EXPLOITING THE ABUNDANCE OF U.S. SHALE GAS: OVERCOMING OBSTACLES TO FUEL SWITCHING AND EXPANDING THE GAS DISTRIBUTION SYSTEM

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Synopsis: The shale gas revolution has dramatically changed the outlook for natural gas in the U.S. It has fostered industry action and governmental policies aimed at increasing the consumption of natural gas both domestically and internationally. This article examines both the public-utility regulatory and market obstacles to achieving fuel conversions to natural gas. These obstacles, which affect either the demand- or supply-side of the natural gas market, can deter socially beneficial actions by energy consumers. As the saying goes, it takes two to tango: Without the willingness of consumers to change their energy source or the availability of an infrastructure to deliver the gas, fuel switching will not happen. This article focuses on what state public utility commissions can do to promote fuel switching and gas line expansions. It also examines the expected commission responses to positions proffered by stakeholders in their support or opposition to gas line extensions.

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I. THE ABUNDANCE OF U.S. SHALE GAS AND IMPLICATIONS FOR THE DEMAND SIDE OF THE GAS MARKET

Shale gas has been one of the few bright spots in the U.S. economy since 2007.[1] Hydraulic fracturing,[2] along with horizontal drilling, has made it possible for the United States and other countries to recover large amounts of shale gas economically, which promises to serve domestic natural gas consumers for several decades.[3] The energy guru Daniel Yergin has called this development the "biggest energy innovation" of this century.[4]

The potential benefits of recovering these recently discovered vast resources in terms of job creation, cost savings to energy consumers, improved balance of trade, reduced energy dependency on foreign sources, and increased revenues for local, state, and federal governments are large and undeniable.[5] Overall, the abundance of shale gas is a major positive development that promises to bolster the U.S. economy.

The shale-gas revolution has motivated the U.S. natural gas industry to increase the consumption of natural gas. Since 2007, increased domestic gas production has led to an oversupply of domestic gas supplies, as demand for natural gas has failed to keep pace.[6] Potential areas for growing natural gas

1. As expressed by the U.S. Energy Information Administration in its Annual Energy Outlook 2013: Early Release:

> The U.S. Energy Information Administration[] . . . projects U.S. natural gas production to increase from 23.0 trillion cubic feet in 2011 to 33.1 trillion cubic feet in 2040, a 44% increase. Almost all of this increase in domestic natural gas production is due to projected growth in shale gas production, which grows from 7.8 trillion cubic feet in 2011 to 16.7 trillion cubic feet in 2040.

What Is Shale Gas and Why Is It Important?, U.S. ENERGY INFO. ADMIN. (Dec. 5, 2012), http://www.eia.gov/energy_in_brief/article/about_shale_gas.cfm. In 2000, shale gas represented only 1% of American natural gas supplies. David Brooks, *Shale Gas Revolution*, N.Y. TIMES (Nov. 3, 2011), http://www.nytimes.com/2011/11/04/opinion/brooks-the-shale-gas-revolution.html?_r=0. In 2012 it rose to around 30%. *Id.*

2. Hydraulic fracturing ("fracking") is a technique that releases natural gas trapped in shale by injecting at high pressure fluids, usually consisting of water, sand, and chemicals. HEATHER COOLEY & KRISTINA DONNELLY, HYDRAULIC FRACTURING AND WATER RESOURCES: SEPARATING THE FRACK FROM THE FICTION 12 (Nancy Ross & Paula Luu eds., 2012). Typically over 90% of the fracking fluid is composed of water and sand, although the total volume of potentially toxic materials, even below the 1% level, can be considerable. *Id.* at 21. The high pressure of the fluid injected allows the cracking open of the otherwise impermeable shale, freeing trapped gas, which then flows through a horizontal bore into the well casing and up to the surface. *Id.* at 12.

3. *See, e.g.*, U.S. DEP'T OF ENERGY, MODERN GAS SHALE DEVELOPMENT IN THE UNITED STATES: A PRIMER ES-1, 9-10 (2009), *available at* http://www.netl.doe.gov/technologies/oil-gas/publications/EPreports/Shale_Gas_Primer_2009.pdf.

4. *Daniel Yergin Examines America's 'Quest' for Energy*, NPR (Sept. 20, 2011), http://m.npr.org/story/140606249.

5. *See, e.g.*, U.S. ENERGY INFO. ADMIN., DOE/EIA-0383, ANNUAL ENERGY OUTLOOK 2013 WITH PROJECTIONS TO 2040 AT 9-10 (2013) [hereinafter EIA, AEO 2013], *available at* http://www.eia.gov/forecasts/aeo/pdf/0383(2013).pdf (exploring the potential economic outcomes energy growth); ROBERT PIROG & MICHAEL RATNER, CONG. RESEARCH SERV., NATURAL GAS IN THE U.S. ECONOMY: OPPORTUNITIES FOR GROWTH 15-16 (2012), *available at* http://www.fas.org/sgp/crs/misc/R42814.pdf.

6. Domestic gas production grew by approximately 23% over 2007-2012 while domestic gas consumption grew only a little over 10%. MARC HUMPHRIES, CONG. RESEARCH SERV., U.S. CRUDE OIL AND

demand include natural gas vehicles; electricity generation; industrial demand; residential, commercial, or industrial fuel switching from electricity, oil, propane, or coal to gas; and exports.[7] So far the most promising driver of increasing demand for U.S. natural gas is electricity generation, either from the retirement of coal-fired plants or the addition of new generating capacity.[8] Exports more marginally have the potential to grow demand and make the domestic gas sector more profitable.[9] Extending gas service to new areas, which is the topic of this article, would have the same effect.

II. THE NEW INTEREST IN GAS LINE EXTENSIONS AND FUEL SWITCHING

The shale gas surge has stimulated broad interest in fuel-switching by households and businesses from other energy sources (e.g., oil and propane) to natural gas.[10] This interest has spread beyond energy consumers to gas utilities and local and state governments. A few states, including Connecticut, Delaware and New York, have endorsed fuel switching as part of their energy plan or strategy.[11] In his January 17, 2013, State of the State speech, for example, Governor Jack Markell of Delaware advocated the expansion of gas lines in his state:

> [W]e need to expand natural gas infrastructure across our state. Too many in Delaware are paying too much for energy because they are too far from a pipeline to bring them affordable natural gas. The energy savings from fuel switching are substantial and can cover the costs of new infrastructure. To help businesses and residents save money, we are working with both Delmarva and Chesapeake to make it easier for businesses to switch to cheaper and cleaner energy.[12]

Some of the benefits from fuel switching, referred to in this article as "public benefits," extend beyond energy consumers. Fuel switching has the potential to benefit energy consumers, the environment, the local and state economies, and gas utilities. One study estimated that residential customers in

NATURAL GAS PRODUCTION IN FEDERAL AND NON-FEDERAL AREAS 4 (2013), *available at* http://energycommerce.house.gov/sites/republicans.energycommerce.house.gov/files/20130228CRSreport.pdf (showing production); *U.S. Natural Gas Total Consumption*, U.S. ENERGY INFO. ADMIN., http://www.eia.gov/dnav/ng/hist/n9140us2a.htm (Sept. 30, 2013).

7. *See generally* EIA, AEO 2013, *supra* note 5.

8. *Id.* at 39-42.

9. *Id.* at 78.

10. For example, the average U.S. wellhead price of natural gas dropped from $7.97 per MMBtu in 2008 to $2.66 per MMBtu in 2012, a decline of 67%. *U.S. Natural Gas Prices*, U.S. ENERGY INFO. ADMIN. (Aug. 30, 2013), http://www.eia.gov/dnav/ng/ng_pri_sum_dcu_nus_a.htm (providing cost break downs of current and historical natural gas prices).

11. CONN. DEP'T OF ENERGY & ENVTL. PROT., 2013 COMPREHENSIVE ENERGY STRATEGY FOR CONNECTICUT (2013) [hereinafter CONN. ENERGY STRATEGY], *available at* http://www.ct.gov/deep/lib/deep/energy/cep/2013_ces_final.pdf; Del. Governor Jack Markell, State of the State Address: Leading in the World We Now Live In (Jan. 17, 2013), *available at* http://governor.delaware.gov/2013_sots_address.shtml; N.Y. ENERGY HIGHWAY TASK FORCE, NEW YORK ENERGY HIGHWAY BLUEPRINT (2012), *available at* http://www.nyenergyhighway.com/Content/pdf/Blueprint_FINAL.pdf.

12. Markell, *supra* note 11.

Connecticut would save, over a twenty-year period, $22,324, on a present value basis, if they were to convert from fuel oil to natural gas.[13] Estimates of annual savings for residential customers are within the $1,500-$2,000 range.[14] The savings are much larger for commercial and industrial customers.[15]

The public benefits from fuel switching could affect the policies of state public utility commissions (PUCs or "state commissions") as well as of state and local governments. For example, policymakers might rationalize unprecedented taxpayer or general ratepayer funding of fuel switching that promises large public benefits. State commissions are coping with complex ratemaking questions and whether to allow utilities to extend gas service to unserved areas.

New natural gas customers offer gas utilities a sustainable and viable form of demand growth. Unlike some other sources of demand growth, new customers promise additional profits for gas utilities as a result of increased throughput.[16] Once a utility signs up new customers, it will see sustainable demand growth. Increasing the number of customers, however, is usually far more costly to a gas utility than growing throughput from existing customers. The latter outcome, when it occurs between rate cases, normally increases a utility's profits, assuming that the utility base rates are above short-run marginal costs (which is typically true). Increasing the number of customers normally requires the utility to incur greater additional cost, especially if it has to build both new main and service lines.[17]

Realization of this potential source of new gas demand depends on two broad factors. The first is the willingness of households and businesses to convert from their current energy source to natural gas. Even though the economics seem favorable to large-scale conversions, regulatory and market obstacles may prevent conversions from happening. Related to this is the second factor, which is the development of an adequate pipeline infrastructure to accommodate the latent demand by prospective customers. Many challenges revolve around the expansion of gas service, especially extending main lines to unserved remote areas where, as a rule, utility revenues from new customers will fall short of the connection costs. A policy question is then who should fill this

13. CONN. ENERGY STRATEGY, *supra* note 11, at 126.

14. *Id.* at 127.

15. *Id.*

16. "Throughput" refers to the gas volumes delivered by a gas local distribution company. The company's primary source of profits comes from the level of throughput. *See, e.g.*, ENERGY INFO. ADMIN., IMPACT OF HIGHER NATURAL GAS PRICES ON LOCAL DISTRIBUTION COMPANIES AND RESIDENTIAL CUSTOMERS 23 (2007), *available at* http://www.eia.gov/pub/oil_gas/natural_gas/feature_articles/2007/ngpristudy/ngpristudy.pdf (discussing throughput and the impact it has on utility costs). Most gas utilities use a two-part rate structure that recovers a portion of their fixed costs in the volumetric charge. Thus, the utility recovers some of its fixed costs—other than the fixed costs recovered through the customer charge—from throughput.

17. One study for a gas utility showed that a 1% increase in the number of customers raised cost by 0.71%. In comparison, a 1% growth in total retail deliveries from existing customers raised cost by about 0.11%. MARK NEWTON LOWRY ET AL., STATISTICAL ANALYSIS OF PUBLIC SERVICE OF COLORADO'S FORWARD TEST YEAR PROPOSAL 18 (2010).

gap: utility customers, utility shareholders, local communities benefiting from the connection, state taxpayers, or a combination of the above? Alternatively, a better policy might involve not building the gas extension under the principle that growth should pay its own way (i.e., new customers should fully finance the investments).

This article discusses the regulatory and, to a lesser extent, the market, obstacles to achieving fuel conversions to natural gas. These obstacles, which affect either the demand- or supply-side of the natural gas market, can deter socially beneficial actions by energy consumers. As the saying goes, it takes two to tango: Without the willingness of consumers to change their energy source or the availability of an infrastructure to deliver the gas, fuel switching will not happen.

This article focuses on the effects of state public utility regulation. It excludes discussion of regulations that might limit gas service expansion because of environmental, land use, construction permitting, and other restrictions. What follows has both a normative and positive tone: what state commissions can do to promote fuel switching and gas line expansions, and what commission responses to positions taken by stakeholders in their support or opposition to gas line extensions can we expect.

III. DISTINCTION BETWEEN MAIN LINE AND SERVICE LINE EXTENSIONS

Service lines directly benefit only individual customers.[18] By constructing a line from the street to a house,[19] the residents of the household are the sole beneficiaries. For main lines, a group of new customers benefit. Some customers benefit earlier than others do, as new customers on a single main line sequentially sign up for service over time.

A. Three Categories of Benefits

We can classify new line extensions into three different groups according to the scope of their benefits. At one extreme are extensions that benefit only new customers: Utilities dedicate service lines to individual households and businesses and main lines to a group of geographically adjacent customers. The implication for pricing and cost recovery is that the utility should allocate all of the incremental cost to new customers. The reason is that private benefits equate to public benefits.

Other extensions benefit mostly new customers but also can benefit existing customers, although to a much lesser degree. As discussed later, these differences have implications for allocating the costs of extensions.[20] For example, to the extent that existing customers benefit, one can argue that they should pay for a portion of the line extension. Even if existing customers do

18. *E.g.*, PUGET SOUND ENERGY, NATURAL GAS: THE SMART CHOICE 2 (2011), *available at* http://pse.com/accountsandservices/Construction/Documents/4564.pdf.

19. *Id*.

20. *Infra* Section VI.

benefit, utilities dedicate new lines to serve new customers. Existing customers would benefit only as a residual effect from integrating the new lines into a gas utility's distribution network. These benefits presumably are small compared with the direct benefits to new customers. This integration could lower the utility's average cost. If a utility is unable to measure these residual benefits, it might then be appropriate to ignore them for ratemaking purposes.

A third category of new lines can have wider benefits. If they are large in capacity, they can make a concrete contribution to economic development and a cleaner environment. They could also provide some minor reinforcement and reliability benefits to other parts of the utility's distribution system. Under these conditions, policymakers might want to consider subsidies from taxpayers or other governmental assistance to bolster line extensions.[21] As discussed below, however, they should exercise caution before committing taxpayer money to an investment that, as a rule, the private sector should fund.

B. Main Lines Offer More Challenges for Policy

Rules for service line extensions should be simpler than rules for main line extensions. The utility can simply calculate the cost for a service extension to an individual home or business and then determine, based on the approved regulatory rules, how much to charge the new customer (e.g., via a surcharge, or in rates, or both).

Main lines, in contrast, serve an unknown number of new customers. The utility would expect the number of new customers served by main lines to increase over time. Assume, for example, that a new main line costs $10 million, and initially 1,000 new customers sign up for service. Assuming that new customers pay for the entire amount, the utility would assess each customer $10,000. Assume now that the number of customers using the main line grows to 2,000 after five years. Most people would consider it unfair for the utility to charge the later new customers nothing for the main line while continuing to collect $10,000 from each initial new customer (over, for example, a fifteen-year time period). Through its regulatory-approved rules, the utility may charge the 1,000 additional customers $5,000 each and refund each of the initial new customers $5,000.[22] The outcome is that each new customer pays the same amount for the new line ($5,000) and the utility recovers fully its cost for

21. As an alternative, policymakers could institute a Pigovian-like tax on the environmentally damaging fuels, such as oil and propane, to support conversion to natural gas. A Pigovian tax is a tax levied on a market activity that produces negative externalities, such as pollution. It attempts to correct an economically inefficient outcome (e.g., overconsumption of a good) by setting a tax that would increase the price that consumers pay to reflect the social cost of a market activity. *E.g.*, Robert H. Frank, *Heads, You Win. Tails, You Win, Too*, N.Y. TIMES (Jan. 5, 2013), http://www.nytimes.com/2013/01/06/business/pigovian-taxes-may-offer-economic-hope.html?_r=0.

22. A common practice of utilities is to refund excess new-customer advance payments or contributions when they experience unexpected growth in customers on a new main line. *E.g.*, WIS. ADMIN. CODE P.S.C. 113.1007 (2013). Some utilities make refunds when annual revenues exceed expectations. *E.g.*, ILL. ADMIN. CODE tit. 83, § 600.370 (2013).

the line ($10 million). This equal treatment of new customers is common among utilities.

IV. THE NATURE OF PUBLIC UTILITY REGULATION

A. State Commission Duties

Local gas transportation, commonly referred to as distribution service, moves natural gas from the "city gate" (i.e., the point of interconnection between the interstate pipeline system and the local distribution system) to the end users of gas.[23] These end users include homes, businesses, industrial facilities, and electric generating plants.[24] Local distribution service is a natural monopoly service; that is, a single company serves a local area, with the company usually protected from competition by state law.[25] Most local gas distributors, therefore, have exclusive rights to distribute gas in a designated geographic area.[26]

State commissions play a vital role in regulating the natural gas sector. Although the marketplace determines the price of commodity gas,[27] and the Federal Energy Regulatory Commission sets rates for interstate pipelines and wholesale storage service,[28] state commissions approve the cost of purchased gas by gas utilities in addition to the distribution costs incurred by gas utilities in delivering gas to end users.[29]

Most relevant for this article, state commissions authorize the construction of distribution facilities, which include main distribution lines and service lines.[30] The main line usually runs along a street to serve several customers; the service line extends from the street to a home or business. The cost for a utility to connect a new customer system is much lower when the utility has to construct only a service line.[31] New main lines are expensive: estimates on average range around $1 million per mile, and usually new customers taking gas service along them share in the costs that exceed what the utility calculates as economical costs.[32]

23. *Natural Gas Distribution*, NATURALGAS.ORG, http://www.naturalgas.org/naturalgas/distribution.asp (last visited Oct. 16, 2013) [hereinafter NATURALGAS.ORG, *Distribution*].

24. U.S. ENERGY INFO. ADMIN., DISTRIBUTION OF NATURAL GAS: THE FINAL STEP IN THE TRANSMISSION PROCESS 1 (2008) [hereinafter EIA, DISTRIBUTION OF NATURAL GAS].

25. NATURALGAS.ORG, *Distribution*, *supra* note 23.

26. *Id.*

27. *Marketing*, NATURALGAS.ORG, http://www.naturalgas.org/naturalgas/marketing.asp (last visited Oct. 16, 2013).

28. EIA, DISTRIBUTION OF NATURAL GAS, *supra* note 24, at 3.

29. NATURALGAS.ORG, *Distribution*, *supra* note 23.

30. *Id.* A utility might also have to make reinforcements on its existing network by the replacement of undersized mains, pressure uprates, looping, and regulators.

31. *E.g.*, PUGET SOUND ENERGY, *supra* note 18.

32. *E.g.*, *How Gas Gets to You*, ENTERGY LOUISIANA, http://www.entergy-louisiana.com/your_home/safety/how_gas.aspx (last visited Nov. 30, 2013). The cost to each customer served by a new main line depends on a number of factors, including the length of the extension, the number of initial customers receiving gas service, and extraordinary conditions (e.g., street restoration or permitting required by a municipality). *See, e.g.*, PUGET SOUND ENERGY, *supra* note 18.

State commissions issue certificates of convenience and necessity to a gas utility after approving new or replacement facilities.[33] As a rule, state commissions review the economics of and need for these facilities before issuing a certificate.[34]

Under state statutes and rules, most public utilities have an obligation to extend facilities to serve members of the public who need service; that obligation is not unlimited, however.[35] The utility's tariff usually specifies its obligation to extend natural gas mains.[36] The tariff includes an "economic test" that will dictate whether a utility finds a line extension to be economically infeasible. Specifically, utility tariffs often specify that a utility has an obligation to extend its lines only if the expected revenues from new customers cover the incremental costs.[37] When a utility finds it uneconomical, it may request that the customer provide a "contribution in aid of construction" (CIAC) to cover the uneconomic portion.[38] The utility includes the economic portion in its rates and ultimately paid for by all customers over time. As an example, if the utility can expect to receive $10 million of margins from new customers in a particular area, it would normally not charge those customers for that portion of its costs to expand a line. Yet, if the utility's cost is $15 million, it may require a CIAC of $5 million from new customers. As discussed later, the economic test used by some utilities may hinder gas service expansion by (1) mistakenly showing that the expansion would be uneconomical or (2) requiring prospective customers to pay an excessive amount upfront if they want the new pipes built.

B. The "Balancing Act" for Gas Line Expansion

1. Inevitable Trade-Offs

Individuals and groups make trade-offs in making a host of decisions. In understanding the behavior of commissions, trade-offs are also commonplace in

33. *E.g.*, TEX. UTIL. CODE ANN. § 37.051(e) (2013).

34. *Id.* § 37.051(a)-(b).

35. The electric industry differs from the natural gas sector in that consumers have no good substitute to meet certain end-use needs (e.g., lighting, air conditioning). KEN COSTELLO, NAT'L REGULATORY RESEARCH INSTITUTE, NO. 13-01, LINE EXTENSIONS FOR NATURAL GAS: REGULATORY CONSIDERATIONS 18 (2013). Natural gas lacks this essential nature, as other energy sources are able to provide all the end-use services that natural gas does. *Id.* Rather than serving a "public need," gas line extensions to accommodate fuel switching reflects a customer-choice decision that arguably falls outside the definition of a "necessity." *Id.* "Most states, in fact, have a statutory universal service goal or mandate for electric service but not for natural gas." *Id.*

36. *Id.* at 17.

37. *Id.*

38. *Id.* at 25-26; *e.g.*, KEVIN E. MCCARTHY & LEE R. HANSEN, CONN. OFFICE OF LEGISLATIVE RESEARCH, 2012-R-0407, EXPANDING GAS SUPPLY IN THE STATE (2012), *available at* http://www.cga.ct.gov/2012/rpt/2012-R-0407.htm. CIAC are funds deposited with the utility as a non-refundable contribution to assist in the financing of a line extension. The utility calculates CIAC based on "excess" cost relative to the projected revenues received from new customers. Depending on the utility, new customers may be able to pay their share of CIAC over some designated period. CIAC reflects the need to charge certain customers a special fee when they demand unusual service or reside in an area remote from the utility's infrastructure.

their decision-making. Specifically, commissions weigh different objectives in their decisions so as to advance the public interest.[39] This balancing means that commissions are willing to "trade" some objectives in return for others. Achieving one objective such as expanding gas service at any cost is incompatible with a balanced approach. Costs represent lost opportunities for the utility to benefit their customers and the general public.

PUCs strive to balance the interests of different stakeholders with the overall objective of promoting the public interest; at least, that is the premise behind public utility regulation.[40] Although one might question the "public interest" goal of PUCs, experience has shown that they do struggle with balancing the interests of different stakeholders. Terms like "fairness" and "just and reasonable prices" have subjective connotations that challenge regulators to balance multiple objectives including safety, expansion of utility service, universal service, reliability, and economic efficiency.[41] Within this context, PUCs will evaluate utility plans to expand their distribution systems and determine their overall effect on the general public.

One example of a conflict is a commission trying to maximize fuel switching while also holding existing customers harmless. It could promote the first objective by including the incremental cost from pipe expansion in the rates of all customers. This cost allocation would lower the responsibility of new customers to pay for new pipes. By spreading the costs to everyone, however, existing customers could pay more for gas service than the benefits they receive from the expansion. Commissions implicitly must weigh the two objectives to arrive at a decision that it deems to be in the public interest.

2. Objectives of Gas Line Expansion

Interpreting past policies of state commissions on gas expansion plans, four objectives stand out that require them to perform a balancing act:

- Compensate the utility for prudent investments;
- Promote fairness between new and existing customers;
- Require new customers to pay uneconomical costs or else relieve the utility of any service obligation; and
- Promote social goals or public benefits.

Under a balancing act, the utility would recover all of its prudent incremental costs. This outcome avoids worsening of the utility's financial

39. STANLEY MCMILLEN & KANDIKA PRAKASH, CONN. DEP'T OF ECON. & CMTY. DEV., THE ECONOMIC IMPACT OF EXPANDING NATURAL GAS USE IN CONNECTICUT (2011), *available at* http://www.ct.gov/deep/lib/deep/energy/cep/decd-the_economic_impact_of_expanding_natural_gas_use_in_connecticut.pdf; *see, e.g.*, *Goals and Objectives of the Commission*, HAW. PUB. UTILS. COMM'N, http://puc.hawaii.gov/about/goals-objectives/ (last visited Sept. 9, 2013).

40. *See, e.g.*, Order No. 719, *Wholesale Competition in Regions with Organized Electric Markets*, F.E.R.C. STATS. & REGS. ¶ 31,281 at P 7, 73 Fed. Reg. 64,100 (2008) (codified at 18 C.F.R. pt. 35) (requiring utilities to fairly balance the diverse interests of shareholders and customers).

41. *See generally* Douglas N. Jones & Patrick C. Mann, *The Fairness Criterion in Public Utility Regulation: Does Fairness Still Matter?*, 35 J. ECON. ISSUES (2001) (discussing the history of the concept of fairness in utility regulation).

condition when it invests prudently in new gas lines. Commissions generally judge that these costs are not excessive before allowing the utility to recover them. In reducing utility risk, some commissions might entertain pre-approving the investment. Without pre-approval, some utilities might find it too risky to invest in line expansions that require large sums of money.[42]

"Fairness" is an elusive and contentious term that is the subject of heated debate in regulatory proceedings.[43] It applies both to the commission treatment of different classes of customers as well as to the treatment of utility shareholders. Fairness usually requires rates that are not "arbitrary or capricious"[44] and the allocation of costs across customer classes be based on cost-causation principles.

For gas expansion investments, commissions must decide on how to allocate the additional costs to existing and new customers. When utilities and new customers alone stand to benefit, a commission is more likely to balance the risks and benefits by requiring both groups to bear the entirety of the risks. A utility, for example, might expand its main lines in anticipation of serving new customers. This expectation involves some risk as the number of new customers is unknown, other than those who already committed to taking natural gas. Commissions would question whether funding this investment from all utility customers would impose an excessive risk upon existing customers. At least, they would address the "fairness" of this practice to existing customers. This topic probably represents the most contentious of all those being addressed in gas expansion proceedings.

The requirement that new customers pay for uneconomical costs not only protects existing customers but also prevents the utility from suffering any financial harm. This ratemaking practice coincides with the principle of incremental cost pricing that allocates additional costs to those customers who directly benefit. The general perception is that since new customers are the major beneficiaries of line extensions, they should pay the bulk of the costs.[45]

42. Over the past several years, state utility commissions have encountered intense pressure from utilities to approve cost-recovery mechanisms that shift more of the risks to customers. In many instances this pressure takes the form of requests for pre-approval (sometimes called "full commitment") of both an investment and its costs. *See, e.g.*, Staff Report on Sw. Gas Corp. Filing for Pre-Approval of Cost Recovery for Participation in the Kinder Morgan Silver Canyon Pipeline Project, Application of Sw. Gas Corp. for Pre-Approval of Cost Recovery, No. G-01551A-04-0192, 2004 WL 3410688 (Ariz. Corp. Comm'n June 29, 2004). The scope of a regulatory commitment affects the scope and nature of later retrospective review of the utility's performance. Regulatory commitments are controversial because they can assign to customers virtually all the risks of a costly new investment with uncertain benefits. Regulators are understandably reluctant to bet customer money on a capital project that can turn out to be an uneconomic disaster. Pipe expansion into unserved areas might pose such a risk.

43. *See infra* Section VI.B.ii.b.

44. *E.g.*, Office of the Pub. Counsel v. Missouri Pub. Serv. Comm'n, No. SC 92964, 2013 WL3894953, at *1, *3 (Mo. July 30, 2013) (applying the "arbitrary and capricious" standard of review when reviewing whether the Commission's rates were "just and reasonable").

45. Public Serv. Co. of N.H., 94 N.H.P.U.C. 673 (2009) (finding a requirement that new customers pay costs associated with the line extensions from which they benefit "just and reasonable and in the public interest").

Another rationale for this pricing is that it prevents placing other energy sources at an unfair disadvantage. Oil and propane suppliers, for example, would argue that when new customers pay less than incremental cost, they are receiving a subsidy that unduly favors natural gas.[46] This subsidy means that prospective customers are not receiving proper price signals in making energy choices. Specifically, natural gas receives an artificial price advantage that results in excessive fuel switching and new gas line investments.[47]

Commissions seem far less interested in the social benefits from gas line extensions unless the state energy strategy advocates fuel switching to natural gas. Although most commissions are independent agencies, they occasionally succumb to pressure from the Governor's office or the legislature in taking a certain position on an important issue.[48] Experience has shown that in states with a policy to promote fuel switching, commissions have exhibited more support for utility investments in gas line extensions.

Overall, commissions typically strive to serve the public interest, which inevitably deprives individual stakeholders of the maximum benefits that they hoped for.[49] As already evident in regulatory proceedings throughout the country, PUCs will weigh the benefits of gas line expansions to new customers and utilities against the costs that could fall on existing customers.[50]

So far conspicuous are most commissions following the principle that any line extensions should not burden existing customers. Commissions may face pressure in the future, however, to change their position, partially to offset the high costs that could fall on new customers located in rural areas and because of pressure from the governor and the state legislature. Policymakers will continue to ponder over whether a utility should invest in line extensions that cannot pay for themselves from the direct beneficiaries, namely new customers.

V. THE ECONOMICS BEHIND FUEL SWITCHING AND PIPELINE EXTENSION

The United States has seen a large number of households shifting from one fuel to another over time. In 1950, over half of American households with space heating equipment used either coal or oil for space heating; by 2009, only 7% did.[51] Over that same period, the combined natural gas and electricity share rose

46. *See, e.g.*, Public Advocate's Motion to Close Docket at 8, Application of Chesapeake Util. Corp., Del. P.S.C. Docket No. 12-292 (Jan. 4, 2013).

47. *E.g.*, *id.*

48. *See, e.g.*, Governor John Engler et. al., *Governor's Power to Control Agency Discretion*, 74 MICH. B.J. 258 (1995) (illustrating the interplay of policy, administrative law, and accountability in shaping the executive's influence over administrative decisions); William D. Berry, Univ. of Ky., *An Alternative to the Capture Theory of Regulation: The Case of State Public Utility Commissions*, 28 AM. J. POL. SCI. 524, 528-29 (1984) (proposing that commissioners are driven by two major goals: (1) "survival," that is, keeping their position within the agency, and (2) policy objectives).

49. *E.g.*, NEV. REV. STAT. § 704.001 (2011).

50. *E.g.*, Bay State Gas Co., D.P.U. 09-30, 2009 WL 3705629, at *15-16 (Mass. D.P.U. Oct. 30, 2009).

51. U.S. ENERGY INFO. ADMIN., DOE/EIA-0384 (2011), ANNUAL ENERGY REVIEW 2011, at 56 (2012), *available at* http://www.eia.gov/totalenergy/data/annual/pdf/aer.pdf.

from 27% to 85%.[52] In the last twenty years, New England households have shifted in large numbers from oil to natural gas.[53] Households and business continue to switch as oil prices rise relative to natural gas prices.[54] Even the Pacific Northwest, where electricity is relatively inexpensive, has seen many households convert to natural gas for space and water heating.[55] Energy market shares vary widely across regions.[56] Natural gas water heaters dominated in most regions of the country.[57]

Notwithstanding these trends, the recent surge in natural gas supply has generated interest in accelerating fuel switching to natural gas.[58] We have already identified the potentially large private and public benefits from fuel switching. Energy consumers can save large sums of money that they can spend on other goods and services.[59] This increased discretionary income can bolster the local and state economy.[60] Consumers also directly benefit to the extent that natural gas is more convenient and reliable than oil or propane.[61] Natural gas has environmental advantages over oil.[62] Finally, an "amenity" benefit derives from the absence of an oil or propane storage tank on one's property.[63]

A. The Consumer-Side of Fuel Switching

The major drivers for fuel switching are the relative prices of different energy sources, climate, and fuel availability.[64] Rural areas use little natural gas

52. *Id.*

53. The percentage of households in New England using natural gas as their main space heating fuels increased from 28% to 40% during 1997-2009. Over the same period, oil's share fell from 53% to 42%. *2009 RECS Survey Data*, U.S. ENERGY INFO. ADMIN., http://www.eia.gov/consumption/residential/data/2009/ (under "Space Heating," open the spreadsheet for "Northeast Region, Divisions, and States (GC6.8)") (last visited Oct. 17, 2013); U.S. ENERGY INFO. ADMIN., 1997 CONSUMPTION AND EXPENDITURES TABLES 24 tbl. CE2-9c, *available at* http://www.eia.gov/consumption/residential/data/1997/pdf/consumption-expenditures/spaceheat_consump.pdf.

54. *See generally 2009 RECS Survey Data*, U.S. ENERGY INFO. ADMIN, http://www.eia.gov/consumption/residential/data/2009/#undefined (last visited Oct. 17, 2013) (providing data concerning fuel use across a number of different areas and time periods).

55. *Id.*

56. *Id.*

57. *Id.*

58. *See, e.g.*, discussion of activities *supra* Part II.

59. *E.g.*, CONN. ENERGY STRATEGY, *supra* note 11, at 126.

60. *Id.* at 139.

61. For example, natural gas offers less chance of non-deliverability of energy and service shut offs because of extreme weather conditions. *E.g.*, *The Advantages of Natural Gas*, PSE&G, http://www.pseg.com/business/small_large_business/convert/advantages.jsp (last visited Sept. 9, 2013).

62. *E.g.*, *id.*

63. *E.g.*, *id.* Another possible benefit is protection against shut offs during cold weather. Some states prohibit shut offs by delivered-fuel providers, such as propane suppliers, but other states do not. *E.g.*, *Utility Shut Offs As the Winter Moratorium Ends*, IOWA LEGAL AID (Mar. 2003), http://www.iowalegalaid.org/resource/utility-shut-offs-as-the-winter-moratorium-en.

64. *Natural Gas Demand*, NATURALGAS.ORG, http://www.naturalgas.org/business/demand.asp#factorshort (last visited Sept. 10, 2013).

because of the scarcity or absence of gas distribution lines.[65] The reason is the uneconomical nature of extending lines to these areas.[66] Natural gas is highly competitive, and the fuel of choice, in most areas where households and businesses have access to a gas distribution main.[67]

Arguments on why consumers sometimes make wrong decisions, including staying with their current energy source, focus on market obstacles or imperfections.[68] These include: (1) imperfect information, (2) high upfront costs, (3) high consumer discount rate, (4) lack of consumer access to capital or unwillingness to borrow or reduce their savings, and (5) high transaction costs.[69] Some of these obstacles result in consumers not making decisions that are in their self-interest; others reduce society's welfare. Energy-efficient gas equipment, for example, has a higher initial cost than corresponding electric equipment.[70] This cost differential, assuming consumers assign a high discount to the benefits of lower energy cost over the life of the equipment, favors electric utilities even when gas is more economical on a life-cycle cost basis.

The policymaker should carefully consider whether all of these obstacles are truly impediments to better outcomes. Inertia may reflect the reluctance of rational risk-averse consumers to change energy forms because of uncertain outcomes that could make them worse off.[71] It would not be cost-beneficial to eliminate or mitigate some "obstacles." Trying to subsidize consumers' upfront costs, for example, may cost more than the gains.

65. *Beyond Natural Gas and Electricity; More than 10% of U.S. Homes Use Heating Oil or Propane*, U.S. ENERGY INFO. ADMIN (Nov. 28, 2011), http://www.eia.gov/todayinenergy/detail.cfm?id=4070.

66. Keith Edwards, *Pipeline Construction, PR Efforts Herald Natural Gas Push in Central Maine*, KENNEBEC J. (Mar. 18, 2013), http://www.kjonline.com/news/Pipeline-construction-PR-efforts-herald-natural-gas-push-in-central-Maine.html?pagenum=full.

67. *Id.*

68. Behavioral economics combines economics and psychology to explain why people often make "wrong decisions." It assumes "bounded rationality," where people make decisions with less-than-perfect information because of limited time and mental capacity. People often exhibit what some analysts call "rational ignorance." *See, e.g.*, RICHARD H. THALER & CASS R. SUNSTEIN, NUDGE: IMPROVING DECISIONS ABOUT HEALTH, WEALTH, AND HAPPINESS (2008); ROBERT H. FRANK, THE ECONOMIC NATURALIST: IN SEARCH OF EXPLANATION FOR EVERYDAY ENIGMAS (2007).

69. Transaction costs are those costs incurred by energy consumers in converting to natural gas, excluding the appliance and other hardware costs. They include costs for educating themselves, searching for new appliances and contractors, getting funding to pay for the conversion, and other time-related costs that reflect opportunity costs. Higher transaction costs encourage consumers to remain with their current supplier. *See generally* Carol A. Dahl & Thomas K. Matson, *Evolution of the U.S. Natural Gas Industry in Response to Changes in Transaction Costs*, 74 LAND ECON. 390 (1990) (discussing the impact of transaction costs on the natural gas industry).

70. *E.g.*, RICHARD MEYER, AM. GAS ASS'N, SQUEEZING EVERY BTU: NATURAL GAS DIRECT USE OPPORTUNITIES AND CHALLENGES 32-35 (2012), *available at* http://www.getgasfl.com/Portals/6/documents/NaturalGasDirectUse-SqueezingEveryBTUFullReport.pdf.

71. Inertia relates to what analysts call "status quo bias" in which consumers would tend to stick with their current supplier even if switching would benefit them. *See generally, e.g.*, Raymond S. Hartman et al., *Consumer Rationality and the Status Quo*, 106 QUARTERLY J. ECON. 141, 141-44 (1991) (finding the existence of a "irrational" bias toward selection of familiar goods and services).

Elaborating on some of the obstacles, high upfront costs might place energy consumers in debt or drain limited savings. These costs are especially acute when the utility has to extend its main line to new areas.[72] As discussed later, consumers may find the high upfront costs of converting to natural gas a major obstacle.[73] Although not what economists would consider a market obstacle that requires intervention, a utility at the request of the commission might offer prospective new customers the option to pay back appliance replacement costs plus the customers' share of the costs for new pipes over several years. Just as accommodating payment plans have bolstered energy-efficiency investments, a similar mechanism can stimulate fuel switching as well.

Another obstacle to fuel switching is the uncertainty of the benefits.[74] Natural gas prices relative to other energy prices is the major factor.[75] Some astute energy consumers may still remember the large price spikes for natural gas during most of the first decade in this century.[76] Although almost all projections call for much steadier prices for the foreseeable future,[77] consumers may adapt their forecasts of natural gas prices to past events. A common perception, notwithstanding recent market conditions, is that natural gas prices are inherently volatile.[78] Thus, many energy consumers might be reluctant to commit on a long-term basis to a fuel source whose future price could settle substantially above the current level.

In one sense, "inertia" might cause customers to stay with their current supplier when the expected gains are not sufficient to offset the costs and risks associated with switching to a new supplier.[79] This action reflects perfectly rational customer behavior. Inertia can prevent customers, however, from

72. Estimates of pipe mains vary depending on conditions. A "ballpark" estimate that studies often use is $1 million per mile. CONN. ENERGY STRATEGY, *supra* note 11, at 128. Assume that a utility stretches a main line by 40 miles and 8,000 new customers take gas service. The average cost per customer is then $5,000. If initially a far fewer number of customers committed to taking gas, those customers could pay far higher than $5,000 each. As the utility signs up more customers along that line, it is common practice for the utility to give refunds to those early customers.

73. One utility, NSTAR of Massachusetts, estimated an upfront cost of $14,000 for new customers if they have to pay the costs for new heating equipment plus their fair share of a new main line. Dave Allain, Dir. of Gas Sales & Mktg., NSTAR Gas Marketing Program Presentation to the Northeast Gas Association (Aug. 23, 2011) (on file with the author). Conversion costs, excluding line costs, include heating equipment replacement, internal piping, and a meter. Another estimate is $7,500 for the cost of buying and installing a new gas furnace plus $4,300 for the service line meter and $190 per foot (or about $1million per mile) for a main line. CONN. ENERGY STRATEGY, *supra* note 11, at 128.

74. *See generally* CONN. ENERGY STRATEGY, *supra* note 11, at 146-57 (discussing strategies to encourage fuel switching).

75. EIA, AEO 2013, *supra* note 5, at 39, 77, 100-03.

76. *Natural Gas Prices*, U.S. ENERGY INFO. ADMIN., http://www.eia.gov/dnav/ng/hist/n9190us3m.htm (last updated Sept. 30, 2013).

77. EIA, AEO 2013, *supra* note 5, at 99.

78. ERIN MASTRANGELO, U.S. ENERGY INFO. ADMIN., AN ANALYSIS OF PRICE VOLATILITY IN NATURAL GAS MARKETS (2007) (finding perceptions of volatility are correlated with price; although in reality, they are distinct and are subject to many influences).

79. *See generally* Raymond S. Hartman et al., *supra* note 71, at 156-57; *see also* CONN. ENERGY STRATEGY, *supra* note 11, at 2 (identifying consumer inertia as an obstacle to energy efficiency).

changing energy sources when it would benefit them.[80] Since contemplating whether to switch to another energy source requires effort and time, the opportunity cost for many customers can exceed their expected benefits.[81] Unless one energy source offers clear advantages (e.g., large cost differences) in view of the transaction costs, conversion costs, and uncertainty over benefits, residential customers might not deliberate over the choice of their energy source. Yet, this behavior seems less likely in fuel switching to natural gas as its price is currently far below those of alternate energy sources, such as oil and propane.[82] For those prospective customers who would be small users of natural gas, even when the price gap is large, the economics may not favor switching fuels.

Inadequate information on the benefits and costs of fuel conversion will also tend to make consumers hesitant in taking any action.[83] Customers might also have difficulty in processing good information to make rational decisions. With fuel switching, most customers have no prior experience and some are likely to make conversion decisions poorly (e.g., do not switch when the payback period is short).[84]

High consumer discount rates translate into consumers placing a lower value on future energy savings. The effect is to make an investment that requires high upfront costs less economically attractive. Studies have calculated a high implicit discount rate for residential consumers' purchases of high energy-efficient appliances.[85] This evidence seems applicable to fuel-switching decisions by households as well.

Utilities can help overcome some of these problems by (1) facilitating efforts by consumers to fuel switch and (2) aggressively disseminating information showing the benefits from fuel switching.[86] Utilities, for example, can offer consumers a repayment plan for upfront costs and assist in their conversion.

80. Tom de Castella, *Energy Switching: Why the Customer Inertia?*, BBC NEWS (Sept. 21, 2011), www.bbc.co.uk /news/magazine-14989860.

81. *Id.*

82. *Heating Fuel Comparison Calculator*, U.S. ENERGY INFO. ADMIN., www.eia.gov/neic/experts/heatcalc.xls (last updated Sept. 12, 2013). The statement in the text above assumes that consumers have accurate information on the price differentials between energy sources.

83. CONN. ENERGY STRATEGY, *supra* note 11, at 2.

84. *Id.* at 2, 149.

85. *See, e.g.*, Jerry A. Hausman, *Individual Discount Rates and the Purchase and Utilization of Energy-Using Durables*, 10 BELL J. ECON. 33, 51 (1979); *see also* Jeffrey A. Dubin & Daniel L. McFadden, *An Econometric Analysis of Residential Electric Appliance Holdings and Consumption*, 52 ECONOMETRICA 345 (1984) (supporting Hausman's findings).

86. *See generally* CONN. ENERGY STRATEGY, *supra* note 11, at 146-57 (discussing strategies to encourage fuel switching).

B. Investment Criteria for Line Expansion

1. Investments and Utility Profits

State commissions require that utility investments benefit customers. These benefits might include greater pipeline safety and service reliability and economic gains in the form of lower rates and additional services.[87] For line expansions, the objective is to extend service to either unserved or underserved areas.[88] Utilities find it more economical to serve a large number of customers in a densely populated area than to serve a much smaller number in a more sparsely populated area.[89] Thus, line extensions in unserved rural areas can involve large utility investments.

In expanding to either unserved or underserved areas, utilities stand to earn higher profits over time from serving a greater number of customers.[90] In industry jargon, a utility's margins (i.e., net revenues) should increase. Margins equal revenues minus costs, which include the initial investment[91] plus taxes, debt, and operation and maintenance costs during the life of the new pipes.[92]

One observes differences in utilities' postures toward line expansions: some utilities are more proactive in signing up new customers than other utilities. The reason for this behavior is unclear: is it because of regulatory policies, or management disposition, or both? Regulation can affect the expected returns earned by utilities and the certainty of cost recovery.[93] Since line extensions largely involve capital expenditures, the primary criterion for utilities centers on the prospects for earning an acceptable rate of return.[94] These factors are especially important when deciding to expand service to unserved areas where, from the utility's perspective, the risks and costs are greater.

87. *E.g.*, CAL. PUB. UTIL. CODE § 399(e) (2013).

88. *E.g.*, *UGI Asks PUC OK to Expand Natural Gas System to Unserved Areas*, NEWSITEM.COM (Apr. 10, 2013), http://newsitem.com/news/ugi-asks-for-puc-ok-to-expand-natural-gas-system-to-unserved-areas-1.1470492.

89. *E.g.*, Edwards, *supra* note 66.

90. Unlike some other sources of demand growth for natural gas which bypass the distribution system, new demand from system expansions will increase a utility's profits. This assumes that commissions allow a utility to recover all of its incremental costs in serving new customers.

91. In addition to construction of new pipes, investments can involve replacing undersized mains, looping, and regulator station work. *E.g.*, National Grid, Proceeding to Examine Policies Regarding the Expansion of Natural Gas Service: Case 12-G-0297 (Jan. 9, 2013), *available at* https://www3.dps.ny.gov/W/PSCWeb.nsf/ca7cd46b41e6d01f052568580054595 5/01addbdc8541da9885257ae9005cfd4b/$FILE/ATT1STSB.pdf/9-National%20Grid%20-%20Upstate%20(final).pdf.

92. FED. ENERGY REGULATORY COMM'N, COST-OF-SERVICE RATES MANUAL 6-7 (1999), *available at* www.ferc.gov/industries/gas/gen-info/cost-of-service-manual.doc.

93. *See generally* REGULATORY ASSISTANCE PROJECT, ELECTRICITY REGULATION IN THE US 36-58 (2011), *available at* www.raponline.org/document/download/id/645 (describing the factors that a commission considers when determining a utility's rate of return).

94. "Acceptable" accounts for the uncertainty and timing of cost recovery, as well as other risks that the utility perceives. *See also, e.g.*, Proceeding on Motion of the Commission to Examine Policies Regarding the Expansion of Natural Gas Service, 12-G-0297, slip op. at 6-7 (N.Y. P.S.C. Nov. 27, 2012) (discussing the Commission's policy to set rates based on expected rate of return of the expansion project).

At first, it seems somewhat odd why all utilities do not aggressively try to sign up new customers; after all, a gas utility makes profits largely by increasing its throughput.[95] A gas utility typically recovers non-gas costs from customers by charging them a fixed monthly customer charge plus a volumetric or usage charge.[96] The utility recovers a portion of its fixed costs (i.e., costs that do not vary with customer usage in the short run) through a volumetric charge.[97] Thus, the utility's ability to recover its authorized rate of return depends on the level of throughput. The utility would have an economic incentive to increase throughput, as long as additional sales grow revenues by more than costs.[98] Revenue decoupling has diminished the utility's ability to profit from increased throughput by existing customers.[99] It would appear more economical for those utilities that have a revenue-decoupling mechanism to pursue new customers actively by expanding their distribution system. Why they all do not is not obvious; as discussed later, regulatory rules that restrict their expected profits could hamper their interest in expanding gas service.[100]

2. Criteria for System Expansion Investments

Natural gas service presents a unique challenge for utilities because, unlike other forms of utility service, consumers have alternatives to natural gas for meeting their end-use needs.[101] If a utility extends natural gas service to an area, it has no assurance that homes or businesses along the pipe will sign up for such service if they are already using another energy form. One reason is the potentially high initial cost to convert heating systems and appliances to natural gas.[102]

95. *See generally Decoupling in Detail*, CTR. FOR CLIMATE & ENERGY SOLUTIONS, http://www.c2es.org/us-states-regions/policy-maps/decoupling/detail (last visited Oct. 18, 2013) (demonstrating the effect of increased throughput).

96. *E.g.*, Joshua M. Pearce, *Electricity Rates and Fixed Charges: How U.S. Utilities Suppress Distributed Generation*, COGENERATION & ON-SITE POWER PROD. (Jan. 1, 2008), http://www.cospp.com/articles/print/volume-9/issue-1/features/electricity-rates-and-fixed-charges-how-us-utilities-suppress-distributed-generation.html.

97. CTR. FOR STATE INNOVATION, UTILITY RATE DECOUPLING: CONSERVING ENERGY 1 (2008), *available at* http://www.stateinnovation.org/Publications/All-Publications/Utility-Rate/UtilityRates.aspx.

98. *Id.*

99. Most revenue decoupling mechanisms make rate adjustments based on the difference between actual and authorized revenues on a per-customer basis. *See, e.g.*, WAYNE SHIRLEY ET AL., REGULATORY ASSISTANCE PROJECT, REVENUE DECOUPLING 6, 47 (2008), *available at* http://www.raponline.org/docs/RAP_Shirley_DecouplingRevenueRpt_2008_06_30.pdf.

100. Even without revenue decoupling, gas use per customer has fallen since 1987. For example, gas use per residential customer dropped by twenty percent since that time. ENERGY INFO. ADMIN., TRENDS IN U.S. RESIDENTIAL NATURAL GAS CONSUMPTION 3 (2010) [hereinafter EIA, CONSUMPTION].

101. *See generally* U.S. ENERGY INFO. ADMIN., http://www.eia.gov/ (last visited Oct. 18, 2013) (providing information about U.S. energy sources such as crude oil, heating oil, gasoline, coal, hydropower, wind power, and natural gas).

102. CONN. ENERGY STRATEGY, *supra* note 11, at 128-29.

a. Economic Tests for Evaluation

Most utility tariffs specify an economic test that compares expected revenues from new customers with the utility's incremental costs: The utility calculates both the incremental costs and the incremental revenues from a line extension.[103] The difference between incremental revenues and incremental costs equals the utility's distribution margins.[104]

Utilities use different tests to evaluate system expansion investments. Some use a net present value test that subtracts the discounted costs of serving new customers from the expected discounted revenues.[105] If the difference is positive, the utility would consider the line extension to be economical and a financially viable investment.[106] Other utilities use the internal rate of return (IRR) method for evaluating new lines.[107] If the discount rate (i.e., the IRR) is greater than the utility's cost of capital (frequently defined as the utility's authorized rate of return in the latest rate case), the utility would consider the new line economically feasible.[108] Other utilities calculate the maximum investment cost for new lines as a specified multiple of estimated annual net revenues, or distribution margins. In effect, the utility designates a minimum payback period. Assume that a utility wants the payback period not to exceed three years and estimates the annual net revenue (i.e., margins) for a particular customer as $400. The utility would then consider $1,200 as the threshold level of investment, or the maximum amount it will spend to justify the investment economically.

b. A Critique of the Economic Tests

These tests have different implications for utility investments in system expansion. First, all of the above-mentioned tests focus on the financial effect on the utility. The tests exclude the public benefits from fuel switching to natural gas. The tests are analogous to what analysts call the "utility test" for

103. *E.g.*, 52 PA. CODE § 65.21 (2013).

104. *E.g.*, SOUTHERN CONN. GAS CO. ET AL., JOINT NATURAL GAS INFRASTRUCTURE EXPANSION PLAN 12 (2013), *available at* http://nuwnotes1.nu.com/apps/financial/nuinvest.nsf/485278f6d555fbab8525731d005ff955/4db3b22339d27b3c85257b8d004df86e/$FILE/June%202013%20joint%20CT%20gas%20expansion%20plan.pdf.

105. *E.g.*, North Carolina *ex rel*. Utils. Comm'n v. Carolina Util. Customers Ass'n, 446 S.E.2d 332, 341 (N.C. 1994) (describing the North Carolina Utilities Commission's definition of net present value).

106. *E.g.*, *id.*

107. *E.g.*, SOUTHERN CONN. GAS CO. ET AL., *supra* note 104. Firms across different industries commonly use the IRR method to evaluate the financial viability of investments. For gas line extensions, utilities calculate the discount rate at which the present-value distribution margins equal the present value incremental costs. The utility estimates the annual margins and costs over the service life of a new line or some other specified time. Otherwise, the utility would have to decide whether to invest in a new line or invest under the condition that new customers will compensate for any revenue shortfall. For the latter action, the utility could calculate the customer contributions required to increase the IRR to the utility's cost of capital.

108. This condition is necessary for the utility to make the investment, but it may not constitute a sufficient condition. The utility, for example, might have limited capital funds for which it can garner a higher rate of return from other investments.

evaluating energy-efficiency initiatives.[109] While comparing revenue changes and cost changes is important for knowing the effect on a utility, the tests ignore the broader societal effects.[110] For fuel switching, these effects can include economic development, a cleaner environment, and increased energy reliability.[111] Overall, the economic tests used by utilities for evaluating system expansion investments understate the social benefits.

Second, the tests arrive at different answers as to how much a utility should expend on line extensions. Especially for those tests that require a quick payback for the utility (e.g., the net revenue test with a three-year horizon), the utility may reject a large portion of new line investments. One criticism of those tests is that they have a much shorter time horizon than the expected life of new lines (e.g., thirty to forty years).[112] Thus, they fail to account fully for the expected margins earned by utilities over new lines' operating lives.

Third, these tests are less relevant in evaluating new lines in unserved areas. New areas pose higher risk for the utility from greater uncertainty over the expected number of new customers. The utility might build a main line to serve few customers initially, expecting that over time the line will serve an increasing number of new customers to justify ultimately the investment.[113] This is a departure from the traditional strategy of utilities to build a new line only after a sufficient number of customers commit.[114] The initial customers might have to pay a large CIAC, which could discourage some from converting to natural gas.[115] If instead, existing customers have to compensate the utility, stakeholders and the commission itself may resist.[116] At a minimum, in evaluating a build-out

109. LEADERSHIP GROUP, U.S. DEP'T OF ENERGY & U.S. ENVTL. PROT. AGENCY, NATIONAL ACTION PLAN FOR ENERGY EFFICIENCY 6-22 (2006).

110. *Id.*

111. CONN. ENERGY STRATEGY, *supra* note 11, at 55, 121, 126, 139. Households and businesses, for example, would have higher discretionary income from spending less on energy that they could spend on other goods and services. *Id.* at 139.

112. *Extension of Natural Gas Service: Comments Before the H. Comm. on Consumer Affairs*, 113th Cong., 1st Sess. 5-6 (Pa. 2013) [hereinafter *Comments Before Pa. H. Comm.*], *available at* http://www.oca.state.pa.us/Testimony/2013/HouseConsumerAffairs_ExtentionOfNGS.pdf (testimony of Tanya J. McCloskey, Acting Consumer Advocate).

113. Under this strategy, the utility would schedule construction by area and estimate revenues and costs for the area.

114. *E.g.*, Stephen Singer, *Gas Line Upgrade Proposed for NY-to-Boston Route*, YAHOO NEWS (July 6, 2013), http://news.yahoo.com/gas-line-upgrade-proposed-ny-125927705.html. The utility might connect individual customers and estimate the expected revenues and costs for each customer independently.

115. Comments from Consumer Power Advocates at 2-3, Natural Gas Service Expansion, N.Y. P.S.C. Case 12-G-0297 (Mar. 12, 2013) (submitted via email), *available at* documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId.

116. The Connecticut Public Utilities Regulatory Authority (PURA) has commented that:

> The [state energy] strategy calls for the expansion to be built over seven years. According to PURA, existing customers are likely to pay for a significant portion of the expansion during its early years. Moreover, when the gas companies estimated the expansion's potential ratepayer impact, they assumed that (1) all of the new customers were added by the end of the expansion period and (2) these customers, on average, used as much gas as the existing average customer. PURA notes that any changes to the number of potential customers and estimated average consumption will drastically

proposal,[117] a commission would want to know the number of new customers that the utility can reasonably expect to connect.

A better estimate of new customers would lessen the possibility of stranded investments burdening either utility shareholders, or customers, or both. Another way to lessen risk, in addition to improving the economics of a new line, is for the utility to sign up an industrial anchor or any large customer (e.g., housing subdivision, shopping center, or hospital) which would also reduce the required contributions from other new customers. One last point relates to some recent movement toward existing customers paying for part of the costs for new lines in unserved, remote areas. Recent legislation in Nebraska would allow for these payments to promote economic development.[118] Previously, North Carolina permitted taxpayer assistance for funding uneconomical line extensions.[119] In the future, we can expect more funding from taxpayers and existing utility customers to pay for new gas lines in unserved areas.

Fourth, the economist tests determine the responsibility of new customers to compensate for any revenue shortfall. Gas utilities have used economic tests to calculate the maximum investment that they could support given the expected distribution margins from new lines. The difference between the actual cost and economical cost usually would fall on new customers; alternatively, the utility's existing customers and shareholders could shoulder a part of the difference.[120] The amount that new customers would have to pay upfront, as a CIAC or other forms of payment, could affect the rate of fuel switching.[121] As mentioned earlier, high upfront costs could turn prospective customers away from switching to natural gas even when economical in the long run. Allowing customers to amortize those costs over time (e.g., five years), could mitigate this problem and grow the number of new customers for a gas utility.

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change the amounts contributed by existing customers. PURA concludes that expansion could result in a $2.26 billion rate base (the companies' total infrastructure) increase and may not occur without funding from all gas ratepayers and potentially all state residents.

KEVIN E. MCCARTHY, CONN. OFFICE OF LEGISLATIVE RESEARCH, PURA'S COMMENTS ON THE COMPREHENSIVE ENERGY STRATEGY (2013), *available at* http://www.cga.ct.gov/2013/rpt/2013-R-0180.htm.

117. Utilities sometimes refer to this strategy as the "area growth model" in which they would build out their distribution system prior to when enough new customers commit to make it economical. This strategy reflects a "supply push" approach in which the utility takes the initiative in making gas available to energy consumers who want it. The hope is that the new facilities will induce consumers to switch to natural gas. This is similar to long-standing industry practice under which utilities frequently overbuild or create excess capacity when they invest in new projects.

118. Legislative Bill 1115 passed in July 2012. L.B. 1115, 102d Leg., 2d Sess. (Neb. 2012) (enacted); *see also* Laura Demman, Dir., Natural Gas Dep't, Line Extensions for Natural Gas: Nebraska's Experience, (Feb. 2013), *available at* http://www.narucmeetings.org/Presentations/Winter2013_Nebraska-LineExtensions.pdf.

119. N.C. UTILS. COMM'N, ANALYSIS AND SUMMARY OF EXPANSION PLANS OF NORTH CAROLINA NATURAL GAS UTILITIES AND THE STATUS OF NATURAL GAS SERVICE IN NORTH CAROLINA 3-5 (2012), *available at* http://www.pubstaff.commerce.state.nc.us/psngas/publications/bireport.pdf.

120. The utility would normally impose the charge only on new customers. The reason is to avoid existing customers from paying for an investment that does not directly benefit them.

121. CONN. ENERGY STRATEGY, *supra* note 11, at 120, 130.

Overall, existing economic tests exemplify the "balancing act" of regulation. With utilities building new lines at a cost that often exceeds the present value revenues, new customers typically absorb the difference to keep the utility financially whole and not burden existing customers. The rationale for this practice is that new customers are receiving virtually all the benefits, and, assuming a prudent utility, fairness requires that new customers absorb any uneconomic costs. Many utilities provide new customers a limited number of "free feet" or fixed dollars of "free feet."[122] The dollar value generally represents the distribution margins that the utility expects to earn from a new customer over some specified time.[123]

One innovative variant of the economic test is a proposal in Massachusetts that would have a utility conduct an "open season" for prospective customers to commit to natural gas service.[124] The utility would (1) calculate the required customer contributions to justify new lines and (2) compare that with the commitments. If the utility signs up enough customers to meet the threshold, it could then start building new lines.[125]

VI. OBSTACLES HAMPERING FUEL CONVERSION AND NEW PIPELINE INVESTMENTS

A. Distinction Between Artificial and Natural Obstacles

1. Artificial Obstacles

Stakeholders often petition commissions to redress what they consider unfair or excessive obstacles to their agenda. Their advocacy might involve subsidies or other forms of financial incentives or the lifting of certain restrictions.

In their duty to promote the public interest, commissioners should distinguish between what we call here "artificial obstacles" and "natural obstacles." For example, in the context of this article, natural gas seems superior economically and environmentally to other energy forms, but some stakeholders might believe its penetration into new markets is growing too slowly. A key question is whether that slow diffusion is the result of (1) a *natural obstacle* such

122. An unpublished survey by the American Gas Association shows that forty-nine out of the eighty-three respondent gas utilities reported that they offer limited "free" line extensions. Industry observers often refer to "free" line extensions as allowances in the form of a dollar credit toward the new customer's financial obligation for a line extension. Utilities may specify the number of "free feet," fixed dollars of "free" pipes, or the maximum dollars of "free" line extensions based on a formula that considers estimated usage. *E.g.*, *Fee News*, GALLATIN PUB. UTILS., http://www.gallatinutilities.com/fees.html (last visited Oct. 18, 2013) (illustrating a public utility offering customers free natural gas footage).

123. The "free line" generally goes into the utility's rate base. Even by paying higher rates in the short term, existing customers should pay lower rates over time as new customers contribute toward the utility's distribution margins. In this sense, existing customers are not subsidizing new customers.

124. Petition of Bay State Gas Co. for Approval of a General Increase in Gas Distribution Rates, D.P.U. 12-25, slip op. at 373-74 (Mass. Dep't of Pub. Utils. Nov. 1, 2012).

125. *Id.*

as the utility's rational response to risk and consumer uncertainty over the future price of natural gas, or (2) an *artificial obstacle* created, for example, by regulatory rules that discourage utilities from expanding their service when it would be economical and socially beneficial or by improper price signals to consumers that make fuel switching less economically attractive. As a policy matter, commissions should try to mitigate artificial obstacles, which by definition stem from market imperfections or flawed regulatory actions, as long as the benefits exceed the costs of mitigation.

An artificial obstacle would cause a utility not to seek, or prohibit it from seeking, economically or socially desirable investments in line extensions. Artificial obstacles can arise from market or regulatory failures[126] such as distorted prices for utility services and regulatory ratemaking that under-compensate utilities for the risks of new investments.[127] As an illustration, a commission might have a policy of conserving the use of natural gas and erect barriers to a utility that wants to expand its service. Even though fostering both actions could advance the public interest, the commission might mistakenly regard extending gas service as antithetical to energy efficiency goals.[128]

An asymmetric risk/reward relationship is another regulatory practice that could discourage a utility from making socially beneficial investments, such as gas line expansions. A third potential artificial obstacle is inadequate upstream pipeline capacity in the Northeast caused by excessive environmental and land use regulations.[129] As an artificial obstacle, it is impeding additional trading that could produce economic gains to natural gas consumers and providers greater than the cost of new pipeline capacity.[130] In other words, an artificial obstacle would deprive society of the net benefits from additional market transactions. As good public policy, a commission should try to eliminate or at least mitigate artificial obstacles to the extent possible and economical.

2. Natural Obstacles

Natural obstacles would have no positive aggregate-welfare effect if eliminated. In fact, by definition, mitigating them would disrupt normal market

126. Market failures are those barriers to fuel switching that prevent energy consumers from making rational and socially desirable decisions. They might stem from third-party environmental and national security benefits, as well as inadequate consumer information and high transaction costs. *See generally* KENNETH GILLINGHAM & JAMES SWEENEY, MARKET FAILURE AND THE STRUCTURE OF EXTERNALITIES 20 (2010), *available at* http://www.yale.edu/gillingham/Market%20Failure%20and%20the%20Structure%20of%20Externalities.pdf (explaining market failures as barriers).

127. *See, e.g.*, Gail Tverberg, *Natural Gas: Continuously Running into New Obstacles*, OILPRICE.COM (Jan. 5, 2011), http://oilprice.com/Energy/Natural-Gas/Natural-Gas-Continually-Running-Into-New-Obstacles.html (outlining natural gas obstacles).

128. For example, an optimal outcome could combine existing customers using natural gas more efficiently and energy consumers switching to natural gas.

129. *See, e.g.*, Steve McConnell, *Gas Drilling Stays in Limbo in Northeast Pennsylvania*, PIPELINE (June 17, 2013), http://pipeline.post-gazette.com/news/archives/25199-gas-drilling-stays-in-limbo-in-northeast-pennsylvania (discussing regulations affecting the northeast).

130. On the other hand, the pipeline expansion should not occur if the cost of expanding the pipeline system exceeds the benefits. This natural obstacle would not pose a problem that requires intervention.

activities and likely lead to an adverse outcome. One extreme example is the utility providing new customers with no-cost gas service for five years. This practice would unquestionably lift a barrier to fuel switching and make it more economical for prospective customers. Yet, it would create serious problems. For example, it could lead to the decreased economic welfare of those who fund this subsidy, who may be utility shareholders, existing customers, or both.[131] No-cost gas service would also produce an excessive amount of fuel switching since new customers would not pay the true cost of gas service. A third problem is that the subsidy would place other energy providers at an unfair disadvantage. So, by definition, mitigating natural obstacles would on the aggregate produce an undesirable outcome, even though it could benefit individual segments of society and promote a supposedly desirable activity, namely, fuel switching.

Less extreme is the situation where existing customers share in the recovery of utility costs for pipe expansion. Later we refer to this cost allocation as rolled-in pricing.[132] Consequently, additional customers may convert to natural gas since less financially burdened by the expansion. Yet, overall welfare would likely decline: The "subsidy" effect would over-achieve fuel switching and unduly impose an added cost on existing customers, creating both a negative economic efficiency and "fairness" outcome.[133]

Another example of a natural obstacle is retrospective reviews that penalize utilities for imprudent decisions that lead to excessive rates.[134] Wall Street might view these hindsight reviews as impediments to new investments, especially those that carry high risks. Although seen by one group as an obstacle, commissions might consider retrospective reviews as essential in their duty to protect customers from imprudent and uneconomical utility actions, such as excessive utility risk-taking and poor investment choices. So eliminating retrospective reviews, which utility investors would see as lifting an obstacle, society as a whole may see as undesirable.[135]

131. Most commissions would find this practice unduly discriminatory and unfair to those responsible for the revenue shortfall from new customers.

132. *See generally* Memorandum from Donald C. Shepler to Senator Therriault, Rolled-In Pricing Versus Incremental Pricing for Pipeline Expansions at FERC (May 20, 2006), *available at* http://lba.legis.state.ak.us/sga/doc_log/2006-05-20_shepler_memo_on_expansion_ratemaking.pdf (describing rolled-in pricing).

133. The market on its own would unlikely hold existing customers partially responsible for the pipe investments since they would receive at most minimal benefits from them. In a competitive market, for example, existing customers could turn to another gas provider if they felt that the utility unfairly imposed upon them the new pipe costs. *See, e.g.*, Public Advocate's Motion to Close Docket at 8, Application of Chesapeake Util. Corp., Del. P.S.C. Docket No. 12-292 (Jan. 4, 2013) (arguing that allocation of costs among new and existing customers constitutes an "undue and unjust subsidy," which sends false market signals).

134. *See generally* E. King Poor, *Utility Rates Pending Judicial Review*, 17 J. MARSHAL L. REV. 743 (1984).

135. This outcome presumes that commissions do not abuse retrospective reviews by second-guessing a utility for an investment that turned out to be bad but the commission considered prudent at the time the utility proposed the investment for evaluation. Such actions would discourage utilities from investing in socially desirable projects.

One major obstacle to gas line extensions might be the regulatory perception of "fairness" as funding for new utility investments derived only from customers who stand to benefit, namely new customers. Some utilities may consider risk shifting to their shareholders an "artificial obstacle" when it in fact could reflect a fair and appropriate regulatory response, correcting for an imbalance in utility incentives or risk sharing. As an example, placing most of the burden of funding new pipes on existing customers can induce excessive investments by a utility. At the other extreme, placing all the risk on utility shareholders could lead to under-investments.

One likely obstacle is an economic test that restricts the amount the utility and existing customers pay for a line extension. The test may require new customers to pay a larger amount upfront and thereby discourage some energy consumers from converting to natural gas. On the positive side, it protects existing customers and the utility from subsidizing new customers. This is an example of where more fuel switching could compromise other regulatory objectives, like fairness and the economic viability of the utility. On the other hand, if the economic test understates the benefits (i.e., the distribution margins) to the utility and existing customers, it could overly impede economical fuel switching. In this instance, the commission, together with the utility, should reassess whether the economic test acts as an artificial obstacle.

In sum, the key to good regulation is to (1) eliminate artificial obstacles that hurt the general public but to (2) resist elimination of those obstacles that harm certain segments but not the general public (i.e., natural obstacles). The next section identifies those obstacles that are liable to jeopardize the public interest, justifying actions by commissions and other policymakers.

B. Major PUC Obstacles

1. Restrictive Ratemaking Practices

A contentious topic is whether a utility should charge existing customers for new extension lines. Most utilities and commissions tend to favor new customers bearing all of the incremental costs.[136] The presumption is that any incremental costs recovered by existing customers would make them worse off.[137] One possible exception occurs when existing customers benefit indirectly—for example, from cleaner air or economic development.[138] These are public benefits that affect a broad citizenry; therefore, as some have argued, they should help pay for new extension lines.[139] One could say, with good reason, that taxpayers should contribute toward paying the costs. Why restrict funding from only utility customers when those investments have public benefits?

136. *E.g.*, PUGET SOUND ENERGY, *supra* note 18.

137. *See, e.g.*, CONN. ENERGY STRATEGY, *supra* note 11, at 144.

138. *Id.* at 139-40.

139. *Id.*

a. Rolled-In Versus Incremental Pricing

Commissions generally approve rolled-in pricing when a new investment benefits all customers or when demand by all customers creates the need for a new investment.[140] One example is a gas utility investing in new storage capability to meet the growing demand of its customers. Because the investment would benefit all customers, it would be appropriate to roll-in the costs into the rates of all customers. They would then be responsible for paying the costs for this investment that the utility made to benefit them.

When the utility expands its system dedicated to serving new customers, on the other hand, rolled-in pricing becomes less defensible and incremental pricing more valid.[141] Specifically, rolled-in pricing for these investments would result in existing customers subsidizing new customers. Unless the utility can argue that it built a new line partially to serve existing customers, incremental pricing would seem both economically efficient and fair.[142]

Thus, while rolled-in pricing may stimulate more fuel switching, rejection by a commission does not constitute an artificial obstacle (as defined earlier).[143] The reasonable assumption is that the benefits of line extensions accrue only to new customers: Utilities dedicate service lines to individual households and businesses and main lines to geographically adjacent customers. The implication for pricing and cost recovery is that the utility should allocate all of the incremental cost to new customers. Although lowering the cost of fuel switching to new customers, rolled-in pricing would produce undesirable outcomes. First, new customers see poor price signals that can result in excessive fuel switching to natural gas. Second, this price places other energy providers at a competitive disadvantage. Third, existing customers are worse off. Charging new customers below incremental cost essentially increases rates for existing customers to the

140. Under *rolled-in pricing*, the utility adds the costs of line extensions to existing costs with prices to all customers based on this sum. New and existing customers face the same price. Analysts often refer to rolled-in prices as average or embedded cost prices. *See generally* Shepler, *supra* note 132, at 1 (defining rolled-in pricing).

141. Under *incremental pricing*, the utility's price for sales to new customers differs from the price for sales to existing customers; the incremental price includes the cost of new extension lines plus the share of the existing system's costs allocated to new customers. *See generally id.* For example, the utility might charge new customers a premium price for a fixed period to pay for new extension lines. Incremental prices relate closely to the economist's notion of marginal cost.

142. One exception is when current customers benefit from economies of scope. These economies derive from the shared use of joint inputs in serving additional customers. That is, the cost savings from the complementary nature of a utility serving two or more distinct customer groups. These savings could cause the utility's total average cost to fall, benefiting both existing and new customers. *See generally* HERBERT G. THOMPSON ET AL., NAT'L REGULATORY RESEARCH INST., NRRI 96-05, ECONOMIES OF SCALE AND VERTICAL INTEGRATION IN THE INVESTOR-OWNED ELECTRIC UTILITY INDUSTRY 6, 93 (1996) (describing the concept of economies of scope in the context of electricity providers), *available at* http://www.ipu.msu.edu/library/pdfs/nrri/Thompson-Economies-Scale-96-05-Jan-96.pdf.

143. *Supra* Section IV.A.1.

benefit of new customers.[144] Overall, rolled-in pricing would violate the "balancing act" of public utility regulation.[145]

Under incremental pricing, new customers would pay more for the same gas service than existing customers do. One might question whether this is fair and economically efficient; incremental pricing seems to be a form of "vintage pricing," which most economists disdain.[146] In responding, we start with the reasonable assumption that a utility expands its lines only to serve new customers. Existing customers are not telling the utility that it should invest in new lines; at most, they would receive minimal benefit (e.g., from economies of scope).[147] In other words, they would not pay for the gas line extensions at any price. Charging incremental rates under these assumptions would be consistent with the cost-causality principle: that is, a basic principle of sound utility pricing.[148] Cost-causality has no connection to vintage pricing, however. Vintage pricing, in which later customers pay more than other customers, is indefensible when departing from cost-causality principles. New utility customers, on the other hand, should pay more than existing customers because they *alone* caused the utility to expand its system.

A relevant policy question is whether a utility could expand its system without any funding from existing customers. Would such a pricing restriction represent an artificial obstacle to fuel switching and gas line extensions? A prohibition against rolled-in pricing for new extension lines would undoubtedly make fuel switching less economical to prospective gas customers. Those customers would have to pay more for the expansion investments. The utility might also see line-extension investments as less profitable.[149] It would then seem that rolled-in pricing is desirable by promoting gas line extensions and fuel switching. Yet, as just discussed, the downsides to rolled-in pricing would probably tip the scale enough the other way to make it undesirable for a commission trying to promote the public interest.

144. *See generally* Emery Troxel, *II. Limitations of the Incremental Cost Patterns of Pricing*, 19 J. LAND & PUB. UTIL. ECON. 28 (1943) (discussing problems associated with incremental pricing).

145. *See* discussion *supra* Section IV.B.

146. *See, e.g.*, Charles G. Stalon, *The Diminishing Role of Regulation in the Natural Gas Industry*, 7 ENERGY L.J. 1, 3-5 (1986) (describing anticompetitive consequences and fragmentation of consumer interests as two economic inefficiencies of vintage pricing).

147. *See generally* THOMPSON ET AL., *supra* note 142, at 6, 93.

148. *E.g.*, Order No. 1000, Transmission Planning and Cost Allocation by Transmission Owning and Operating Public Utilities, F.E.R.C. STATS. & REGS. ¶ 31,323 at P 504, 75 Fed. Reg. 37,884 (2010) (to be codified at 18 C.F.R. pt. 35). It would also be incompatible with the principle that prices should relate to customers' willingness to pay for a service or good. If existing customers place no value on line extensions to serve new customers, they should not have to pay anything for them. *See generally* Ulf Liebe et al., *To Pay or Not to Pay: Competing Theories to Explain Individuals' Willingness to Pay for Public Environmental Goods*, 43 ENV'T & BEHAV. 106 (2011) (comparing various theories of the willingness to pay principle in the context of public environmental goods).

149. Not only would the utility see fewer energy consumers switching to natural gas, the commission could also require utility shareholders to absorb some of the costs for new investments. The discriminatory nature of rolled-in pricing might find support from utilities since existing customers are not likely to depart if their rates increase.

i. The No-Burden Standard

A common objective of line extension tariffs is to hold existing customers harmless. That is, utilities apply what economists call a "no burden test" to protect existing customers. That is why, for example, tariffs require new customer contributions and economic tests for assessing proposals for line extensions.[150] As a rule, when a utility receives revenues from new customers equal to or greater than the incremental cost, existing customers are either no worse off or better off. The revenues from new customers can filter through rates and a separate surcharge.

The addition of new customers, at least in theory, can benefit existing customers. A concept called "economies of scope" says that by providing another service—for example, service to new customers—a firm might more efficiently use its internal resources.[151] As an illustration, with added customers, a utility might lower its average cost for information technology activities, general personnel, billing, and metering. The result is a lowering of the utility's average cost, which benefits all customers, both new and existing.[152]

ii. Economies of Scope, Incremental Prices, and Rolled-In Prices

This section explores the relationship between economies of scope and price limits on service to both existing and new customers. It also provides a formal definition of cross-subsidization, which links to the regulatory concept of undue price discrimination.[153] Finally, this section addresses "fairness" from the perspective of cost allocation.

(*a*) "Acceptable" Pricing Limits

Formally, economies of scope derive from the following relationships:

$$IC_{NC} = C(NC,EC) - C(0,EC),$$

where the incremental cost in serving new customers (IC_{NC}) equals the utility's cost in serving both new and existing customers [C(NC,EC)] minus the utility's cost in serving only existing customers [C(0,EC)].[154] Economists call this last

150. By failing an economic test, a line-extension project is not feasible, justifying a separate advance or contribution from new customers. Feasibility, in generic terms, means that the expected distribution margins from new customers would support the incremental costs from constructing new lines.

151. *See generally* James C. Koch, *Economies of Scale and Economies of Scope*, REFERENCE FOR BUSINESS, http://www.referenceforbusiness.com/management/De-Ele/Economies-of-Scale-and-Economies-of-Scope.html (last visited Oct. 18, 2013).

152. It would be wrong to infer that line extensions to serve new customers create the same economies as building lines to increase system reliability, access new gas supplies, or provide interconnections. We should expect the system benefits from the line extensions to serve new customers to be much smaller and ostensibly marginal.

153. *See, e.g.*, Austin Frakt, *Simply Put: Price Discrimination and Cost Fiction*, INCIDENTAL ECONOMIST (Mar. 11, 2011, 5:00 AM), http://theincidentaleconomist.com/wordpress/simply-put-price-discrimination-and-cost-shifting/ (stating simply "price discrimination implies cross-subsidization").

154. NC denotes new customers and EC existing customers. "0" implies that the designated cost applies to serving either NC or EC, and not both simultaneously.

term the "stand-alone cost of serving only existing customers." We will refer to this cost as SAC_{EC}.

In the absence of economies of scope, the incremental cost of serving new customers equals

$$IC'_{NC} = C(NC,0) = SAC_{NC},$$

where the incremental cost (IC'_{NC}) equals the utility's cost in serving new customers alone [C(NC, 0)], which is the stand-alone cost (SAC_{NC}).

In the presence of economies of scope, the following relationship holds:

$$C(NC,EC) < C(NC,0) + C(0,EC) = SAC_{NC} + SAC_{EC}.$$

Assume that the utility's cost in serving new customers alone is $12 million ($SAC_{NC}$), in serving existing customers alone is $100 million ($SAC_{EC}$), and in serving both groups of customers collectively is $110 million [C(NC,EC)]. The benefit to new customers from the utility's serving existing customers simultaneously is $2 million; that is, the difference between the cost of serving new customers alone ($12 million, or SAC_{NC}) and the cost of serving new customers when the utility is serving existing customers ($10 million, or IC_{NC}).[155] The $2 million are the benefits from economies of scope. This illustration shows how serving both groups of customers simultaneously can benefit new customers.

Similarly, economies of scope can benefit existing customers as well. Assume that existing and new customers consume, on average, the same quantity of gas. In our example, the total cost for the utility increases by 10% (from $100 million to $110 million) when the utility serves new customers. Assume also that the stand-alone cost per existing or new customer is the same. New customers would then grow the utility's sales by 12% and reduce the utility's average cost by roughly 2%.[156] Thus, rates to existing customers would tend to decrease.

By definition, economies of scope measure the difference between the sum of the cost for serving existing and new customers separately and serving them simultaneously.[157] We assume that serving one group of customers is distinct from serving the other group. As long as the utility recovers from new customers sufficient revenues to cover the incremental costs, no burden falls on existing customers. From the perspective of existing customers, the prices are compensatory.

In the above example, if the utility charges new customers $8 million (below the incremental cost), existing customers are worse off by $2 million. Whereas prior to new customers, existing customers were paying $100 million, now they are paying $102 million for the same service ($110 million minus

155. The incremental cost of serving existing customers, assuming that the utility previously served new customers, is C(NC,EC) – C(NC,0). We are now reversing the definition of "new customers" to include the previous existing customers and the existing customers to include the previous new customers. The amount equals $110 million minus $12 million, or $98 million.

156. As assumed earlier, the stand-alone costs for new customers and existing customers are $12 million and $100 million, respectively.

157. Koch, *supra* note 151.

$8 million). We can say that existing customers are cross-subsidizing new customers. Cross-subsidization, according to economists, occurs anytime a utility charges any individual service or customer class more than its stand-alone cost.[158] When the utility charges a particular service or group of customers more than the stand-alone cost, it is necessarily charging another service or group of customers less than the incremental cost. This outcome constitutes a cross-subsidy.[159] Many economists have argued that a utility should not charge more for any service or customer than the stand-alone cost, on grounds of both "fairness" and economic efficiency.

If instead the utility recovers more than incremental costs from new customers—say, $14 million—existing customers are better off by $4 million,[160] but new customers are cross-subsidizing existing customers. The reason is that new customers are paying more than their stand-alone cost, which, as we assumed earlier, is $12 million.[161] This outcome means that new customers would be better off if the utility only served them and not existing customers.[162] In sum, prices violate a fairness standard anytime a customer class or service pays more than its stand-alone cost.[163] That statement presumes that regulators associate unfairness with a cross-subsidy.[164]

For cross-subsidization not to occur, the total costs allocated to (1) existing customers cannot exceed $100 million and (2) new customers cannot exceed $12 million. Otherwise, each group of customers would be better off without the other. As long as the utility recovers sufficient revenues from each group to cover the group's incremental cost, each group benefits from the presence of the other. That is, each group is paying less than the stand-alone cost for that group. This outcome mimics the operation of a well-functioning competitive market. One implication is that existing customers are better off, or at least not worse off,

158. Howard Bodenhorn, *Making the Little Guy Pay: Payments-System Networks, Cross-Subsidization, and the Collapse of the Suffolk System*, 62 J. ECON. HIST. 147, 157 (2002) (explaining by example cross-subsidization).

159. *Id.*

160. Existing customers now pay $96 million, a decrease of $4 million from what they previously paid for the same service.

161. Charging above incremental cost does not always result in a cross-subsidy. If the utility charges new customers $11 million, they are paying more than their incremental cost ($10 million) but less than their stand-alone cost ($12 million).

162. Although it would be difficult to measure stand-alone cost, the condition that no customer pays more than this cost hinges on two reasonably measurable outcomes: (a) the utility's revenues equal its total cost and (b) all customers at least pay the incremental cost of serving them. Thus, no customer is paying more than the stand-alone cost when the utility earns normal profits, and no cross-subsidy exists.

163. As expressed by one noted economist:

> The stand-alone cost criterion is equivalent to the game theoretic concept of an imputation that lies in the core of a "cost-sharing game," requiring each subset of members of a coalition to receive as a result of their membership a payoff at least as large as they could obtain for themselves if they were to leave the coalition and fend entirely for themselves.

WILLIAM J. BAUMOL, SUPERFAIRNESS: APPLICATIONS + THEORY 121 (1986).

164. *See generally* Gerald R. Faulhaber, *Cross-Subsidization: Pricing in Public Enterprises*, 65 AM. ECON. REV. 966 (1975) (examining fairness, competition, and market stability implications of cross-subsidization).

when the utility charges new customers at least the incremental cost of serving them.[165]

(*b*) What Constitutes Fairness?

The utility charging the incremental cost for each group of customers might pose a "fairness" problem. In our example, the sum of the incremental cost for both customers, $108 million,[166] falls short of the utility's total cost of $110 million.[167] The shortfall comes from the missing $2 million that arises from common or shared costs.[168] How then should the utility assign responsibility for the shortfall of $2 million between the two groups of customers? If the utility decides, for example, to charge new customers the incremental cost of $10 million, existing customers would pay $100 million, as they did prior to the utility's signing up new customers.[169] This outcome, at first sight, seems reasonable in not burdening existing customers. Yet all of the benefits from economies of scope would transfer to new customers, a situation that some regulators might consider unfair, and rightly so.[170]

Whereas previously this article defined fairness in terms of a cross-subsidy, we now apply a less rigorous test. Charging new customers more than the incremental cost may be fairer, if not the most economically efficient, action. While in this example, no customer group receives a cross-subsidy, regulators could determine that the benefits from more efficient operations (i.e., economies of scope) should more evenly pass down to both customer groups. Cost allocation inevitably comes down to the regulators' judgment in weighing and trading-off different societal objectives.[171] If economic efficiency is one

165. Another way of expressing this idea is that as long as the revenues received from existing customers are below their stand-alone cost, assuming the utility earns a normal profit, the utility is collecting more than the incremental cost from new customers. In our example, assume that the utility charges new customers $12 million, which is $2 million more than the incremental cost of serving new customers. With a total cost of $110 million, the costs allocated to existing customers are $98 million. This amount is $2 million below what existing customers would have had to pay without the new customers (i.e., SAC_{EC}).

166. We calculated above the incremental cost of new customers as $10 million and the incremental cost of existing customers as $98 million.

167. Assuming that the utility earns a normal profit, it should collect enough revenues from both groups of customers collectively to cover C(NC,EC), or $110 million.

168. These costs occur when the utility uses the same input or resources to serve both existing customers and new customers. The shared nature of these inputs means that it becomes impossible to assign them unambiguously to each customer group.

169. One can show that the total cost of serving existing customers and new customers together is the sum of the stand-alone cost of serving existing customers and the incremental cost of serving new customers.

170. Utilities might find this outcome favorable to their interests as they would have the tendency to keep down the cost burden to new customers relative to existing customers. The reason is that existing customers arguably are more captive and, therefore, less responsive to price.

171. Some economists would label this subjective cost allocation as arbitrary. It seems, however, that because regulators have an obligation to allow utilities an opportunity to earn a reasonable rate of return, they have no choice but to use their judgment, especially in spreading common and joint costs across different customers and services. Common costs, for example, are costs incurred jointly for two or more types of operation or the provision of two or more services. They include the capital cost of a new distribution main

objective, and weighed heavily, regulators would tend to allocate more of the common costs to customers with the lowest price elasticity of demand. Applying in our example what economists call the Ramsey, or second-best pricing rule, existing customers would seem to bear disproportionately those costs.[172] In sum, even when applying incremental-pricing principles, because of the traditional-ratemaking objective to set revenues equal to a utility's total costs, regulators must grapple, in the absence of an objective standard, with how to allocate a portion of the utility's costs among customers and services.

2. Conjunctive Decision-Making

Another conceivable artificial obstacle is a commission giving undue weight to a certain stakeholder or position. A consumer advocate, for example, might oppose line expansion investments if they include a special surcharge for utility cost recovery and raising the rates of existing customers to fund the investment. A competing energy supplier might also oppose the investment on grounds that it would give the utility an unfair advantage. The commission has the duty to review all points of view and weigh them in reaching a decision.[173] Yet, if the commission acts based on whether a particular group will find its decision offensive, it invites a bad outcome.

Although commissions generally attempt to balance the interest of all stakeholders, occasionally they may adhere to a stakeholder's position as a threshold for decision-making. This commission posture would reflect what analysts called a conjunctive decision; that is, an acceptable decision must satisfy a minimum threshold for specific outcomes.[174] A commission might reject outright, for example, a utility's plan to invest in a new expansion because it violates the objective of promoting less use of natural gas. The plan might also not pass muster because it includes setting higher rates for existing customers, which the commission might in principle reject out of hand. The plan might

serving residential, commercial, and industrial customers. For further explanation of common and joint costs, see, e.g., ROGER L. CONKLING, ENERGY PRICING: ECONOMICS AND PRINCIPLES 71-73 (2011).

172. *See, e.g.*, S. Keith Berry, *Ramsey Pricing in the Presence of Risk*, 13 MANAGERIAL & DECISION ECON. 111 (1992). Ramsey pricing maximizes social welfare, given a revenue-requirement constraint. Specifically, it says that when setting prices equal to marginal or incremental cost fails to produce sufficient revenues for the utility, regulators should adjust rates to minimize efficiency losses. The way to achieve this outcome is to increase rates the most for those services or customers exhibiting the lowest price elasticities of demand. Existing customers arguably would have a lower price elasticity than prospective customers, who are contemplating fuel switching. Yet whether this pricing rule is fair, or at least fairer than other rules that violate efficiency conditions, lacks any objective evidence. Some readers might argue that the Ramsey pricing rule is unfair because it would increase prices more to "captive" customers. According to this view, there is an inevitable conflict between achieving both efficiency and fairness goals.

173. *E.g.*, *Public Service Commission Duties and Responsibilities*, GA. MUN. ASS'N (Nov. 5, 2010), http://www.gmanet.com/MDR.aspx?CNID=55997.

174. *Conjunctive Decision Rule*, DESIGN & MKTG. DICTIONARY, http://design-marketing-dictionary.blogspot.com/2011/11/conjunctive-decision-rule.html (last visited Oct. 18, 2013). One example is a commission rejecting declining-block rates simply because they violate the regulatory objective of fostering price-driven energy efficiency. A commission might also reject a straight fixed-variable rate design because of evidence that it would adversely affect low-income households.

have enormous positive outcomes in other aspects, but the commission still rejects it because the plan fails to satisfy what it considers an essential criterion or criteria.

In taking these positions, commissions can jeopardize the public interest by creating an artificial obstacle. One lesson for utilities is that they might have to compromise on some matters if they want to get commission approval. For example, if having existing customers pay for a new line extension is nonnegotiable for a commission, the utility would have to offer an alternative funding proposal. The commission might also require a utility to absorb a portion of the risk for line investments. Especially if utilities want to build-out their systems prior to new-customer commitment, they may have to shoulder some of the risks.

3. Utility Risk in Cost Recovery

Public utility regulation affects both the demand and supply side of fuel switching. As one of their major responsibilities, commissions try to set just and reasonable rates for utility service.[175] If they capriciously disallow a prudent utility to recover all of its costs for new pipes, the utility understandably would be reluctant to make similar investments in the future. These investments can include economical ones. This regulatory action would create an artificial obstacle that jeopardizes the public interest.

Fair cost recovery prevents severe cash-flow problems for the utility while simultaneously protecting customers against excessive costs.[176] Some ratemaking mechanisms, such as an infrastructure surcharge rider, achieve the first outcome while violating the second in the absence of a thorough regulatory review of costs.[177] These mechanisms can reduce a utility's financial risk by stabilizing its earnings and cash flow: they (1) shorten the time lag between the incurrence of a cost and its recovery in rates (i.e., lessening regulatory lag) and (2) increase cost-recovery certainty.[178] Utilities favor infrastructure surcharge riders because they allow cost recovery without filing a general rate case.[179] Although surcharge riders have become more prevalent, their application has focused on non-revenue producing investments (e.g., accelerated pipeline replacement programs).[180] Since pipe extension would increase revenues and

175. *E.g.*, NEV. REV. STAT. § 704.001 (2011) (stating that the policy of the state that the Commission provide just and reasonable rates).

176. "Cost recovery" refers to the timing and methodology used for inserting allowable costs in rates. *E.g.*, AM. GAS ASS'N, NATURAL GAS RATE REPORT (2011), *available at* http://www.aga.org/our-issues/RatesRegulatoryIssues/ratesregpolicy/Issues/infrastructure-investment-cost-recovery-mechanisms/Documents/2011%20Apr%20Infrastructure%20Fact%20Sheet.pdf; *see also supra* Section V.B.2.a.

177. *Id.* at 2; *see also* AARP, INCREASING USE OF SURCHARGES ON CONSUMER UTILITY BILLS ii (2012), *available at* http://www.aarp.org/content/dam/aarp/aarp_foundation/2012-06/increasing-use-of-surcharges-on-consumer-utility-bills-aarp.pdf.

178. AM. GAS ASS'N, *supra* note 176, at 2; AARP, *supra* note 177, at 7.

179. AARP, *supra* note 177, at ii.

180. AM. GAS ASS'N, *supra* note 176, at 2.

long-term profits for utilities, a commission may be less receptive to a surcharge rider for gas line expansions.

Commissions tend to favor those ratemaking mechanisms that avoid a sharp increase in rates.[181] Especially troublesome for commissions are new rates that increase unexpectedly and are well above previous rates for particular classes of customers. A line expansion program might require a large investment (e.g., expansion of the distribution network into remote, previously unserved areas). By allowing a utility to recover the costs for those investments on an annual basis outside of a general rate case, a commission can avoid any dramatic one-time rate increase that could occur under traditional ratemaking.[182] Such an increase could trigger a backlash by utility customers and politicians.

Fair regulation would allow utilities a reasonable opportunity to earn their authorized rate of return, as long as they were prudent.[183] If utilities spend their money wisely in line expansion, the commission should allow them to recover all of their costs so as to avoid any severe financial problems. For example, if the commission previously approved line-expansion investments and determined that the utility managed construction prudently, it should allow the utility to earn an adequate rate of return on those investments. On the other hand, when a utility is not prudent, it would be unfair to its customers if it were allowed to recover all of its costs. "Just and reasonable" rates would require each of these regulatory actions under those specific conditions.

4. Restrictive Economic Test

In accordance with most tariffs, a utility cannot extend its lines unless (1) the projected revenues from new customers cover its projected expenses plus a return on its investments, or (2) new customers cover any revenue shortfall.[184] One conceivable artificial obstacle is array of economic tests used by utilities, which might prevent pipeline facility investments that are in the public interest. Some tests, one referred to earlier as the net revenue test, calculate the economic benefits for only the first three to five years when in fact new customers will produce net revenues (i.e., margins) for the utility over the life of the new facilities, which could be thirty to forty years.[185]

Some utilities have modified, or have proposed to modify, their economic tests to reflect better the actual net revenues they expect to receive over the life of new pipes. As an example, in late 2012, Delmarva Power & Light Company proposed to change its economic test from a three-year net revenue test to giving

181. *E.g.*, *Natural Gas Regulation in Delaware*, DELAWARE.GOV, http://depsc.delaware.gov/naturalgas.shtml (last visited Oct. 18, 2014).

182. AARP, *supra* note 177, at 10.

183. *See, e.g.*, Duquesne Light Co. v. Barasch, 488 U.S. 299, 309 (1989) (discussing the constitutional implications of the prudent investment rule).

184. *E.g.*, PUGET SOUND ENERGY, RULE NO. 7: EXTENSION OF DISTRIBUTION FACILITIES—OTHER THAN KITTITAS COUNTY §§ 4, 7 (2003), *available at* http://pse.com/aboutpse/Rates/Documents/gas_rule_07_rule.pdf.

185. *See, e.g.*, *Comments Before Pa. H. Comm.*, *supra* note 112.

new customers up to 100 feet of "free" main line and charging them $40.23 for each additional foot.[186] The utility's rationale for this change is that over time its net revenues per customer have remained constant while its pipeline facility construction costs have grown.[187] These dynamics would cause new customers to pay larger upfront costs or not qualify for line extensions. Other utilities' economic tests might produce similar outcomes, warranting a commission review to determine if they act as an artificial obstacle to utility investments or energy consumers' willingness to fuel switch.[188]

Commissions might also want to consider requiring utilities in their state to apply the same economic test for evaluating line extensions. Whether an expansion is economical or not should depend on the same criteria and assumptions, irrespective of the utility.

5. Competing Capital Needs

A serious concern around the country is the age of old cast-iron or bare-steel pipelines or old plastic pipelines, many of which are susceptible to breaks or leaks.[189] Many of these pipes are several decades old and are either cast-iron or bare-steel.[190] Cast-iron and bare-steel pipelines account for a disproportionate percentage of leaks.[191] The replacement of old pipelines is a costly endeavor. One estimate is that replacing all pre-1960 pipelines in the United States would cost around $15 billion, or $2,100 per customer.[192]

One observation is that commissions might limit their approval of pipe expansions to serve new customers because of utilities undertaking massive investments in their accelerated pipeline replacement programs. Commissions might decide to avoid even higher utility rates by rejecting a utility's gas line expansion plan to serve new customers until it completes its replacement program. If a commission has to choose between expanding gas service and maintaining a safe pipeline system, it would unequivocally choose the latter.

186. Application for an Increase in Natural Gas Base Rates and Miscellaneous Tariff Changes § XVII, Application of Delmarva Power & Light Co. for a Change in Natural Gas Base Rates, Del. P.S.C. Docket No. 12-546 (Dec. 7. 2012). Some utilities grant allowances based on the number of qualifying gas appliances installed.

187. *Id.* at 1-3. This concurrent development probably holds true for most other gas utilities as well. At the national level, gas use per residential customer has fallen by 20% since 1987. EIA, CONSUMPTION, *supra* note 100, at 3.

188. The last outcome can occur if the economic test understates the economic value of a new pipe to the utility, thereby requiring new customers to make higher contributions.

189. Scot Macomber, Manager Loss Control Util. Operations, AEGIS Ins. Servs., Inc., Pipelines and Aging Infrastructure in the Natural Gas Industry 20 (Aug. 3, 2011), *available at* http://www.aga.org/membercenter/gotocommitteepages/RiskMang/Documents/PHCAging Infrastructure.ppt.

190. *Id.* at 5, 10, 20.

191. *Id.*

192. Rocco D'Alessandro, Am. Gas Ass'n, Pipeline Safety: Planning for a Safer Future 9 (Nov. 2010), *available at* http://www.narucmeetings.org/Presentations/D'Alessandro%20-%20NARUC%2011-101.pdf.

6. Biasness Against Gas Demand Growth

One puzzle for commissions is how to reconcile the tension between promoting energy efficiency while simultaneously giving support to growing natural gas consumption by expanding gas service. While the majority of commissions support energy efficiency, far fewer have championed gas line extensions and fuel switching. This view may change in the near future if commissions become more convinced that fuel switching has benefits similar to those of energy efficiency. Logically, since commissions in years past have supported utility energy-efficiency initiatives partially because of high natural gas prices, they should also endorse initiatives to increase natural gas consumption during a period of low prices. Utilities and other advocates of fuel switching should provide commissions with better empirical evidence of the benefits. Commissions themselves might want to conduct an independent analysis of those benefits.

7. Uncertainty over the Utility Role

Gas utilities can assume different roles in stimulating fuel switching: At one end, they can confine their activities to investing in new pipeline facilities under existing regulatory tariffs. In this role gas utilities would react to fuel-switching demands and not try to affect demand itself; they would provide no marketing or promotion of fuel switching.[193] They would simply provide a natural-monopoly service (e.g., local distribution) at a regulated price.

In a more active role, gas utilities would engage in marketing and promoting fuel conversion through outreach and education programs. They would try to educate customers on the benefits of natural gas. Education and outreach are particularly critical when energy consumers are unaware of their options and the potentially large benefits from converting to natural gas.[194] This role might also include lobbying for governmental financial incentives at the federal, state, and local levels. Utilities might want to advocate a public-private partnership that would strengthen the support system for large investments in gas lines. Different government entities, as shown in some jurisdictions, might want to get involved if they believe that fuel switching contributes to economic

193. These activities can include distributing brochures and other documents to all energy consumers in the utilities' service area that currently are not hooked up to their distribution system. Promotional activities can also involve offering rebates to energy consumers for purchasing a gas furnace or water heater when they convert from oil or propane to natural gas. CONN. ENERGY STRATEGY, *supra* note 11, at 151.

194. *E.g.*, *id.* at 148-49. Evidence has shown that consumers tend to be myopic in not accounting for the life-cycle benefits of durable goods like appliances. *See generally* XAVIER GABAIX & DAVID LAIBSON, NAT'L BUREAU OF ECON. RESEARCH, SHROUDED ATTRIBUTES, CONSUMER MYOPIA, AND INFORMATION SUPPRESSION IN COMPETITIVE MARKETS 6 (2005), *available at* http://www.nber.org/papers/w11755 (explaining consumer myopia as, for example, the tendency of consumers to focus more on upfront costs of an appliance rather than the lifetime energy costs of using it). Such shortsightedness, caused by such factors as uncertainty about the future, inertia, and inadequate information might warrant government or utility intervention. *Supra* Section V.A. It might include better consumer education and financial incentives. Incidentally, myopic consumers are a major rationale for utility activities promoting energy efficiency. The same factors might contribute to less-than-optimal fuel switching by households and businesses.

development, a cleaner environment, energy independence, and other public benefits.

Utilities can also offer loans and other financial assistance to new customers, or provide management support for facilitating fuel switching.[195] This last function would address an (artificial) obstacle to fuel switching by lowering the transaction cost for energy consumers. Who should pay for these activities depends on whether commissions (1) believe that these activities would, in some way, benefit existing customers, thereby allowing the utility to pass through their costs to them, or (2) view these activities as strictly promotional, deciding then to require utility shareholders or new customers to pay for them.

Gas utilities might also provide ratepayer-funded financial incentives for fuel conversion,[196] including the purchase of home fueling appliances.[197] All of these activities hope to bolster fuel switching to natural gas. Regulators need to address the fundamental question of whether, and under what conditions, a utility should "charge" all customers for a service that would directly benefit only a distinct minority. One essential condition is that the gap between the social benefits and the private benefits of fuel conversion is large enough to justify a subsidy.

An example of a proactive utility is NSTAR in Massachusetts. It has an aggressive outreach program that disseminates information on the substantial benefits for energy consumers who switch from oil to natural gas.[198] The utility calculates that even with high up-front costs for conversion (i.e., the sum of the cost for new heating equipment, new service connection, and new main extension) households can save, on average, $2,000 annually when they switch from oil to natural gas.[199] NSTAR offers new customers financial arrangements;[200] for example, they would pay the up-front costs over time rather than in one large lump sum (which the utility says could easily exceed $14,000).[201]

195. *E.g.*, CONN. ENERGY STRATEGY, *supra* note 11, at 19.

196. Some utilities are currently providing financial incentives. *See*, e.g., *Natural Gas Expansion—Presentations from the Jan. 9, 2013 Technical Conference*, N.Y. STATE PUB. SERV. COMM'N, http://www3.dps.ny.gov/W/PSCWeb.nsf/All/01ADDBDC8541DA9885257AE9005CFD4B?OpenDocument (last updated Jan. 10, 2013) [hereinafter *N.Y. P.S.C. Technical Conference*]; Consol. Edison Co. of N.Y., Inc., Gas Distribution System 9 (Jan. 9, 2013) (included in the aforementioned list of presentations).

197. Though conversion costs vary, depending on such factors as the age of the heating system and the need for new internal piping, they can range from $7,000 to $12,000. CONN. ENERGY STRATEGY, *supra* note 11, at 128.

198. *Convert to Gas Heat*, NSTAR.COM, https://www.nstar.com/residential/account_services/gas_heating/heating_equip/convert.asp (last visited Oct. 18, 2013).

199. *Natural Gas vs. Oil & Propane Calculator*, NSTAR.com, https://www.nstar.com/residential/account_services/gas_heating/heating_equip/calc.asp (last visited Oct. 18, 2013).

200. NSTAR, *Convert to Gas Heat*, *supra* note 198.

201. Allain, *supra* note 73.

UGI Utilities' proposed Growth Extension Tariff also reflects a proactive utility in promoting fuel switching and gas line extensions.[202] The pilot plan would allocate the cost of line extensions to the group of new customers connected to a new main.[203] It would add a monthly surcharge that new customers could pay over ten years, avoiding high upfront payments.[204] The proposal represents a balanced approach that coincides with those regulatory objectives outlined earlier in this article.

In sum, gas utilities can take on different roles. They range from a minimalist role to a more active role in which utilities act more as a catalyst for market activities. A proactive utility has the ability to stimulate fuel switching to natural gas. By restricting promotion and marketing, a commission is hindering a utility from exploiting the benefits that natural gas can offer to energy consumers and to society as a whole. Other than new customers, utilities stand to benefit the most from fuel switching. Thus, state commissions should allow them to play an active role in expanding their gas lines and fuel switching.

VII. REMEDIES FOR CONSIDERATION

What follows is a litany of ideas to stimulate fuel switching to natural gas when economically and socially beneficial. The emphasis is on commissions and gas utilities working together to promote fuel switching. The previous sections already provide some clues to needed actions. Since commissions can affect both sides of the market for fuel switching, this section groups those actions into consumer-side and supply-side. It also identifies actions that government entities can consider to promote fuel switching.

A. Consumer-Side

Commissions can first review their policies and practices for any obstacles hampering fuel switching. They cannot only mitigate obstacles that they create themselves, but they can also address "market" obstacles. One example of the latter obstacle is high transaction costs that deter energy consumers from fuel switching; another is consumer inertia.[205]

Commissions should promote the efficiency of energy markets. They can encourage utilities to facilitate fuel switching and disseminate useful information on its benefits.[206] Evidence across various industries has shown that when consumers have access to better information and lower transaction costs, they are more likely to switch to another product or service when commensurate with

202. Press Release, UGI Utils., Inc., UGI Files Innovative Proposal to Expand New Customer Connections (Apr. 4, 2013), *available at* http://www.ugi.com/portal/page/portal/UGI_Content/About%20Us/Newsroom_2013/20130404_Utilities1.

203. *Id.*

204. *Id.* The utility calculates that customers' fuel savings should exceed the surcharge. The plan applies only when a customer would pay more than $15,000 for a line extension. *Id.*

205. *Supra* Section V.A.

206. *See generally* CONN. ENERGY STRATEGY, *supra* note 11, at 146-57 (discussing strategies to encourage fuel switching).

their self-interest.[207] Thus, energy consumers are more likely to switch to natural gas when they have good information on the benefits of natural gas and transaction costs are kept to a minimum.

Below is a list of actions that would stimulate fuel switching on the demand-side:

1. Dissemination of Information on What Energy Consumers Are Losing When They Fail to Convert to Natural Gas

This information should be easily understood by consumers and framed in the most effective way. Behavioral economics, for example, predicts that consumers become more persuaded by information that shows what they are losing when they do not take a particular action than what benefits they receive when they do act.[208] The utility or even the commission can spread this information through brochures, mailing, home canvassing, websites, and general education.

2. Lowering of Transaction and Inconvenience Costs Through the Expansion of the Utility Role

Expanded utility service offerings can assist energy consumers in switching to natural gas.[209] Commissions should look favorably upon utility proposals that include these expansion services; the commission can also take the initiative by encouraging utilities to provide them. This expanded role of utilities seems justified given their first-hand knowledge of the market and their apparent incentive to promote fuel switching when profitable.

3. Customer Incentives or Rebates for Gas Conversion and High Energy-Efficiency Gas Appliances

Applying the same economic arguments for energy efficiency programs, a utility could provide financial incentives to energy consumers who convert to natural gas. These incentives can apply to furnaces and other gas equipment. One can view fuel switching as an expanded form of energy efficiency. Like energy efficiency, fuel switching can reduce consumers' energy costs, contribute to a cleaner environment, and produce other social benefits.[210] Any financial incentive should hinge on evidence showing that (a) market failures are preventing energy consumers from switching to natural gas or (b) public benefits are large enough to warrant special inducements.

207. *See generally* Dahl & Matson, *supra* note 69, at 390-91.

208. *E.g.*, *When Averting Loss Can Lead to Averting Gains*, BEYOND BULLS & BEARS (Oct. 11, 2012), http://us.beyondbullsandbears.com/2012/10/11/loss-aversion/ (quoting Duke Professor of Psychology and Behavioral Economics Dan Ariely, explaining that "[p]eople hate losing much more than they enjoy winning")

209. *See, e.g.*, Application, Application of Chesapeake Utilities Corporation for Approval of Natural Gas Expansion Service Offerings to be Effective September 1, 2012, Del. Pub. Serv. Comm'n, No. 12-292 (June 25, 2012), *available at* http://depsc.delaware.gov/dockets/12-292%20app.pdf.

210. *E.g.*, CONN. ENERGY STRATEGY, *supra* note 11, at 126-28, 139-42.

4. Amortization of Required Upfront Costs

Economic activities like fuel switching involve an investment with short-run costs greater than short-run benefits.[211] Consumers may forgo the investment even though they would benefit in the long run.[212] Analysts have calculated a quick payback from fuel switching to natural gas in many areas of the country.[213] Still, consumers may hesitate to change energy sources if the combination of appliance conversion and their required payments for new line costs amounts to a large sum of money. Utilities can consider offering loans or allow new customers to pay their CIAC or other upfront payment over a number of years.[214] For example, utilities could offer customers a CIAC loan payable over five years. Utilities could also impose a temporary surcharge that customers would pay as part of their monthly gas bill.[215] If utilities do not take the initiative in making these accommodations, a commission should ask them why they have not and consider requiring utilities to provide upfront financing.

5. Innovative Ratemaking Approaches

Commissions should consider "thinking outside the box" in how they want utilities to set rates for new customers. Historically, commissions have approved some forms of price discrimination while rejecting others. Namely, commissions have rejected forms of undue discrimination, in which prices for some services are set below incremental costs or are favorable to some customers while "excessively" driving up prices to the other customers. Price discrimination is more socially defensible when it leads to a net increase in sales and improved welfare for consumers as a whole but undesirable when most of the economic gains pass to the firm and total sales by the firm drop.[216]

Commissions have approved discriminatory pricing when it serves some public interest, such as economic development and the deterrence of uneconomic bypass.[217] It seems that at a cursory glance, offering new customers special rates might pass these thresholds: Total utility sales would likely increase, and switching to natural gas can promote economic development, a cleaner

211. *Id.* at 128-29.

212. *See generally* Hausman, *supra* note 85; Castella, *supra* note 80.

213. An important factor is a customer's level of gas usage. Owners of vacation homes, for example, might not recoup their conversion costs for several years.

214. *E.g.*, *supra* notes 199-205 and accompanying text.

215. *E.g.*, AM. GAS ASS'N, *supra* note 176, at 2; AARP, *supra* note 177, at ii.

216. *See, e.g.*, W. KIP VISCUSI ET AL., ECONOMICS OF REGULATION AND ANTITRUST ch. 9 (MIT Press 2d ed. 1995).

217. Uneconomic bypass refers to the condition where a customer turns to a non-utility provider for one or more services when that provider has higher total costs but lower prices. *See generally* Robin E. Mansell, *The Telecommunication Bypass Threat: Real or Imagined?*, 20 J. ECON. ISSUES 145 (1986) (discussing economic and uneconomic bypass in the telecommunication context). It is uneconomic because society incurs higher cost in meeting the demands of a customer. One major cause of uneconomic bypass is the inability of a utility to lower its rates below fully allocated embedded costs, which under certain circumstances (e.g., where a utility has a high level of surplus capacity) could far exceed its marginal cost.

environment, and other public benefits.[218] Yet, on the other hand, commissions may reject any pricing that promotes gas sales and charges new customers below incremental cost, which translates into higher prices to existing customers.[219]

B. Supply-Side

On the supply-side of the market, fuel switching requires willing and financially able utilities to expand their systems to serve new customers. Actions that utilities or a commission can take to stimulate more investments in gas line expansion follow:

1. Mitigation of Cost-Recovery Uncertainty

Utilities should proactively promote fuel switching when in the public interest. It seems likely that utilities would want to add to their customer base to increase their future revenues and profits. Utilities, in other words, should welcome new customers with open arms. Looking below the surface, however, a utility might fear the risk of less-than-full cost recovery from new investments. Consequently, a risk-averse utility might be content with serving fewer customers but assured of full cost recovery. Commissions can mitigate this risk by pre-approving new investments, allowing an infrastructure surcharge rider that enables utilities to recover their costs in a more timely fashion, or establishing guidelines that articulate regulatory criteria for utility recovery. One criterion could be line expansions that pass an economic test.

2. Customer Funding of Marketing and Promotional Activities

These activities can stimulate fuel switching that produces both private and public benefits. Commissions should show consistency in their policy on promotional practices for both electric and gas utilities. When commissions unevenly restrict these practices, which can provide useful information to consumers (for example, the life cycle costs of different energy sources), less fuel switching is likely.

3. Shifting of Utility Funds from Energy Efficiency Initiatives to Gas Service Expansion Initiatives

This controversial recommendation presumes that capital funding is a binding constraint for a utility and that gas expansion has become more beneficial than energy efficiency. Just as several commissions advocate subsidies (i.e., general customer funding) for energy efficiency, they could require financial assistance to prospective customers who want to switch to natural gas.[220] In fact, commissions might discover that utility expenditures on fuel switching yield a higher societal return than from allocating the same

218. CONN. ENERGY STRATEGY, *supra* note 11, at 121, 126-28, 139-42.

219. A commission may view any price below incremental cost as undue discrimination.

220. *See, e.g.*, Warwick J. McKibbin et al., *Subsidizing Energy Efficient Household Capital: How Does It Compare to a Carbon Tax*, BROOKINGS (Oct. 25, 2010), www.brookings.edu/research/reports/2010/10/25-energy-subsidy-mckibbin-morris-wilcoxen (discussing energy efficiency subsides and the goals behind them).

monies to energy efficiency. If this is true, commissions should require utilities to shift their spending from energy efficiency to fuel switching. A commission should not find surprising, given the dramatic drop in natural gas prices since late 2008,[221] that some existing energy-efficiency initiatives would no longer pass a cost-benefit test.

4. Utility Justification for Recovering a Portion of Line Extension Costs from Existing Customers

Although the previous discussion argued against rolled-in pricing, there are occasions where this pricing might have some validity. Commissions generally approve rolled-in pricing when a new investment stands to benefit all customers, or when demand by all customers creates the need for more investments.[222] It would be wrong, therefore, to infer that rolled-in pricing is always unduly discriminatory, unfair, and economically inefficient.[223]

Utilities would be hard pressed, however, to argue that the benefits of line expansions are evenly distributed across all customers. On the other hand, if there are truly broad benefits (e.g., public benefits) or economies of scope from line expansions, a utility could make a valid case for requiring existing customers to pay some of the line-expansion costs. The utility would have the onus to show not only that these benefits exist but that they are large enough to burden existing customers with a portion of the expansion costs. Otherwise, the utility can expect resistance from existing customers as well as from the commission itself. They will tend to perceive rolled-in pricing as discriminatory against existing customers and an unjustifiable subsidy. Whether or not this perception is valid, so far most commissions seem to concur with it.[224]

5. Uniform Statewide Tariff and Policy

In making its decisions more consistent, predictable, and balanced, a commission may want to consider a uniform policy and tariff on gas line extensions. It might promulgate a statewide line-extension rule that specifies: (1) the economic test, "free" allowances, and the ratemaking treatment of incremental costs; (2) utility financing for customer contribution; and (3) criteria for new customer contributions and refunds. Commissions might find the current utility-by-utility tariffs confusing, inconsistent, and overall discouraging

221. COSTELLO, LINE EXTENSIONS, *supra* note 10.

222. *See generally* Shepler, *supra* note 132, at 4.

223. Discriminatory pricing generally occurs when price differences for the same service do not correspond to cost differences. It considers customers' willingness to pay, which depends on the ability of customers to find alternative suppliers or to engage in self-supply. A utility may have to offer prospective customers a rate below incremental cost to entice them to convert to natural gas. Yet, as discussed earlier, such a rate can burden existing customers, diminish economic efficiency and create an artificial barrier for competing energy providers.

224. *E.g.*, Demman, *supra* note 118 (presenting for the Nebraska Public Service Commission); MCCARTHY, *supra* note 116 (presenting for the Connecticut Public Utilities Regulatory Authority). PURA expressed reservations toward subsidization by existing customers to pay for new pipeline infrastructure before new customers get connected.

energy consumers from converting to natural gas and utilities from expanding gas service. A statewide rule can help promote economic efficiency and fairness. It can include general principles and guidelines for [utility] line-extension activities. Commissions should view the expansion of gas service important enough to warrant specific rules, similar to energy efficiency and integrated resource planning.

C. Government Involvement

The rationales for government involvement are that (1) market forces are not accounting for the public benefits or (2) market obstacles are impeding the amount of fuel switching. Either condition would result in deficient fuel switching from society's perspective. Both state and local governments may want to get involved if fuel switching promotes economic development and expands the tax base.[225] Good policy may dictate, for example, that citizens as taxpayers pay for investments such as line extensions that contribute to economic development and cleaner air in their community.[226] Public funding would shift some of the burden of paying for new gas lines away from utility customers. Unserved areas in particular will need large investments that utilities, their customers, or the commission might find prohibitively expensive.[227] State and local governments often provide financial support for investments that benefit the public but are unprofitable to private entities.[228] Municipalities or county governments can contribute to the capital costs for line expansion or provide other kinds of support if they view the wider availability of gas service as an economic development tool.[229]

As another action, states can include fuel switching to natural gas as part of their energy strategy. Some states (e.g., Connecticut, Delaware, and New York) have already done so by including fuel switching to natural gas as a state energy objective consistent with advancing a cleaner environment, energy savings for consumers, and economic development.[230] Especially for those states in which the potential benefits are particularly high, they should consider fuel switching as a top priority in their energy strategy.

After all is said and done, justification for governmental assistance must rest on potentially large benefits from fuel switching to natural gas for a locality,

225. *E.g.*, CONN. ENERGY STRATEGY, *supra* note 11, at 152-57 (discussing various regulatory methods to assist fuel switching).

226. As an alternative, the Minnesota Public Utilities Commission has attached a surcharge to customers who take natural gas in a community newly connected to the distribution system. Minnesota Energy Resources Corporation's (MERC) Petition for Approval of a New Area Surcharge Rider, No. 6-007,011/M-11-1045 (Minn. P.U.C. July 26, 2012). The surcharge applies only to previously unserved areas that cannot support economically a line extension under the utility's tariffs.

227. CONN. ENERGY STRATEGY, *supra* note 11, at 132-33.

228. *E.g.*, Scott Kraus, *Access to Natural Gas is Fueling Economic Development*, MORNING CALL (Apr. 13, 2013), http://articles.mcall.com/2013-04-13/news/mc-ugi-natural-gas-economic-development-20130413_1_dan-adamo-ugi-utilities-natural-gas.

229. *Id.*

230. *See* sources cited *supra* note 11.

region, or state.[231] These benefits, although theoretically plausible, so far lack empirical support, at least in providing policymakers with sound evidence that their magnitude is sufficient to warrant governmental actions.[232] The state, together with utilities, can conduct analyses calculating the public benefits from expanded gas service: namely, economic development, job creation, environmental benefits, and less dependency on foreign oil. Empirical-based evidence would give more credibility to government policies premised on the existence of public benefits. The public would be less resistant to the use of their monies to foster pipeline infrastructure development when the benefits are more transparent.

Other than direct financial assistance, governments can do other things more incrementally, such as facilitating fuel switching through information dissemination on the benefits of fuel switching.[233] Many customers, especially households, may not know how much they can save on energy costs, let alone be aware that fuel switching is an option for them.

Government units can also collaborate with utilities and consumers in developing proposals for the expansion of gas service They can then present their proposals before the state commission or other relevant authorities for review and approval. A joint public-private partnership can provide broad support for fuel switching. Rural initiatives can also help to extend gas service to unserved areas that consume expensive and less clean energy sources.[234] In one sense, government assistance in rural areas for fuel switching parallels federal subsidies for essential air service and rural electric cooperatives.[235]

Government assistance comes in several forms, including (1) public-private partnerships or collaboration, (2) tax increment financing, (3) tax rebates, (4) economic development grants and (5) state-backed bonds.[236] In Nebraska, North

231. CONN. ENERGY STRATEGY, *supra* note 11, at 139-41.

232. One exception is the analysis by Stanley McMillen and Nandika Prakash. STANLEY MCMILLEN & NANDIKA PRAKASH, DEP'T OF ECON. & CMTY. DEV, THE ECONOMIC IMPACT OF EXPANDING NATURAL GAS USE IN CONNECTICUT (2011), *available at* http://www.ct.gov/deep/lib/deep/energy/cep/decd-the_economic_impact_of_expanding_natural_gas_use_in_connecticut.pdf.

233. CONN. ENERGY STRATEGY, *supra* note 11, at 148 (suggesting outreach as a method of encouraging fuel switching).

234. *E.g.*, *Research Grants*, CTR. FOR RURAL PA., http://www.rural.palegislature.us/grants_rfp.html (last visited Sept. 14, 2013).

235. Subsidies to rural electric cooperatives assisted in the expansion of electric service to areas that privately owned utilities did not find financially viable. One difference with natural gas is that rural people and businesses would not have access to electricity without the cooperatives. Prospective natural gas customers, on the other hand, have access to some other energy source (even if it is not their preferred source) to meet their demands. The main reason for switching would be to save money on energy, not to have available some new end-use service.

236. *See generally* Douglas J. Amy, *How Government Is Good for Business*, GOVERNMENT IS GOOD, http://www.governmentisgood.com/articles.php?aid=21&p=3 (last visited Sept 14, 2013) (discussing various forms of government assistance). The tax increment might include a significant reduction in the utility's property taxes for a specified number of years.

Carolina, and New York, the public sector has supported gas line expansions.[237] Connecticut and Delaware have made fuel switching an integral part of their energy plans.[238] Pennsylvania has proposed legislation that supports gas line extensions.[239] Increasingly, the public sector has gotten involved because of their awareness that the benefits from expanded gas service can produce substantial economy-wide benefits.[240]

Finally, the best prospect for getting public support for gas line expansions is to spread the responsibility for cost recovery to different stakeholders, including utility shareholders, new customers, communities with new line expansions, and state and perhaps even the federal government. The federal government supports energy-efficiency efforts; they could do the same for fuel switching to natural gas given the potentially high public benefits and market barriers that are similar to those for energy efficiency.[241]

VIII. WHAT A PROACTIVE COMMISSION CAN DO PROMPTLY

Commissions can immediately pursue a number of actions to set the tone for future activities promoting fuel switching and gas line extensions. The first

237. St. Lawrence Gas in New York offers a good example of a public-private partnership for funding a gas line expansion into a rural area. Economic development is a major reason for the project and government involvement. The revenues from new customers alone will not cover the incremental cost. In addition to a temporary CIAC from new customers, funding to fill the shortfall will come from the county, regional and state governments, and utility shareholders. These funds include property tax avoidance and grants. *See, e.g.*, *N.Y. P.S.C. Technical Conference*, *supra* note 196; James P. Ward, Enbridge St. Lawrence Gas, System Expansion to Franklin Country (Jan. 9, 2013) (included in the aforementioned list of presentations).

238. *E.g.*, CONN. ENERGY STRATEGY, *supra* note 11; Markell, *supra* note 11. The Governor of Connecticut hopes to have 300,000 customers convert to natural gas as part of his energy plan. Currently, only about 31% of homes in Connecticut have natural gas heat; the typical oil-heat customer spends about $2,650 a year on fuel, and the typical gas customer spends just $1,100. The Governor and the legislature see fuel conversion as creating jobs, making in-state business more competitive, and improving the environment. One problem is the high cost of extending main lines to both underserved and unserved areas, estimated to cost around $2 billion. Mara Lee, *Malloy's New Energy Plan Promotes Natural Gas*, COURANT (Oct. 5, 2012), http://articles.courant.com/2012-10-05/business/hc-energy-plan-1005-20121004_1_natural-gas-energy-efficiency-water-heaters.

239. The legislation, introduced on March 26, 2013, would promote the extension and expansion of natural gas distribution systems to unserved and underserved areas of the state. One of the provisions would require every gas utility to submit a three-year plan to the Public Utility Commission that outlines the utility's strategies for line expansions. S.B. 738, 197th Gen. Assemb., Reg. Sess. § 3 (Pa. 2013); *see also* Mark Maroney, *Legislation Designed to Expand Gas Use*, SUN-GAZETTE (Mar. 27, 2013), http://www.sungazette.com/page/content.detail/id/590813/Legislation-designed-to-expand-gas-use.html?nav=5011.

240. In Nebraska, the perceived problem was the absence of the pipe network in rural areas hindering economic development. The new legislation encourages collaboration among stakeholders, including state and local governments, economic development groups, and gas utilities. Commission staff has expressed concern over the possibility of stranded investment from building out with a fewer than expected number of energy consumers converting to natural gas. The legislation allows funding for new pipeline facilities from local sales tax revenues and surcharges to customers. L.B. 1115, 102d Leg., 2d Sess. (Neb. 2012) (enacted).

241. The rationales for government incentives to promote energy efficiency are two-fold: (a) social benefits are greater than private benefits and (b) energy consumers would benefit from additional energy efficiency. Both of these conditions would seem to apply equally to fuel switching.

act is to promote fuel switching with the same vigor they have shown for energy efficiency. Commissions, as well as other parts of government, have exhibited much enthusiasm for energy efficiency. They might want to consider broadening this support to fuel switching. Commissions might want to consider initiating workshops or a technical conference addressing fuel switching and gas line extensions. Commissions can review whether existing, and in some instances long-standing, rules are incompatible with current regulatory objectives and conditions in the natural gas sector. New York is a good example where, in late 2012, the Public Service Commission initiated a new proceeding to examine existing policies relating to the expansion of natural gas service.[242]

Lower natural gas prices have made fuel switching to natural gas more economical.[243] Simultaneously, they have made energy efficiency less cost-effective.[244] Current commission practices and policies seem to reflect the natural gas sector prior to the shale gas revolution, a period of high and volatile gas prices and constrained domestic gas supplies. Because this environment no longer exists, commissions should revisit those practices and policies. Commissions should start placing more emphasis on fuel switching relative to energy efficiency initiatives. Existing utility economic analyses and other practices, as pointed out earlier, have hindered the expansion of pipeline facilities to unserved and underserved areas.[245]

Commission actions to encourage fuel switching and pipeline expansion can take on several forms. Initially, commissions could examine their policies to make sure that they do not disfavor natural gas. They could also attempt to reduce transaction costs for prospective fuel-switching customers and mitigate other artificial obstacles with the goal of promoting efficient fuel markets. Overall, commissions should identify and eliminate any regulatory barriers that stifle fuel switching or utility investments that are in the public interest (i.e., artificial obstacles). Specifically, they might want to reexamine utilities' economic tests for evaluating line expansion investments and review options to ease the burden of high upfront costs on prospective customers.

Commissions might also want to develop guidelines as part of their policy statement. Guidelines can act as "safe harbor" rules that reduce uncertainty for the utility and mitigate hindsight reviews. They can help to steer utilities'

242. Proceeding on Motion of the Commission to Examine Policies Regarding the Expansion of Natural Gas Service, Case 12-G-0297 (N.Y. P.S.C. Nov. 30, 2012), *available at* http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7B33008B64-79D4-4DD3-B222-442061E06BAE%7D. The commission expressed the need to revisit its policies on natural gas expansion in view of recent developments in gas markets.

243. *See generally U.S. Natural Gas Prices*, U.S. ENERGY INFO. ADMIN. (Aug. 30, 2013), http://www.eia.gov/dnav/ng/ng_pri_sum_dcu_nus_a.htm (providing cost break downs of current and historical natural gas prices).

244. The major benefit from energy efficiency is the avoided cost from the local distribution company having to purchase less gas. Some commissions may favor utility energy-efficiency programs because they reduce the demand for fossil fuels. A consumer switching from oil or propane to natural gas is merely substituting one fossil fuel for another.

245. *Supra* Sections V.B.2.a, VI.B.4.

proposals for facility extensions in line with what the commission considers essential requirements. Regulatory guidelines can include (1) criteria for acceptable investments in pipeline expansion, (2) commission procedures for reviewing and evaluating proposed expansions, (3) cost allocation, (4) ratemaking treatment of costs, and (5) the conditions under which the commission would favor system expansions and allow full recovery of costs. Guidelines have the positive effect of reducing utility risk. As an example, a commission can articulate that it would not second guess a utility decision that it previously approved, to determine cost recovery for line expansions. It can also articulate that it will not subject specific utility actions to prudence reviews that focus on outcomes rather than the utility's decision-making process. A commission might want to consider pre-approving utility investments for line expansions, especially when they involve large sums of money. By increasing the certainty of cost recovery, a utility is more likely to expand its distribution system.

Since interest in gas service expansions will likely proliferate in the years ahead, commissions should begin to devote more time and resources to the myriad questions surrounding those investments. Since commissions issue policy statements in other matters, it seems advisable for them to give the same attention to gas service expansion. Gas line expansion has become an important but complex topic that deserves a higher standing by commissions than what they have shown so far.