequences are real. Ultimately, it means that there is no way to know whether or not the "numerous opportunities to collaborate and share costs"[250] Peoples Gas cites to justify this reactive work actually lead to improved program implementation and customer benefits.

Given the reactive, inefficient nature of PI/SI work, it is most likely that Peoples Gas customers will see raised costs and delayed project completion. While it is impossible at this point to know the exact contribution of PI/SI work, the evidence shows that Peoples Gas customers are paying higher costs for pipe replacement. Peoples Gas replaced 52 miles of pipe in 2018, compared to its plan to replace 74.9 miles of pipe. It spent $5.7 million per mile of pipe retired, significantly more than the $1 million per mile it spent itself in 2006, prior to acceleration.[251] This cost per mile is also significantly higher than peer utilities like New York City's Consolidated Edison and Baltimore Gas & Electric which spent $3.4 million and $2.4 million per mile respectively in recent years.[252]

Over the course of a multi-decade program, some variation from plans is inevitable. Falling behind schedule or going over

cost on a short-term basis is not necessarily a problem in the context of a long-term project, especially if properly tracked and analyzed. In some circumstances, performing work off-schedule could save money and speed up project completion.

For example, for a period of time after resurfacing a street, the city of Chicago charges additional fees for re-opening the street for underground work in order to minimize disruption for residents. If neighborhood work is scheduled for a window of time wherein these resurfacing fees would increase costs, there may be a cost benefit of doing work ahead of schedule, while streets are already open.

Peoples Gas made clear during the Commission investigation that *it does not perform any analysis of this kind*, but rather simply does System Improvement projects when it has the opportunity to do them.[253]

With no baseline cost or schedule expectations, and absent any analysis of whether or not performing off-schedule work is helpful or harmful to achieving program objectives, Peoples Gas claims that all PI/SI work is "non-discretionary." This claim is in conflict with its own program definition, which clearly classifies Public Improvement work as mandatory while saying that it "makes sense" to do System Improvement work off-schedule if it would otherwise be performed later through the Neighborhood Program.[254] The treatment of all PI/SI projects as mandatory does, however, fit within the company's practice of not collecting quality data or performing meaningful analysis, all of which makes evaluating program performance and holding Peoples Gas accountable more difficult.

The mandated work included within PI/SI, for example addressing hazardous leaks, must continue, but it should continue outside of the SMP and the favorable cost recovery it affords. Decreasing the amount of disruptive, discretionary, reactive work will position Peoples Gas to properly analyze the harm resulting from unplanned work and improve execution of its planned work.

PEOPLE GAS' POOR DATA COLLECTION AND ANALYSIS MEANS ITS CANNOT EVALUATE PROGRAM IMPACT, LIMITS ITS ABILITY TO SUCCESSFULLY MANAGE THE SMP, AND LIMITS THE COMMISSION'S ABILITY TO PROTECT CUSTOMERS FROM IMPRUDENT COSTS

Even if Peoples Gas had a plan, it would prove difficult to use and adapt because the company does not adequately track or analyze its work. Arguably the biggest missed opportunity for reform concerns Peoples

Liberty worked with Peoples Gas to improve executive level oversight of the SMP. As a test, Liberty shared a report with executive management from October 2016 "that should have been of major concern to executive management. The [report] asked for management's response to those issues. The response effectively denied the existence of the issues."

Gas' failure to make decisions based on thoughtful analysis of empirical evidence.

Liberty found "Peoples Gas was not collecting data in a manner that makes detailed information readily available." The data that company management did provide to Liberty proved "incomplete and difficult to reconcile."[255] The monthly report presented to management "lacks the analysis needed to draw conclusions about the attributes of performance that drive cost up or down, lengthen or shorten schedules, and increase or decrease quality."[256]

Over the course of their various program proposals and during the recent Commission investigation, Peoples Gas has not presented analysis of the cost impact of adding pressure upgrade work to the SMP scope, even though the company has admitted that the extra work played a significant role in the budget ballooning from $2.6 billion to as high as $11 billion.[257] It has resisted quantifying and measuring risk and examining the tradeoffs of a faster or slower pace or of the addition of additional scope elements. In their testimony, the company does not even attempt to use empirical analysis to justify spending higher amounts for discretionary, reactive system improvement work, instead just doing it when the opportunity arises.[258]

Liberty repeatedly documented how problems with internal oversight and analysis continued under new management. The auditors found new management's metrics for analyzing program performance inadequate,[259] and that reports to leadership did not include proper context for whether data and variances were good or bad, nor identify root causes.[260] For example, reviewing the 2016 Year-end SMP Productivity Analysis Report, Liberty found:

> This report contains a wealth of information. However, there are no narratives or analyses on any pages to explain whether these nicely produced charts are projecting a positive or negative message. The Unit Meter Installation Cost is an example, with the year-end actual cost of $1,941/meter versus the Planned Cost of $1,000/meter. The actual unit cost almost doubled the planned cost, which was based on the 2015 actual costs. There should be some analysis regarding whether the 2015 level was valid to use as a base for 2016, and also why the workforce achieved only 75% of meter installation while exceeding the Plan Cost by 50%.[261]

Liberty further found instances where proper oversight was avoided altogether[262] or where "oversight" entailed denying, rather than dealing with serious problems.[263]

Until and unless Peoples Gas begins collecting quality, meaningful empirical information about the SMP and analyzing it in a consistent, transparent manner, there is no way for regulators or the public, let alone the company's own leadership, to know to what extent the SMP is succeeding or failing.

The Illinois Commerce Commission has failed to hold Peoples Gas accountable

THE MISSION of the Illinois Commerce Commission is to "ensure adequate, efficient, reliable, safe and least-cost public utility services."[264]

Since 2015, under the leadership of Commission Chairman Brien Sheahan, the Commission has failed to fulfill its mission, repeatedly going out of its way to not hold Peoples Gas accountable.

Time and again, over the objections of stakeholders, the Commission majority limited investigation and chose not to use its well-established authority to hold Peoples Gas and its executives accountable for clear management failures and alleged malfeasance:

- The Commission chose to not compel appropriate transition planning for the accelerated program during the 2014-2015 merger proceeding, instead requiring planning as a post-merger condition, an approach that failed.
- The Commission limited investigations into management malfeasance, including allegations of obstruction of the Liberty audit and withholding updated AMRP cost estimates during the merger proceeding.
- Despite announcing its investigation with great fanfare, the Commission investigation failed to answer basic questions or achieve reform.

THE COMMISSION CHOSE TO NOT COMPEL APPROPRIATE TRANSITION PLANNING FOR THE ACCELERATED PROGRAM DURING THE 2014-2015 MERGER PROCEEDING, INSTEAD REQUIRING PLANNING AS A POST-MERGER CONDITION, AN APPROACH THAT FAILED

When Wisconsin Energy submitted its petition to acquire Peoples Gas to the Commission in August 2014, Commission staff and the Office of the Attorney General questioned its due diligence and transition planning. A Wisconsin Energy witness responded in rebuttal testimony in December 2014:

> In my experience, it is not customary for pre-merger due diligence to include investigation into the specifics of the utilities' "on-the-ground" operations before the Transaction has been approved by the multiple regulatory bodies that must review it. Rather, it is typical and appropriate for this work to be performed once approval for the merger has been received and merger integration activities have begun.[265]

In January 2015, in the middle of the merger docket, Liberty released an unplanned interim report it felt compelled to expedite given troubling initial findings. In response, the Commission directly asked Wisconsin Energy and Peoples Gas if they had a transition plan, with a specific focus on the AMRP.[266] The companies responded that

they had "not developed a formal transition plan at this time," that "plans addressing near-term integration are typically developed in the month leading up to the transaction closing," and "[m]ore specific plans addressing the longer-term integration of the companies, including enhancements to their operations, will follow."[267]

Approaching a vote on the merger in June 2105, the release of the highly critical and alarming Liberty Phase One report in May prompted the Office of the Attorney General, City of Chicago, and Citizens Utility Board to file a joint emergency motion, asking the Commission to require the merger applicants to produce a transition plan before merger approval.[268] Rather than require a transition plan before merger approval, however, the Commission allowed new management to produce four AMRP transition plans within 75 days of merger approval:

> 1) an implementation plan for each of Liberty's recommendations, 2) an AMRP scheduling master plan, 3) an AMRP cost plan model, and 4) an AMRP transition plan that provides detailed changes to the AMRP needed as a result of the Reorganization in order to ensure a seamless transition that avoids a diminishment in service.[269]

As described in the previous chapter, by July 2105 new management informed the Commission it would only produce two of four plans by the 75-day deadline, and the plans it eventually produced were described by Liberty, Commission staff, and Commissioners as inadequate.

The Commission could have easily compelled transition plans as a prior condition of voting to approve the $5.7 billion merger and closely tracked progress post-merger closing. If Wisconsin Energy and Peoples Gas believed approval was contingent on quality transition planning, they would have produced, and one assumes produced plans of sufficient quality, to get the merger approved.

Given the clear evidence that the AMRP was in disarray, the Commission's decision not to use its pre-approval leverage is inexcusable. Instead of a smooth transition, Liberty reported "organizational change and turmoil"[270] a few months after the close of the merger.

THE COMMISSION LIMITED INVESTIGATIONS INTO MANAGEMENT MALFEASANCE, INCLUDING ALLEGATIONS OF OBSTRUCTION OF THE LIBERTY AUDIT AND WITHHOLDING UPDATED AMRP COST ESTIMATES DURING THE MERGER PROCEEDING

The Commission took little action to resolve serious whistleblower allegations

In February 2015, Commission staff began receiving whistleblower letters from Peoples Gas employees. Among other things, the letters alleged that Peoples Gas executives were "working overtime to suppress the audit findings that will uncover major safety concerns for the citizens of Chicago" and that the AMRP is "an ATM machine for contractors and consultants because those who are supposed to be in a position of oversight are the wolves watching the henhouse."[271] During 2015 and 2016, the Commission received seven whistleblower letters.[272]

The Commission opened an investigation into the allegations contained in the letters in March, 2015.[273]

Commission staff later testified that Peoples Gas management did not thoroughly investigate or address the allegations, that conflicts of interest with contractors persisted, and that management failed to ensure that safety inspectors were free of management coercion or pressure.[274]

After the Office of the Attorney General agreed to withdraw as a party to this investi-

gation as part of the settlement of a separate investigation (described below), Commission staff settled with Peoples Gas, requiring only a modest update to the company's Code of Conduct concerning the hiring of family members, and, for four years, a semi-annual report of all field observation audits of the SMP. The settlement acknowledged that staff still considered Peoples Gas' "investigations into the allegations made in the letters to be insufficient in scope and completeness." [275]

THE COMMISSION PURSUED AN UNNECESSARILY NARROW INVESTIGATION OF PEOPLES GAS' MISLEADING AND WITHHOLDING OF INFORMATION FROM THE COMMISSION DURING THE MERGER PROCEEDING

Throughout the 2014-2015 merger docket, Peoples Gas leadership represented that its most recent AMRP cost estimate was $4.5 billion and that the company was in the process of developing a new cost model and estimate. It was later revealed that Peoples Gas had an updated cost estimate of over $8 billion as early as November 2014.[276]

Peoples Gas tasked its contractor, Jacobs Engineering, with developing this new estimate as early as July 2014. Jacobs presented a new, over $8 billion estimate to Peoples Gas staff on November 7 and 20, and on December 29, 2014. Jacobs made a presentation on the new estimate to senior Peoples Gas executives on January 6, 2015.[277]

Peoples Gas never disclosed this new estimate to the Commission, and new management claims to have had no knowledge of it until after the merger.[278] Obviously, a new, almost double, AMRP cost estimate was material information that should have been shared during the merger docket.

After Liberty released its alarming Phase One report, the Commission brought three senior Peoples Gas executives in for a public meeting to respond to the report findings. During the meeting, multiple Commissioners pressed the executives on the status of an updated cost estimate and model. The executives spoke of their intention to update the 2012 cost estimate of $4.5 billion. They never disclosed the updated estimate the company had received more than five months earlier.[279]

New management revealed the existence of the $8 billion estimate in a letter to the Commission in July. Liberty later revealed, in its first Phase Two implementation report in September, that senior Peoples Gas management was presented this estimate in January.[280]

Responding to this revelation, the Office of the Attorney General and Citizens Utility Board petitioned the Commission to initiate a thorough investigation of Peoples Gas executives' misrepresentations of AMRP costs during the merger proceeding.[281] The petition highlighted multiple specific responses to discovery, responses to Administrative Law Judge requests, and testimony in which Peoples Gas failed to disclose its knowledge of the updated estimate.[282]

The Commission majority rejected the Attorney General-CUB petition, and initiated a much narrower investigation, regarding omissions of fact only during the May 20 meeting. Commissioner del Valle objected:

> I believe the most important question to be answered is whether the Commission was knowingly misled in the merger proceeding. The Initiating Order before us purposefully avoids this question … By reducing the scope of this investigation to exclude an 11-month proceeding and only include a 30-minute Open Meeting, the Commission is disregarding the most important question and redirecting the focus to whether two individuals made knowing misrepresentations specifically at the May 20, 2015 Open Meeting.[283]

By limiting the investigation to the omissions of two individuals during one public hearing, rather than repeated company ommissions during the merger proceeding, the Commission greatly reduced Peoples Gas potential liability during the subsequent investigation.

The company ultimately paid an $18.5 million settlement to resolve this investigation in May 2016.[284] When explaining his dissenting vote against the settlement, Commissioner del Valle said:

> the public interest has been reduced to a dollar amount in exchange for Commission agreement to not ask the difficult questions of executives...This does not sound like a deterrence to me. It sounds like the cost of doing business in Illinois.[285]

DESPITE ANNOUNCING ITS INVESTIGATION WITH GREAT FANFARE, THE COMMISSION INVESTIGATION FAILED TO ANSWER BASIC QUESTIONS OR ACHIEVE REFORM

At its December 16 meeting, the Commission "suspended"[286] the AMRP and initiated an urgent investigation into the scope, pace, and cost of the program.[287] Chairman Sheahan expressed the need for a fundamental re-evaluation of the program, and his commitment to get the troubled program on track:

> [T]he Commission agrees with ICC Staff, and auditors, the Attorney General, CUB, and City of Chicago that the current program needs to be reconsidered.[288]
>
> ***
>
> The company proposed, you know, basically let us keep doing what we are doing for three years and we will see how it goes. I think this is a pretty strong rejection of that.[289]
>
> ***
>
> [W]e are going to get to the bottom of this where we are going to get everybody talking about best approaches, what kind of impact there may be on ratepayers, and then come back and come to a formal docketed case where the Commission says, look, this is what [the company is] doing going forward.[290]

> *"I believe the most important question to be answered is whether the Commission was knowingly misled in the merger proceeding. The Initiating Order before us purposefully avoids this question ..."*
>
> *– Miguel del Valle*

In 2016, the Commission held informal stakeholder meetings, followed by a formal docket.[291] By December 2016, the Commission had a proposed order ready for approval which took no action to change the course of the program.[292] Instead of approving the order, however, the Commission decided to reopen the docket in March 2017 for additional testimony and briefings on metrics, rate and schedule impact, and all of the questions already under consideration in the investigation, effectively re-starting the investigation.[293]

In December 2017 and January 2018, the Commission rushed through the final stages of the docket, requiring parties to submit final briefs on tight timelines during the holiday season,[294] to approve in January 2018 a program that was essentially identical to what the Commission dramatically rejected two years prior[295].

The approving Commission order placed no legal obligations on the company such

as requiring project completion or mandating specific risk mitigation outcomes. Despite its public safety justification, Peoples Gas has no obligation to the Commission to complete the SMP. The order did not even answer the questions posed by the investigation. An investigation of the program scope, pace and cost did not determine:

- **An official cost estimate** - Peoples Gas presented multiple estimates based on conflicting quantities and paces of work.
- **The cost impacts of the different parts of the scope** - There has never been an accounting of the costs directly attributable to medium pressure work or the cost difference between the same work being done in the PI/SI or Neighborhood Program.
- **The root causes for ballooning program costs and their impact** - The closest Peoples Gas has come to explaining ballooning costs is stating that earlier estimates did not account for the full scope of the program and that the City has increased the costs of resurfacing.
- **The duration of the program** - From the time of the order ending the investigation, the program could last 18 to 23 years, a difference of 28%.[296]

Despite the fact that the SMP approved by the Commission had essentially the same scope and approach employed by the company since accelerated work began in 2011, the order propagated the fiction that the "refreshed" SMP was too "new" to properly analyze:

> Since the SMP is still in the developmental stages and will be ongoing for a long period of time, it is difficult to determine at this point whether the rate impacts provided by the company or those provided by the AG will be more accurate.[297]

(For a discussion of the credibility of Peoples Gas rate impact estimates compared to those provided by the Office of the Attorney General, see pages 58-60).

Commissioner del Valle cast the lone dissenting vote against the order ending the investigation:

> In 2015, Liberty warned that the program's ballooning costs would raise profound questions about, and I quote, the value proposition of continuing to address pressure improvements and meter relocations after a reasonably sound reflection of their true costs becomes known, sometime down the road. Two years down the road and we still don't know their true costs, but by now it should be obvious, any efficiencies are probably more than offset by the adverse impact to ratepayers from paying for the full modernization at an accelerated pace … We should not have allowed a two-year investigation into the SMP's cost, scope, and schedule to abandon any meaningful quantification of what it was investigating."[298]

Despite the failure of the investigation to determine program cost or evaluate affordability impacts, both the Chairman and dissenting Commissioner agreed that the program was unaffordable for too many Peoples Gas customers, saying respectively, the "costs that they have proposed will cause too great a burden for too many households in Chicago,"[299] and there is "no doubt in my mind that the SMP as approved today is unaffordable."[300]

The Commission majority justified its lack of action by citing a staff legal opinion that the 2013 law creating the QIP rider limited Commission authority. Chairman Sheahan explained:

> This case can be distilled into basically one fundamental question. Can the Illi-

> nois Commerce Commission... limit the utility's investment in statutorily defined categories of work during the effectiveness of the law? The answer, according to the career professional staff of the Illinois Commerce Commission is that we cannot. It is with reluctance that I accept their opinion.[301]

This legal conclusion is currently under appeal in the courts.

Even if the Commission were correct in its legal interpretation, it could have, but chose not to, compel Peoples Gas to provide more detailed and accurate information regarding the SMP, such as its cost, impact on ratepayers, and progress towards mitigating risk.

The investigation excluded Liberty, and did not include other experts as promised

While there are many examples of the Commission's failure to conduct a proper investigation, one of the clearest examples is the exclusion of outside expertise.

The Commission and its staff do not internally possess the expertise to properly examine and regulate massive capital projects like the SMP.[302] Peoples Gas itself has obviously struggled with the program and relied on multiple outside firms to plan, execute, and evaluate it. The Liberty audit shows the value of having outside experts examine the program. When the Commission initiated the investigation at a December 2015 meeting, the Commission and staff discussed at length a decision to bring on new experts to help analyze the program going forward.[303]

Despite this critical, undisputed need, outside experts were excluded from the investigation. Liberty had a more thorough understanding of the program than anyone, perhaps including Peoples Gas management, but staff recommended and the majority agreed to hire a new consultant, rather than incorporate Liberty into the new investigation. The Commission never hired a new consultant, but Liberty was not included in the investigation.[304]

Staff said at the December 2015 meeting that it believed the 95 Liberty audit recommendations would serve as "the basis for the discussion as to what needs to be done and what needs to change."[305] This also proved inaccurate, and even worse, the opposite happened: the existence of the investigation allowed Peoples Gas to avoid implementing critical audit recommendations. For example, in Liberty's final implementation monitoring report, regarding its recommendation that Peoples Gas adopt a realistic long-term plan and schedule of work, Liberty concluded (referring to the investigation as the "stakeholder process"):

> The outcome does not conform to our recommendation. Nevertheless, consideration of schedule through the Stakeholder Process makes it appropriate to consider implementation complete.[306]

Liberty was clear that Peoples Gas' plans and implementation did not conform to multiple audit recommendations. Because Commission staff were facilitating negotiations with Peoples Gas concerning the implementation of recommendations and Liberty's contract was ending, there was nothing more for Liberty to do than note that its recommendations were not met.

The investigation did not order an engineering study prior to the investigation, which would have given all parties an empirical understanding of the current status of the Peoples Gas distribution system

An engineering study, among other things, evaluates the condition of a sample of pipes and reviews program management to ensure the pace and design of the program is adequate for safety. The last engineer-

ing study was the Kiefner study from 2007, properly understood as an update to a more complete 2002 study. Peoples Gas had failed to conduct follow up studies every five years, a required condition of its 2007 merger.[307]

An engineering study would have provided valuable data and insight to the investigation, but the Commission did not compel Peoples Gas to perform one. The Commission claimed there was not enough time to perform one, given the supposed urgency of the investigation,[308] which they nonetheless extended for a year. Rather, the Commission ordered an engineering study at the *conclusion* of the investigation, and left its oversight and timeline to a follow-up staff recommendation and formal docket. That docket, completed in July 2018, allowed Peoples Gas, rather than the Commission, to hire and oversee the engineering firm, and gave the company a year and a half, through January 31, 2020, to complete the study.[309] In contrast, the 2007 study update, ordered on February 7,[310] was completed by March 1, only weeks later.[311]

When the investigation concluded in January 2018, Chairman Sheahan boasted of the yet to be hired outside experts: "For the first time since Illinois utilities were building nuclear power plants, the ICC is going to employ outside independent accounting and engineering firms to help ensure that every dollar of this program is spent appropriately."[312] More than a year later, the Commission has still not hired these experts.[313]

In the absence of outside expertise, the Commission and intervenors could evaluate only the information the company provided. Unfortunately, Peoples Gas was not forthcoming when asked to provide data and analysis about, for example, the cost impact of different scope parts or risk mitigation earned by different construction methodologies.[314]

Considering these limitations, it is no surprise the investigation failed to answer the very questions it set out to answer.

The Commission employed a questionable legal position to avoid taking action

Instead of ending the investigation with an order "where the Commission says, look, this is what [the company is] doing going forward,"[315] the Commission majority left questions unanswered, claimed the law tied its hands and effectively allowed Peoples Gas to maintain, and continue profiting off of, the status quo the Commission previously dramatically rejected.

The Office of the Attorney General has appealed the Commission decision to the Illinois Court of Appeals and at the time of this report the case is ongoing.[316]

The Commission argues that the 2013 law, Section 9-220.3 of the Public Utilities Act,[317] which authorizes specific categories of investment, allows cost-recovery through a rider, and sets caps on annual cost-recovery of those investments, deprives the Commission of authority established elsewhere in the Act to modify the cost, pace, or annual investment in capital programs.

> The Commission also notes … that it does not have the authority to limit the expenditures of the company pursuant to Rider QIP.
>
> ***
>
> Section 9-220.3 of the PUA establishes the level of rate recovery for SMP through Rider QIP and other QIP eligible capital work and does not authorize the Commission to establish an alternative level of rate recovery.[318]

The Office of the Attorney General argues that, to the contrary, nothing in Section 9-220.3, which governs cost recovery, removes or overrides Commission author-

ity, such as that found in sections 8-501 and 8-503 of the Act, to investigate utility operations and, if found necessary, require changes. As the Office of the Attorney General wrote in its initial appeal brief:

> Section 8-501's plain language confirms the Commission's far-reaching investigatory and regulatory authority: its power to "determine" and "fix" what is "just, reasonable, safe, proper, adequate or sufficient" applies to the full range of a utility's operations ("rules, regulations, practices, equipment, appliances, facilities or service") and may be exercised "[w]henever" the Commission makes the relevant findings after a hearing.[319]

Section 8-503 is similarly structured, and allows the Commission to direct "additions, extensions, repairs, improvements or changes" to an infrastructure project "in the manner and within the time specified" if the Commission finds such actions are necessary "to promote the security or convenience … of the public."[320]

The Office of the Attorney General further argues that, even if restricting SMP investments limits the company's cost recovery in a given year, it does not limit the company's ability to recover *other* qualified investments covered by the Rider.[321] The rider covers categories of investment, not the SMP specifically. If the Commission limited SMP activity, Peoples Gas could make and recover other investments outside of the SMP through the rider.

Commission staff appear to have understood the distinction between regulation of cost recovery and regulation of utility operations at the outset of the investigation. After the conclusion of informal workshops, staff wrote a report that formed the basis of the formal docketed Commission investigation. In the report, staff recognized rider limits as representing legislative intent to manage annual rate increases, not to determine the scope or pace of the program:

> Staff views QIP rider limits as indicative of the legislative intent regarding acceptable rate increases related to a safety-based system modernization program. The rider limit, however, does not constrain program expenditures; the company may determine that additional expenditures, to be recovered through base rates rather than the QIP surcharge, are necessary.[322]

Even if the Commission were correct that the rider limited its ability to order changes to the SMP, that would not limit its ability to take other actions. The Commission could have, and should have, fulfilled its oversight responsibility by, for example, conclusively quantifying cost drivers, the risk in Peoples' Gas system, and how effectively the SMP mitigates risk per dollar spent.

The Commission declined time and again to fulfil its regulatory responsibility to oversee and regulate the SMP to ensure safe and affordable utility service. Holding Peoples Gas accountable and fixing the SMP – a large, complex program with a history of mismanagement – is admittedly a daunting challenge. Unfortunately, for the past four years, the Commission has done what it can to avoid, rather than assume, its responsibility.

The affordability burden Peoples Gas is placing on Chicagoans is large, unjustified, and unnecessary

NO ONE DISPUTES that the SMP is creating affordability problems for Chicago gas customers.

- **Stakeholders highlighted affordability problems.** The Office of the Attorney General, City of Chicago, and Citizens Utility Board all expressed significant concerns during the Commission investigation regarding the rate impacts of the SMP. The Sargent Shriver National Center on Poverty Law[323], a national anti-poverty organization based in Chicago, took the rare step of intervening in the investigation, over the objections of Peoples Gas, due to its alarm over the program's impact on low income Chicagoans.

Chicago Bungalows. Photo: Bryan Hayes

- **Commission Chairman Sheahan, who has led the Commission through its failure to hold Peoples Gas accountable, acknowledges affordability problems.** At the conclusion of the investigation, Chairman Sheahan said the "costs that they have proposed will cause too great a burden for too many households in Chicago."[324]
- **Peoples Gas acknowledges affordability problems.** In the Commission order ending the investigation, the Commission summarized the company's position: "Peoples Gas has never taken the position that all customers will easily be able to absorb the inevitable bill increases that will result from the SMP."[325]

In addition to agreement on the importance of the question, there was a clear expectation at the outset of the investigation that the "cost/rate/affordability issue [will] be one of the top two or three issues in the docket."[326] Among the topics Chairman Sheahan pledged to "get to the bottom of" when announcing the investigation was "what kind of impact there may be on ratepayers."[327]

In the end, however, the Commission investigation came to no conclusion regarding affordability, claiming that "it is difficult to determine the overall impact of the SMP now and over the life of the project,"[328] and that "affordability must be studied and considered as the program continues."[329]

Given the SMP does not effectively achieve its public safety justification nor need to be conducted in the manner or at the pace the company is implementing it, the affordability burden it is placing on an increasing number of Chicagoans is both unjustified and unnecessary.

This chapter documents:

- The pace of investment drives monthly bills and represents a greater harm to customers than the overall cost of the program.
- The accelerated pace is the reason customers are already having affordability problems. Over time, more and more customers will struggle to afford their gas bills.
- Peoples Gas makes non-credible cost and bill impact projections and presents them in a misleading manner.
- The SMP's accelerated pace is a profit strategy.

THE PACE OF INVESTMENT DRIVES MONTHLY BILLS AND REPRESENTS A GREATER HARM TO CUSTOMERS THAN THE OVERALL COST OF THE PROGRAM

The pace of the program has a bigger impact on affordability than the overall cost of the program. Accomplishing the work of the SMP at a faster pace over a shorter period of time decreases the total cost of the project but increases the impact on customers' monthly bills. Slowing the program down adds to the *total cost*, because a longer program has more annually-recurring fixed costs and may lose some efficiencies. On the other hand, a longer program is more *affordable* for customers, because costs are spread out over more ratepayers and over more time.

A company witness explained this trade-off during the recent Commission investigation when she testified:

> The critical question for the Commission is how to appropriately strike a balance between completing the SMP, which I think all parties agree is needed, and the impact on bills. *Extending the SMP will tend to decrease the annual bill impact* while increasing the total SMP cost. Conversely, completing the SMP on a shorter time frame will tend to increase the annual bill impact but decrease the total SMP cost. Striking the balance, therefore, comes down to the pace at which Peoples Gas completes the SMP, and the appropriate pace is (and should be) driven by safety.[330] (Emphasis added)

"Extending the SMP will tend to decrease the annual bill impact while increasing the total SMP cost. Conversely, completing the SMP on a shorter time frame will tend to increase the annual bill impact but decrease the total SMP cost."

– Peoples Gas

The pace of the program has greatly increased over the last decade. In 2006, the company spent roughly $47 million in combined capital and operations and maintenance costs on pipe replacement.[331] In the first year of the AMRP, 2011, Peoples Gas budgeted to spend $108.6 million on the program.[332] Between 2017 and 2019, the company budgeted to spend over $300 million per year.[333]

In 2017, *Crain's Chicago Business* reporter Steve Daniels compared the company's overall planned capital spending (that is, the SMP as well as other capital investments) between 2017 and 2019 with capital spending during the 1990s. He found that the company planned to spend more, in inflation adjusted dollars, in those three years than they had across the entire 1990s.[334]

According to Peoples Gas' 2018 annual report, it plans to increase capital spending even further in coming years, from $1.26 billion between 2016 and 2018 to $1.91 billion between 2019 and 2021.[335] At least in previous years, the SMP represents the majority of this capital spending.[336]

Peoples Gas has never properly justified the pace of the SMP

The company argues that its SMP pace is "driven by safety" in several ways, without presenting any empirical evidence to support its as-fast-as-possible pace. In the Commission investigation, Mr. Hesselbach was directly asked, "What level of estimated annual spending on SMP would result in optimal cost per unit of work completed?" His answer, in its entirety, was:

> Peoples Gas' current three-year plan has set investment levels of approximately $300 million per year. This level of annual investment will put Peoples Gas on track to complete the SMP by 2035 to 2040.[338]

This response, to simply state annual planned expenditures and claim this put the program "on track" for a five-year completion window, in no way addresses the question of what level of annual spending would optimize cost per unit of work. When asked to justify its pace of investment during the investigation, Peoples Gas responded with no empirical evidence or analysis.

THE ACCELERATED PACE IS THE REASON CUSTOMERS ARE ALREADY HAVING AFFORDABILITY PROBLEMS - OVER TIME, MORE AND MORE CUSTOMERS WILL STRUGGLE TO AFFORD THEIR GAS BILLS

In 2018, the average residential Peoples Gas heating customer paid $74.90 over the course of the year for the QIP rider alone.[339] This does not represent the full cost customers are paying for the SMP, as a significant amount of program costs have already been included in base rates, including hundreds of millions of dollars spent in the early years of acceleration.[340] These harder-to-

FIGURE 04. PEOPLES GAS CAPITAL SPENDING / PEOPLES GASS CAPITAL BUDGET[337]

track additions have led to substantial bill increases. Peoples Gas customers currently pay close to $40 each month before using a therm of gas.[341]

During the 2017-2018 winter, the average residential Peoples Gas customer paid 80 percent more to heat their homes than the average residential of Nicor Gas, the gas utility serving the suburbs surrounding Chicago, did. In the 2018-2019 winter, the disparity was less, but still significant, at 67 percent.[342]

In 2018, Peoples Gas sent disconnection notices to 92,000, or 15 percent of, Chicago residential heating customers.[343] Peoples Gas added $36 million in uncollectible accounts in 2018, just $1 million less than the $37 million added in 2014, "when a polar vortex drove up heating gas consumption and prices."[344]

Undisputedly, a significant portion of the company's customers are struggling to pay their gas bill.

Customers suffer a variety of harms when they can't afford utility bills

In 2017, during the second year of the investigation, an Office of the Attorney General expert, Roger Colton, provided insight on affordability problems.

Mr. Colton argued that gas leaks are not the only public health risk we should be considering: "The affordability issues I identify above, along with the arrearage and payment problems, pose real, identifiable, quantifiable, public health and safety risks."[345]

Mr. Colton referenced a survey conducted by the National Energy Assistance Directors' Association, the national association of state staff who administer the federal energy assistance programs. A 2018 version of this survey is now available. The survey documents some of the health and safety risks that occur in part due to customers' challenges affording essential utility service:

- 37 percent closed off part of their home.
- 25 percent kept their home at a temperature that was unsafe or unhealthy.
- 30 percent used their kitchen stove or oven to provide heat.
- 48 percent of respondents who had utilities shut off had to use candles or lanterns and 7 percent of all respondents had this problem
- 36 percent went without food for at least one day.
- 41 percent went without medical or dental care.
- 31 percent did not fill a prescription or took less than the full dose of a prescribed medication in the past five years.
- 30 percent were unable to use their main source of heat in the past year because their fuel was shut off, they could not pay for fuel delivery, or their heating system was broken and they could not afford to fix it.[346]

The testimony from experts hired by the Office of the Attorney General and the brief from the Shriver Center goes into considerably more detail on these problems, highlighting the significant low-income population in Chicago, 47.6% of Peoples Gas customers are below 80% area median income,[347] the disparate impacts on communities of color, and the massive and highly unrealistic increases in incomes necessary to make the projected increases in gas bill affordable. The harms are real and widespread.

If the program continues on its current course, more and more customers will struggle to afford essential utility service

Mr. Colton testified that the rate impacts of the SMP will cause affordability problems not only for low-income, but also for median-income customers:

> First, the data demonstrates that the "affordability" problems presented by the company's gas main replacement program are not exclusively "low-income" problems ... The total affordability problems extend into the middle class as measured by median income.[348]

As such, Mr. Colton concludes the affordability problems "that would result from the company's proposal instead extend to hundreds of thousands of customers."[349]

Peoples Gas customers face multiple other increasing financial pressures

The Commission investigation was limited to the affordability impacts of the SMP, but of course Chicago residents face other escalating costs in their household budgets. The Chicago Resilient Families Task Force, created by Chicago Mayor Rahm Emanuel and Alderman Ameya Pawar, described "deep and wide" economic insecurity in Chicago in its February 2018 report. The report highlights that median earnings for a full time, year-round worker in Chicago were $50,356 in 2017, below the $60,936 cost of living for a family of three.[350]

Even limiting our consideration to utility costs, Chicago residents face other escalating bills:

- Commonwealth Edison, the electric utility serving the Chicago region, is close to completing a $2.6 billion investment in smart meters, which will continue to increase bills significantly, and recently presented investors with a plan for even higher capital spending levels over the next four years.[351] The utility is currently pushing legislation in Springfield which would extend "formula rates," which limits Commission oversight of their spending.[352]
- Chicago Water and Sewer rates are increasing, in part due to a large water main replacement program currently underway.[353]
- The cost of gas, which has been low in recent years, is another variable that affects gas bills outside of the SMP.[354] Low fuel costs have helped "mask" rate increases. Fuel prices will inevitably rise.

PEOPLES GAS MAKES NON-CREDIBLE COST AND BILL IMPACT PROJECTIONS AND PRESENTS THEM IN A MISLEADING MANNER

The rate impact analysis Peoples Gas presented during the investigation is not credible for several reasons.[355] First, the company based its rate impact analysis on projected levels of annual spending much

> *"The "affordability" problems presented by the company's gas main replacement program are not exclusively "low-income" problems ... The total affordability problems extend into the middle class as measured by median income."*
>
> *– Office of the Illinois Attorney General Expert Witness*

TABLE 04: THE DIFFERENCE BETWEEN PEOPLES GAS PROJECTION BASE CASE AND ACTUAL PLAN

Year	Base Case Projection	Actual Plan	Difference
2016	$132,300,000	$192,000,000	$59,700,000
2017	$144,400,000	$301,500,000	$157,100,000
2018	$152,900,000	$300,000,000	$147,100,000
2019	$161,900,000	$305,000,000	$143,100,000
2020	$171,100,000	$304,000,000	$132,900,000
2016-2020	**$762,600,000**	**$1,402,500,000**	**$639,900,000**

lower than the company's actual plan for spending:

> The Base Case bill impact calculations show capital expenditures of $132.3 million for 2016, $144.4 million for 2017, $152.9 million for 2018, $161.9 million for 2019 and $171.1 million for 2020. However, in the company's testimony, exhibits, and response to data requests in this second phase of the case, the company has reported that it has spent or projects to spend on the SMP/AMRP the following amounts: $192 million, $301.5 million, $300 million, $305 million, and $304 million for each year 2016 to 2020, respectively.[356]

Peoples Gas cost and bill impact projections are based on annual spending figures almost half as small as its actual plan.

Second, Peoples Gas bases its bill impacts analysis on cost projections reliant on achieving aggressive cost savings it is not trying to achieve in the short term nor even attempting to track.[357]

Peoples Gas' cost and bill impact projections are untethered from reality, misleading, and not credible.

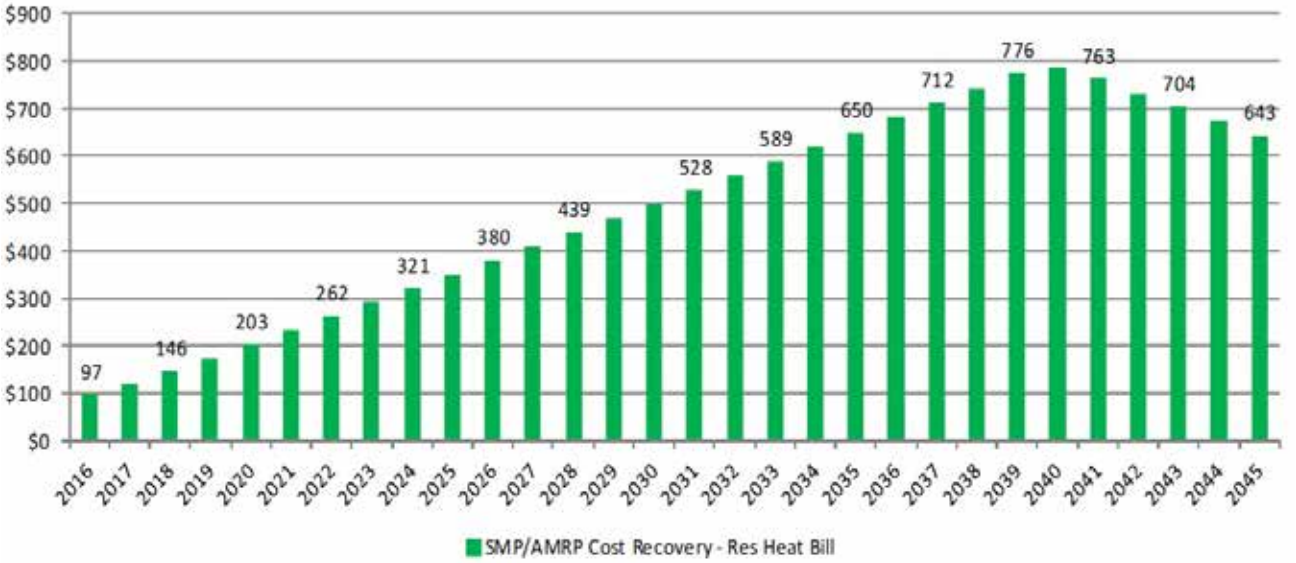
Peoples Gas presents year to year, rather than cumulative, bill impacts, in an attempt to make the impacts appear smaller

Instead of presenting an average residential customer's annual program costs, annual total bill costs, or cumulative program costs, Peoples Gas presents year over year bill impact changes. For example, in its Base Case model, Peoples Gas presents that average residential customer bills will increase by an average of $21, or 1.7%, per year, over the course of the entire program.[358]

Averaging the annual bill impact of the SMP costs over the entire term of the program combines "the low cost in the early years of the program with the higher cost in the later years as the program costs continue to accumulate,"[359] masking the increasing burden placed on ratepayers over time.

Attorney General expert witness Sebastian Coppola made projections that presented average annual bill burdens at different stages of the program. Instead of using the company's Base Case scenario, Mr. Coppola used the company's actual planned spending. He estimating that bill impacts would continue escalating until peaking in 2040 at $785 for the average residential customer.

FIGURE 05. ANNUAL COST OF SMP/AMRP FOR AVERAGE RESIDENTIAL HEATING CUSTOMER: PGL 3-YEAR PLAN ESCALATED AT 3% WITH 2040 END DATE[360]



Mr. Coppola continues his analysis to show the total customer bill will be at double 2016 levels by 2031 and almost triple by 2045.[361]

Peoples Gas did not present cumulative program or total bill cost projections during the Commission investigation. The company also never made a single definitive projection, presenting various scenarios based on its end date window between 2035-2040. As a point of reference, because Peoples Gas never presented cumulative program costs, Mr. Coppola did. Using Peoples Gas' non-credible Base Case scenario, he projected that the average residential customer would pay $602.76 for the SMP alone in 2040.[362]

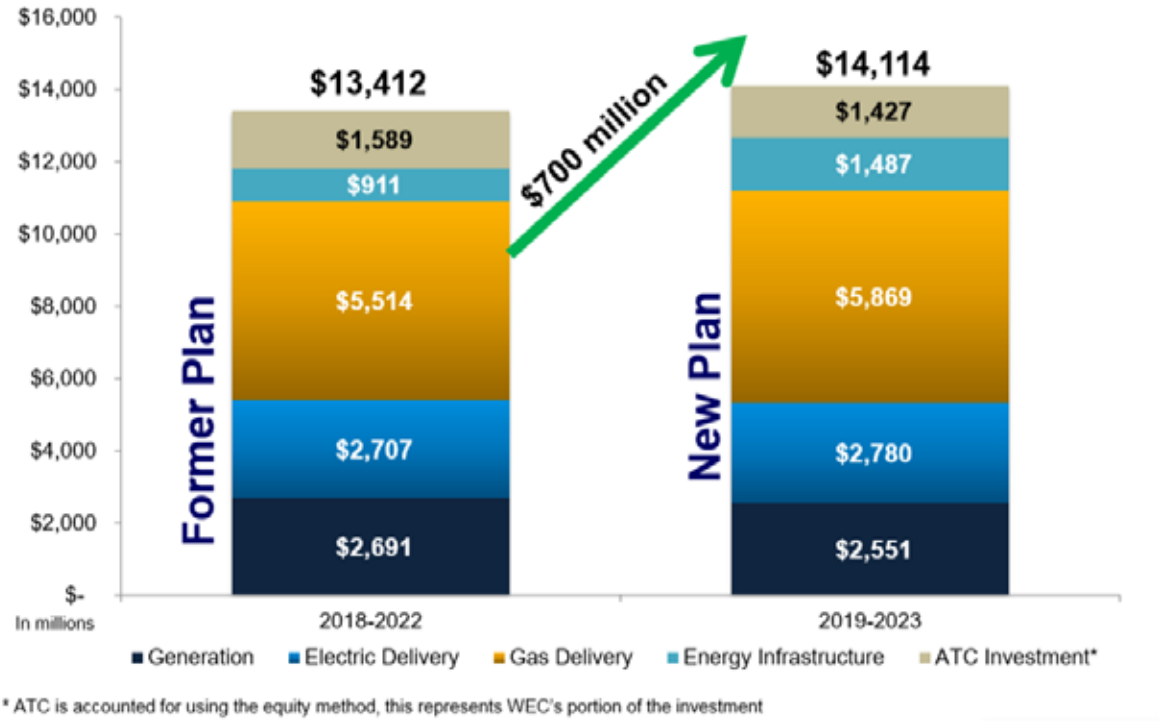
THE SMP'S ACCELERATED PACE IS A PROFIT STRATEGY

On WEC Energy Group, Peoples Gas' parent company, quarterly shareholder presentations, WEC senior management regularly describe capital programs, and the SMP specifically, as critical to their overall corporate strategy for increasing profits. In the 3rd Quarter 2018 earnings package, WEC executives projected 5-7 percent growth in earnings per share and highlighted increasing gas delivery capital investments.[363]

Aggressive capital investment is currently a common strategy for gas and electric distribution utilities, whose historical profit drivers, customer and consumption growth, have slowed or reversed.[365] All major utilities in Illinois have significantly increased their capital budgets, and in turn profits based off total assets, over the past decade.[366] All are planning to increase capital spending even more in coming years.[367]

Peoples Gas' rate base has grown significantly since the 2006 merger. Peoples Gas went 12 years, between 1995 and 2007 rate cases, without a rate increase and, at the end of that period, the company's rate base increased by $142 million, or 13 percent.[368] In less than 10 years between 2006 and 2015, however, Peoples Gas' rate base, and with it its opportunity for profit, increased $600 million, or 56 percent.[369] On top of that increase, the company has continued to add additional profits through Rider QIP. As high levels of capital spending continue,

FIGURE 06. INCREASING CAPITAL SPENDING[364]



* ATC is accounted for using the equity method, this represents WEC's portion of the investment

the next rate case will likely include another large increase in rate base.

In Commission proceedings, the company's prioritization of rate recovery has been apparent since first proposed acceleration in 2007. Time and again, Peoples Gas stressed it would only perform an accelerated program under favorable cost recovery terms. By implication, this means Peoples Gas would not perform the program through the normal rate setting process, which would place its program under more scrutiny.

In the 2007 rate case, a company witness testified:

> Only a rider, such as Rider ICR, would adequately address the issue of managing costs of the magnitude anticipated on an ongoing basis and allowing Peoples Gas the nimbleness to respond to external forces and events and thereby manage the unpredictability and uniqueness of the opportunities that lead to the Accelerated Program costs.[370]

In the 2009 rate case, the Office of the Attorney General commented, "The company's request to approve a cost recovery mechanism before the Commission has even evaluated a specific implementation plan for any acceleration proposal is a classic case of putting the cart before the horse."[371]

Peoples Gas went 12 years, between 1995 and 2007 rate cases, without a rate increase and, at the end of that period, the company's rate base increased by $142 million, or 13 percent.[368] In less than 10 years between 2006 and 2015, however, Peoples Gas' rate base, and with it its opportunity for profit, increased $600 million, or 56 percent.[369]

In the 2012 rate case, after an Illinois Appellate Court had invalidated the first rider Peoples Gas used to recover AMRP costs, a company witness would only commit to a 2030 completion date "if appropriate and timely recovery is provided."[372] In its final order in the 2012 rate case, the Commission wrote that the company:

> … rests timely completion on being provided "appropriate and timely recovery."... [Peoples Gas] wavers even further in its response to [a data request], when the company explained that "if, over time, Peoples Gas does not recover the costs of the AMRP projects, then at some point funding the AMRP projects will become infeasible as a matter of practical business reality."[373]

During the 2014-2015 merger proceeding, the company only committed to continue the AMRP "assuming it receives and continues to receive appropriate cost recovery, with a planned 2030 completion date."[374]

Peoples Gas has fought hard, repeatedly, to ensure the SMP proceeds under favorable cost recovery terms. While the scope, design, and accelerated pace of the SMP do not adequately address the program's primary public safety justification, they do produce positive returns for utility managers and shareholders, at the expense of ratepayers.

Climate change means gas system improvement investment should slow, not accelerate

GOVERNOR JB PRITZKER, in one of his first acts as Governor, signed an executive order committing Illinois to reducing greenhouse gas emissions consistent with targets set in the 2015 Paris climate agreement.[375] Achieving long-term greenhouse gas emission reduction targets will depend on changes in energy production and consumption in the electric, transportation, building, and industrial sectors.

This includes, of course, how homes and businesses heat space and water. "Seventy million American homes and businesses burn gas, oil, or propane on site to heat their space and water, generating 560 million tons of carbon dioxide each year—a tenth of total US emissions."[376]

While burning gas for home heating or electricity generation emits less greenhouse gas emissions than other fossil fuels like coal, the amount of gas released from leaks during production, processing, distribution, storage and transportation can reduce or even negate its greenhouse gas advantage.[377]

Hitting Illinois' greenhouse gas emission targets will require burning significantly less gas for home heating - if not completely abandoning gas as a home heating fuel. This prospect raises profound questions about the viability of maintaining the Peoples Gas distribution system into the future and the wisdom of investment in system modernization, much less *accelerated* investment.

A climate-themed art exhibition in Chicago. Photo: John LeGear

Even if Chicago does not abandon its gas distribution system before the end of its useful life, many customers will, magnifying the bill impacts of those customers that remain.

Accompanying the imperative of addressing climate change is the rapid maturation of electric home heating technology, which is already competitive on both cost and greenhouse gas emissions when replacing or buying new home heating systems, and will soon be superior in both cost and climate impacts.[378]

If and when the company's accelerated medium pressure upgrade program returns

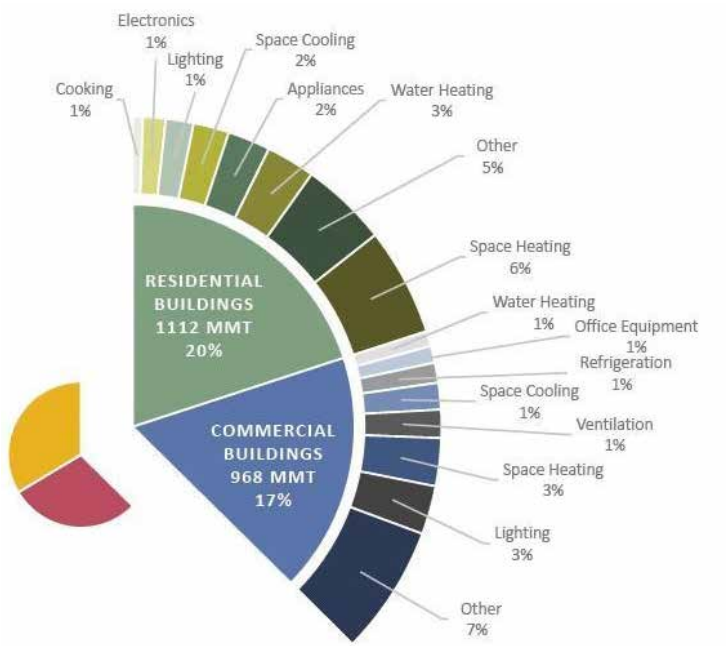
to the Commission for proper review, the public interest demands the Commission consider the implications of climate change and Illinois' commitment to reducing greenhouse gas emissions.

The Paris Climate Agreement and its implications for home heating

The "United States Mid-Century Strategy for Deep Decarbonization," published by the White House in November 2016, responds to the Paris Agreement's invitation to nations to develop, by 2020, "mid-century, long-term low greenhouse gas emission development strategies."[379] The mid-century strategy "envisions economy-wide net [greenhouse gas] emissions reductions of 80 percent or more below 2005 levels by 2050."[380]

According to the mid-century strategy (MCS), "Residential and commercial buildings are responsible for over one-third of the CO_2 emissions from the U.S. energy system," with 14 percent of the total emissions, or 38 percent of emissions from the building sector, attributable to cooking and air and water heating.[381]

FIGURE 07. CO_2 EMISSIONS BY END USE: BUILDINGS[382]



The MCS presents two strategies for driving down emissions from the building sector – energy efficiency and electrification of end-uses – to achieve "near-complete" decarbonization of the sector.[383]

While both strategies will significantly drive down gas consumption in the building sector, electrification of end-uses will be critical to achieving "near complete" decarbonization in the building sector:

> Further electrifying building end-uses—combined with the near-complete decarbonization of the grid—is an important strategy to reduce building emissions. A key opportunity for electrification in buildings lies in space heating and hot water heating appliances. About half of U.S. floor space is currently heated with systems that directly burn fuels.[384]

The MCS further highlights the importance of starting these transitions quickly in the building sector, considering the slow stock turnover of buildings, which once built, are typically used for decades if not centuries: "This slow stock turnover elevates the importance of ensuring that starting today, new buildings and buildings features are designed for optimal efficiency and low carbon emissions."[385]

A 2017 study by the National Renewable Energy Laboratory provides more detail of what enacting these broad strategies and achieving these goals could look like. The study models widespread electrification of end-use services in the transportation, buildings, and industrial sectors coupled with electric sector decarbonization. Its electrification scenarios are aggressive. Below is the methodology used for the building sector:

> In both the residential and commercial sectors, end uses selected for electrification were space heating, water heating, and cooking, as well as end uses

included in the "other" category, such as pool and hot-tub heaters, outdoor grills, and motorized devices (e.g., lawn mowers). With the exception of space heating, we assume that all of the end uses linearly ramp from their business-as-usual 2020 fuel mix to 100% electricity-fueled by 2050. We assume that electrification of space heating does not begin until 2025, but electric heating devices (both heat pumps and resistance heaters) are subsequently adopted at a rate sufficient to achieve 100% electrification of space heating by 2050.[386]

Even with this aggressive electrification and similar aggressive targets in other sectors, the study found that "by 2050, electrification and simultaneous power sector decarbonization can achieve reductions of nearly 74% below the 2005 level of economy-wide fossil fuel combustion emissions."[387] Therefore, to achieve the 80% reductions envisioned by the MCS "pathways to achieving deep reductions in greenhouse gas emissions will necessarily involve additional strategies for reduction."[388]

While Illinois may be able to meet its greenhouse gas emission reduction targets without completely electrifying residential and commercial building space and water heating by 2050, significant gains in efficiency and electrification will be necessary - meaning Peoples Gas will have fewer customers and those remaining customers will consume less gas. Dividing accumulating SMP costs among less customers using less gas would drive bill impacts even higher, incentivizing more customers to electrify, creating a potential "utility death spiral."

The real potential that gas distribution systems will become stranded assets within this half-century should concern policy makers considering significant gas system modernization investment. If anything, these types of investments should be decelerated, not accelerated.

The study found that, for "newly constructed homes in Chicago, heat pumps are significantly more cost-effective than installing both air conditioning and a gas furnace and water heater; a heat pump system will save $4,000 over the lifetime of the device."

The potential for electrification

A 2018 study by the Rocky Mountain Institute analyzed the economic and climate impacts of the electrification of residential space and water heating. The study compared electric space and water heating to fossil fuels in four locations, including Chicago.

The study found that, for "newly constructed homes in Chicago, heat pumps are significantly more cost-effective than installing both air conditioning and a gas furnace and water heater; a heat pump system will save $4,000 over the lifetime of the device."[389] For retrofits, heat pumps are still more cost effective if replacing both gas heating and air conditioning appliances, but not if replacing gas space or water heating appliances alone.

The short-term climate impact in Chicago is less clear, because the Chicago region of the electrical grid is still significantly reliant on coal generation to meet marginal demand. As of 2016, the data used in the report, the added electrical demand would be met by relatively carbon-intensive generation. Because of this, the report found that electrification of home heating would either increase short-term emissions or, when the climate impact of methane leaks in the gas life cycle are factored in, have essentially no impact on emission levels.[390]

The carbon intensity of marginal generation in the Chicago region, however, will be declining soon, based on planned coal plant retirements and the significant new renewable generation coming on to the grid soon as a result of the Future Energy Jobs Act.[391]

While these results do not support aggressive short-term electrification, they reinforce questions about the prudence of aggressive investment in gas distribution infrastructure. Among the topline recommendations of the study is:

> **Stop supporting the expansion of the natural gas distribution system, including for new homes.** This infrastructure will be obsolete in a highly electrified future, and gas ratepayers face significant stranded asset risk in funding its expansion today. Furthermore, electrification is a lower-cost and lower-carbon solution than extending natural gas, either to new or existing homes.[392] [emphasis in original]

While this recommendation concerns the expansion of gas distribution systems, the stranded asset concern equally applies to aggressive system modernization investments.

Chicago will rely on the Peoples Gas distribution system for the foreseeable future. As such, investments to maintain system integrity and safety are clearly necessary and prudent. However, given the imperative to decarbonize our building sector, policy makers should scrutinize aggressive investments in overhauling gas systems, like the SMP, with a high degree of skepticism.

Recommendations

PEOPLES GAS IS FAILING to appropriately address the public safety risk it invokes to justify the SMP. Instead of implementing a program that scientifically prioritizes at-risk pipes for replacement, the company is conducting a broad, overly reactive, system-wide upgrade. The pace of SMP spending places an unjustified and unnecessary affordability burden on Chicago gas customers. The acceleration of gas system improvement investment harms Illinois' ability to meet its greenhouse gas emission targets and risks saddling ratepayers with billions of dollars of stranded investment.

The Illinois Commerce Commission has failed to uphold its regulatory responsibility to ensure ongoing safe and least cost public utility service.

The time has come for policy makers in Illinois to intervene and reform the System Modernization Program.

Policymakers should force Peoples Gas to create and implement a credible plan for pipe replacement that prioritizes risk mitigation based on an empirically justified scope, design, and pace

1. Peoples Gas is conducting an engineering study, due by January 2020. Because the Commission allowed for the company, rather than the Commission, to oversee the engineering firm, the Commission should engage third-party experts to evaluate the study when complete.
2. The study should evaluate the impacts of medium pressure and third-party public improvement work on the SMP. The Commission should be prepared to order a second, independent, engineering study if the one Peoples Gas produces is biased or otherwise inadequate.
3. If the engineering study demonstrates the ongoing need for an accelerated pipe replacement program, the Commission should order Peoples Gas to submit a plan for a targeted program, to be evaluated, modified as necessary, and approved through a formal docketed proceeding.

The Peoples Gas Light and Coke Building on Michigan Avenue. Photo: Wikicommons

4. At-risk pipe replacement should be separate from medium pressure work and work responsive to third parties. Only at-risk pipe replacement should enjoy incentives.

5. If Peoples Gas fails to present relevant information or follow best practices, it should not be allowed to recover associated costs and customers should be held harmless.

6. The program should be conducted according to operational long-term plans which include a credible long-term cost projection, a fixed completion date and long-term schedule of work, a risk indexing methodology, and evaluation metrics such as risk-mitigation and risk-mitigation-per-dollar.

7. The Commission should formally re-evaluate the program, including evaluation of contractor and management performance, on a periodic basis (every 3-5 years) in a dedicated formal docket, hiring an outside expert each time.

8. Policymakers should rigorously question whether medium pressure work is necessary and beneficial. Before approving rate recovery for a broad medium pressure upgrade program, the Commission should thoroughly evaluate the program in a formal docket and within the context of a distribution system plan and long-term policy trends.

9. The company should present a separate program proposal for any medium pressure work complete with a cost-benefit analysis and guarantees that the largely separate medium pressure work would not delay or otherwise harm safety-driven pipe replacement work.

10. Medium pressure work should not be conducted at an accelerated pace. It should not be granted accelerated cost recovery unless there are strict safeguards built in to protect against unaffordable spending.

11. Peoples Gas targeted pipe replacement work should be disaggregated and distinct from Public Improvement and System Improvement work. Policy makers should not incentivize mandatory or inefficient, reactive system improvements work through accelerated cost recovery.

Policy makers should slow down and comprehensively re-evaluate gas distribution utility system improvement investments

1. Policy makers should require Illinois gas distribution utilities to engage in distribution system planning to evaluate distribution system maintenance and capital investments. This robust planning process should take into account long-term trends including those responding to climate change. All investments should be considered within an empirically-grounded, long-term plan for the entire system.

2. The Illinois General Assembly should revoke, or phase out ahead of its 2023 sunset, Rider QIP for all gas utilities.

3. The Illinois General Assembly and the Illinois Commerce Commission should consider performance-based rates to end the utility management incentive to profit more by spending more, and instead incentivize achieving public interest outcomes.

4. Any massive utility infrastructure modernization or other large capital outlay in Illinois should be examined by independent experts that aim to ensure all promised customer benefits are reasonably and efficiently realized.

5. Policy makers should reform gas and electric utility affordability programs to increase bill assistance funding to meet growing need, and create more effective repayment plan options.

   Policy makers should evaluate the value of uncollectibles riders, which allow utilities to collect uncollectible accounts through a bill rider paid by all other customers, and their impact on utilities' collections and shutoffs behavior.

Policy makers should proactively study decarbonization and its implications for gas distribution utilities

1. All gas distribution capital programs should be evaluated considering climate risks.

   The Commission should consider plausible scenarios that would prompt significant reductions in gas use within the useful life of current infrastructure investments, such as state or federal policy changes that increase the cost of gas.

2. Policy makers should adapt and expand gas efficiency policies and develop programs to incentivize or accelerate the adoption of electric heat pump and other technologies in new building and retrofits that can be powered by carbon-free energy.

3. Policy makers should consider workforce development programs to help facilitate a more orderly transition to carbon-free technologies.

Appendix A: Abbreviations and common terms

AMRP - Accelerated Main Replacement Program - name of accelerated pipe replacement program between 2011 and 2015, which includes medium pressure work.

CI/DI - Cast Iron and Ductile Iron - legacy pipe material at higher risk to leak, crack, or break.

Commission - Illinois Commerce Commission - The five-person utility regulator for the state of Illinois. Members are appointed by the Governor and approved by the state Senate.

DIMP - Distribution Integrity Management Plan - federally mandated gas distribution utility safety plan.

Kiefner - Kiefner and Associates, Inc.- Engineering firm which performed engineering study on Peoples Gas distribution system in 2007.

Liberty - The Liberty Consulting Group - Consulting firm which has been hired by the Commission multiple times to perform program audits examining Peoples Gas.

PHMSA - Pipeline and Hazardous Materials Safety Administration - federal agency with oversight of pipeline safety.

PI/SI - Public Improvement / System Improvement - Program within the SMP that is reactive to third parties and imminent or emerging threats.

Replacement/Retirement - "Replacement" and "retirement" are used interchangeably and indicates a pipe is no longer in use and a new pipe has replaced it. "Installed" pipe, on the other hand, may not be in use yet. Due to a construction practice wherein new pipe is installed on both sides of a street, many more miles of pipe may be "installed" than "replaced" or "retired."

SMP - System Modernization Program - name of accelerated pipe replacement starting in 2016, which includes medium pressure work.

QIP - Qualified Infrastructure Plant - categories of work authorized by the Illinois General Assembly for cost recovery through a bill rider - used by Peoples Gas to recover the costs of the SMP.

UMRI - Uniform Main Ranking Index - scientific measurement and index of risk of each and every segment of pipe in the Peoples Gas distribution system.

ZEI - Zinder Engineering, Inc. - Engineering firm which performed engineering study on Peoples Gas distribution system in 1981 and multiple follow up studies.

Appendix B: Timeline

Pre-acceleration

1970S-1990S

- 1976-1977 - Peoples Gas "experienced a high level of cast iron pipes breaking during the severe winter of 1976-1977 which prompted the initiation of an investigation to determine the condition of the cast iron pipe in its distribution system."[393]
- January 1979 - Peoples Gas task group publishes "Long-Range Operating Plan for the Distribution Department" recommending replacement of cast iron pipe.[394]
- May 1981 - Zinder Engineering, Inc. (ZEI) analyzes the Peoples Gas distribution system and recommends a replacement program for 1,679.36 miles of pipe, with a target completion date of 2030.[395] The Zinder report places emphasis on reducing risk by replacing small-diameter cast iron pipe laid in clay soil.
- 1988 - A management audit finds that while Peoples Gas has replaced a significant amount of cast iron pipe, replacement does not track or follow the recommendations of the 1981 Zinder report, and instead appears "to be driven, in large part, by the City of Chicago's street resurfacing program."[396] The company replaces mains in three scenarios, the only one that is not responsive to third parties is a system improvement project that aims to upgrade the entire system to medium pressure.[397]
- 1992 - Over-pressurized pipes in the River West Neighborhood cause explosions, killing four people and bringing Peoples Gas under increased regulatory scrutiny.[398]
- 1993 - Peoples Gas states it plans to upgrade its entire distribution system to medium pressure by 2033.[399]
- 1993 - Peoples Gas institutes a "Main Ranking Index" or MRI, quantifying pipe risk in order to prioritize replacement work. The rate of leaks and breaks, which had held steady since 1981, began to decrease after the introduction of the MRI.[400]
- 1994 - Zinder submits a re-evaluation of the replacement program with a revised recommended completion date of 2050.[401]
- 1994 - A second management audit finds that replacement work was driven not by targeted risk reduction, but by City public improvements and medium pressure work, finding, "the City's public improvement projects appear to exert an undue influence on [Peoples Gas'] replacement decisions."[402]

2000S

- January 2000 - Commission staff notifies Peoples Gas it is not in compliance with state and federal law governing safety inspections of meters inside customers' homes.[403]

- 2002 - Zinder performs another program status review and reaffirms the 2050 target completion date.[404]
- January 2004 - Commission pipeline safety inspectors begin finding problems with Peoples Gas corrosion control record keeping and testing.[405]
- January 2006 - Peoples Gas reaches a $196 million settlement with the Attorney General and City of Chicago over allegations it engaged in a fraudulent scheme with Enron between 1999 and 2002 that cost Peoples Gas customers over $100 million.[406] An executive involved in the scandal is later given oversight over the AMRP.[407]
- March 2006 - The Commission imposes a $500,000 civil penalty on Peoples Gas for its failure over five years to come into compliance with federal and state laws regarding safety inspections of meters located inside customers' homes. "The record shows that Peoples failed abysmally to meet its goal of 75,000 inspections during five of the six years following its receipt of the notification that it was in violation. Only after this proceeding was initiated, in its sixth year of noncompliance, did Peoples ramp up its efforts enough to get close to compliance."[408]
- August 2006 - In its merger application, WPS Energy touts accelerating the main replacement program as a benefit of its proposed merger.[409]
- February 2007 - As a condition of merger approval, the ICC requires WPS Energy to hire an independent outside consultant to "(i) conduct a study of Peoples Gas' cast and ductile iron main replacement program and (ii) make recommendations regarding appropriate improvements to the program and its implementation. "[410] As part of this condition, WPS also agrees to conduct follow-up studies every five years.
- March 2007 - Kiefner and Associates, Inc, completes the outside study required by approval of the merger, finding the current replacement program effective, and recommending a staggered completion target of 2036, 2050, and 2080, based on the diameter of the pipe to be replaced.[411]
- April, 2007 - Based on concerns over Peoples Gas' corrosion control programs, the Commission hires Liberty Consulting Group to perform an audit of Peoples Gas pipeline safety programs.[412]

Proposed Acceleration

- March 2007 - Separate and in addition to its existing work replacing the riskiest pipe, Peoples Gas proposes an accelerated program. Peoples Gas refers to the Kiefner study, which estimated it would cost $1.4 billion to replace all cast and ductile iron main.[413]
- February 2008 - The Illinois Commerce Commission rejects the Peoples Gas acceleration proposal, finding "Peoples Gas presented this Commission with no quantitative evidence, no benefit-cost analysis, and no plan as to why or how a $1.0 billion, 40- to 45-year investment should be completed at a much faster rate"[414]
- August 2008 - Liberty releases its report on Peoples Gas pipeline safety program, finding "considerable room for improvement." Problems identified include safety-related programs without someone with bottom line responsibility, insufficient staffing, insufficient training, and a failure to monitor and measure its own performance.[415]
- March 2009 - Peoples Gas returns with another rate case and again proposes an accelerated pipe replacement program, this time at an estimated cost of $2.47

billion.[416] The company presents acceleration as part of a broader modernization program including pressure upgrades and a zonal approach to replacement.[417]

- January 2010 - In the Final Order for the 2009 rate case, the Commission approves a bill rider to provide cost recovery for an accelerated program and mandates an end date of 2030 with management audits every five years.[418]
- December 2010 - Liberty releases its eighth and final quarterly report tracking Peoples Gas' progress in implementing recommendations from its 2008 pipeline safety audit. While recognizing progress, Liberty highlights ongoing inadequacies, including, for example, in field safety auditing personnel. "Peoples Gas will undertake a significant pipeline replacement program starting next year. Assuring the quality of this work by its own and contractor personnel presents a significant challenge and is a high-risk safety issue."[419]

Acceleration

2011 - 2014: ACCELERATED MAIN REPLACEMENT PROGRAM

- 2011 - Accelerated pipe replacement begins, under the name Accelerated Main Replacement Program (AMRP).[420]
- 2011 - In reaction to major gas pipeline incidents across the country, PHMSA issues a "Call to Action to accelerate the repair, rehabilitation, and replacement of the highest-risk gas pipeline infrastructure."[421]
- September 2011 - The Illinois Court of Appeals overturns the Commission's approval of the bill rider supporting the accelerated program, finding it "was not adequately justified by any special circumstances."[422]
- 2012 - Peoples Gas prepares an updated cost estimate of $4.45 billion.[423]
- 2012 - Absent a rider providing cost recovery for AMRP work, Peoples Gas includes the work in its 2012 rate case. Commission staff argue for disallowing all of the proposed 2012 AMRP costs and half of the 2013 costs ($296 million total) due to Peoples Gas' failure to demonstrate "how it developed its schedule for AMRP work and how it derived its cost estimates for this work."[424]
- May 2013 - Illinois General Assembly passes legislation to grant gas utilities, including Peoples Gas, the ability to use a rider similar to the one the appeals court struck down. The House legislative sponsor, during floor debate, claims the Peoples Gas pipe replacement work will cost "a little over 2 billion" with bill impacts of $1.14 a month.[425]
- June 2013 - Distressed by the poor performance of the AMRP in 2011 and 2012, the Commission orders an outside audit of the AMRP, but spares the company the almost $300 million in penalties recommended by ICC Staff. Commission staff testifies that there is no reason to believe "that Peoples can complete its AMRP in 20 years as it convinced the Commission it should back in 2009 and no way for the Commission to know what the completed AMRP will cost … The AMRP is behind schedule and will fall further behind in 2013."[426]
- January 2014 - Under the 2013 law, the Commission approves the tariff language and first-year plan for the new rider for the AMRP.[427]
- August, 2014 - With Peoples Gas struggling again less than a decade after the 2007 merger, Wisconsin Energy Corporation files an application to acquire Peoples Gas, its parent company, and affiliates.[428]

2015 MERGER

- January 2015 - Peoples Gas senior executives receive a new, over $8 billion, cost estimate. They do not share this information in the merger proceeding or in any public venue until after the merger.[429]
- March 2015 - The Commission opens a new investigation[430] into Peoples Gas, after receiving whistle-blower letters alleging Peoples Gas executives "are working overtime to suppress the audit findings that will uncover major safety concerns for the citizens of Chicago" and that the AMRP is "an ATM machine for contractors and consultants because those who are supposed to be in a position of oversight are the wolves watching the henhouse."[431] Over 2015 and 2016, the Commission receives seven whistleblower letters.[432]
- May 2015 - Liberty delivers a highly critical Phase One audit report, finding Peoples Gas management has no understanding of program costs, duration, or why leak rates have not fallen after four years of accelerated replacement.[433] The Final Report for Phase One makes 95 recommendations for improvements to the AMRP. [434]
- May 2015 - Questioned by the Commission the day the Liberty Audit is made public, Peoples Gas executives fail to disclose their updated cost estimate. Executives repeatedly speak of their intention to update their last, 2012, estimate, despite already having one.[435]
- June 2015 - The Commission approves the $5.7 billion acquisition of Peoples Gas by Wisconsin Energy, forming WEC Energy. Instead of requiring a plan to fix the AMRP before approving the acquisition, the Commission allows WEC to submit detailed plans 75 days after the acquisition is approved.[436] The Commission relies on its "existing authority" to properly mitigate any potential harm from the AMRP, which is not investigated in any detail in the formal merger docket. Commissioner del Valle dissents, highlighting the lack of an AMRP transition plan.[437]
- July 2015 - One month after the merger closes, WEC management informs the Commission that they received, post-acquisition, the updated cost estimate of over $8 billion. They also share that they are terminating the contract of Jacobs Engineering and will not meet the September 7 deadline to submit the detailed reports required as a condition of the merger.[438]
- September 2015 - Peoples Gas submits two of four plans required as a condition the acquisition order. These plans attempt to primarily outline the company's plans for a seamless transition and for meeting the Liberty audit recommendations. Peoples Gas commits to submit the two remaining plans, concerning project timeline and cost, after deadline, by the end of November.[439]
- September 2015 - Liberty Consulting submits its first follow-up quarterly report, finding the "Peoples Gas plans for implementing the 95 recommendations ... need substantial improvement in a number of areas." The report also reveals Peoples Gas senior management knowledge of the $8 billion cost estimate in January 2015.[440]
- October 2015 - Commission staff submit a report critical of the "work in progress" plan Peoples Gas submitted in September, which recommends the Commission wait until final two plans are submitted before reviewing further.[441]
- November 2015 – The Attorney General and CUB petition Commission for

investigation of Peoples Gas executives' misrepresentations of AMRP costs before the Commission by withholding the more than $8 billion estimate during the merger proceeding.[442]

- November 2015 - Rather than grant the Attorney General and CUB petition, the Commission initiates its own "investigation into whether Peoples Gas and its parent companies knowingly misrepresented or withheld material facts to the Commission concerning the estimated long-term cost of the Accelerated Replacement Program." The Commission limits the scope of the investigation to the executives' statements before the Commission during a 30-minute meeting in May 2015, excluding the rest of the 11-month proceeding. Commissioner del Valle objects to the narrow investigation.[443]

- November 2015 - Peoples Gas submits the remaining two plans required by the merger condition. The new plans for the AMRP focus on a rolling three-year plan rather than a plan with a fixed end date and propose spending $250 million to $280 million per year over the next three years. Peoples Gas presents a new cost estimate of $6.8 billion.[444]

- December 2015 - The Commission launches an urgent investigation of the AMRP because it has lost the trust of the people.[445] It announces that it is "suspending the AMRP as it currently exists and authorizes Staff to convene a series of stakeholder workshops that will … culminate in a recommendation to the Commission regarding the scope, pace and cost of Peoples' critical efforts to replace century-old infrastructure."[446] After some confusion ICC staff clarifies: Suspension does not mean stopping work. Rather, the Chairman describes the action as symbolically rejecting the most recent Peoples Gas plan, while allowing it to proceed and taking the next six months to conduct a series of informal workshops on the plan.[447]

System Modernization Plan

2016

- January - March 2016 - Commission staff hold a series of six workshops on the AMRP.[448]

- May 2016 - Peoples Gas settles, for $18.5 million, both the Commission's investigation into Peoples Gas executives' misleading statements concerning AMRP costs before the Commission and the Office of the Attorney General's participation in the whistleblower case.[449]

- July 2016 - At the conclusion of the workshops, the ICC initiates a docketed investigation into "the cost, scope, schedule and other issues related to the Peoples Gas Light and Coke company's natural gas system modernization program."[450]

- October 2016 - In the Commission investigation of whistleblower allegations, Commission staff testify that Peoples Gas did not thoroughly investigate or address the allegations. Staff testimony notes ongoing conflicts of interest with negative safety, cost, and competition implications. Staff testimony also notes the failure of Peoples Gas to ensure that safety inspectors are free of management coercion or pressure.[451]

- December 2016 - The Commission issues a proposed order taking no action to reform the AMRP, now named System Modernization Program (SMP).[452]

2017

- Early 2017 - Normally uneventful Commission open meetings in Chicago are filled with loud protesters clamoring

for the Commission to take action to rein in program bill impacts.[453]

- January 2017 - Peoples Gas submits its 2016 year-end SMP report, showing the program is behind schedule and spent more per mile of pipe retired than planned.[454]
- March 2017 - Despite the supposed urgent nature of the investigation, instead of adopting its proposed order, the Commission re-opens the investigation to hold additional hearings to add more information to the record.[455]
- May 2017 - The Commission ends its investigation into Peoples Gas whistle-blower letters in a settlement agreement with the company which requires a slight change WEC's code of conduct, confidential reports to the Commission regarding any violations of the code, and safety reports. The required changes fall short of staff recommendations. Commissioner del Valle casts the lone dissenting vote against the agreement.[456]
- May 2017 - Peoples Gas submits its current SMP plan as part of the reopened investigation. The plan continues the rolling three-year plan and proposes budgets of $300 million to $305 million over the next three years.[457]
- July, 2017 - Liberty publishes its 8th and final quarterly report monitoring the company's implementation of Liberty's 2015 audit recommendations. Crucial recommendations, including creating a realistic project completion timeline and development of a long-term management resource plan, are left to be resolved by the ongoing Commission investigation.[458]
- August 2017 - Over the objections of Peoples Gas, the Commission grants the Sargent Shriver National Center on Poverty Law's petition to intervene.[459]
- December 2017 - The Commission rushes the conclusion of the docket during the holiday season such that it can hold a Final Order vote during its January 2018 meeting, Commissioner del Valle's final meeting as a Commissioner.[460]

2018

- January 2018 - The Commission concludes its two-year investigation without resolving the questions it set out to answer and by taking no action to adequately reform the SMP, arguing it lacks legal authority to do so. [461]
- February 2018 - State Representative Will Guzzardi introduces legislation to immediately revoke the bill rider Peoples Gas is using to recover the costs of the SMP.[462] The legislation is sent to subcommittee and never receives a hearing or vote in subcommittee.
- February 2018 -- Peoples Gas submits its 2017 year-end SMP report, showing the program is once again over-budget and behind schedule.[463]
- April 2018 - The Office of the Attorney General appeals the Commission order to the Illinois Court of Appeals.[464]
- May 2018 - Peoples Gas releases its first quarterly SMP progress report.[465]
- July 2018 - The Commission orders Peoples Gas to complete an engineering study by 2020 over the objections of the Office of the Attorney General, which argued for a shorter timeline and that the Commission, rather than company, manage the engineering firm.[466]
- July 2018 - Chicago Alderman George Cardenas files a resolution calling for a hearing into the SMP. The resolution is blocked twice before being sent to the Health & Environmental Protection

Committee, which Cardenas chairs.[467] Because of these delays, the hearing is further delayed until after Chicago municipal elections.

2019

- February 2019 - State Representative Sonya Harper files legislation to immediately revoke the bill rider Peoples Gas is using to recover the costs of the SMP.[468]
- February 2019 - Peoples Gas publishes its 2018 year-end result demonstrating it once again fell short of work targets, while paying more per unit of work than intended. The report fails to include an "earned value metric" as it was ordered at the conclusion of the Commission investigation.[469]
- April 2019 - Alderman Cardenas files a substitute resolution, calling on "Governor JB Pritzker and the Illinois General Assembly to restore necessary oversight of this troubled program, and take adequate action to protect Peoples Gas customers and the public interest."[470] The substitute resolution passes out of the Committee on Health and Environmental Protection.
- April 2019 - WEC CEO Gale Klappa responds to an investor questions about Alderman Cardenas' resolution by saying he is not "overly concerned" and dismissed Crains Chicago Business reporting as "fake news."[471]
- May 2019 - Peoples Gas submits its first 2019 SMP quarterly report, showing the program is again behind schedule and over budget.[472]
- May 2019 - The Illinois General Assembly concludes the 2019 session without taking action or holding hearings on Representative Harper's legislation.

Appendix C - Year by Year Retirement Data

THERE IS NO DEFINITIVE public record of year by year pipe retirement data. The authors have attempted to create one. For most of the history of the program, there is one source, the Liberty Audit Phase One report, which produced a chart similar to the one below, primarily drawing on PHMSA data.

Starting in 2009, the authors have found two or more different numbers from different sources for almost every year. Below the chart is a color key, explaining the various sources of information.

	1981	1982	1983	1984	1985	1986	1987	1988	1989
	59	57	84	78	83	81	85	62	84
1990	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**
60	101	74	69	47	51	62	42	27	29
2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
36	46	7	60	33	32	39	49	46	12
						47			27
2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	
24	19	86	92	58	71	80	64	63	
23	24	118	64	183	79	57	54	52	
				69	81	99			

Source: Liberty Audit Phase One Final Report[473]
Source: 2007 Kiefner engineering study[474]
Source: Peoples Gas filling in 2012 rate case[475]
Source - Annual Peoples Gas Gas Performance Reports to the ICC[476]
Souce: Peoples Gas Replacement Program Benchmarking[477]
Source: Peoples Gas December 2014 monthly status report[478]
Source: Peoples Gas December 2016 SMP Report[479]
Source: Peoples Gas December 2017 SMP Report[480]
Source: Peoples Gas 2018 SMP 4th quarter report[481]

Appendix D - Leak Rate Discussion

LEAK RATE ANALYSIS presents a number of challenges. Leak data reported to PHMSA is more accurately *repair* data, which, because less hazardous leaks may be repaired years after discovery, can appear better or worse depending on the existence and size of a repair backlog. An increase in leaks in a given year does not necessarily mean that pipes have been cracking and breaking at a faster rate than the previous year; it does mean the utility is performing more leak repairs that year.

Another issue is that the number of leaks found on a system is in part determined by the frequency and areas of the system surveyed. More frequent surveys find more leaks. Surveying areas of the system with higher leak rates more than areas of the system with lower leak rates will also find more leaks, and vice versa. In order to have the proper context with which to analyze Peoples Gas' leak survey results, Office of the Attorney General witness Neale asked Peoples Gas, via numerous different data requests, to provide information about its leak survey program. Peoples Gas refused.[482]

Further complicating leak data is Peoples Gas' practice, begun in 2015, of "weather-normalizing" its leak data, a practice which "may decrease the reported number of leaks, thereby masking the true state of the system."[483]

New technology could provide a clearer picture of where the distribution system is leaking most gas. A settlement as part of the recent Commission investigation required Peoples Gas to pilot new methane detecting technology to find leaks and to determine "the amount of potential lost gas, which was not possible with current technologies."[484] In its December 2018 annual report on the pilot program, the company stressed that the new technology is "not an evaluation of risk" and the pilot "does not dilute the effect of the safety-based ranking methodology that PGL uses to rank neighborhoods for replacement of at-risk gas mains."[485] The findings in the report show little or no relationship between the methane detected and prioritization of neighborhoods.[486]

Notes

Note: this report includes many citations from Illinois Commerce Commission proceedings. These sources can be looked up by docket numbers, for example, 16-0376, on the Commission website, https://www.icc.illinois.gov.

1. PGL Ex. 5.0, Andrew J. Hesselbach, 16-0376, 3.

2. Cast Iron Pipe Replacement Study for Peoples Gas Light and Coke company, Volume I. Engineering Report ER-048, Zinder Engineering, Inc., 5/22/1981.

3. Illinois Commerce Commission, Comprehensive Management Audit of the Peoples Gas Light and Coke company, 1988. Final Report, Focused Management Audit of the Gas Operations Division of the Peoples Gas Light and Coke company, 10/28/1994.

4. Final Report on Phase One of an Investigation of Peoples Gas Light and Coke company's AMRP, The Liberty Consulting Group, 5/5/2015, Chapter F generally, D-4.

5. Final Report on Phase One of an Investigation of Peoples Gas Light and Coke company's AMRP, The Liberty Consulting Group, 5/5/2015, D-4-D-5.

6. Ibid, D-5-D-6.

7. AG Exhibit 4.0, Sebastian Coppola, 16-0376, 27.

8. Final Order, 12-0511/0512 Cons., 61.

9. Illinois Public Act 98-0057.

10. Final Report on Phase One of an Investigation of Peoples Gas Light and Coke company's AMRP, The Liberty Consulting Group, 5/5/2015, ES-1.

11. Final Report on Phase One of an Investigation of Peoples Gas Light and Coke company's AMRP, The Liberty Consulting Group, 5/5/2015, F-16.

12. AG Ex. 1.0, Allen Neale, 16-0376, 20.

13. The Peoples Gas Light and Coke company System Modernization Program ICC 2018 4th Quarter Report, 16-0376, 2/14/2019, 23-30.

14. Illinois Commerce Commission, Comprehensive Management Audit of the Peoples Gas Light and Coke company, 1988. Final Report, Focused Management Audit of the Gas Operations Division of the Peoples Gas Light and Coke company, 10/28/1994. Report on an Investigation of Peoples Gas Pipeline Safety Program, Liberty Consulting Group, 8/14/2008. Final Report on Phase One of an Investigation of Peoples Gas Light and Coke company's AMRP, The Liberty Consulting Group, 5/5/2015.

15. Final Report on Phase One of an Investigation of Peoples Gas Light and Coke company's AMRP, The Liberty Consulting Group, 5/5/2015, ES-1.

16. Peoples Gas Ex. JFS-1.0, James F. Schott, 07-0241/07-0242 Cons., 9-10. Program Level Cost Forecast and Schedule Model, Submitted to The Peoples Gas Light & Coke company, Burns McDonnel, 14-0496, 11/30/2015, 9.

17. The Peoples Gas Light and Coke company System Modernization Program ICC 2018 4th Quarter Report, 16-0376, 2/14/2019, 5, 8.

18. System Modernization Program 2017 Year-End Report, 16-0376, 2/28/2018, 3.

19. System Modernization Program December 2016 Month-End Report, 16-0376, 1/31/2017, 3.

20. Review of the Peoples Gas Light & Coke company Cast Iron Gas Main Replacement Program, Kiefner & Associates, 3/1/2007, 3. Peoples Gas' System Modernization Program Report for 4th Quarter 2018, 16-0376, 2/14/2019, 4, 5, 8. Peoples Gas spent $38 million in capital and operations and maintenance in 2006 to replace 47.24 miles of pipe. $38 million in 2006 is $47.33 million in 2018 inflation adjusted dollars. Peoples Gas spent $295 million in 2018 to replace 52 miles of pipe.

21. *What's Chicago getting for Peoples Gas' spending spree? Less for more*. Crains Chicago Business, 3/3/18.

22. *Peoples Gas spending inflates parent's profit*, Crains Chicago Business, 4/05/2019.

23. *Chicagoans paid a 67 percent premium for heat last winter*, Crains Chicago Business, 5/22/2019.

24. The Peoples Gas Light and Coke company System Modernization Program ICC 2018 4th Quarter Report, 16-0376, 2/14/2019, 17. As detailed later in the report, the $74.90 average rider cost does not represent the full amount customers are paying for the SMP.

25. AG Exhibit 4.0, Sebastian Coppola, 16-0376, 38. AG Exhibit 5.0, Roger Colton, 16-0376, 9-10.

26. Electrification & Decarbonization: Exploring U.S. Energy Use and Greenhouse Gas Emissions in Scenarios with Widespread Electrification and Power Sector Decarbonization, National Renewable Energy Laboratory, July, 2017, 37.

27. Final Report on Phase One of an Investigation of Peoples Gas Light and Coke Company's AMRP, The Liberty Consulting Group, 5/5/2015, D-4.

28. PGL Ex. 5.0, Andrew J. Hesselbach, 16-0376, 3.

29. PGL Ex. 7.0, Andrew J. Hesselbach, 16-0376, 3.

30. PGL Ex. 5.0, Andrew J. Hesselbach, 16-0376, 3. *Blowing Smoke*, Chicago Reader, 11/11/1993.

31. Cast Iron Pipe Replacement Study for Peoples Gas Light and Coke company, Volume I. Engineering Report ER-048, Zinder Engineering, Inc., 5/22/1981, 10.

32. Ibid, ii.

33. Management Studies Division Staff Report, Subject: Focused Management Audit of the Gas Operations Division of the Peoples Gas Light and Coke company, December, 1993, 1.

34. Final Report, Focused Management Audit of the Gas Operations Division of the Peoples Gas Light and Coke company, 10/28/1994, VII-37, VII-51.

35. *Blowing Smoke*, Chicago Reader, 11/11/1993.

36. Supplement No. 1 to Engineering Report No. ER-048 Cast Iron Pipe Replacement Study for Peoples Gas Light and Coke company, 2/3/1994, 7.

37. Final Report on Phase One of an Investigation of Peoples Gas Light and Coke Company's AMRP, The Liberty Consulting Group, 5/5/2015, F-3. "Peoples Gas uses the Main Ranking Index to give each distribution and transmission system segment a numbered risk ranking. Higher numbers reflect higher risk … Rank calculations use an equivalent likelihood of a main break. Breaks create the principal safety risk of low-pressure, cast iron mains. Ductile iron mains suffer from a similar failure event … Peoples Gas standardizes index results to city-block lengths of 660 feet. This standardization accounts for the fact that discretely-captured pipe segments can range from a foot to a mile in length."

38. Review of the Peoples Gas Light & Coke company Cast Iron Main Replacement Program, Kiefner & Associates, Inc., 3/1/2007, 11-12.

39. PGL Ex. 5.0, Andrew J. Hesselbach, 16-0376, 9.

40. PGL Ex. 5.0, Andrew J. Hesselbach, 16-0376, 59.

41. Final Order, 16-0376, 209.

42. PGL Ex. 5.0, Andrew J. Hesselbach, 16-0376, 8.

43. Final Report on Phase One of an Investigation of Peoples Gas Light and Coke company's AMRP, The Liberty Consulting Group, 5/5/2015, C-3.

44. Ibid, C-5-6.

45. Ibid, C-4.

46. Ibid, C-12.

47. Ibid, C-7.

48. Ibid, D-6. With the SMP, to be transferred new customers must also have new services, and have outside, medium pressure, meters.

49. Final Report on Phase One of an Investigation of Peoples Gas Light and Coke company's AMRP, The Liberty Consulting Group, 5/5/2015, C-4.

50. PGL Ex. 5.0, Andrew J. Hesselbach, 16-0376, 8.

51. Ibid, 16-17.

52. *Know the Natural Gas Lines Before Digging*, accessed at https://www.thebalancesmb.com/types-of-natural-gas-pipelines-1182593

53. Review of the Peoples Gas Light & Coke company Cast Iron Main Replacement Program, Kiefner & Associates, Inc., 3/1/2007, 9-11.

54. Peoples Gas Ex. SDM-1.0 Rev., Salvatore D. Marano, 09-0166/-167 Cons., 62-63. Final Report on Phase One of an Investigation of Peoples Gas Light and Coke company's AMRP, The Liberty Consulting Group, 5/5/2015, D-5 -D-6.

55. Phase Two of an Investigation of Peoples Gas Light and Coke Company's Accelerated Main Replacement Program, Recommendation Implementation Monitoring, Eighth Quarterly Report, 7/31/2017, C-31-32, C-150-151, C-190-191.

56. PGL Ex. 5.0, Andrew J. Hesselbach, 16-0376, 41-42.

57. Final Order, 15-0341, 22-23.

58. Illinois Administrative Code, 83 Ill. Admin. Code §501.110(b).

59. Final Order, Appendix, 13-0460, 4.

60. Final Order, 14-0496, 86, 101.

61. PGL Ex. 5.0, Andrew J. Hesselbach, 16-0376, 17.

62. The Peoples Gas Light and Coke company 2019 Annual QIP Plan Update, 13□0534.

63. PGL Ex. 1.0, Andrew J. Hesselbach, 16-0376, 14-15.

64. The Peoples Gas Light and Coke company System Modernization Program ICC 2018 4th Quarter Report, 16-0376, 2/14/2019, 13.

65. Confusingly, the company reports separately on its meter relocation work, but not the other two scope elements. This may be because this work is performed by Peoples Gas employees rather than contractors.

66. Final Report on Phase One of an Investigation of Peoples Gas Light and Coke company's AMRP, The Liberty Consulting Group, 5/5/2015, F-4. "The second, neighborhood (or zonal) method of replacement-work prioritization came into existence in 2012 for work performed during the 2013 construction season. Its introduction sought to increase the efficiency of capital work by combining high-risk pipe replacement with: (a) upgrades to medium pressure, and (b) relocating customer meters from inside buildings to outside. By 2014, the neighborhood approach had come to drive most of the main and service replacements."

67. PGL Ex. 5.0, Andrew J. Hesselbach, 16-0376, 12-13.

68. PGL Exhibit SDM-1.0, Rev. - Salvatore D. Marano, 09-0166/-167, 60-62.

69. Peoples Gas Ex. SDM-1.0 Rev., Salvatore D. Marano, 09-0166/-167 Cons., 62-63. Final Report on Phase One of an Investigation of Peoples Gas Light and Coke company's AMRP, The Liberty Consulting Group, 5/5/2015, D-5 -D-6.

70. PGL Ex. 10.0, Mark Kinzle, 16-0376, 5. It is unclear how well these boundaries align with the sections of the distribution system or why the company chose the neighborhood boundaries.

71. PGL Ex. 4.0, Mark Kinzle, 16-0376, 4.

72. Final Report on Phase One of an Investigation of Peoples Gas Light and Coke company's AMRP, The Liberty Consulting Group, 5/5/2015, F-16, F-23

73. Ibid, F-16.

74. PGL Ex. 5.2, Appendix D, 16-0376.

75. PGL Ex. 5.2, 16-0376, 28.

76. Ibid, 28.

77. The Peoples Gas Light and Coke company System Modernization Program ICC 2018 4th Quarter Report, 16-0376, 2/14/2019, 23.

78. Ibid, 5-13, $194 million out of a budget of $295 million.

79. PGL Ex. 6.2, 16-0376, 2.

80. PGL Ex. 1.0, 16-0376, 18.

81. Illinois Commerce Commission, Comprehensive Management Audit of the Peoples Gas Light and Coke company, 1988, II-10.

82. Final Report on Phase One of an Investigation of Peoples Gas Light and Coke company's AMRP,

The Liberty Consulting Group, 5/5/2015, D-2. "Early Liberty interviews identified public improvements as a source of scope confusion. Months after conducting them, however, a request for installed and retired AMRP quantities produced a February 20, 2015 response that: 'The quantities for AMRP main installed, main retired, and services installed do not include Public Improvement projects. Total AMRP expenditures, budgeted and actual, include Public Improvement projects'." [Emphasis in original].

83. PGL Ex. 1.0, Andrew J. Hesselbach, 16-0376, 16.

84. PGL Ex. 7.0, Andrew J. Hesselbach, 16-0376, 3.

85. Ibid, 4.

86. Final Order, 16-0376, 83.

87. PGL Ex. 5.2, 16-0376, 24. Note, the authors have found no direct reference to the replacement of pipes with high UMRI scores being part of the PI/SI program, but assume they are as these repairs are consistently referenced in combination with the repair of Class 1 and 2 leaks.

88. PGL Ex. 5.2 Appendix B, 16-0376,1.

89. Ibid, 1.

90. Final Report on Phase One of an Investigation of Peoples Gas Light and Coke company's AMRP, The Liberty Consulting Group, 5/5/2015, F-4. "The numbers of main segments replaced because they ranked six (or five in specified cases) has remained stable. About 10 segments come onto the list each year, as ten ranked from last year get removed by virtue of being replaced. The Main Ranking Index underwent an Illinois Commerce Commission-mandated review by an independent consultant in the mid-2000s. This review found Index-driven replacements appropriate, given declining rates of cast iron main breaks."

91. PGL. Ex. 5.3, 16-0376. $31.7 million out of a budget of $300 million. As an example of Peoples Gas reporting inconsistent numbers, it submitted a plan in 2017 stating that the 2018 PI/SI budget was $31.7 million, while its 2018 end-of-year report stated the planned 2018 PI/SI budget was $93.4 million.

92. December 2016 Month-End Report on behalf of The Peoples Gas Light and Coke Company, 16-0376, 1/31/2017, 3.

93. PGL. Ex. 5.3, 16-0376.

94. Cast Iron Pipe Replacement Study for Peoples Gas Light and Coke company, Volume I. Engineering Report ER-048, Zinder Engineering, Inc., 5/22/1981, vi.

95. Supplement No. 1 to Engineering Report No. ER-048 Cast Iron Pipe Replacement Study for Peoples Gas Light and Coke company, 2/3/1994, 7.

96. Illinois Commerce Commission, Comprehensive Management Audit of the Peoples Gas Light and Coke company, 1988, II-8. *Blowing Smoke*, Chicago Reader, 11/11/1993.

97. Review of the Peoples Gas Light & Coke company Cast Iron Main Replacement Program, Kiefner & Associates, Inc., 3/1/2007, 2.

98. Ibid, 23.

99. Ibid, 3.

100. See endnote 20.

101. PGL Ex. 5.0, Andrew J. Hesselbach, 16-0376, 41-42.

102. Program Level Cost Forecast and Schedule Model, Submitted to The Peoples Gas Light & Coke company, Burns McDonnel, 14-0496, 11/30/2015, 9.

103. While the company has argued for a five year target end date, its most recent reporting to the Commission on SMP progress estimates work will continue through 2040.

104. Final Order, 16-0376, 19.

105. The Peoples Gas Light and Coke company System Modernization Program ICC 2018 4th Quarter Report, 16-0376, 2/14/2019, 23-26. Remaining estimated cost calculated by adding "cost" figures from the table in the 2018 year-end SMP report's Appendix A - Neighborhood Metrics.

106. Due to Peoples Gas' poor record keeping, it is difficult to state this number with certainty. We arrived at this figure using yearly replacement statistics from the Liberty the Liberty audit Phase 1 Final Report, year end reports from 2014, 2016, 2017, and 2018, and for 2015 a figure reported in 2016 and 2017 annual Natural Gas reports to the Commission. See Appendix C.

107. Review of the Peoples Gas Light & Coke company Cast Iron Main Replacement Program, Kiefner & Associates, Inc., 3/1/2007, 1.

108. Final Report on Phase One of an Investigation of Peoples Gas Light and Coke company's AMRP, The Liberty Consulting Group, 5/5/2015, D-4.

109. Pipeline and Hazardous Materials Safety Administration, Annual Gas Distribution Report, 2017

110. Ibid.

111. The Peoples Gas Light and Coke company System Modernization Program ICC 2018 4th Quarter Report, 16-0376, 2/14/2019, 4-8. SMP figure calculated by adding figures from the 2018 year-end SMP report. 1801 miles remaining at the end of 2018 + 52 miles replaced in 2018 = 1,853 miles.

112. Final Report on Phase One of an Investigation of Peoples Gas Light and Coke company's AMRP, The Liberty Consulting Group, 5/5/2015, D-4.

113. The Peoples Gas Light and Coke company System Modernization Program ICC 2018 4th Quarter Report, 16-0376, 2/14/2019, 5-8.

114. Final Report on Phase One of an Investigation of Peoples Gas Light and Coke company's AMRP, The Liberty Consulting Group, 5/5/2019, N-7.

115. Final Report on Phase One of an Investigation of Peoples Gas Light and Coke company's AMRP, The Liberty Consulting Group, 5/5/2015, B-12.

116. Lazar, J. (2016). Electricity Regulation in the US: A Guide. Second Edition. Montpelier, VT: The Regulatory Assistance Project, 52.

117. Initial Brief of the People of the State of Illinois and The Citizens Utility Board, 15-0209, 6.

118. Final Report on Phase One of an Investigation of Peoples Gas Light and Coke company's AMRP, The Liberty Consulting Group, 5/5/2019, N-7. The company received approval for another Rider, Infrastructure Cost Recovery Rider, or Rider ICR, when it began accelerated work in 2011, but the Illinois Appellate Court later decided the Commission did not have the authority to approve Rider ICR.

119. The Peoples Gas Light and Coke company System Modernization Program ICC 2018 4th Quarter Report, 16-0376, 2/14/2019, 17.

120. See "Rate Case History" available at: https://icc.illinois.gov/chiefclerk/

121. The current Peoples Gas fixed customer charge for a residential heating customer is $33.43. Several other bill charges, such as taxes, are calculated based on a percentage of the existing bill, which brings the total bill near $40. See https://accel.peoplesgasdelivery.com/home/gas_rates.aspx

122. Illinois Compiled Statutes. 220 ILCS 5/9-220.3 (g).

123. Illinois Compiled Statutes. 220 ILCS 5/9-220.3 (e)(2).

124. Final Order, 16-0376. See for example, 132, 137.

125. Final Order, 15-0209, 2/20/2018.

126. Final Report on Phase One of an Investigation of Peoples Gas Light and Coke company's AMRP, The Liberty Consulting Group, 5/5/2015, G-2-G3.

127. Ibid, G-7.

128. ICC Staff Exhibit 3.0, 15-0209, 6.

129. ICC Staff Exhibit 1.0, 15-0209, 5.

130. Proposed Order, 15-0209, 22.

131. Final Order, 15-0209, 2/20/2018, 4. The settlement included a couple other stipulations, including a one time $4.7 million penalty.

132. Proposed Order, 16-0197, 19.

133. Ibid-19-10.

134. Ibid, 21.

135. Ibid, 21.

136. Ibid, 21.

137. Ibid, 21.

138. Final Report on Phase One of an Investigation of Peoples Gas Light and Coke company's AMRP, The Liberty Consulting Group, 5/5/2015, B-12.

139. Ibid, C-12.

140. Ibid, F-1.

141. PGL Ex. 5.0, Andrew J. Hesselbach, 16-0376, 58.

142. Final Report on Phase One of an Investigation of Peoples Gas Light and Coke company's AMRP, The Liberty Consulting Group, 5/5/2015. AG Ex. 1.0, Allen Neale, 16-0376.

143. Exhibit JFS-1.0, James F. Schott , 07-0241/07-0242 Cons., 12.

144. Ibid, 10.

145. Final Order, 07-0241/0242 Cons.,161.

146. Final Report on Phase One of an Investigation of Peoples Gas Light and Coke company's AMRP, The Liberty Consulting Group, 5/5/2015, D-2.

147. Program Level Cost Forecast and Schedule Model, Submitted to The Peoples Gas Light & Coke company, Burns McDonnel, 14-0496, 11/30/2015. As discussed in the Commission investigation, the SMP's scope is actually broader than the AMRP, including high pressure and transmission upgrades.

148. Final Order, 16-0376, 14.

149. Review of the Peoples Gas Light & Coke company Cast Iron Main Replacement Program, Kiefner & Associates, Inc., 3/1/2007, 19.

150. The Peoples Gas Light and Coke company System Modernization Program ICC 2018 4th Quarter Report, 16-0376, 2/14/2019, 4-8. SMP figure calculated by adding figures from the 2018 year-end SMP report. 1801 miles remaining at the end of 2018 + 52 miles replaced in 2018 = 1,853 miles.

151. Review of the Peoples Gas Light & Coke company Cast Iron Main Replacement Program, Kiefner & Associates, Inc., 3/1/2007, 2. Pipeline and Hazardous Materials Safety Administration, Annual Gas Distribution Report, 2017.

152. Final Report on Phase One of an Investigation of Peoples Gas Light and Coke company's AMRP, The Liberty Consulting Group, 5/5/2015, ES-1.

153. Phase Two of an Investigation of Peoples Gas Light and Coke Company's Accelerated Main Replacement Program, Recommendation Implementation Monitoring, Eighth Quarterly Report, 7/31/2017, C-33.

154. Peoples Gas Ex. SDM-1.0 Rev., Salvatore D. Marano, 09-0166/-167 Cons., 62-63. Final Report on Phase One of an Investigation of Peoples Gas Light and Coke company's AMRP, The Liberty Consulting Group, 5/5/2015, D-5 -D-6.

155. Final Report on Phase One of an Investigation of Peoples Gas Light and Coke company's AMRP, The Liberty Consulting Group, 5/5/2015, F-3.

156. PGL Ex. 1.0, Andrew Hesselbach, 16-0376, 21-24.

157. Final Report on Phase One of an Investigation of Peoples Gas Light and Coke company's AMRP, The Liberty Consulting Group, 5/5/2015, Chapter F generally, F-14.

158. Ibid, F-16.

159. Ibid, F-23.

160. PGL Ex. 4.0, Mark Kinzle, 16-0376, 4.

161. AG Ex. 1.0, Allen Neale, 16-0376, 31-32.

162. AG Cross Exhibit 21, 16-0376, 1.

163. Final Report on Phase One of an Investigation of Peoples Gas Light and Coke company's AMRP, The Liberty Consulting Group, 5/5/2015, F-1.

164. Peoples Gas Light and Coke, Distribution Integrity Management Plan, Revision January 31, 2016, 7.

165. Pipeline and Hazardous Materials Safety Administration, "The gas distribution [integrity management] regulations require operators, such as natural gas distribution companies, to develop, write, and implement an integrity management program" accesed at https://www.phmsa.dot.gov/pipeline/gas-distribution-integrity-management/gas-distribution-integrity-management-program-dimp.

166. PGL Ex. 1.0, Andrew Hesselbach, 16-0376, 21-22.

167. Final Report on Phase One of an Investigation of Peoples Gas Light and Coke company's AMRP, The Liberty Consulting Group, 5/5/2015, F-23 - 24.

168. Phase Two of an Investigation of Peoples Gas Light and Coke company's Accelerated Main Replacement Program Recommendation Implementation Monitoring, Fifth Quarterly Report, 11/24/2016, 13.

169. PGL Ex. 5.0, Andrew J. Hesselbach, 16-0376, 59.

170. PGL Exhibit 2.0, Andrew J. Hesselbach, 16-0376, 9.

171. Ibid, 9.

172. The Peoples Gas Light and Coke company System Modernization Program ICC 2018 4th Quarter Report, 16-0376, 2/14/2019, 22, 4.

173. Final Report on Phase One of an Investigation of Peoples Gas Light and Coke company's AMRP, The Liberty Consulting Group, 5/5/2015, ES-1.

174. AG Ex. 1.0, Allen Neale, 16-0376, 17-24.

175. AG Ex. 1.0, Allen Neale, 16-0376, 20.

176. This data does not include leaks caused by third party damage.

177. The Peoples Gas Light and Coke company System Modernization Program ICC 2018 4th Quarter Report, 16-0376, 2/14/2019, 22, 4.

178. Ibid, 23-26.

179. Ibid, 26-27. See Dearborn Park.

180. Annual Report on Pilot Program for Incorporation of Advanced Leak Detection and Quantification Technology into System Modernization Program, 16-0376, 12/31/2018.

181. PGL Ex. 5.0, Andrew Hesselbach, 16-0376, 49.

182. Supplement to Peoples Gas' System Modernization Program Report for 4th Quarter 2018, 16-0376, 5/10/2019. Peoples Gas represents these cost increases as negative savings.

183. Program Level Cost Forecast and Schedule Model, Submitted to The Peoples Gas Light & Coke company, Burns McDonnel, 14-0496, 11/30/2015, 9. $932 million.

184. $881 million more according to 2016, 2017, and 2018 year end reports, and the first quarter 2019 report. Combined with the $932 million spent 2011-2015, this amounts to $1.8 billion since 2011. If Peoples Gas spends according to plan in 2019, it will have spent $2,090,000,000 on the SMP since 2011.

185. Final Report on Phase One of an Investigation of Peoples Gas Light and Coke company's AMRP, The Liberty Consulting Group, 5/5/2015, ES-1.

186. For a project the size and scope of the SMP, it is expected that work will not always go according to plan. These deviations from the original work plan are known as "variances." Good project management includes anticipating variances, studying them, and having a system in place to manage inevitable changes to work plans.

187. PGL Ex. 5.0, Andrew J. Hesselbach, 16-0376, 59.

188. Appendix K, May 31, 2016 Staff Report, Illinois Commerce Commission,Household Economics in the City of Chicago and Natural Gas Bills, Office of Illinois Attorney General Lisa Madigan, 3/10/2016, Slide 11.

189. See for example, ICC Staff Exhibit 3.0, 15-0209, 6.

190. See for example Stipulation and Settlement, Exhibits 1 and 2, 15-0608.

191. Illinois Commerce Commission, Comprehensive Management Audit of the Peoples Gas Light and Coke company, 1988. Final Report, Focused Management Audit of the Gas Operations Division of the Peoples Gas Light and Coke company, 10/28/1994.

192. Management Studies Division Staff Report, Subject: Focused Management Audit of the Gas Operations Division of the Peoples Gas Light and Coke company, December, 1993, 1.

193. Application for reorganization, 06-0540, 2.

194. Minutes, Illinois Commerce Commission Bench Meeting, 12/16/2015.

195. Final Report on Phase One of an Investigation of Peoples Gas Light and Coke company's AMRP, The Liberty Consulting Group, 5/5/2015, D-6.

196. Ibid, E-13.

197. Exhibit 20.0, Phillip Roy Buxton, 15-0511/0512 Cons., 9.

198. Final Report on Phase One of an Investigation of Peoples Gas Light and Coke company's AMRP, The Liberty Consulting Group, 5/5/2015, B-20.

199. Ibid, B-20.

200. Ibid, ES-1.

201. Ibid, B-3.

202. *ICC blesses acquisition of Peoples Gas parent*, Crain's Chicago Business, 6/24/2015.

203. Charles Matthews Letter to the Commission, Re: Post-Merger Updates on the Accelerated Main Replacement program, July 27,2015, 14-0496, 1-2.

204. October 14, 2015 Staff's Report: Regarding Peoples Gas' Compliance with Condition 5 of Appendix A to the Commission's June 24, 2015 Final Order in Docket No. 14-0496, 4-5.

205. Final Order, 14-0496, 31.

206. Phase Two of an Investigation of Peoples Gas Light and Coke company's Accelerated Main Replacement Program, Recommendation Implementation Monitoring, First Quarterly Report, The Liberty Consulting Group, 9/30/2015, 3.

207. Ibid, 7

208. Ibid, 8.

209. Phase Two of an Investigation of Peoples Gas Light and Coke company's Accelerated Main Replacement Program, Recommendation Implementation Monitoring, First Quarterly Report, The Liberty Consulting Group, 9/30/2015, 10.

210. Ibid, 10.

211. Compliance Filing for Condition of Approval No. 5, 14-0496.

212. Staff Report to the Commission Regarding Workshops Held to Evaluate and Assess The Peoples Gas Light and Coke company Gas System Modernization Program, 5/31/2016, 3. Final Order, 16-0376, 1/10/2018.

213. Phase One ended with a final report in May 2015. The Final Phase Two report was published 7/31/2017.

214. PGL Ex. 5.0, Andrew J. Hesselbach, 16-0376, 59.

215. Phase Two of an Investigation of Peoples Gas Light and Coke Company's Accelerated Main Replacement Program Recommendation Implementation Monitoring Eighth Quarterly Report, 7/31/2017, 2.

216. Final Report on Phase One of an Investigation of Peoples Gas Light and Coke company's AMRP, The Liberty Consulting Group, 5/5/2015, D-16.

217. PGL Ex. 1.0, 16-0376, 18.

218. Final Order, 07-0241/07-0242/Cons., 162.

219. NS-PGL Ex. SDM 2.0, Salvatore D. Marano, 09-0166/0167 Cons., 5, 7.

220. Final Report on Phase One of an Investigation of Peoples Gas Light and Coke company's AMRP, The Liberty Consulting Group, 5/5/2015, D-15.

221. Ibid, B-6.

222. Transcript, Before the Illinois Commerce Commission, 07-0241/0242 Cons., 9/17/2007, 1632.

223. Final Order, 09-0166/0167 Cons., 196.

224. PGL Ex. 5.0, Andrew Hesselbach, 16-0376, 35.

225. Phase Two of an Investigation of Peoples Gas Light and Coke company's Accelerated Main Replacement Program Recommendation Implementation Monitoring, Eighth Quarterly Report, 7/31/2017, 8.

226. Ibid, 57.

227. Final Report on Phase One of an Investigation of Peoples Gas Light and Coke company's AMRP, The Liberty Consulting Group, 5/5/2015, D-1.

228. PGL Ex. 5.0, Andrew J. Hesselbach, 16-0376, 38.

229. Final Order, 16-0376, 211.

230. Final Report on Phase One of an Investigation of Peoples Gas Light and Coke company's AMRP, The Liberty Consulting Group, 5/5/2015, K-1

231. Peoples Gas Ex. JFS-1.0, James F. Schott, 07-0241/07-0242 Cons., 9-10. Program Level Cost Forecast and Schedule Model, Submitted to The Peoples Gas Light & Coke company, Burns McDonnel, 14-0496, 11/30/2015, 9.

232. PGL Ex. 5.0, Andrew J. Hesselbach, 16-0376, 41-42.

233. Final Report on Phase One of an Investigation of Peoples Gas Light and Coke company's AMRP, The Liberty Consulting Group, 5/5/2015, B-12.

234. Phase Two of an Investigation of Peoples Gas Light and Coke Company's Accelerated Main Replacement Program Recommendation Implementation Monitoring Eighth Quarterly Report, 7/31/2017, C-30 - C-33.

235. AG Ex 4.0, Sebastian Coppola, 16-0376, 4.

236. Phase Two of an Investigation of Peoples Gas Light and Coke Company's Accelerated Main Replacement Program Recommendation Implementation Monitoring Eighth Quarterly Report, 7/31/2017, C-50.

237. Final Order, 16-037, 85.

238. AG Ex. 29, 16-0376, 1.

239. PGL 1.0, Andrew Hesselbach, 16-0376, 19.

240. PGL 5.0, Andrew Hesselbach, 16-0376, 40.

241. Ibid, 40.

242. Peoples Gas CEO defends consumer cost of gas line replacement project, ABC7, 3/22/2019, https://abc7chicago.com/business/peoples-gas-ceo-defends-consumer-cost-of-gas-line-replacement-project/5210509/

243. Phase Two of an Investigation of Peoples Gas Light and Coke Company's Accelerated Main Replacement Program Recommendation Implementation Monitoring Eighth Quarterly Report, 7/31/2017, C-51.

244. Phase Two of an Investigation of Peoples Gas Light and Coke company's Accelerated Main Replacement Program, Recommendation Implementation Monitoring, First Quarterly Report, The Liberty Consulting Group, 9/30/2015, 4.

245. Illinois Commerce Commission, Comprehensive Management Audit of the Peoples Gas Light and Coke company, 1988, II-10.

246. Final Report, Focused Management Audit of the Gas Operations Division of the Peoples Gas Light and Coke company, October 28, 1994, VII-51.

247. Final Report on Phase One of an Investigation of Peoples Gas Light and Coke company's AMRP, The Liberty Consulting Group, 5/5/2015, ES-2.

248. See SMP reporters: December 2016, December 2017, every 2018 quarterly report, 1st quarter 2019 report.

249. The Peoples Gas Light and Coke company System Modernization Program ICC 2018 4th Quarter Report, 16-0376, 2/14/2019, 3.

250. Ibid, 3.

251. See endnote 20.

252. *What's Chicago getting for Peoples Gas' spending spree? Less for more*. Crain Chicago Business, 3/3/18.

253. System Improvement work is not insignificant: according to estimates provided by Mr. Hesselbach, it constituted roughly one third of PI/SI work in 2016 and had a larger budget in 2017. Mr. Hesselbach estimated the cost as $20 million in 2016 and $29 million in 2017. PGL Ex. 7.0, Andrew J. Hesselbach, 16-0376, 3-5. Peoples Gas spent $62.23 million on PI/SI in 2016. Peoples Gas never submitted monthly or an annual report on 2017. December 2016 Month-End Report on behalf of The Peoples Gas Light and Coke Company, 16-0376, 1/31/2017, 6.

254. PGL Ex. 7.0, Andrew Hesselbach, 16-0376, 3 -5. Peoples Gas insists both programs are non-discretionary because the "work is consistent with [its] obligation to provide reliable service to customers." Peoples Gas could invoke this incredibly broad argument -- that any investment at any time in any context is "non-discretionary" if it "is consistent" with its fundamental service obligation -- to justify any number of imprudent investments. It is not persuasive. While insisting System Improvement work is non-discretionary, Mr. Hesselbach uses estimates of System Improvement costs to answer questions about the cost of non-discretionary work in PI/SI.

255. Final Report on Phase One of an Investigation of Peoples Gas Light and Coke company's AMRP, The Liberty Consulting Group, 5/5/2015, D-3

256. Ibid, B-15.

257. PGL Ex. 5.0, Andrew J. Hesselbach, 16-0376, 41-42.

258. PGL Ex. 7.0, Andrew Hesselbach, 16-0376, 3 -5.

259. Phase Two of an Investigation of Peoples Gas Light and Coke Company's Accelerated Main Replacement Program, Recommendation Implementation Monitoring, Eighth Quarterly Report, 7/31/2017, C-185

260. Ibid, C-133, C-157, C-162, C-175, C-191. Phase Two of an Investigation of Peoples Gas Light and Coke Company's Accelerated Main Replacement Program, Recommendation Implementation Monitoring, Seventh Quarterly Report, 4/10/2017, B-35, B-61.

261. Phase Two of an Investigation of Peoples Gas Light and Coke Company's Accelerated Main Replacement Program, Recommendation Implementation Monitoring, Eighth Quarterly Report, 7/31/2017, C-93.

262. Phase Two of an Investigation of Peoples Gas Light and Coke Company's Accelerated Main Replacement Program, Recommendation Implementation Monitoring, Seventh Quarterly Report, 4/10/2017, B-56. "The latest Change Order Procedure provides no senior management oversight."

263. Phase Two of an Investigation of Peoples Gas Light and Coke Company's Accelerated Main Replacement Program, Recommendation Implementation Monitoring, Seventh Quarterly Report, 4/10/2017, B-77. "This DR used the October 2016 monthly report, which appeared to contain two issues that should have been of major concern to executive management. The DR asked for management's response to those issues. The response effectively denied the existence of the issues. Accordingly, Liberty was unable to provide a specific example validating management Oversight."

264. Illinois Commerce Commission, https://www.icc.illinois.gov/about/Commissioners, last accessed 5/27/2019.

265. Joint Applicants Exhibit 8.0, John Reed, 14-0496, 13.

266. Commissioners' Data Request, 3/11/2015, 14-0496, 2.

267. Joint Applicants Responses to Commissioners Data Requests, 3/8/2015, 14-0496, 2.

268. Emergency Motion to require Additional Testimony from the Joint Applicants Regarding Needed Transition Plans Related to the Peoples Gas Light & Coke company's Accelerated Main Replacement Program, 14-0496.

269. Appendix A to Final Order, 14-0496, Condition 5, 1.

270. Phase Two of an Investigation of Peoples Gas Light and Coke company's Accelerated Main Replacement Program, Recommendation Implementation Monitoring, First Quarterly Report, The Liberty Consulting Group, 9/30/2015, 3.

271. Staff Report, Attachment, 15-0816, 1.

272. Stipulation and Settlement, Staff-Respondent Joint Exhibit 1.0, 15-0186, 4/

273. Order - Initiating Proceeding, 15-0816.

274. ICC Exhibit 1.0, David Sackett, 19-20, 27-38.

275. Joint Stipulation and Settlement, 15-0186, 7-11.

276. Stipulation and Settlement, Joint Exhibit 1.0, 15-0608, 8.

277. Stipulation and Settlement, 15-0608, 9-10.

278. Memorialization of an Ex Parte Communication from an Interested Party, 14-0496, 7/27/2019.

279. Minutes, Illinois Commerce Commission Bench Session, 5/20/2015, 37-63.

280. Phase Two of an Investigation of Peoples Gas Light and Coke company's Accelerated Main Replacement Program, Recommendation Implementation Monitoring, First Quarterly Report, The Liberty Consulting Group, 9/30/2015, 4.

281. Petition, 15-0593, 11/9/15.

282. Ibid, 5-10.

283. Minutes, Illinois Commerce Commission Bench Session, 11/18/2015, 12-14.

284. Stipulation and Settlement, Exhibits 1 and 2, 15-0608.

285. Minutes, Illinois Commerce Commission Regular Open Meeting, 5/25/2016, 12.

286. Minutes, Illinois Commerce Commission Bench Meeting, 12/16/2015, 57-59. It is somewhat confusing what this "suspension" actually meant as all work related to the program continued through the lifetime of the investigation. Additionally, a little more than two years after "suspending" the program the ICC majority found that it couldn't limit the program, further illustrating that the so-called "suspension" was anything but that.

287. Ibid, 10.

288. Ibid, 10.

289. Ibid, 58.

290. Ibid, 59.

291. Staff Report to the Commission Regarding Workshops Held to Evaluate and Assess The Peoples Gas Light and Coke Company Gas System Modernization Program, 16-0376, 5/31/2016.

292. Proposed Order, 16-0376, 12/23/2016.

293. Order directing additional hearings, 16-0376, 3/1/2017.

294. Motion to Modify Briefing Schedule, 16-0376, 12/26/2017.

295. Final Order, 16-0376, 210-211.

296. Ibid.

297. Final Order, 16-0376, 128. This is also in conflict with how the company describes the program in a recent letter to the editor published by the Chicago Sun-Times in which they inaccurately claim, "Peoples Gas launched SMP in 2011 in response to a call to action by the federal government…" https://chicago.suntimes.com/opinion/peoples-gas-modernization-plan-heating-bills/

298. Minutes, Illinois Commerce Commission Regular Open Meeting, 1/10/2018, 39-40.

299. Ibid, 51.

300. Ibid 41.

301. Ibid, 50.

302. ICC Staff Exhibit 14.0, 09-0166/09-0167, 2. In 2009, the Director for the Energy Division at the Commission testified that Peoples Gas should present a plan for acceleration, and that the Commission should hire, at the company's expense, outside experts to evaluate it. He further testified that the company should report to the Commission on the status of the program every three years, and that each report be analyzed by outside experts, again, hired by the Commission at the expense of the company.

303. Minutes, Illinois Commerce Commission Bench Meeting, 12/16/2015, 35-39, 45-51.

304. The Service List for 16-0376 shows no Commission hired consultants: https://icc.illinois.gov/docket/servicelist.aspx?no=16-0376&slsid=0

305. Ibid, 29.

306. Phase Two of an Investigation of Peoples Gas Light and Coke Company's Accelerated Main Replacement Program, Recommendation Implementation Monitoring, Eighth Quarterly Report, 7/31/2017, 8.

307. Final Order, Appendix A, Condition 23, 06-0540, 5.

308. Staff Report to the Commission Regarding Workshops Held to Evaluate and Assess The Peoples Gas Light and Coke company Gas System Modernization Program, 5/31/2016, 61-62. "Staff does not contend that there would be no merit to conducting further engineering studies. Rather, Staff notes there are sound safety considerations and other reasons for the Commission's expressed concern that a docketed proceeding be completed by the end of calendar year 2016. As a result, engineering studies cannot be Commissioned and completed in time to be useful to the Commission's deliberations in the docketed proceeding." Notice of Administrative Law Judges Ruling, 8/17/16, 16-0376. "Notice is hereby given by the Administrative Law Judge that due to the time constraints in this docket an engineering study will not be beneficial to the parties and the Commission before [January 11th, 2017]."

309. Final Order, 18-1092.

310. Final Order, Appendix A, Condition 23, 06-0540, 5.

311. Review of the Peoples Gas Light & Coke company Cast Iron Main Replacement Program, Kiefner & Associates, Inc., 3/1/2007. The Kiefner study did not do some of the analysis of pipe conditions expected in a thorough engineering study. The last engineering study to do so was in 2002.

312. Minutes, Illinois Commerce Commission Regular Open Meeting, 1/10/2018, 51.

313. From a conversation with the Office of the Attorney General, the authors understand that a Request for Proposals has been issued for consultants to begin work on the calendar year 2016 QIP reconciliation docket. It is not expected that the consultants will be hired until late in the summer at the earliest.

314. See for example, Final Order, 16-0376, 85-87,163-164, 166-167; Phase Two of an Investigation of Peoples Gas Light and Coke Company's Accelerated Main Replacement Program, Recommendation Implementation Monitoring, Eighth Quarterly Report, 7/31/2017, C-31-32, C-150-151, C-190-191.

315. Minutes, Illinois Commerce Commission Bench Meeting, 12/16/2015, 59.

316. Docket number 18-0679 in the Illinois Court of Appeals, 1st Division. Oral argument was held 06/19/2019.

317. 220 Illinois Compiled Statutes, 5/220.3.

318. FInal Order, 16-0376, 48, 210.

319. Brief of the Petitioner People of the State of Illinois, Petition for Review of Orders of the Illinois Commerce Commission, 1-18-0679, 31.

320. Illinois Compiled Statutes. 220 ILCS 5/8-503.

321. Brief of the Petitioner People of the State of Illinois, Petition for Review of Orders of the Illinois Commerce Commission, 1-18-0679, 36.

322. Staff Report to the Commission Regarding Workshops Held to Evaluate and Assess The Peoples Gas Light and Coke company Gas System Modernization Program, 5/31/2016, 46.

323. Notice of Administrative Law Judge's Ruling, 16-0376, 8/23/2017.

324. Minutes, Illinois Commerce Commission Regular Open Meeting, 1/10/2018, 50-51.

325. Final Order, 16-0376, 113.

326. Staff Report to the Commission Regarding Workshops Held to Evaluate and Assess The Peoples Gas Light and Coke Company Gas System Modernization Program, 5/31/2016, 16-0376, 36.

327. Minutes, Illinois Commerce Commission Public Utility Regular Open Meeting, 12/16/2015, 59.

328. Final Order, 16-0376, 131.

329. Ibid, 128.

330. PGL Ex. 13.0, Debra E. Egelhoff, 16-0376, 3.

331. Review of the Peoples Gas Light & Coke company Cast Iron Main Replacement Program, Kiefner & Associates, Inc., 3/1/2007, 3. This figure has been adjusted for inflation. One can assume this amount was fairly typical for the preceding decade because the company's authorized cost recovery stayed steady without a rate case from 1995 to 2007.

332. Final Report on Phase One of an Investigation of Peoples Gas Light and Coke company's AMRP, The Liberty Consulting Group, 5/5/2015, D-14. This would be $121 million in 2018 dollars.

333. PGL 5.1, Peoples Gas 2017 System Modernization Plan, 16-0376, 7.

334. *Peoples Gas pipes may not be exploding, but replacement budget is*, Crains Chicago Business, 8/2019/17.

335. *Peoples Gas spending inflates parent's profit*, Crains Chicago Business, 4/05/2019.

336. According to year-end SMP reports, the SMP spends in 2016, 2017 and 2018 were, respectively, $190 million, $348 million, and $295 million, out of total capital spending of $270 million, $511 million, and $481 million.

337. Ibid.

338. PGL Ex. 5.0, Andrew J. Hesselbach, 16-0376, 43.

339. The Peoples Gas Light and Coke company System Modernization Program ICC 2018 4th Quarter Report, 16-0376, 2/14/2019, 17.

340. Appendix K, May 31, 2016 Staff Report, Illinois Commerce Commission,Household Economics in the City of Chicago and Natural Gas Bills, Office of Illinois Attorney General Lisa Madigan, 3/10/2016, Slide 11.

341. See endnote 121.

342. *Chicagoans paid a 67 percent premium for heat last winter*, Crains Chicago Business, 5/22/2019.

343. *Peoples Gas blows the pipe-replacement budget again*, Crain's Chicago Business, 2/27/2019.

344. *Peoples Gas spending inflates parent's profit*, Crains Chicago Business, 4/5/2019.

345. AG Exhibit 5.0, Roger Colton, 16-0376, 37.

346. 2018 National Energy Assistance Survey Final Report, December 2018, The National Energy Assistance Directors' Association, ii.

347. Appendix K, May 31, 2016 Staff Report, Illinois Commerce Commission,Household Economics in the City of Chicago and Natural Gas Bills, Office of Illinois Attorney General Lisa Madigan, 3/10/2016, Slide 6.

348. AG Exhibit 5.0, Roger Colton, 16-0376, 14.

349. Ibid, 14.

350. Big Shoulders, Bold Solutions: Economic Security for Chicagoans, Chicago Resilient Families Task Force Report, February 2019, 12-16.

351. *With smart grid completed, ComEd budgets as if it never happened*, Crains Chicago Business, 2/15/2019.

352. House Bill 3152 and Senate Bill 2080, 101st General Assembly.

353. *City Inaugurates Costly Plan to Replace Aged Water Mains,* New York Times, 12/17/2011.

354. U.S. Energy Information Administration, https://www.eia.gov/dnav/ng/hist/n3010us3a.htm.

355. For a detailed analysis, see the Office of the Office of the Attorney General's Brief on Exceptions, 1/5/2018, 16-0376, 87-89.

356. AG Exhibit 4.0, Sebastian Coppola, 16-0376, 32-33.

357. AG Ex. 29, 16-0376, 1. Final Order, 16-037, 85.

358. PGL Ex. 5.4, 16-0376.

359. Ibid, 30.

360. Ibid, 38.

361. Ibid, 38.

362. Ibid, 31.

363. WEC Energy Group, Inc., 2018 Third Quarter Earnings, Released October 31, 2018, accessed https://s22.q4cdn.com/994559668/files/doc_financials/2018/Q3/2018-Q3-WEC-Earnings-Package-Final.pdf.

364. Ibid.

365. Annual Energy Outlook 2019, U.S. Energy Information Service, 1/24/2019, 12, 24, 82. While overall gas consumption has increased, "gas consumption in the residential and commercial sectors remains largely flat."

366. Costs Analysis for the Energy Infrastructure Modernization Act (EIMA) and the Future Energy Jobs Act (FEJA), The Power Bureau, 3/18/2019. *Nicor seeks record-setting rate hike,* Crain's Chicago Business, 11/14/2018.

367. *With smart grid completed, ComEd budgets as if it never happened*, Crain's Chicago Business, 2/15/2019. WEC Energy Group, Inc., 2018 Third Quarter Earnings, Released October 31, 2018.

368. Author calculations based on Commission Rate Case History excel file, downloaded June 2019. Accessed at https://icc.illinois.gov/chiefclerk/. $1,212,274,000 - $1,070,058,000 = $142,216,000. $142,216,000 / $1,070,058,000 = 13.29%.

369. Ibid, $1,669,690,000 - $1,070,058,000 = $599,632,000. $599,632,000 / $1,070,058,000 = 56.04%.

370. PGL EX 1.0, 07-0214/0242., 13.

371. Initial Brief, Office of the Attorney General, 09-166/167, 27-28.

372. NS-PGL Exhibit 34.0, Philip M. Hayes, 07-0214/0242, 11.

373. Final Order, 12-0511/0512, 55.

374. Final Order, 14-0496, 16.

375. Executive Order 2019-06, accessed at https://docs.google.com/viewer?url=https%3A%2F%2Fwww2.illinois.gov%2FIISNews%2F19626-Executive_Order_2019-06.pdf.

376. Billimoria, Sherri, Mike Henchen, Leia Guccione, and Leah Louis-Prescott. The Economics of Electrifying Buildings: How Electric Space and Water Heating Supports Decarbonization of Residential Buildings. Rocky Mountain Institute, 2018, 6.

377. Elizabeth Ridlington and Gideon Weissman, Frontier Group, Natural Gas and Global Warming: A Review of Evidence Finds that Methane Leaks Undercut the Climate Benefits of Gas, 7/272016, 4.

378. Billimoria, Sherri, Mike Henchen, Leia Guccione, and Leah Louis-Prescott. The Economics of Electrifying Buildings: How Electric Space and Water Heating Supports Decarbonization of Residential Buildings. Rocky Mountain Institute, 2018, 36.

379. United States Mid-Century Strategy for Deep Decarbonization, November 2016, 6.

380. Ibid, 6.

381. Ibid, 59.

382. Ibid, 59.

383. Ibid, 60-61.

384. Ibid, 60.

385. Ibid, 61.

386. Electrification & Decarbonization: Exploring U.S. Energy Use and Greenhouse Gas Emissions in Scenarios with Widespread Electrification and Power Sector Decarbonization, National Renewable Energy Laboratory, July, 2017, 37.

387. Ibid, vi.

388. Ibid, vii.

389. Billimoria, Sherri, Mike Henchen, Leia Guccione, and Leah Louis-Prescott. The Economics of Electrifying Buildings: How Electric Space and Water Heating Supports Decarbonization of Residential Buildings. Rocky Mountain Institute, 2018, 36.

390. Ibid, 36.

391. *Science group to Illinois: close more coal plants, and do it quickly,* Energy News Network, 10/26/2018.

392. Billimoria, Sherri, Mike Henchen, Leia Guccione, and Leah Louis-Prescott. The Economics of Electrifying Buildings: How Electric Space and Water Heating Supports Decarbonization of Residential Buildings. Rocky Mountain Institute, 2018, 10.

393. Cast Iron Pipe Replacement Study for Peoples Gas Light and Coke company, Zinder Engineering, Inc., 5/22/1981, 10.

394. Review of the Peoples Gas Light & Coke company Cast Iron Main Replacement Program, Kiefner & Associates, Inc., 3/1/2007, 4.

395. Cast Iron Pipe Replacement Study for Peoples Gas Light and Coke company, Zinder Engineering, Inc., 5/22/1981, vi. The study recommended the replacement of 8,867,00 feet of pipe.

396. Management Studies Division Staff Report, Subject: Focused Management Audit of the Gas Operations Division of the Peoples Gas Light and Coke company, December, 1993, 1.

397. Final Report, Focused Management Audit of the Gas Operations Division of the Peoples Gas Light and Coke company, October 28, 1994, VII-30-31.

398. *Blowing Smoke*, Chicago Reader, 11/11/1993.

399. Ibid.

400. Review of the Peoples Gas Light & Coke company Cast Iron Main Replacement Program, Kiefner & Associates, Inc., 3/1/2007, 11.

401. Supplement No. 1 to Engineering Report No. ER-048, Cast Iron Pipe Replacement Study for PEOPLES Gas Light and Coke company, Chicago Illinois, ZEI, Inc, 7.

402. Final Report, Focused Management Audit of the Gas Operations Division of the Peoples Gas Light and Coke company, 10/28/1994, VII-51.

403. Final Order, 15-0341, 3.

404. Review of the Peoples Gas Light & Coke company Cast Iron Main Replacement Program, Kiefner & Associates, Inc., 3/1/2007, 4.

405. Report on an Investigation of Peoples Gas Pipeline Safety Program, Liberty Consulting Group, 8/14/2008,1.

406. Press Release, Office of the Attorney General, 1/17/2006.

407. *The link between Peoples Gas' current troubles and its dalliance with Enron,* Crain's Chicago Business, 3/13/2015.

408. Final Order, 15-0341, 22-23.

409. Application for reorganization, 06-0540, 2.

410. Final Order, Appendix A, Condition 23, 06-0540, 5.

411. Review of the Peoples Gas Light & Coke company Cast Iron Main Replacement Program, Kiefner & Associates, Inc., 3/1/2007, 19.

412. Report on an Investigation of Peoples Gas Pipeline Safety Program, Liberty Consulting Group, 8/14/2008,1.

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452. Proposed Order, 16-0376, 12/23/2016.

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454. System Modernization Program December 2016 Month-End Report, 16-0376, 1/31/2017, 3.

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460. Motion to Modify Briefing Schedule, 16-0376, 12/26/2017.

461. Final Order, 16-0376.

462. House Bill 4898, 100th General Assembly.

463. System Modernization Program 2017 Year-End Report, 16-0376, 2/28/2018, 3. Instead of filing the report as a "report," Peoples Gas sent it to commission staff, who filed it as an "Ex Parte Communication." This makes the report difficult to find.

464. Appellate Court Acknowledgement Letter, 16-0376, 4/19/2018.

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