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REGULATORY ASSISTANCE PROJECT

Modernizing Gas Utility Planning: New Approaches for New Challenges

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Introduction[1]

Investments that gas utilities are making today need to serve customer energy needs reliably and equitably throughout their useful lives. When utilities make a clear case that investments are prudent, regulators allow them to recover those costs in customer rates. However, it's becoming more difficult for utilities and regulators to carry out these basic statements about public interest regulation with confidence because of significant new uncertainties and options for the gas industry. Current regulatory processes and tools are not designed to adequately reflect these uncertainties and options in decision making.

Many of the unknowns facing the gas industry relate to the potential for customers to switch from gas to electricity for heating and other uses and the potential for the utility to replace fossil methane with alternative gas resources.[2] Yet the decision-making tools and processes that underlie regulation of today's gas distribution utilities are not directly coordinated with electric system planning processes and are unable to quantify a range of potential long-term risks and benefits for gas customers. Specifically, regulators are lacking insights from transparent tools that can model major uncertainties in long-term planning assumptions, such as decline in customer demand. These tools could also model the impacts of alternative gas supply and delivery options, such as biomethane and new

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[2] The gases that can provide energy services include methane, propane, butane, hydrogen and other heavier gases. Each of these can come from different sources or methods of creation. In this paper, we use the term "fossil methane" where appropriate or more generally "fossil gas" for gases that are extracted from the ground or derived from another fossil fuel. When these gases are combusted, greenhouse gases (primarily carbon dioxide) are a byproduct, as well as nitrogen oxides, carbon monoxide, formaldehyde and particulate matter, all of which can harm human health. Methane is also a potent greenhouse gas when released through leakage or partial combustion. Methane extracted from the ground has long been called "natural gas" in many contexts. We find "fossil methane" or "fossil gas" more accurate and illuminating.

storage capabilities. Without such insights, it's more difficult for regulators to have confidence that proposed utility investments will not become stranded assets due to customer declines or lead to unaffordable supply and delivery costs when less costly options were available.

To bring confidence back to regulatory decision making, many important questions facing our energy systems will need to be answered within gas utility planning. These questions include the following:

- *How are gas utilities intending to meet short- and long-term system adequacy needs? How are the impacts of gas utility decisions on the electric system being addressed in the public interest?*

Different regions of the United States are facing existing or growing gas and electric system adequacy constraints during winter and summer peak use periods. In the East, shortages in interstate gas pipeline capacity are limiting gas utility growth. Projections for fuel switching from gas to electric are raising concerns about the electric system's ability to handle increased load.

- *How are gas utilities considering potential reductions in number of customers and overall usage?*

Some communities are working to accelerate decarbonization of their energy use through growing renewable energy, promoting efficiency and reducing fossil gas use.[3] Customers are also contributing to a decline in gas use by choosing to switch to new efficient electric technologies for a variety of reasons, including favorable performance, cost or environmental attributes.

- *What actions or investments will utilities need to take to meet climate targets in the public interest?*

Within the past two years, many states have passed or begun considering legislation to reduce greenhouse gas emissions significantly by 2050. These new climate policies commonly set a trajectory of declining emissions limits for gas distribution and electric utilities, in alignment with state goals for overall emissions reductions by 2030 and 2050.[4]

Utilities in these states may now be tasked with planning how they will comply with these future emissions limits. Even if the utilities are not legally obligated to achieve emissions reductions, regulators may consider the risk to customers of future policies and requirements as impetus to explore avenues for improving planning. In either case, new questions are arising that need to be considered in today's investment decisions.

[3] Berg, W. (2022, July 21). *State policies and rules to enable beneficial electrification in buildings through fuel switching.* American Council for an Energy-Efficient Economy. https://www.aceee.org/policy-brief/2022/07/state-policies-and-rules-enable-beneficial-electrification-buildings-through

[4] States with emissions reduction targets that are affecting utilities directly include California, Colorado, Washington, Oregon, Massachusetts, New York and Vermont.

What's Next: Broadening Gas Planning Participation and Processes

A well-designed form of expanded planning for gas utilities is needed to give stakeholders and commissions the robust analysis necessary to determine the best gas system investment strategy that is aligned with the public interest. We see the need for a continuum of tightly coordinated bottom-up and top-down planning processes grounded in existing best practices and embracing transparency and equity. At the heart of this paper are five principles for improving gas distribution utility planning according to this vision.

States can start today with steps to broaden public participation, build in equity and ensure that the widest possible range of resource options is considered, regardless of the scope of specific planning processes. States that are ready can take further steps and connect what are now typically disparate processes into a comprehensive, robust framework for analysis and decision-making across energy systems.

When considering how to expand and bolster gas planning processes, we can look to the electricity sector for insights. In more than half of U.S. states, regulated electric utilities have many years of experience with integrated resource planning (IRP), while only a handful of regulated gas utilities use IRP. With the IRP process, utilities use modeling to compare various portfolios of resource options to arrive at the investment plan with the least cost and risk. Requiring this planning process for gas utility systems is an important way to add analytical rigor and a longer-term perspective to gas planning.

Principles for gas planning in the public interest

1. Build equity into planning so decisions are made with equitable service and distribution of costs and benefits in mind.
2. Consider an expanded range of investment and resource options.
3. Establish integrated gas planning by combining integrated resource planning practices with gas distribution system planning.
4. Use combined energy planning to take the broadest possible view of emissions reduction opportunities.
5. Foster collaboration with state agencies that have expertise in emissions reduction.

This paper offers two visions for expanded gas planning built on a foundation of IRP. The first, called **integrated gas planning**, tightly links IRP with existing gas distribution system planning activities and aligns their time frames.

The second vision, for what we call **combined fuel planning**, goes farther, integrating single-fuel planning processes into a whole. Combined fuel planning recognizes the need for a new approach due to the impacts of new climate legislation by states, winter peak adequacy limitations for gas and electric systems, and consumers' shift from fossil fuels to efficient alternatives. This means reframing the objective to plan our energy systems in the public interest while maintaining safe, reliable delivery of essential services and meeting policy goals. Regulators can play a critical role by developing a coordination strategy for planning assumptions across energy suppliers (gas, electric, propane, oil, etc.) to further augment gas utility-specific planning processes.

If current gas planning practices are not changed, business-as-usual planning may lead to an inefficient, overbuilt energy system where customers are left to carry the high-cost burden of poor planning.

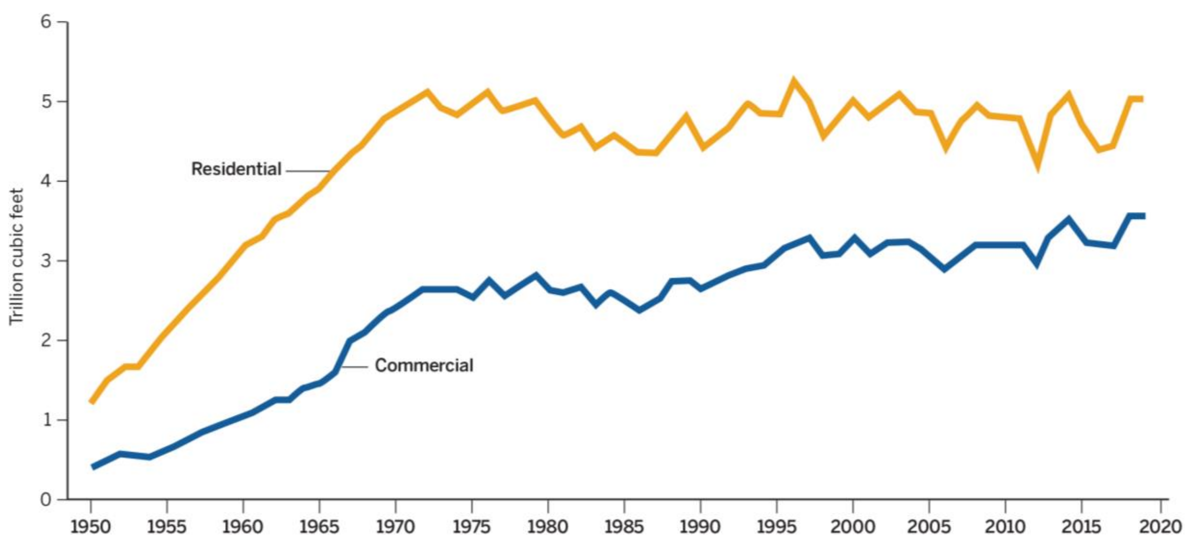
In the remaining sections, this paper:

- Provides context with an overview of current approaches to gas planning.
- Explores the five principles for improving gas planning.
- Summarizes recent gas planning investigations in several states and describes key takeaways on process and issues.
- Identifies concrete actions commissions can take in the near term to smooth the shift to expanded and interconnected gas planning.

Current Approaches to Gas Utility Planning

Analytical expectations for electric utility planning have increased as technologies, policies and customer expectations have become much more complex. By contrast, gas distribution utilities have experienced a comparatively steady industry landscape. Over the past 50 years, U.S. residential and industrial consumption of fossil gas has held essentially flat, while commercial demand has seen a modest upward trend (see Figure 1).[5] To keep pace with growth and sustain reliable gas service, utilities have had limited resource options beyond purchase of fossil gas commodity contracts. Energy efficiency potential for gas utilities is less mature than for electric utilities, and markets for biomethane (often called renewable natural gas) contribute less than 1% of total gas needs.

Figure 1. U.S. residential and commercial gas consumption

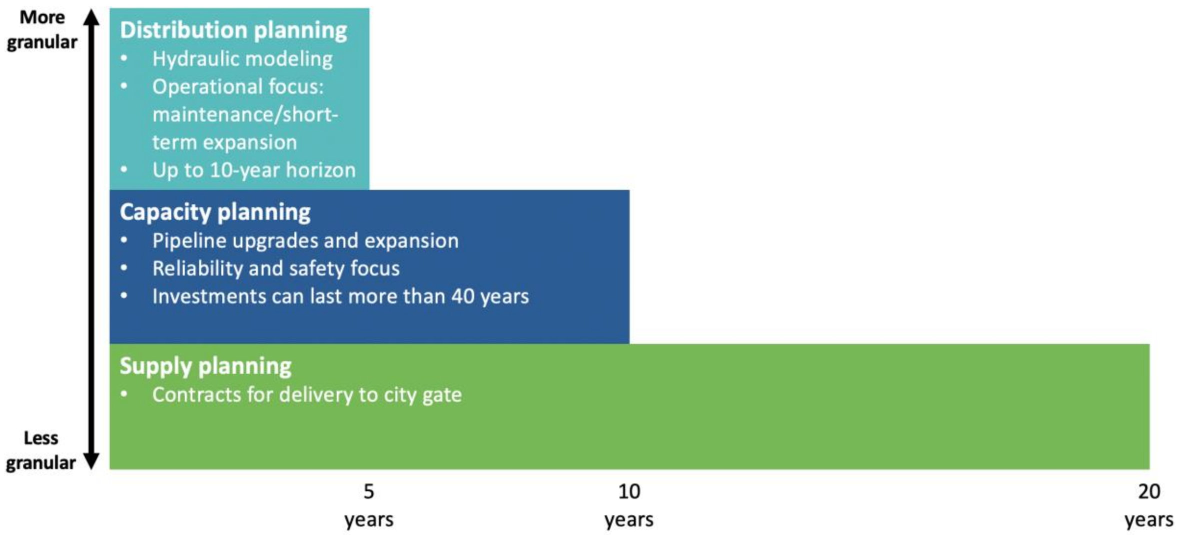


Source: U.S. Energy Information Administration. (2021, February 26). *Natural Gas: Natural Gas Consumption by End Use*

[5] U.S. Energy Information Administration. (2021, February 26). *Natural gas: Natural gas consumption by end use*. https://www.eia.gov/dnav/ng/ng_cons_sum_dcu_nus_a.htm

Gas utility planning in most states currently consists of several discrete processes with varying time frames and levels of detail (see Figure 2). At the shortest-term end of the spectrum is distribution planning, which focuses on operations and asks what the immediate delivery needs are in the system. This form of planning employs hydraulic modeling of pressure and flow of gas from the point where purchased gas enters the local utility distribution system to the customer. Most decisions related to system load, supply and safety during daily operations do not go before the regulator. They are considered essential operational functions, and utilities are expected to follow reasonable business practices.

Figure 2. Time frames and scope of current typical gas planning processes



Typical Planning Actions With Regulatory Oversight

Gas utilities' planning-related actions typically come before regulators within general rate cases or annual purchased gas adjustment filings, where specific issues related to *gas supply planning* or *capacity planning* affect utility requests for rate adjustments. But this consideration of long-lived resources often lacks the underlying analytical rigor of long-term planning methods used to consider options and uncertainty, as is done in IRP.

Gas Supply Planning

Utilities manage a portfolio of gas commodity products to ensure reliable supply and storage to meet energy needs with adequate pressure at customer locations. Gas purchases include transportation of the supply to the city gate, where the interstate transmission-level gas supply enters the local system. Commodity procurement plans include long-term contracts and spot-market purchases of physical and financial products with firm and nonfirm terms.

Because the cost of gas supply is an expense that is passed through to customers, utilities may seek to manage supply price volatility by hedging a portion of the portfolio. Regulators, also driven by an interest in managing price volatility to customers, may seek to review and provide guidance on these utility risk management strategies and costs.

The emergence of biomethane and the potential for hydrogen to contribute to gas supply will add complexity to risk management and regulatory considerations in gas supply planning. In addition, planning for on-system gas storage can address the risk involved in balancing supply with varying seasonal demands.

Capacity Planning

Maintaining reliable service delivery to customers depends on the condition and capacity of main and service lines and on line pressure, which are all interrelated with customer demand. Infrastructure investments to ensure system safety and meet load growth include capital projects to upgrade and expand pipelines. Utilities typically present replacement programs to regulators for approval of the cost, with supporting justification for the investment's timing and need. The most common replacement projects are for aging infrastructure — including bare or unprotected steel pipe or specific types of plastic service and main lines with elevated risk of brittleness failures — and these can span more than 10 years. Regulators weigh the utility's justification for these investments to improve safety and reliability against cost and risks. Newly replaced infrastructure can have a lifespan of 40 or more years. Since capital investments are typically amortized over the lifespan of their use, today's investment decisions will affect customers well into the future.

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Utilities' system infrastructure expansion plans align with forecast need so that the system is ready to provide service in anticipation of demands from new roads and neighborhoods. Costs for service line extensions from pipeline mains to new-construction homes and businesses are typically funded partly by the customer receiving service. Utilities propose the expansion of main pipelines, storage and other system infrastructure (such as compressor stations) to enable increased deliveries while sustaining safe and reliable service pressure to all customers. Regulators review the utility's justification for these investments to expand the system and maintain high-quality service.

An Emerging Model: Gas Utility IRP

The Energy Policy Act of 1992 instructed states to consider adopting IRP for gas utilities as a means to evaluate energy efficiency as a resource option compared with traditional gas supply options. Very few states, however, have instituted or maintained gas IRP processes. Oregon, Washington, Rhode Island and New York are among those that do have gas IRP or closely related long-range planning processes. Yet several of these states are exploring expanding those requirements because the plans were never intended to manage the possibility of a shrinking system or to coordinate with other fuel plans. A new iteration of gas IRP will need to look different.

Needed Changes to Gas Distribution Utility Long-Term Planning

The gas distribution industry is undergoing a significant paradigm shift. Factors driving the change include peak gas and electric system constraints, consumer fuel switching through adoption of electric technologies, and decarbonization legislation. Business-as-usual planning is no longer sufficient. Commissions across the country are recognizing the need to review and update current planning approaches to ensure gas utility infrastructure investments of the future are made in the public interest.

> The gas distribution industry is undergoing a significant paradigm shift, and business-as-usual planning is no longer sufficient.

The foundational concepts of long-term energy planning remain: Forecasting customer needs and identifying the least cost resources to fulfill policy, while considering risks and uncertainties; and the reliable delivery of service in the public interest. However, three key aspects are changing:

1. The overall planning objective is expanding to include emissions limits and other state policies.
2. Fuel switching (i.e., customer and demand decline) needs to be considered.
3. The assumptions of future resource cost, availability and magnitude of alternative fuel options lack evidence and are untested at scale.

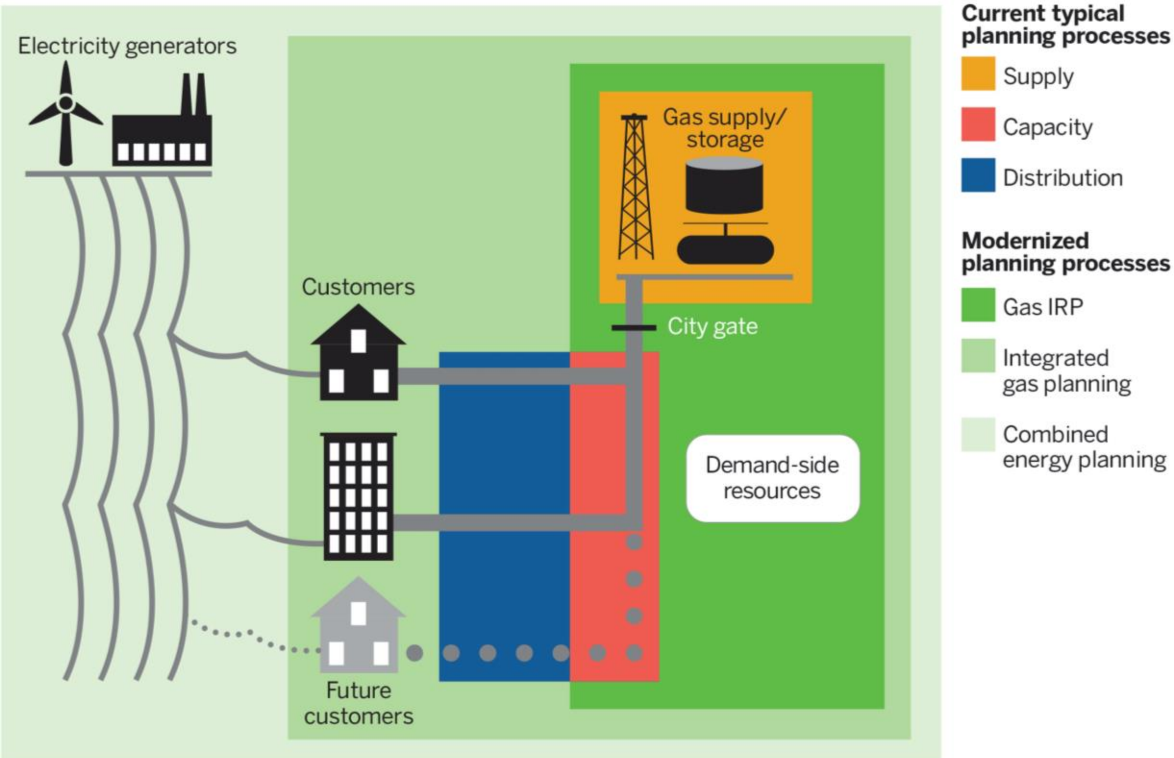
Commissions can and are responding to these new aspects by restructuring the way they think about gas distribution utility planning to recognize the limitations of available evidence and incorporate tools in the planning process that can better manage the risk of costly impacts for customers. In this section, we explore how commissions can move toward a broader, more inclusive and analytically rigorous planning landscape.

Principles for Gas Planning in the Public Interest

The following five principles offer key ways to expand planning and then interconnect all levels more closely. The first two principles apply generally to every level of planning across the continuum. The second two apply the IRP lens to typical gas planning processes while connecting them in new ways (see Figure 3 on the next page depicting the scope of current planning processes and the modernized versions we describe below). The final principle considers utility planning within the context of other state goals and expertise.

What we describe in this section is comprehensive and may seem daunting if current planning practices are limited. However, even small steps toward each principle will lead to improvements that far outweigh the costs of not advancing planning.

Figure 3. Levels of gas utility planning



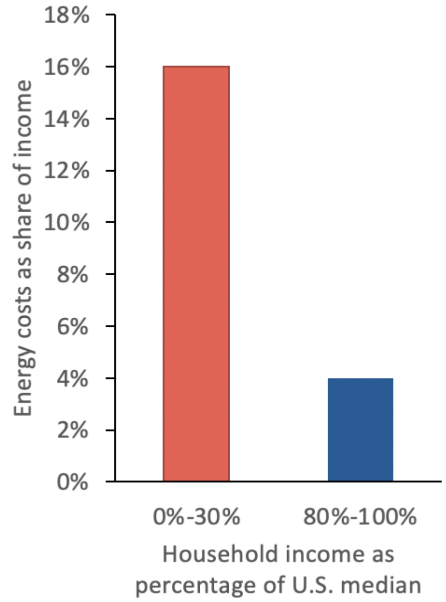
Principle 1: Build equity into planning so decisions are made with equitable service and distribution of costs and benefits in mind.

Regulators need to take deliberate steps to ensure that changes to the gas system will not disproportionately affect low- and moderate-income customers, those on fixed incomes or environmental justice communities.[6] Several state commissions now have explicit directions to ensure that equity is considered in utility regulation.[7] Even without that explicit guidance, public interest regulation encompasses ensuring fair, affordable rates for high-quality service for all customers.

[6] Environmental justice communities are communities that are disproportionately affected by pollution and other environmental hazards. Their residents are more likely to be people of color. See Mikati, I., Benson A. F., Luben, T. J., Sacks, J. D., & Richmond-Bryant, J. (2018, March 7). Disparities in distribution of particulate matter emission sources by race and poverty status. *American Journal of Public Health*. https://ajph.aphapublications.org/doi/10.2105/AJPH.2017.304297

[7] 73rd Colorado General Assembly, S.B. 21-272, June 2021. https://leg.colorado.gov/sites/default/files/2021a_272_signed.pdf

Figure 4. Comparative U.S. energy burden



Source: U.S. Department of Energy, Office of Energy Efficiency & Renewable Energy. (n.d.). *Low-Income Energy Affordability Data (LEAD) Tool*

The technical solutions with the least cost and risk identified through energy planning may lead to very different distributions of customer impacts. Figure 4 shows the relative energy burden (energy costs as a percentage of household income) for median-income and low-income customers in the U.S.[8]

Community input is key to several strategies for mitigating inequity:

- Create inclusive stakeholder processes to inform the underlying assumptions and objectives of the planning proceedings and then report how that input was integrated into the work. When utilities integrate customer feedback into program designs, the programs are more likely to be successful at meeting customer needs. Asking for greater detail about how the utility considered equitable distribution of benefits ensures that the utility is connecting the dots to identify technical solutions that also equitably distribute costs and benefits.
- Create a baseline understanding and characterization of customer needs and differences. This is a good starting point from which to measure improvements and inform designs for programs and rates to mitigate bill impacts. This includes understanding how potential resource portfolios and actions will affect customer bills compared to the business-as-usual scenario.
- Identify the most meaningful indicators for equitable service for the individual utility services territory. Indicators may include reduction in arrearages and energy burden, increased efficiency program participation and improved service quality by location or customer income.

Regulators can also prompt utilities to focus distributed energy resource programs — including beneficial electrification of end uses — where targeted customers could benefit from lower total energy burden while most efficiently meeting heating, cooling and other essential energy needs. Additional tools, such as performance incentive mechanisms, can be considered to financially motivate utilities to achieve specific outcomes that may lower their energy sales yet lead to beneficial outcomes for customers.

[8] U.S. Department of Energy, Office of Energy Efficiency & Renewable Energy. (n.d.). *Low-Income Energy Affordability Data (LEAD) tool.* https://www.energy.gov/eere/slsc/maps/lead-tool

Principle 2: Consider an expanded range of investment and resource options.

Gas utilities need to shift their focus from managing their fossil gas commodity portfolio with a mix of physical and financial products to also directly consider how energy efficiency and other resources meet customer needs. Additional resource options and strategies to lower emissions could include:

- Expanded energy efficiency options, such as dual-fuel heat pumps and whole-home retrofits.
- Nonpipeline alternatives consisting of targeted, locational strategies to lower costs and emissions (district energy, demand response, energy efficiency, beneficial electrification).
- Replacement fuel options, such as biomethane, green hydrogen and synthetic methane.
- Alternative compliance options. Depending on rules or legislation, these could include certificates of environmental attributes as well as system leak identification and reduction programs.
- Exploring programmatic options to support beneficial electrification, potentially through performance-based regulation.[9]

Since resource options now include the potential for the number of gas customers and gas demand to decrease, all resource options need to include cost impacts to existing and new infrastructure investments necessary to enable either the expansion or contraction of the gas system. Additionally, requiring the reporting of infrastructure costs in rate base by year (existing and new) and amortization schedules for existing and new planned infrastructure will add meaningful data to the overall analysis of least cost and risk in the public interest.

Principle 3: Establish integrated gas planning by combining integrated resource planning practices with gas distribution system planning.

Integrated resource planning can be thought of as a special lens through which to view long-term utility needs and options to ensure adequate supply and capacity. By combining IRP with distribution system planning, regulators can maximize IRP's potential while aligning their time frames and improving transparency. The interaction of IRP and distribution planning also brings a focus on location-specific delivery and system size considerations at the customer level. For that reason, we include customers in our depiction of integrated gas planning in Figure 3. Below, we look at the two planning components of integrated gas planning in turn.

[9] Performance-based regulation typically involves incentive mechanisms for utilities to achieve specified objectives. It is one of the tools discussed in Anderson, M., LeBel, M., & Dupuy, M. (2021). *Under pressure: Gas utility regulation for a time of transition.* Regulatory Assistance Project. https://www.raponline.org/knowledge-center/under-pressure-gas-utility-regulation-for-a-time-of-transition/

Integrated Resource Planning: Rigorous and Proven

IRP is an established power sector process to develop a utility plan for meeting forecasted annual demand and energy reliably through a combination of supply- and demand-side resources over a period of time (e.g., 20 years or through 2050). It can provide the level of transparency, rigor and decision support analysis regulators need and has a proven history of avoiding costly investment mistakes.[10]

Fundamental steps of gas IRP include:

- Forecasting future loads.
- Identifying potential resource options to meet those future loads reliably and safely, including demand-side gas options and potential for beneficial electrification.[11]
- Determining the optimal mix or "preferred portfolio" of supply- and demand-side resources based on the goal of minimizing future gas system costs while considering risks and uncertainties and achieving all policy mandates.
- Using scenario analysis and sensitivities to test portfolio performance with uncertainties, including reductions in customer numbers and load.
- Receiving, responding to and incorporating public input through an open and transparent stakeholder process.
- Creating and implementing the resource plan.

IRP provides the framework within which to study and explore uncertainties and test resource portfolios to see how well they meet customer needs.

Each of the forecast assumptions in long-term planning includes uncertainty, which is why IRP is so important. As noted above, new challenges in planning are bringing new policy, technology adoption and load forecasting uncertainties. IRP provides the framework within which to study and explore these uncertainties and test resource portfolios to see how well they meet customer needs across a range of outcomes.

The resulting resource portfolio actions translate into future utility investment decisions, which appear as rate adjustments before the regulator.

Each commission values IRP analysis toward prudence in different ways, but a common value of the IRP analysis is that the utility, commission and stakeholders are working together throughout the process to understand the utility's vision and potential justifications for future investments.

[10] For example, in the 1970s, nuclear plants throughout the U.S. were planned based on overestimated load growth projections and underestimated new plant costs, ultimately costing ratepayers $100 billion invested in projects that were eventually abandoned.

[11] Inclusion of beneficial electrification options requires coordination with electric utilities delivering services to shared customers (covered in Principles 3 and 4) and could be modeled as a reduction to load.

Distribution System Planning: Improving Transparency and Timing

Integrated gas planning will be most effective if regulators take steps to optimize the distribution system planning component. We have two main recommendations:

- **Ask utilities to provide more granular detail that illustrates and describes the current system and infrastructure plans.** While IRP provides regulators with transparency into the long-term planning decisions of major transmission infrastructure and resource supply projects, nearer-term, five- to 10-year and granular distribution system planning from the city gate to the customer site is often less transparent. This recommendation, borrowed from RAP's recent report *Under Pressure*,[12] will give regulators and stakeholders insights into pipeline infrastructure upgrades, maintenance and expansion cost recovery requests before those requests appear in rate cases. Scenario testing can explore the implications of fuel switching for load and customer numbers. Other location-specific planning, including evaluation of nonpipeline alternatives for constrained system locations, can be tested and made more transparent to stakeholders.
- **Extend the analysis beyond five to 10 years to align with the IRP timeline.** There are good reasons why distribution system planning has not typically spanned a longer time frame. The level of detail used for operational purposes beyond five years leaves too much uncertainty. However, we are making this new recommendation because of the potential impacts of nontraditional resource options. Both hydrogen mixing and beneficial electrification would have significant cost and operational impacts for gas distribution systems and for customers, but with planning horizons that exceed five years. To consider and test the performance of these resource options and their cost and operations impacts, they need to be considered within granular-level modeling techniques over five to 20 years or more, something that is not typically analyzed today.

Prudently planning for a potential decline in sales requires assessing the impacts on system pressure and reliability beyond five years out so as to arrive at the optimal path to modify or "prune" the system at the least cost and risk. The same can be said for the resource option of switching to hydrogen fuel, with commensurate system upgrade costs to reinforce pipelines plus customer appliances, depending on targeted fuel-mixing percentages.

Integrated Gas Planning in Practice

To fulfill their objectives for utilities and regulators, the IRP and distribution system planning analyses described above may require separate modeling tools. But the tight sharing of assumptions, inputs and outputs between the two essentially creates one planning framework for regulators to see the interconnected system view over the long term. Together, they lead to integrated gas planning.

[12] Anderson et al., 2021.

Principle 4: Use combined energy planning to take the broadest possible view of emissions reduction opportunities.

Combined energy planning recognizes that today's full range of resource options has ripple effects beyond a single utility and its customers.

To properly model the costs, benefits and achievability of this new range of resource options (see Principle 2), planning will need to analyze the interactive effects of gas, electric, propane, biomass, oil and other petroleum energy systems.

Combined energy planning looks more broadly than integrated gas planning, which focuses on a single utility for investment planning purposes. Combined energy planning encompasses consideration of all energy sources affecting greenhouse gas reduction plans for a state or region. The multiple fuel aspects inform each other and need to be aligned and consistent.

The tight coordination of planning assumptions across electric and gas utilities is new to nearly all state commissions. Even dual-fuel utilities separate their business utility planning assumptions and revenue requirements by fuel type.

To decarbonize the energy system in the public interest, commissions will want to understand how the energy use of shared multifuel customers will impact the financial health of separate utilities or the separate business units of a multifuel utility. Ensuring continued affordable, reliable energy service while lowering emissions may lead to new business models that can be considered in holistic planning processes.

One type of combined energy planning used in many states is the deep decarbonization pathways study, which seeks to capture the economywide energy system impacts of significantly lowering greenhouse gas emissions. Regulatory commissions most likely do not have the data, budget or authority needed to pursue these studies on their own.

A first step toward combined energy planning that may be more attainable would be to have utilities with shared customers align their major planning assumptions and scenario designs that include efficient fuel switching.

What is a deep decarbonization pathway?

Deep decarbonization pathways studies,[13] also known as road maps to decarbonization, are helpful tools to show multiple possible ways in which states can achieve their greenhouse gas emissions reduction targets economywide by taking cumulative policy actions across all energy sectors. Pathways studies consist of a mix of policy and technology adoption actions that meet societies' energy needs with incrementally fewer emissions. Actions include what are known as pillars of decarbonization: beneficial electrification of transportation and buildings, energy efficiency, increasing renewable energy, and carbon capture technology. These studies provide a common focal point for actions that legislatures, state agencies, regulators and stakeholders can look to for coordinating actions efficiently across sectors.

[13] Evolved Energy Research. (2020). *Energy pathways to deep decarbonization: A technical report of the Massachusetts 2050 decarbonization roadmap study*. Commonwealth of Massachusetts. https://www.mass.gov/doc/energy-pathways-for-deep-decarbonization-report/download

Principle 5: Foster collaboration with state agencies that have expertise in emissions reduction.

State efforts to pass legislation linking energy services to emissions limits create a new need for coordination among state agencies, even if this is not explicitly detailed in statute. Typically, state departments of environmental quality or air resource agencies hold authority for regulation of emissions. Utility commissions likely have not needed to have emissions expertise on staff to evaluate utility plans claiming that specific resources will provide real, quantified emissions reductions. That is likely to change.

Although their staffing resources may be constrained, commissions might benefit by prioritizing the building of relationships with related agencies early on, as the state plans to implement legislation. Coordinating and understanding each other's processes, schedules and roles could lead to more efficient implementation for all groups.

Insights From Current State Proceedings Related to Gas Planning

A few states are already exploring how revised gas utility planning might best serve their goals. They are the first states to implement new energy system decarbonization legislation or to have come up against winter peak system-adequacy constraints. These states have started initial commission proceedings to meet statutory deadlines for planning documents and measured results.

This section summarizes the gas utility planning proceedings of several states and highlights examples of particularly interesting aspects other states may wish to consider. Based on a synthesis of these proceedings, we then identify concrete actions that commissions can take in the early stages of preparation for a shift to expanded and interconnected gas planning.

Table 1 at the end of this paper lists current proceedings in California, Colorado, Minnesota, New York, Nevada, Oregon and Washington exploring potential revisions to gas utility planning. Each proceeding was initiated by a different driver. For example, Colorado's proceeding is a rulemaking to implement Clean Heat Plan legislation. Oregon's proceeding is a fact-finding investigation to understand how greenhouse gas emissions limits set by the Climate Protection Program of Oregon's Department of Environmental Quality will impact customers of gas utilities.

Certain process components and issues from current state proceedings stood out as being potentially valuable for other states to explore when initiating similar investigations. These takeaways are listed below with their contribution to the investigation.

Best Practices for the Public Process

Opening Questions

Several states launched their stakeholder processes by posing a series of questions on the broad topic of gas planning to interested parties. California, Colorado, New York and Nevada, in particular, used comments received during this typical approach to shape the scope and schedule of the investigation and quickly find topics of consensus and disagreement.

Providing adequate time for comments seemed to be a common challenge within responses and processes. Although rulemakings and investigations may be on a tight schedule due to legislative deadlines, finding ways to extend preparation time was appreciated.

Level-Setting or Educational Components

Incorporating these components can help stakeholders develop robust comments by enhancing their understanding of the issues.

Historically, gas system regulation has not garnered as much stakeholder attention as the electric system. As a result, many new and existing stakeholders and commission staff are learning the current state of gas systems while also learning about new issues. The steep learning curve for all parties can be lessened if staff and utilities gather relevant current state information up front and make it accessible to all parties.

Several states used this foundational data-sharing step. The California process included a comprehensive paper on the gas system.[14] The paper compiled extensive information about the current system and future considerations. The Nevada commission requested information on the usage of natural gas by type and location, emissions and options to reduce emissions. As part of the Oregon process, commission staff prepared a presentation[15] of utility characteristics and provided statistics and financial workbooks they compiled from recent utility filings to set a basic level of understanding of the gas system in Oregon.[16]

Use of System Modeling

A couple of states included early-stage modeling and analytics of potential cost impacts to customers from utility compliance measures to meet future emissions reduction targets while providing reliable, safe service. These analyses were not intended to provide rigorous results, but they did provide indications or a sense of the magnitude of potential impacts. The risk of providing this type of analysis without sufficient commission and stakeholder input is that the results could be misleading, so it is important to address that risk up front and align use with intention.

In Oregon, utilities were asked to modify their existing IRP analyses to meet new greenhouse gas emissions limits. Given the limited time frame, the results were presented as a first cut at incorporating the new emissions limitations. It was made clear they were not as comprehensive as what would be provided within an economywide deep

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[14] Brockway, A. (2021). *Gas planning and reliability in California* [Graduate intern white paper]. California Public Utilities Commission. https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/natural-gas/long-term-gas-planning-oir/gasplanning_final_2021-12-27.pdf

[15] Oregon Public Utility Commission. (2021, July 20). *Natural gas fact-finding, workshop #2: Modeling* [Presentation]. https://edocs.puc.state.or.us/efdocs/HAH/um2178hah163416.pdf

[16] Oregon Public Utility Commission. (n.d.) *Utility regulation: Natural gas fact-finding*. https://www.oregon.gov/puc/utilities/Pages/EO-20-04-UP-FactFinding.aspx

decarbonization study and not as rigorous as what will be included and vetted in future IRP processes. The analysis helped stakeholders identify needed improvements and modifications.

In California, the investigation includes an examination by the commission of demand scenarios that will materialize from state and local greenhouse gas-related laws. The commission directed in an order: "To facilitate this examination, the gas utilities will provide the Commission with data on how forecasted demand scenarios will translate into operational gas flows on their systems (e.g., backbone, transmission, distribution), accounting for balancing and pressure rating requirements. Using this information, the Commission will also examine the extent to which the projected reduction in gas demand will require regulatory changes, such as shortening the useful life of gas assets, to ensure that gas transmission costs are allocated fairly and that stranded costs are mitigated."[17]

Process Mapping

A common issue for staff and stakeholders across most state proceedings is figuring out how existing processes are informed by or inform new requirements. One indication of the complexity of integrating processes comes from Colorado. The state Energy Office highlighted in its comments the existence of related processes and plans (including gas demand-side management plans, clean heat plans, beneficial electrification plans and short- and long-term planning), demonstrating the need to consider the interactions and interdependencies of various plan requirements.

Visual mapping of processes and interactions may help commissions identify efficiencies for all participants in the regulatory process. It may also highlight places where it is important to ensure the use of consistent information and be aware of the sequence of processes due to interactive effects.

Key Issues at the Forefront in Current Proceedings

Equity

An equitable energy transition is a high priority for states and therefore should play a central role in planning proceedings. The California process is a particular example to highlight due to its focus on requesting comments on actions to address barriers facing low-income and disadvantaged communities. Questions to stakeholders raised the subject of health benefits from emissions reductions, both from a societal perspective related to outdoor air quality and on an individual basis from improved indoor air quality.

Resource Options

Reviewing resource options is important to every proceeding as commissions and stakeholders grapple with questions that are being raised by proposed new resources like biomethane, hydrogen, nonpipeline alternatives and even increased energy efficiency. This review is a necessary step in growing our collective understanding of these new resources' performance, cost, availability and timing of inclusion in the least-cost and lowest-risk

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[17] California Public Utilities Commission, Rulemaking 20-01-007, Order on January 16, 2020, instituting rulemaking to establish policies, processes, and rules to ensure safe and reliable gas systems in California and perform long-term gas system planning. https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M325/K641/325641802.PDF

resource portfolio. It is reminiscent of when renewable electricity generation resources were first introduced into electric utility resource planning.

A number of states are looking at various questions related to new resources.

In the New York proceeding, the commission staff's proposal highlighted the importance of considering nonpipeline alternatives when utilities propose traditional infrastructure investments.

Energy efficiency is a commonly applied resource to meet customer needs. In multiple proceedings, stakeholders have questioned whether continuation of efficient gas appliance program incentives is prolonging reliance on fossil gas. In Colorado, the question of whether gas appliance energy efficiency incentives should qualify as clean heat resources has surfaced. In California, issues related to fuel-neutral evaluation of energy, emissions and system benefits of demand-side management are being raised.

All investigations have included questions about the role of hydrogen and biomethane in lowering greenhouse gas emissions in the gas system, with commissions asking questions related to availability, cost, safety and potential magnitude.

Agency Coordination

The coordination of roles and responsibilities across agencies is a common theme. This is because more agencies are implicated in this important planning work today, and not only utility commissions but also environmental quality, transportation and housing departments play roles. The details will differ by state, but the importance of clear communications is widely applicable. For example, in Colorado, the Public Utility Commission, Air Quality Control Commission and Air Pollution Control Division are coordinating the development of workbooks that utilities will use when developing their clean heat plans to estimate emissions reduction impacts.

Transportation Service Customers

Large industrial and commercial users who purchase their own supplies and receive only gas transportation service are not regulated customers of gas distribution utilities. However, their usage of gas, and therefore their emissions contribution, is sizable compared with retail customers. How states assign responsibility for those emissions varies and is critically important to accounting for the amount of gas used by the customer class. In Oregon, gas utilities' emissions compliance requirements include those of transport customers, while in Colorado they do not. In either situation, questions need to be addressed about properly accounting for emissions of transport customers and allocating the costs of compliance.

Balancing Infrastructure Investments and Stranded Asset Risk

A common issue across proceedings is managing the risk of stranded infrastructure investments (i.e., investments that ratepayers no longer use yet for which utilities have not recovered the cost). If the number of gas system customers declines over time, system costs will be spread over fewer customers, leading to higher rates for those remaining. At a certain level of reduced use, assets may no longer be considered used and useful. This risk is driving the underlying question of how to use planning techniques to guide gas utility service investments in the public interest.

Lessons for Improvements Outside a Planning Proceeding

Even if commissions have not yet opened a comprehensive docket to rethink energy planning, they can act now to lay the groundwork for robust planning process changes when ready. This section highlights four areas of action with significant potential for process improvements in the near future. It draws on current proceedings as well as the principles and discussion laid out in this paper.

- **Advance informed decision-making by increasing customer awareness and participation.**
    - Commissions, utilities and consumer advocates can prepare customers for coming changes to the energy system by raising awareness of current planning and policy proceedings. Engaged customers develop from educated customers, so it's particularly important that utilities start this education process now where goals begin in 2025.
    - Industry assumptions related to consumer and market adoption of new technologies and energy use behavior rely upon customers taking action. General outreach will raise customer awareness and improve the level and depth of constructive participation in proceedings to inform the public interest.
- **Design and implement shared studies across fuel types (gas, electric, propane and oil).**
    - In states where deep decarbonization pathways studies are available, make sure that common assumptions from those studies are integrated and coordinated with utility-specific planning model assumptions. For example, assumptions related to rate of fuel switching or alternative fuel market growth could be coordinated.
    - If no statewide modeling opportunities exist in the state, utility commissions could consider initial steps within their purview to gather and coordinate use of different utility data sources (e.g., gas and electric utility customer data and planning assumptions) for shared customers to model current and potential end-use fuel switching.
- **Integrate the risk of declining system use into infrastructure investment prudence reviews.**
    - Recognize that the commission's level of risk tolerance on customers' behalf may not be as high as utility/shareholder risk tolerance.
    - Consider applying greater levels of scrutiny in infrastructure investment prudence reviews commensurate with the increased level of uncertainty and risk in load forecasts.

- **Consider a range of tools to minimize further exacerbation of future emissions and system capacity issues.** Examples of these tools include:
    - Prioritizing energy efficiency program efforts for low- and moderate-income customers, environmental justice communities and those on fixed incomes.
    - Increasing the portion of line extension costs paid by customers requesting a service extension.
    - Revisiting gas rate designs to better reflect cost to serve.

Conclusion

Changes on the horizon — or already taking place — in the gas system are heightening risks for customers and creating new challenges for regulators. Gas customers could face higher costs if their numbers decline over time in favor of electrification or if investments in alternative gases far exceed current resource costs.

Yet current typical tools and processes for regulating gas distribution utilities are unable to quantify the range of potential risks and benefits for gas customers, leaving regulators without complete information on which to make decisions about long-term utility investments.

Business-as-usual planning is no longer serving the gas sector well. Commissions across the country are recognizing the need to review and update their planning approaches. The principles and insights in this paper provide a framework for redesigning planning to restore confidence that utility investments will be in the public interest.

Commissions across the country are recognizing the need to review and update their planning approaches.

Table 1. Current gas planning proceedings

State	What's driving the investigation?	Commission process plan/schedule	Current status (September 2022)	Process and issue questions highlights
CA	CPUC order: Rulemaking to respond to past gas system operational issues and future gas greenhouse gas emissions reductions	Long-term natural gas planning rulemaking; multiple tracks: 1A. Reliability standards 1B. Market structure 2A. Gas infrastructure 2B. Equity, rate design, gas revenues, safety, workforce 2C. Data and process	Amended scoping memo January 5, 2022 (with extended deadline to August 2023) Two Track 2A workshops in January 2022 to address scoping questions related to infrastructure; party comments on scoping questions into August 2022 Equity workshop March 29, 2022	• Thorough, accessible documentation of workshops • Foundational gas system information • Development of modeling studies to evaluate when declining demand can enable decommissioning or derating of lines • Legal discussion of obligation to serve related to system pruning • Tracks 2B and 2C focused on equity, safety, workforce and data
CO	SB 21-264 Requires gas utilities to file clean heat plans (CHPs) to meet 2025/2030 emissions reduction targets	Three parts: 1) inform rulemaking of CHP, 2) inform gas utility planning, 3) develop gas utility information on potential impact	Rulemaking for CHP requirements; PUC coordination with work of Air Pollution Control Division developing emissions workbooks for utility use in CHPs	• Interaction/integration of existing and new processes (CHPs, demand-side management, beneficial electrification, IRP, etc.) • Coordinated agency roles • Preliminary utility modeling of rate impacts
MN	Natural Gas Innovation Act Passed in 2021; allows gas utilities to propose voluntary projects within innovation plans to reduce greenhouse gas emissions	PUC proceeding to establish frameworks to compare life cycle greenhouse gas and cost-effectiveness of resource options in utility innovation plans	Order establishing frameworks June 1, 2022	• Creation of cost-effectiveness and greenhouse gas life cycle frameworks • Stakeholder process to develop proposed frameworks with third-party coordination

NV	Investigation regarding long term planning for natural gas utility service in Nevada	Phase 1: Inventory of uses of natural gas in Nevada, associated greenhouse gas emissions and alternative fuels Phase 2: Impacts of decarbonization on the electric system Phase 3: Costs, planning and mitigation measures	Comments received for all three phases; future proceedings to be established	• Gathering of foundational gas system information
NY	Recent gas distribution system capacity constraints and the Climate Leadership and Community Protection Act	NY DPS order to establish proceeding to examine issues related to the operation of gas utilities in a supply-constrained environment	NY DPS order adopting gas system planning process, issued May 12, 2022	• Staff proposal includes requirement for a "No infrastructure" scenario (including nonpipeline alternatives); adopted version supports proposal, allowing exceptions if infeasible • Independent third-party consultant evaluation of utility filings to test assumptions, check calculations and analyses, and provide insights from best practices throughout the utility industry
OR	Executive Order 20-04 establishing greenhouse gas reductions of regulated natural gas utilities under state Climate Protection Program (CPP)	UM 2178 natural gas fact-finding: PUC investigation to analyze the potential bill impacts that may result from utility compliance with the CPP	Draft staff report released in first quarter 2022 followed by stakeholder engagement and final report posting in third quarter 2022	• Preliminary utility IRP modeling with emissions limits • Sharing of foundational gas landscape data as level-setting stakeholder education
WA	Fiscal 2022-2023 state appropriation to the Utilities and Transportation Commission (UTC) for an examination	Examination of how natural gas utilities can decarbonize; impacts of increased electrification; costs and benefits to customers; equity and regulatory considerations	UTC investigation started with competitive process to secure a consultant to manage the statewide study; estimated completion late 2022 into 2023	• Comprehensive (electric and gas energy systems) statewide analysis requiring combining data from all utilities and coordinating assumptions from a third party

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