Future Test Years: Challenges Posed for State Utility Commissions

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Executive Summary

Over the past several decades, public utilities have lobbied hard for changes in traditional rate-of-return (ROR) ratemaking when conditions arise that threaten their financial viability. More recently, they have gone before state legislatures and petitioned utility commissions for additional expedient cost recovery in the form of cost trackers, surcharges, revenue decoupling, and formula rates. On occasion, they have also pushed for a future test year (FTY) in determining rate changes. An FTY uses projections of costs and revenues, usually over a 12-month period during which new rates would apply, as the basis for rate changes. The selection of a test year can affect future rates. Depending on conditions, for example, an FTY can either reduce or increase rates over what they would be under a historical test year (HTY).

Understandably, utilities tend to endorse an FTY when it would increase their rates in a period of rising average cost and are silent during periods of declining costs. Utilities have stressed the adverse effects of regulatory lag and the need to file frequent rate cases in the face of rising average cost. Specifically, they contend that current market and operating conditions inevitably cause a utility's total costs to grow more than sales between rate cases, in the process eroding their earnings, a trend they find particularly worrisome in an era of large investments. Overall, utilities argue that the ratemaking paradigm needs to adapt to current conditions if regulation is to fairly compensate utility shareholders and serve the long-term interest of customers. One particular change advocated by utilities is the use of an FTY. An FTY usually covers the first 12 months when new rates would go into effect, or what some analysts call the "rate year" or "test period."

The reader might ask why a commission should rely on anything other than an FTY, since good ratemaking requires that new rates reflect the utility's costs and sales, at least over the first several months that they are in effect. Ratemaking, after all, is prospective, and an FTY matches the test year with the effective period of new rates. Although in theory this argument seems indisputable, it ignores the reality that forecasts are susceptible to error and some costs and sales elements are inherently difficult to predict. Another factor, as this paper stresses, is that utilities would have incentives to present biased forecasts that are not always easy for commission staff and interveners to uncover. A commission would be presumptuous to assume that forecasted costs and sales are more accurate than modified HTY data accounting for "known and measurable" changes. In fact, many commissions have taken this view, which seems sensible and in line with their mandate to set "just and reasonable" rates.

In sum, an environment of rising average cost does not constitute a sufficient condition for the use of an FTY. Supporters of an FTY give this false impression, which ignores the reality of utility forecasts being susceptible to bias and inherent error. Information asymmetry, which is an acute problem in public utility regulation, makes it difficult for commissions to evaluate a utility's forecasts in terms of their accuracy and objectivity.

Utilities contend that rising average cost requires an FTY for ratemaking if they are to have a reasonable opportunity to earn their authorized rate of return. They see shortening regulatory lag as essential for achieving this outcome. "Regulatory lag" refers to the time gap between when a utility undergoes a change in cost or sales levels and when the utility can reflect these changes in new rates. This gap has long been contentious within the regulatory arena in different contexts, with varying interpretations as to its positive and negative effects on utility customers and the public interest. Several state commissions view regulatory lag in a positive light by giving utilities greater incentive to manage their costs. Partly for this reason, they look more favorably upon HTYs than FTYs.

Although financially viable utilities is a regulatory goal, state utility commissions have a duty to take a broader and more balanced perspective by considering whether the use of an FTY would serve the public interest. What might best serve utility interest might violate the public interest. For example, utility over-collections between rate cases is a serious problem, especially when it leads to "exorbitant" actual rates of return for a number of consecutive years. Commissions should recognize that over-collections are just as troubling as under-collections.

Commissions should ask how an FTY would benefit utility customers. Commissions set rates using the "just and reasonable" standard as the primary goal. This standard recognizes the prominence of both utility financial viability and prudent utility operation. The utilities' one-sided view of FTYs gives little attention to this second aspect of good ratemaking. Utilities also underemphasize the role that management plays in affecting their rate of return. The fact that they are earning below their authorized rate of return may stem from less-than-optimal management practices.

This paper will first discuss the arguments for an FTY and why utilities have advocated it for ratemaking. It will then identify the major elements of an FTY and what challenges they pose for state utility commissions. The paper will look at, for example, what can go wrong if a commission is unable to sufficiently evaluate a utility's forecasts in rate cases. Although in theory an FTY seems appealing, its effect on the public interest hinges on a commission capability to meet the challenges that it presents. In other words, the merits of an FTY rest on the details of whether the forecasts (1) reflect prudent utility management and (2) contain a minimal margin of error. After all, if a utility makes poor forecasts, if a cost or sales element is susceptible to a potentially large forecasting error, or if the utility biases its forecasts that go undetected, an FTY could easily take money away from utility customers and give it to the utility and its shareholders. This paper shows that when the utility wants to avoid what analysts call a "ratchet effect," it could attempt to inflate its costs in line with its forecasts. Customers end up paying excessively for service while utility shareholders earn lower returns. In effect, this avoidance benefits utility management at the expense of two of its major stakeholders: customers and shareholders.

Finally, this paper suggests how commissions can execute an FTY to minimize problems that can harm utility customers. A fundamental, and perhaps the most serious, obstacle to this goal is information asymmetry that places commissions in a tough position to evaluate the reasonableness of a utility's forecasts. If commissions are unable to perform this evaluation—for example, because of deficient resources—utilities can charge higher rates that hurt the economic well-being of their customers.

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Future Test Years
Challenges Posed for State Utility Commissions

I. An Historical Perspective

Although traditional rate-of-return (ROR) procedures have dominated ratemaking for decades, state commissions have a history of adapting to a changing environment when doing so is in the public interest.[1] Take the example of the rising average cost of utility service, which started to emerge in the late 1960s. General inflation, oil price shocks, declining productivity growth, and stricter environmental standards were major factors leading to increases in electricity generating costs. Commissions were unable to include these cost increases in rates fast enough to prevent utility profits from falling. At the same time, utilities' sales growth started to decline in response to rising electricity prices and a slowdown in economic activity. Overall, electric utilities' earnings were eroding because of regulatory lag.[2] In response, many state commissions adopted fuel adjustments clauses, future test years, Construction Work in Progress (CWIP) in rate base, and new rate designs (e.g., marginal-cost pricing) to mitigate the problem.[3]

Over the past several years, both electric and gas utilities have continued to petition their state public utility commissions in addition to increasingly lobbying state legislatures for what they call "innovative ratemaking mechanisms" that deviate from traditional ratemaking practices.[4] In fact, one can go as far back as the late 1960s and early 1970s to see that utilities

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[1] *See* Douglas N. Jones, "Agency Transformation and State Public Utility Commissions," *Utilities Policy*, Vol. 14 (2006): 8-13; and Douglas N. Jones, "Regulatory Concepts, Propositions, and Doctrines: Casualties and Survivors," *Journal of Economic Issues*, Vol. 22, no. 4 (December 1988): 1089-1108.

[2] "Regulatory lag" refers to the time gap between when a utility undergoes a change in cost or sales levels and when the utility can reflect these changes in new rates.

[3] Other actions included hypothetical capital structures and a year-end rate base. Most utilities also can file for emergency rate relief anytime it encounters a serious financial problem; the commission could specify conditions for a utility to file an emergency or interim rate filing petitioning for immediate rate relief.

[4] Traditional ratemaking refers to the application of cost-of-service methods for setting rates that determine the utility's authorized of return. Features of this method include: (a) new rates remains fixed until the commission approves new rates after a comprehensive rate case; (b) the utility has a reasonable opportunity to earn its authorized rate of return; (c) rates only reflect prudent and efficient utility costs; (d) the balancing of utility customer and shareholder interests is an overriding goal; (e) the selected test year tries to matches revenues with costs over the first year of new rates; (f) the utility's actual rate of return between rate cases deviate from the authorized return because of unexpected movements in sales

also pushed for new ratemaking mechanisms to accommodate what they perceived as the changing market and operating environment. This time the new ratemaking mechanisms have encompassed a wider umbrella. Both electric and natural gas utilities in recent years, for example, have expanded their use of nontraditional ratemaking mechanisms to include different cost trackers for a large number of utility activities, revenue decoupling, formula rates, and surcharges for new investments.[5]

All of these mechanisms have resulted in the shifting of risk from utility shareholders to customers. In fact, these mechanisms collectively have accommodated utilities over time by giving them more financial security. But as some analysts have argued, these mechanisms have weakened the incentive of utilities to manage their operations and investments efficiently, in part because of the erosion of regulatory lag. These mechanisms may also jeopardize prudence reviews, which along with regulatory lag are arguably the most effective regulatory tools to motivate utility cost efficiency.

One mechanism that utilities have intermittently pushed for over the past 40 years is a future test year (FTY) for setting general rates. Utilities have exhibited "cherry picking" by pushing for FTYs when it favors their financial position; they did not lobby for FTYs when average cost was falling, as continuation of an historical test year (HTY) would bolster their financial position.[6]

Utilities favor FTYs under predictable conditions: slow sales growth, large new investments and, overall, rising average cost.[7] An increase in average cost means that, given a

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and costs; and (g) regulatory lag can either benefit or harm utilities, depending on whether average cost is decreasing or increasing.

[5] *See* Pacific Economics Group Research, *Alternative Regulation for Evolving Utility Challenges: An Updated Survey*, prepared for the Edison Electric Institute, January 2013 at http://www.eei.org/whatwedo/PublicPolicyAdvocacy/StateRegulation/Documents/innovative_regulation_survey.pdf. Cost trackers, for example, are a general category of devices that allow current recovery of costs in specified categories; revenue trackers compensate a utility for revenue losses between rate cases because of energy-efficiency programs and other factors (e.g., the price elasticity of demand).

[6] During the 1950s and 1960s, for example, the cost of generation, both because of scale economies and technological advances, declined and demand for electricity grew at a robust rate. Rate reviews were relatively infrequent and utilities consistently earned above their authorized rate of return.

[7] One way to define average cost is the price of inputs divided by total factor productivity (TFP). TFP in turn is the output divided by the input. Growth in TFP can originate from different sources, including technology advances, economies of scale, higher output, less waste of internal resources, and more efficient mix of inputs. Some of these factors fall within the control of utility management, while others fall outside. Mathematically, any increase in average cost results from the combined percentage increase in input prices and the level of inputs exceeding the percentage increase in output (*see* footnote 8). A slowdown of output growth along with inflation and new investments creates a condition of rising average cost. With price, or average revenue fixed between rate cases, an increase in average cost inevitably leads to the lowering of a utility's earnings or profits. This creates what analysts called

fixed price between rate cases, a utility's earnings will erode. By definition, average cost increases when total cost grows by a higher percentage than output or sales. Total cost, in turn, grows whenever the price of inputs used by a utility rises or the utility increases its inputs (e.g., labor, materials, physical capital). So three general factors affect average cost: changes in input prices, the level of inputs, and sales.[8] Some critics of an HTY, which has dominated state-commission ratemaking through the years, have argued that it is non-compensatory when the utility's average cost is higher in the rate year than in the historical test year, which could start as long as two years prior to the rate year (i.e., the first 12 months of new rates).[9]

II. The Current Status of Future Test Years

A. Trend toward FTYs

A recent survey noted that:

> Forward test years were adopted in many jurisdictions during the 1970s and 1980s when rapid price inflation and major plant additions coincided with slowing growth in average use…Several additional states have recently moved in the direction of FTYs. Many of these states are in the West, where comparatively rapid economic growth has required more rapid build out of utility infrastructure. FTYs were recently sanctioned legislatively in Pennsylvania.[10]

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earnings attrition. Conversely, in an environment where a utility's productivity is growing rapidly and inflation is low, a utility's earnings is likely to increase between rate cases above the authorized rate of return set in the last rate case.

[8] Specifically, average cost increases when the combined growth in input prices and levels exceeds the growth in sales. Under a condition of moderate to high inflation, large investments in new facilities and slow sales growth, average cost would likely rise. Average cost equals total cost divided by the output level (Total cost, in turn, equals the sum of the product of input prices and input levels.) Rearranging terms, average cost (AC) equals:

$$AC = \text{price of inputs}/\text{total factor productivity}$$

Thus, % ΔAC equals % Δ price of inputs minus % Δ total factor productivity, or % Δ price of inputs plus % Δ inputs minus % Δ output. As an example, if input prices increase by an average three percent, input levels by one percent and output by two percent, average cost would rise by two percent.

[9] These critics, utilities, have included Wall Street, consultants working for industry and some economists.

[10] Pacific Economics Group Research LLC, *Alternative Regulation for Evolving Utility Challenges: An Updated Survey*, prepared for the Edison Electric Institute, January 2013, 29 at http://www.eei.org/whatwedo/PublicPolicyAdvocacy/StateRegulation/Documents/innovative_regulation_survey.pdf. Since this survey, Indiana has allowed utilities to use an FTY.

The survey shows that 23 states allow or require commissions to use an FTY for ratemaking, at least for electric utilities.[11] In addition to Pennsylvania, recent states that have allowed an FTY include Indiana and New Mexico. Over half of the states now allow the use of a test year other than historical, and this number has grown over time.[12]

B. Continued commission opposition to FTYs

How many additional states will allow or require FTYs over the next several years is hard to predict. The research for this paper has shown that many commissions hold FTYs in deep contempt. It seems unlikely that they will switch to an FTY in setting rates unless forced to by their legislatures. A past order by the Public Service Commission of Utah exemplifies why many parties have a negative disposition toward FTYs:

> Our concerns with future test periods include the diminished economic examination and accountability, replacement of actual results of operations data with difficult-to-analyze projections, ability of parties to effectively analyze the Company's forecasts, dampening of the efficiency incentive of regulatory lag, playing to the Company's strength from control of critical information, and shifting of the risks of the future to ratepayers.[13]

In the past ten years, some commissions have studied different test years and decided against the use of an FTY. One such commission is the Iowa Utilities Board. In a 2004 report to the state's General Assembly, the Board concluded that:

> [The] implementation of the future test-year option would significantly increase costs of ratemaking during the transition and probably in the long-term. It also finds use of a future test year over the current hybrid approach will not necessarily provide rates that more accurately reflect a utility's cost of providing service.

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[11] State statutes, rules, and practices have laid out three distinct conditions for use of an FTY: (a) the commission must use an FTY, (b) the commission must use an FTY if the utility proposes one (e.g., Michigan, Minnesota), and (c) the commission has the discretion to choose a test year, including an historical, future or hybrid (several states). The last condition allows the commission to weigh the evidence in deciding on what test year the utility should use. Although it gives the commission flexibility to decide on a case-by-case basis, the downside is that the time parties need to present their arguments and for the commission to rule might reduce scrutiny of other important issues in a rate case.

[12] A 2009 survey conducted by the NARUC Subcommittee on Accounts, with only 20 state utility commissions responding, showed that 6o percent used an HTY with "known and measurable" changes of state utility commissions, 35 percent used either an HTY or FTY and 5 percent only used an FTY.

[13] Public Service Commission of Utah, *In the Matter of the Application of PacifiCorp for approval of Its Proposed Electric Service Schedules and Electric Service Regulations, Order Approving Test Period Stipulation*, Docket No. 04-035-42, 3, October 20, 2004.

Iowa's hybrid approach allows for consideration of evidence outside the historical test year. [14]

In Nevada, a report to the state's legislatures by the Public Utilities Commission recommended:

> …the hybrid test period for its energy utilities that starts with the most recent 12-month historical date and adjusts all major costs of service elements for reasonably known and measurable data through the rate effective period. The Commission believes this hybrid test period has more advantages than either the fully forecasted methodology or the more restrictive hybrid methodology, which adjusts for 7-months of data…this hybrid approach leverages the existing ratemaking methodology, providing consumers, regulated utilities and the regulatory community with more consistency than the fully forecasted test year methodology.[15]

As with many other commissions, the Washington Utilities and Transportation Commission relies on a modified historical test year. The commission believes that this approach avoids the problems with an FTY while also recognizing the need to adjust historical data. As articulated in a recent rate case:

> [I]n Washington, we use a modified historic test year approach. We start with audited results from a recent 12 month period, but we modify those results to reflect changes that substantial evidence, timely presented, shows have occurred during the pendency of a rate case, or will occur in the rate year that begins at the conclusion of the proceeding…*This approach reduces regulatory lag without burdening ratepayers with unnecessary costs determined on the basis of the more speculative future test year approach to ratemaking that is used in some jurisdictions.* Our approach strikes a balance that motivates…utilities subject to our jurisdiction to carefully manage their costs and revenues going forward and take full advantage of their opportunity to recover fully all fixed and variable costs including a reasonable return on capital investments.[16] [Emphasis added]

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[14] Iowa Utilities Board, *Review of Utility Ratemaking Procedures*, Report to the Iowa General Assembly, January 2004, 13 at http://www.state.ia.us/iub/docs/reports/noi032_FinalReport.pdf.). The Board added that it can consider capital investments in service within nine months after the end of the test year for rate base inclusion.

[15] Public Utilities Commission of Nevada, *Report to the 74th Session of the Nevada Legislature: Alternatives to the Historical Test Year Methodology for Setting Public Utility Rates in Nevada*, May 10, 2006, 17.

[16] Washington Utilities and Transportation Commission, *Order 11, Docket UE-090704 and UG-090705*, April 2, 2010, 11 at http://www.utc.wa.gov/docs/Pages/DocketLookup.aspx?FilingID=090704.

A modified HTY adjusts historical data for unreasonable and non-recurring costs and sales in addition to accounting for expected changes in the future (i.e., "known and measurable" changes). As with an FTY, the intent is to reflect cost and sales conditions expected for the period of new rates. Many commissions implicitly consider a modified HTY to satisfy the "balancing act" by making adjustments to mitigate regulatory lag while protecting customers from paying for "speculative" costs.

This paper addresses whether the continued resistance to an FTY reflects what some critics of commissions would describe as "status quo bias" or, instead, a rational position given the risks, especially to utility customers, associated with an FTY.[17] Utilities and Wall Street tend to criticize commissions for not changing to an FTY. As discussed in this paper, these critics have a credibility gap in advancing FTYs as supporting the public good, since they take a clearly narrow and biased perspective on FTYs that downplays the negatives. As discussed later, these negatives have the effect of redistributing economic welfare from customers to utilities.

III. Different Test Years and Regulatory Lag

A. Sources of regulatory lag

How does the selection of a test year affect regulatory lag? A test year is an actual or hypothetical 12-month period over which a utility calculates its costs, including both operating and capital costs, and revenues to determine the need for a rate change.[18] At the core of a test year is the "matching principle" for achieving consistency between costs and revenues. The utility would thus consider jointly revenue requirements and billing determinants in setting new rates.

Regulatory lag can be understood as the period between the beginning of the test year and the starting period for new rates. If the HTY is the calendar 2012, for example, and new rates do

[17] "Status quo bias" refers to a situation in which a commission would stick with its current practices and policies even if change would better serve the public interest. Some analysts would label this behavior bureaucratic inertia.

[18] In determining the required revenue change, the commission compares the revenue requirement and revenues under present rates. Specifically, revenue deficiency equals

$$RR_{ty} - GR_{pr}$$

RR_{ty} equals the test-year determined revenue requirement, and GR_{pr} equals the gross revenues under present rates. If the utility expects a shortfall in revenues to meet its revenue requirement, it might decide to file for a rate increase.

not go into effect until January 2014, the lag would be 24 months.[19] In the context of this paper, regulatory lag is the time between a test year and the rate year.

Four events encompass regulatory lag:

1. The utility recognizes the need for new rates—for example, because of earnings erosion caused by costs rising faster then revenues.[20]

2. The utility prepares and files a rate case.

3. The commission conducts hearings and issues a decision.

4. New rates go into effect.

The time between events (1) and (3) can extend longer than one year, depending on the preparation time for filing new rates and the length of a rate case. Assuming that it takes a utility four months to prepare a rate case and the rate case itself lasts nine months, the time duration would be 13 months. Say that the utility sees its cost increasing and earnings eroding in October 2012. It promptly prepares a rate case and files with the commission in February 2013. The commission makes a decision in November 2013. The new rates do not take effect until January 2014.

B. Three kinds of test years

There are three general groupings of test years (*see* Figure 1). Using our previous example, an historical test year would be 2012, in which the utility would have actual data for the 12-month period. An HTY uses data for a 12-month period that ends prior to a rate filing. A partially future or hybrid test year could cover the last six months of 2012 and the first six months of 2013.[21] A future test year could be the calendar year 2014.

For the historical test year, the new rates starting in 2014 depend on cost and demand conditions in 2012. If these conditions change between the two years, the new rates could create

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[19] January 2012 is the beginning of the test year and the starting point for the new rates is January 2014.

[20] Attrition or erosion refers to the tendency for a utility's rate of return or profits to fall since the last rate case. On the opposite side of the spectrum is the term accretion, which refers to a utility "overearning" between rate cases.

[21] Minnesota is a state that relies heavily on a partial future test year. The FTY usually starts when interim rates go into effect, which is within 60 days of a utility's rate filing. One rationalization for defining the test year this way is that it differs little from an HTY adjusted for "known and measurable" changes.

a gap between the authorized and actual rate of return.[22] When using an historical test year, the utility usually normalizes and annualizes its costs and sales[23]; it may also make adjustments for "known and measurable" changes.[24] These last two actions convert the raw HTY data to be more representative of the conditions during the effective period of the new rates (i.e., the rate year or, as some call it, the test period). These adjustments would tend to increase the likelihood that the utility would earn its authorized rate of return.[25]

The partially future or hybrid test year would mitigate regulatory lag when compared with the HTY, as the new rates would account for conditions in the first half of 2013, which is closer in time to when the new rates go into effect.[26] Actually, although at the outset of the rate case the utility presents six months of forecasts, as the case progresses the utility might substitute actual data for some of its forecasts. For example, the commission could allow the utility to use actual data for the first four months of 2013. The test year would then represent 10 months of actual data and two months of forecasts.[27]

The future test year, in its purest form, forecasts all the costs and sales elements for the first 12 months of new rates. An FTY, therefore, begins after a rate case and normally at the time when new rates would go into effect.[28]

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[22] This discrepancy mostly affects equity holders, as revenue shortfalls cut into the utility's rate of return on equity. On the other hand, changing conditions could make the HTY favorable to the utility and its shareholders. For example, sales could increase enough to more than offset any inflation and new investments.

[23] The utility would normalize weather for projecting sales; it could also normalize rate case expenses and storm damage. An annualization adjustment would involve, say, a wage increase in effect for only five months to cover the entire HTY.

[24] These changes can include those that have already taken place after the end of the HTY or changes that are likely to happen in the near future (which is more contentious and speculative). For the latter, usually the commission would require a high probability of occurrence.

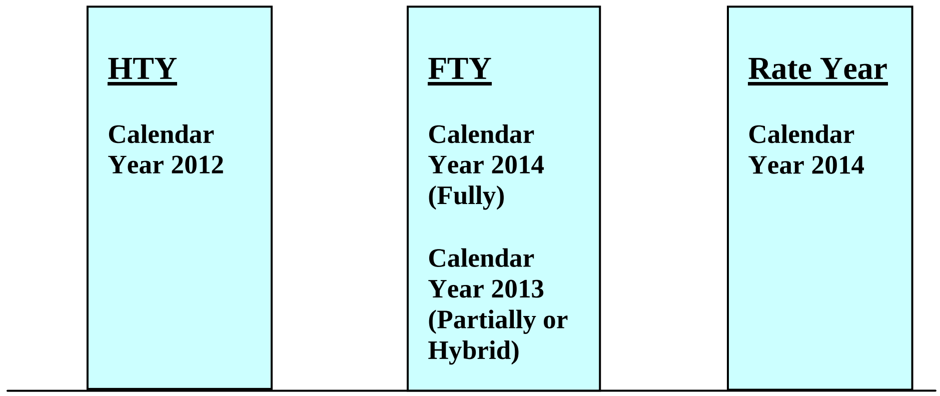
[25] These adjustments are arguably the most contentious aspect of HTYs.

[26] Some analysts refer to them as a rolling test year; for example, a test year that always takes 3 quarters of actual data and 3 months of forecasts.

[27] Unlike a FTY, the hybrid test year ends prior to the effective date of new rates.

[28] In a different sense, an FTY can begin after the period of the latest available actual data for costs and sales.

Figure 1: Different Test Years (Rate Case Filed in Early 2013)



IV. Framing the Issue: Two Different Perspectives

A. Utility/investor perspective

Utility management and their investors understandably place primary consideration on the effect of a test year on the utility's finances. They view regulatory lag in an era of increasing costs and slowing sales growth as detrimental to their interests. [29] Utilities contend, for example, that regulatory lag can limit their ability to raise capital for new investments and to remain financially viable. As expressed on the website of the National Association of Water Companies (NAWC):

> In a rising-cost industry with heavy capital investment requirements, the use of historic test years assures there will be no return on or recovery of capital that is invested during the test year and thereafter until the utility files another rate case. Any return on such investments could therefore be delayed for a number of years. This discourages necessary investment during these periods and skews construction and investment timing based on artificial test year issues rather than system needs and efficient construction planning processes. Due to regulatory lag, strictly historical test years can virtually ensure that the utility does not earn its allowed rate of return, thereby increasing risk and the cost of capital.[30]

In various forums, utilities and their investors have argued that an FTY would:

[29] Compared to the late 1960s and early 1970s, current conditions of low inflation and interest rates have helped to control utilities' average cost, making the argument for FTYs less tenable.

[30] C:\My Documents\Rate Design\NAWC Prospectively Relevant Test Year.mht. The link contains a table of the test years used in the 50 states and the District of Columbia for water utilities.

1. *Avoid earnings shortfalls from regulatory lag.* Utilities point to the divergence between the authorized and actual rate of return as a measure of excessive regulatory lag; they contend that during a period of rising average cost, a commission should use an FTY to set new rates; otherwise, they are unlikely to have a reasonable opportunity to earn their authorized rate of return.

2. *Support new investments, especially by shortening the lag time for recovering the costs for new facilities.* Otherwise, a utility may have to file rate cases more frequently just to get new facilities into rate base.

3. *Give customers better price signals by setting rates that are more closely aligned with a utility's actual costs during the effective rate period.*

4. Since the future is unlike the past because of economic and operational changes, historical data, even with piecemeal adjustments, *give a false sense of accuracy*.[31]

As will be discussed later in this paper, many state commissions believe that regulatory lag provides an important incentive for efficient utilities operations. There is no clear answer to the question of optimal regulatory lag.[32] Several commissions are also leery of the accuracy of forecasts and their manipulation by utilities to support higher rate increases, matters that this paper addresses later.

B. Broader public-interest perspective

The task for commissions is to translate stakeholders' interest into the public or more general interest. This is an essential feature of the "balancing act" of regulation in which commissions try to avoid certain outcomes, notably excessive rates and suppression of utility investors. FTYs are definitely beneficial to utilities and their investors. Why else would they propose them, other than to reduce the risk of earnings shortfalls? The relevant question for commissions is how an FTY would promote the interest of utility customers. The answer is not so obvious, as this paper argues.

The "balancing act" often uncovers the extreme positions of parties, whether they are utilities or interveners. It requires commissions to make trade-offs between various ratemaking objectives in reaching an outcome that best serves the general public. For example, although an

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[31] Similarly, as discussed later, a false impression occurs when presuming that when the utility directly forecasts costs and sales over the period of new rates, those forecasts would accurately represent future conditions.

[32] When the utility initiates rate reviews, it is in a position to manipulate the regulatory process to its advantage. Yet if reviews occur at fixed intervals, such as under a price-cap regime, the utility would have an incentive to inflate costs just prior to a review so as to receive higher rates in the following period.

FTY could help the utility financially, it may expose customers to the risks of forecasting error and bias.

Listening to Wall Street and utility investors gives the impression that commissions are the sole reason for utilities not earning their authorized rate of return. They tend not to blame management when utilities lose customers or allow the efficiency of their operations to deteriorate. Instead, investors expect commissions to compensate utilities even when utility management is at fault. Specifically, they want commissions to grant utilities prompt and guaranteed cost recovery.[33]

For FTYs, utilities like to emphasize the benefits while downplaying the negatives. They tend to overstate the ease with which a commission and other parties can evaluate their forecasts.[34] They place primary focus on the financial effect of ratemaking practices. Consumer groups often concentrate on the negatives of FTYs while slighting their benefits. They tend to unequivocally reject FTYs in principle, while actual conditions may sometimes justify them.[35] The job of commissions is to sift through the conflicting evidence in approving "just and reasonable" rates.

Commission rejection of an FTY may be more of a rational response than inertia. Inertia implies a rigid commission position toward an FTY, no matter the circumstance or what the evidence shows (i.e., status quo bias, in which the commission sticks with an HTY no matter the environment or expected outcome). It seems more plausible that rejection of an FTY reflects the reluctance of a risk-averse commission to accept a mechanism with uncertain outcomes that could make matters worse. Some commissions find the evidence for an FTY to be speculative, inconclusive, and biased.[36] Even if exaggerated, this perception reflects a common belief among both commissioners and staff that using an FTY could lead to an undesirable outcome, irrespective of the utility's costs, demand, and operating conditions.

[33] *See*, for example, Chairman Mark Sievers, "Wall Street Meets Main Street: The Regulator's View," presentation at the Mid-America Regulatory Conference, June 11, 2013, 9 at http://www.marc2013.com/CLE/SieversWall%20Street%20Meets%20Main%20Street.pdf.

[34] Utilities give the false impression that they do not have much of an advantage over other parties in understanding their operations and what constitutes efficient management. To the contrary, they have a pronounced advantage over other parties that makes evaluating the utility forecasts such a difficult task.

[35] These conditions include capability of parties to review a utility's forecasts, the absence of ratemaking mechanisms to allow a utility to recover costs between rate cases (e.g., cost trackers, infrastructure surcharges, revenue decoupling) and rapidly rising average cost.

[36] Poor forecasts are the product of ignorance, bias, or a combination of both.

1. Achieving "just and reasonable" rates

The acceptability of a test year depends on its ability to produce outcomes compatible with the standards underlying "just and reasonable" rates. The test year provides a foundation for determining such rates.

Legal precedent dictates that commissions must set reasonable rates that allow a prudent utility to operate successfully, maintain its financial integrity, attract capital, and compensate its investors in line with actual risks.[37] The emphasis is then on the results reached, not on the methods used. One obvious implication is that the appropriate test year depends on its likelihood of leading to "just and reasonable" rates.

"Just and reasonable" rates have two primary traits. First, rates should reflect the costs of an efficient and prudent utility. Second, rates allow a prudent utility a reasonable opportunity to receive sufficient revenues to attract new capital and not encounter serious financial problems. The first condition prevents customers from paying for costs that the utility could have avoided with efficient or prudent management. In using an FTY, excessive costs can also include "phantom" expenditures that the utility forecasts and that are included in rates but are not actually incurred. Commissions attempt to protect customers from excess utility costs in part by scrutinizing a utility's costs in a rate case.

A prudent utility should have a fair chance of earning its authorized rate of return. Yet this condition does not guarantee that the utility will earn close to or at its authorized rate of return. Part of the reason why a utility may experience earnings shortfalls is management's inability to control costs. Under traditional ratemaking practices, the commission normally does not allow a utility to make up any lost profits, which would constitute retroactive ratemaking.[38]

If commissions want to guarantee that the utility will recover its authorized earnings, they would favor a rate design that allows the utility to recover all of its fixed costs in a monthly service charge or a customer charge.[39] Since generally commissions do not, they implicitly recognize the positive incentive effect from allowing a utility's actual rate of return to deviate from the authorized level. Commissions also know that if a utility is continuously earning below its authorized rate of return, the utility can always file a general rate increase.

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[37] The U.S. Supreme Court outlined these conditions in its 1944 order for *FPC v. Hope Natural Gas Co.*, 320 U.S. 591, 605 (1944).

[38] Variants of traditional ratemaking, such as formula rate plans, are not retroactive because the regulator does not look back to alter past rates, but instead provides notice that future rates will be adjusted pursuant to a specific formula.

[39] Such a rate design would not guarantee the utility earning its authorized rate of return, as unexpected variable costs would cause the utility's earnings to decline.

2. The positive side of regulatory lag

Economic theory predicts that the longer the regulatory lag, the more incentive a utility has to control its costs; when a utility incurs costs, the longer it has to wait to recover those costs, the lower its earnings are in the interim. The utility, consequently, would have an incentive to minimize additional costs. As economist and regulator Alfred Kahn once remarked:

> Freezing rates for the period of the lag imposes penalties for inefficiency, excessive conservatism, and wrong guesses, and offers rewards for their opposites; companies can for a time keep the higher profits they reap from a superior performance and have to suffer the losses from a poor one.[40]

Commissions rely on regulatory lag as an effective tool for motivating utilities to act efficiently. Specifically, they view it as essential to limit risk shifting to utility customers from utility "mistakes."

Regulatory lag is a less-than-ideal method, however, for rewarding an efficient, and penalizing an inefficient, utility. Some of the additional costs could fall outside the control of a utility (e.g., increase in the price of materials), and any cost declines might not correlate with a more managerially efficient utility (e.g., deflationary conditions in the general economy). As discussed elsewhere in this paper, commissions are more receptive to an FTY when (1) regulatory lag causes a substantial downward movement in a utility's rate of return between rate cases, and (2) the utility has displayed good forecasting capability, as evidenced by its past track record.

3. Relevant policy questions

Commissions should ask what test year would best produce "just and reasonable" rates, in addition to other regulatory objectives. Specifically, what conditions would most support a specific test year? Is the preferred test year sensitive to an individual utility's operating and market conditions? The preferred test year hinges on several factors. They include:

1. *The ability of the commission to validate the accuracy and reasonableness of cost and revenue projections.* Some commissions might have to augment their staff expertise by hiring more economists and forecasters to review utility projections; commissions need a different skill set in reviewing an FTY filing versus an HTY filing.

2. *The increased cost and complexity of rate cases that an FTY would cause, net of the expected decrease in the frequency of rate cases over time, especially in a period of rising average cost.*

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[40] Alfred E. Kahn, *Economics of Regulation, Vol. 2* (New York: John Wiley & Sons, 1971), 48.

3. *The perceived fairness of customers prepaying for utility activities before they occur*; that is, the utility recovering costs before they are incurred or for activities that may not happen (i.e., "phantom" activities).[41]

4. *The trade-off between the accuracy of historical data and their representativeness for the test period*. Historical data, even when adjusted, might poorly reflect conditions over the period of new rates; accurate forecasts compatible with prudent costs for a future period, however, are difficult for utilities to produce, and even harder for commissions to evaluate.

5. *A dynamic environment in which the future is unlike the past and might deviate substantially from the past in terms of utility cost, operating, and demand conditions*.

6. *Overall, the test year that provides a better picture of the actual conditions a utility will face over the period of new rates.*

V. Basic Elements of a Future Test Year

A. Difference from a modified historical test year

The comprehensive nature of an FTY makes it distinct from a modified HTY. Every cost and revenue item requires a forecast. As proponents of an FTY have argued, an HTY, even when adjusted for "known and measurable" changes, may poorly represent actual conditions during the period of new rates. It may require a utility, for example, to rely on growth in sales, economies of scale, and productivity gains to avoid "earnings" erosion until it files the next rate case.

An FTY makes it more difficult for commission staff and other parties to review a utility's rate filing. It requires evaluating all the utility's cost subaccounts and revenue categories with enough skill and resources to make a valid judgment.

B. Matching revenues with costs

Two core features of a test year are (1) that the calculations of revenues, expenses, and rate base occur over the same time period and (2) the presence of consistency among the different costs and sales elements. The latter requires, for example, that the variable-cost[42]

[41] One prime example is customers paying for a new generating facility before it begins operation. The utility might include the plant in rate base using, for example, a 2014 test year. The expectation is that the utility will start operating the plant in 2014. The plant may get delayed to 2015, but the utility in the meantime received approval to start recovering its cost in 2014.

[42] Variable costs are costs that vary with the level of sales or output.

forecasts are compatible with the sales forecasts and that operating costs account for new facilities added to the rate base.

One problem with adjusting an HTY for "known and measurable" changes is that the utility could make adjustments to some costs or revenue[43] components but not others because they are either difficult to measure or speculative in nature. As an example, completion of a new facility is imminent, so it receives test-year inclusion, but any savings in system operating cost or increase in revenues generated by the facility may get excluded. The utility's filing in this example violates the "matching principle" and would tend to support an excessive rate increase.

C. Should commissions prefer price caps?

One might then ask whether commissions should view price caps as an alternative to ROR regulation using an FTY. A generic price-cap formula contains a specified price index (PI) from which a productivity measure (X) is subtracted:

$$\%\Delta P = \%\Delta\ PI - \%\Delta\ X,$$

The allowed percentage increase in price (%Δ P) equals the percentage increase in some specified price index (%Δ PI) minus the percentage increase in productivity (%Δ X).[44] Productivity growth, for example, could reflect the average historical gains for a peer group of utilities. It could measure technological improvements for an industry or for the economy as a whole. The price index could encompass a broad range of commodities that are either regional or national in scope. One possible choice is the Consumer Price Index.

Unlike ROR regulation using a FTY, price caps rely on cost and productivity estimates for the industry or at least not directly for an individual utility. A utility could then profit from keeping changes in its costs below the industry average. Whereas under ROR regulation the utility uses itself as the benchmark, price caps include a benchmark exogenous to the control of an individual utility.

Under price caps, the utility has strong incentives to grow sales and manage costs. Price caps compared to ROR regulation, at least in theory, promote cost efficiency because price adjustments do not reflect changes in a utility's cost, and rate reviews take place at predetermined

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[43] Revenue issues include utility versus non-utility operating revenues, weather adjustments, off-system power and gas sales, contracts, promotional and other discount rates, unbilled revenues (billing lags), imputed revenues, deferred revenues, and sales growth forecasts.

[44] See, for example, Paul L. Joskow and Richard Schmalensee. "Incentive Regulation for Electric Utilities," *Yale Journal on Regulation*, Vol. 4, No.1 (Fall 1986): 1-49.

multiyear intervals prescribed by regulators.[45] Price caps should, therefore, provide utilities with stronger incentives when prices relate to cost factors outside the control of an individual utility, and regulators do not readjust the price-cap formula whenever a utility is earning above-normal (or below-normal) profits or for some arbitrary reason.[46]

A problem with price caps is that a utility's earning might fluctuate to extreme levels. Commissions tend to frown upon utilities' earning a "high" rate of return. More generally, they also might feel uncomfortable about a ratemaking mechanism that accommodates a wide range of utility profits.

D. Filing requirements

1. Essential information

Commissions should require at least three things from utilities that propose an FTY: (1) documentation, (2) supporting analyses, and (3) assumptions. Utilities should file these items at the same time they submit their FTY rate request.[47]

Utilities should provide complete documentation to allow a thorough review by commission staff and interveners of the forecasting methodology, data sources, assumptions, and the past forecasting record of the utility. These parties should have access to transparent information from the utility that allows them to understand and verify the forecasts. Only then can a commission rule on the validity of the utility's forecasts in setting new rates.[48]

Utilities should link their projections with historical data to provide a "bridge." Otherwise, the utility would find it easier to hide costs from commission staff and interveners. The utility should provide at least three years of historical data, with more years preferred for recognizing trends and better judging the utility's forecasts.

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[45] In effect, prices caps have commission-determined regulatory lag; for example, once the commission sets base rates in a rate case, the utility cannot file another rate case for five years. Under ROR regulation, utilities control the timing of rate cases.

[46] As a rule, the "ratchet effect" would affect utility behavior under price caps any time it expects current benefits of increased efficiency to be "taken away" in the form of lower future prices. If so, utility incentives to control costs would converge toward those under ROR regulation.

[47] The utilities should file their data in executable electronic format.

[48] One question relates to whether the commission should allow a utility to file confidential data in support of its FTY. What is a reasonable standard for which the commission should grant confidentiality on future projected data? It could allow confidentiality of some data with good cause but not enough to jeopardize transparency, which is so important in reviewing a utility's rate proposal.

2. An example of utility modeling

If the utility used a statistical (e.g., econometric) method for forecasting,[49] the utility should provide the commission with various information. First, the utility should explain the theoretical construct of the model: What were the reasons for choosing the predictors specified in the model? Why did the utility choose a linear, quadratic, or other functional model for the model?

Second, the utility should provide the entirety of the data used in estimating the model. Regulatory staff might want to replicate the results by re-estimating the model with actual data used by the utility. Third, the utility should document the statistical procedures used and their rationales. Fourth, the utility should document the underlying assumptions of the predictors used in the model (e.g., price in a sales model). What did the utility assume, for example, about economic growth and inflation rates for materials? As expressed by the noted statistician, Nate Silver:

> When we make a forecast, we have a choice among many different methods…The way to become more objective is to recognize the influence that our assumptions play in our forecasts and to question ourselves about them…You will need to learn how to express—and quantify—the uncertainty in your predictions. You will need to update your forecast as facts and circumstances change.[50]

Finally, the utility should demonstrate the forecasting ability of its model. How well did the model forecast past costs or sales, assuming that the utility knew the values of the predictors?[51] In this example, any forecasting error would result from how the utility specified and estimated the model, rather than from making wrong assumptions about the predictors.

In sum, any of the above factors could affect the forecasts and would be difficult to rebut by other parties. The utility could simulate a model several times and present in a rate filing the result that most favors its position (e.g., the forecast that shows the lowest sales growth). Although parties could dispute the forecast, they may find it hard to argue the superiority of an alternate forecast. The utility, for example, might use a quadratic model because it forecasts the lowest sales growth while a linear model would show a higher growth, but the choice is not easy for other parties to defend as more valid.

For many items forecasts are not robust, in that they are highly sensitive to future scenarios of the world. Electricity sales for next year depend on economic conditions, price,

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[49] Some utilities apply econometrics methods to forecast sales and selective cost components.

[50] Nate Silver, *The Signal and the Noise: Why So Many Predictions Fail—But Some Don't* (New York: The Penguin Press, 2012), 72-3.

[51] *See* Part VI.D.2 for a more detailed discussion.

weather, and energy-efficiency behavior. Arguments over the numerical value for each predictor—and how it affects electricity sales—would be contentious and time consuming in a rate case. More important, the commission has the tricky task of selecting what it considers the most accurate single-point forecast. Basing a decision solely on a single-point or "best guess" forecast is risky. Usually in different contexts it is valid only when (1) the decision maker places a high degree of confidence in a single-point forecast, and (2) the consequences of an incorrect forecast are small.

A key question for commissions is whether forecasts from a model or other methodologies are sufficiently accurate for setting rates. For sales and large cost components, the forecasting error in percentage terms could be small and still have a non-trivial effect on the utility's earnings. Supporters of an FTY emphasize the deficiency of an HTY to accurately represent costs and revenues in the rate year. There is no guarantee, however, that forecasting them over the same period would produce more accurate results. Forecasters, as a general matter, tend to overstate the accuracy of their predictions even when those predictions are based on sound techniques. When adding the "bias" element inherent in a utility's forecasts (discussed later), one can easily imagine why an FTY might fail to better represent the utility's cost, operating and other conditions over the rate year.

One last point is that commissions should subject outside forecasts produced by reputable firms to the same scrutiny they would apply to a utility-produced forecast. They cannot take for granted that a forecast produced by an outside firm is sound and objective. The firm might have a reputation for producing results that favor a utility or other clients' positions in regulatory and other venues.

VI. Specific Challenges for State Commissions

A report by the NARUC Staff Subcommittee on Accounting and Finance laid out the basic questions on test years that commissions need to address:

> Whether using a future or historic test year, the auditor should judge the appropriateness of the test year that has been proposed. Is it representative, after adjustments, of the period in which rates take effect? …When looking at a future test year, one will want to examine the test year selected for reasonableness. Is this period mandated by rules, statute, or Commission directive? Is the test year founded on a historical base or documented figures, such that its projections are readily understandable and traceable?[52]

Below are the major challenges of FTYs for commissions. Although they should not automatically disqualify the use of FTYs for ratemaking, they do pose special problems that

[52] NARUC Staff Subcommittee on Accounting and Finance, *Rate Case and Audit Manual*, Summer 2003, 10 at http://www.ipu.msu.edu/library/pdfs/NARUC%20Ratecase%20Audit%20Manual.pdf.

commissions need to address carefully. If commissions do not, an FTY could harm utility customers.

A. Information asymmetry

The core problem with FTYs for commissions is information asymmetry. Commissions are at a distinct disadvantage relative to the utility in interpreting and evaluating the utility's performance. Commissions generally lack the knowledge, for example, to detect when the utility is efficient or inefficient, and the opportunities for utilities to minimize their costs. As part of their duties, they need to evaluate whether the utility's projected costs reflect competent utility management, or imprudent management. A utility naturally would argue that its projections reflect its best effort given the conditions it faces.[53] To rebut this claim, commission staff and interveners would need to provide evidence to the contrary. They can show, for example, the invalidity of some assumptions or forecasting methodologies that underlie their predictions.

One basic question centers on who has the burden of proof in providing information in support of its position. Assume that a utility proposes an FTY. Should the utility have the duty to show that using an FTY rather than a modified HTY would more likely produce "just and reasonable" rates? Or should other parties have the burden to show that a modified HTY would produce more socially desirable rates? Who has the burden of proof could influence the commission's decision. A persuasive argument for placing the burden on a utility is that it possesses superior expertise in accessing and interpreting relevant information. Efficiency and "fairness" considerations, along with the general principles of law, suggest that the party with the best access to information should have the burden of proof. For example, a utility should back up its claim of superiority of an FTY over other test years. Of course, commissions should exercise caution in interpreting information originating from one party with definite self-interest motivations.[54] That is why parties have to scrutinize the utility's filing and frequently supplement it with information from other sources. The commission would be well-advised to have as its mantra "Don't trust and do verify."

Although the utility may have the burden to demonstrate the reasonableness of its predictions, any proposed adjustments by other parties would require an evaluation showing the predictions' shortcomings. The utility has a big advantage over other parties in knowing its prudent costs. It is hard for commission staff and interveners to either (1) show that the utility's costs are excessive or (2) produce independent forecasts that reflect efficient utility management. For the commission, it comes down to a judgment call in determining the appropriate cost for an FTY. Probably the truth lies somewhere between the utility's high forecasts and the interveners' low forecasts.

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[53] Some utilities might want to give the impression that they have little control over certain costs or that whatever control they might have, they have done their best in managing.

[54] As a rule, commissions should apply caution in interpreting information that is asymmetrical, insufficient, and uncertain.

B. Acceptable format for data submittal

Commissions should require utilities to present certain data in a format that allows other parties to review it without great difficulty. Good examples of comprehensive and standard data-filing requirements are Illinois[55], New Mexico[56] and Wisconsin.[57]

In presenting its forecasts, a utility should file sufficient documentation to permit a thorough review by the commission and non-utility stakeholders of the forecasting methodology, data sources, assumptions for the predictors, and the past forecasting record of the utility.[58] Only then can the commission judge the validity of the forecasts. If the utility used a model for forecasting a specific cost or sales element, the utility should demonstrate the forecasting ability of its model. How well did the model, for example, forecast in the past?

C. Compatibility of rate-base treatment of new projects with the "used and useful" test

FTYs pose a special problem for commissions in regard to how they should address unexpected delays, cost overruns, and even cancellation of new facilities. If the utility's forecast turns out to be overly optimistic, customers may end up paying for new facilities prior to in-service status. As an example, a commission may approve a 2014 test year that included costs for a new electric transmission facility expected to be in service by June of that year. Assume that the facility encounters delays that set a new expected completion date of early 2015. Customers are then paying for the facility without receiving any benefits from it. This prepayment might not pose a problem in states that allow, for example, CWIP in rate base, but for other states it would. Can we then conclude that an FTY is not permissible in the latter states, or that they need to give special treatment to new facilities?

Take the example of a "used and useful" state (i.e., a state that allows a utility cost recovery only after a facility is in service and benefiting its customers) where a utility expects a new facility to come into service part way through the test period. In avoiding the situation described above, the commission could:

- Exclude the facility as part of the revenue requirement calculation in the rate case, and

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55 *See* http://www.icc.illinois.gov/docket/files.aspx?no=02-0509&docId=51197.

56 *See* http://www.nmcpr.state.nm.us/nmac/parts/title17/17.001.0003.htm.

57 *See* Wisconsin Public Service Commission, "Investor Owned Utility Rate Cases Data Submittal Requirements Request for Change in Rates," Commission staff correspondence, April 6, 1995

58 *See* the discussion in Part V.D.2.

- Only add it into rates when the facility comes on line and the commission determines its costs to be prudent in a separate proceeding.

This approach is not reliant on the construction-completion date and the cost projections; it also does not require customers to prepay for the facility prior to its in-service date. Finally, this approach also would reduce regulatory lag by allowing the utility to start recovering its costs prior to filing a new rate case. If the utility operated under an HTY, for example, the utility would have to file a new rate case before recovering any of the costs for a new facility completed outside the test year. Exceptions are when the utility has a special surcharge or tracker that allows it to recover costs in the absence of a general rate case.[59]

D. Checking for the accuracy of past forecasts

1. Three commission actions

Commissions can do three things. They can require utilities to measure the accuracy of their past forecasts. Commissions can then compare the actual costs and revenues with what the utility forecasted during the previous rate cases.[60] If a utility applied a model to derive these forecasts, it should identify the different causes of forecast errors. To what extent were errors the result of (1) wrong assumptions for specific predictors or (2) model estimation errors? The legitimacy of applying the same model to predict the future partially depends on the model's historical forecasting performance.

A commission can also view whether forecast errors occurred predominantly in one direction: Were cost forecasts consistently high or sales forecasts consistently low? Finally, a commission can rely on past forecasting errors as a guide to set a tolerance level for using an FTY. If past forecasts exhibited large errors, a commission might want to consider alternatives to using an FTY for setting future rates. Consistently biased and faulty forecasts can provide support, for example, for reverting to an HTY adjusted for "known and measurable" changes.

2. One measure of forecasting accuracy

One simple measure of forecasting accuracy *ex post facto* is to compare the actual outcomes with the forecasts. This is expressed mathematically as:

$$E_t = C_t^a - C_t^e$$

[59] A commission may consider appropriate a so-called negative tracker or rider in the event customers are paying for a new plant that unexpectedly encountered delays in completion and thus not providing them with any benefits. The rider, which would involve the utility crediting customers, could continue until the time that the plant actually goes into service. I thank Bill Steele for this thought.

[60] Analysts refer to any discrepancies as *ex post* forecasting variances.

E_t is the forecast error for year t, C_t^a is the actual outcome (say) for a cost element for year t, and C_t^e is the forecast for year t.[61] Forecast errors measured with historical data provide an indicator of a model's past performance. A measurement of forecast error can also apply to forecasts from utility budgets or other procedures. Generically, forecast errors provide a track record of a utility's past performance in forecasting individual cost and revenue components. They can identify forecast bias and whether the utility has performed better or worse over time. Has the utility, for example, improved its forecasting ability during the past two years relative to earlier years?

Forecast errors can offer a guide to the model's future forecasting performance. But often they will understate the error because of market and other dynamics that could jeopardize the forecasting accuracy of the model for future periods.[62]

Calculating forecast errors for several years can reveal whether the utility was consistently biased in one direction. The caveat is that a utility might intentionally inflate its actual costs to align with its forecast. As discussed later, a utility may seek self-fulfilled prophecy to avoid the consequences of the "ratchet effect."

When outcomes vary from the forecasts, the commission should distinguish between two causes: faulty forecasts, and unexpected events that a prudent forecast could not have accounted for. From an analytical perspective, the objective should be to minimize forecast error by creating the best possible forecast; for example, producing unbiased forecasts from a sound statistical model. Commissions should require utilities to forecast with valid methods and verifiable data. This standard requires that utilities apply generally acceptable statistical and modeling techniques. If utilities fall short in meeting it, commissions should reject their forecasts or at least question the forecasting method.

Finally, forecasting errors from models can result from mistaken assumptions and the wrong theory. The wrong theory might result in model misspecification with important predictors excluded. The underlying theory might predict, for example, that natural gas sales depend on the wrong factors or ignore certain factors that are important. If, for example, general economic conditions play an important role in affecting sales, ignoring this factor could produce biased forecasts that would systematically over- or under-forecast sales for a future test year.

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[61] Variants of this measure express the error in percentage terms or as a root mean square error over several periods.

[62] An estimated model may have good statistical properties from applying historical data, but perform poorly in forecasting. One explanation is that a structural change in the electricity or natural gas market could make the historical relationships between cost or sales and their predictors irrelevant for forecasting the future. One example involves the future availability of new energy-efficiency hardware, which could make consumers more responsive to increased prices in the future than historically.

E. Determining criteria for judging forecasts

Before its evaluation, a commission should consider drafting guidelines on criteria for judging forecasts: Should sales forecasts rely on generally acceptable modeling and statistical techniques? What factors should a utility consider in forecasting sales and costs? What inflation index should it use? How will a commission assess the reasonableness of the assumptions underlying the forecasts?

F. Limited time to evaluate utility projections

Utilities have a distinct "resource" advantage over other parties that they can better exploit under an FTY rate filing. Given the limited time for rate cases and the complexity of evaluating forecasts, parties may have insufficient time to thoroughly assess a utility's forecasts.

One possible outcome is the utility hiding inflated costs and not "getting caught." Utilities would (1) have an incentive to overstate its costs, as discussed elsewhere in this paper and (2) vigorously challenge other parties who propose to adjust the costs downward.

G. Updating revenues and costs during a rate case

As part of guidelines, a commission can lay out criteria for updating the utility's filing during a rate case. These criteria can apply to all test years, whether historical or future in nature: For an HTY, updates would make actual costs and sales more current; updates for an FTY would involve using more current data to revise forecasts; if, for example, the utility used a statistical model for forecasting, it could add more data points to re-estimate the model.

The commission may want to limit updates to major developments. Any updates should give other parties adequate time to review them. If a utility proposes a partial FTY, the more updating the commission allows the more the test year becomes historical in nature.

H. Are less-than-perfect forecasts more representative of the future than historical conditions?

This question lies at the crux of selecting the appropriate test year. As argued earlier, if the utility has a poor track record of forecasting, an HTY, even with all of its flaws, might be preferred. A utility should lose the opportunity to use an FTY, for example, if previous forecasts turned out grossly wrong and the utility earned exorbitant returns.

I. Utility incentive for misreporting costs and revenues

Commissions observe forecasts but not the effort or competence of utility management, except for crude measures (e.g., labor costs, plant availability); utilities have the information edge, knowing their own effort, output and skill level; this asymmetry makes it difficult to distinguish between forecasts reflecting prudent and imprudent costs.

1. Three questions

- **Why would a utility be more inclined to overstate costs than to understate costs?** The utility expects the commission to lower its cost forecasts, so it would tend to initially file inflated costs.[63] There is little payback for a utility that hedges on the low side. The likelihood of the utility's actual costs being higher would increase, thus jeopardizing its rate of return and penalizing shareholders.

- **How serious is this problem?** It depends on the ability of a utility to get away with reporting inflated costs. For example, the utility might ask for recovery of costs in a rate case no matter how frivolous or unlikely they are. It has little to lose if the commission catches it (except for the credibility of future forecasts); if the commission approves the cost, the utility recovers "phantom" or imprudent costs. The result is that the utility's customers are paying excessively for utility service.

- **How can a commission detect overstating of costs?** It can observe any systematic bias in past forecasts. For example, it may detect constant overforecasting of a certain cost item for a number of years. The only way for a commission to uncover inflated costs, although admittedly imperfect, is to do a thorough review of the assumptions, methodologies and other factors underlying the forecasts. This activity requires a commission staff with adequate resources and skills. It also subtracts time from other crucial rate-case matters that could lead to ill-informed decisions.

2. The "ratchet effect"

a. Definition and conventional view

The "ratchet effect" involves the commission's adjusting future forecasts based on past forecasting errors. The commission observes the utility's actual costs *ex post* to reset a future price. The "ratchet effect" reflects dynamic strategic behavior that analysts often ignore in comprehending the actions of public utilities and their regulators.

One conceivable utility response to regulatory lag is to reduce costs during the initial years after new rates and increase costs right before the next rate review. The latter action could justify a higher future rate, while the former action could allow the utility to retain the cost savings during most of the time between rate cases. For example, the utility might try to fool the commission into thinking that it is a high-cost utility so that it can charge higher rates in the future.

An argument made by FTY proponents is that the "ratchet effect" reduces the incentive of a utility to overstate forecasted costs in a rate case. Since the interaction between the utility

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[63] Conceivably, a commission's downward adjustment of a utility's forecasts could leave the utility in no better position than under an HTY.

and commission is a repeated game, the commission can learn more about the accuracy of a utility's forecasts over time as it (1) observes the utility's actual costs and (2) compares them with the forecasts filed in previous rate cases; thus, the utility would acquire a reputation for its ability to forecast. Gross bias, for example, could damage the utility's credibility. Another possible check on utility misreporting is other parties' monitoring the utility's forecasts.[64]

Traditional ratemaking would then seem to "penalize" a utility for overstating its costs or understating its sales in a future rate case. For example, assume that a utility has an incentive to overstate its costs for an FTY. To the extent that it can misreport its expectation of the true cost, the utility can earn, without taking any incremental actions, an above-normal ROR without the commission knowing it until a later time. The commission at some future time could apprehend this strategic behavior and, in effect, transfer the excess earnings in the next rate case to the utility's customers.

b. An illustration of utility avoidance of a "ratchet effect"

Using a simple equation to more formally illustrate the previous discussion, the net gain to a utility from misreporting estimated costs is,

$$NG_u = (c^r - c^e) - b \cdot (c^r - c^e)$$

$$= (c^r - c^e) \cdot (1 - b)$$

The net gain to the utility, NG_u, equals the difference between reported costs (c^r) to the commission and the utility's expected costs (c^e), minus the proportion (b) of the misreporting level (c^r-c^e) that the commission deducts from the utility's forecasted costs in the next rate case.

As the value of "b" approaches one, the ratchet effect strengthens: The utility suffers from misreporting in previous periods by being granted lower rates in the future. In the extreme case where "b" equals one, a utility's overreporting of cost in an earlier period (thereby increasing its rates) is fully offset by lower rates in later periods. The utility would benefit marginally, since its discount rate is greater than zero. Thus regulatory lag provides the utility with some incentive to control costs, even with a "ratchet effect." The commission would presumably look at a utility's costs and deduct from them the amount that the utility overforecasted in a prior period.

Alternatively, the utility could avoid a "ratchet effect" by intentionally inflating its costs right before a new rate case to close the gap between its forecasted and actual costs. In other words, a utility may initially overforecast its costs in the last rate case and then make sure that actual costs do not fall far below them.

An example is a utility projecting costs of $110 million but knowing that with efficient management it can achieve a cost of $100 million. Assume that the commission allows the $110

[64] This action assumes that other parties have the capability to detect misreporting.

million for setting new rates. If the utility achieves $100 million, which the utility could easily do, its shareholders would benefit from a higher rate of return. But the utility might conclude that in the next rate case the commission would adjust its cost forecasts because it overestimated its previous cost by 10 percent. To avoid this "ratchet effect," the utility might decide to allow its costs to attain closer to or at the $110 million level.[65] The end result is that (1) utility management would have excess money to spend, funded by its customers, and (2) shareholders would earn close to their authorized ROR because management prefers to spend the excess money rather than giving the money back to shareholders in the short run. This behavior seems more rational if one presumes the importance of utilities' retaining credibility with their past forecasts for future rate cases. If utilities are high with their cost forecasts a few times or even once, understandably they may believe that the commission would more likely adjust downward their forecasts in the future. On the margin, a utility may decide that inflating costs to lessen forecasting error is in its best long-term interest.

J. Utility incentive for efficient operation

Whether using an historical or future test year, a utility retains (at least until the next rate case) every dollar that is saved: By lowering its input prices or improving its overall cost efficiency (e.g., productivity), a utility actually would earn a higher rate of return until the commission "takes it away." The commission might do this by implicitly setting a higher productivity target in the next rate case to account for improved efficiency gains in the preceding periods. The "ratchet effect"—namely, lower costs today translate into lower rates in the future—dilutes a utility's incentive to improve its efficiency: The utility would receive no benefits beyond the next rate case when the regulator reflects past improvements in future rates. Knowing this possibility, a utility subject to ROR regulation (no matter the test year) would have an incentive to inflate its costs shortly before the next rate case.

As discussed in the last section, FTYs can have a negative effect on cost efficiency. One reason is self-fulfilling predictions to avoid a "ratchet effect." Another possible reason lies with imputing in an FTY expected cost increases yet to be determined. A utility, for example, might have a weaker incentive to negotiate wage increases below the amount already included in rates. A third reason lies with information asymmetry, in which a commission would find it difficult to identify imprudent costs in a utility's rate filing. As such, the threat of disallowed costs lessens and thereby removes an important tool for commissions to control a utility's costs. Overall, an FTY would seem to score poorly in achieving cost efficiency.

K. FTYs and utility risk

Historically, commissions have approved cost trackers, revenue decoupling, and infrastructure surcharges to avoid earnings erosion because of unforeseen or immeasurable events at the time of the last rate case. The argument for these out-of-rate-case mechanisms is

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[65] By our assumption, this cost level would reflect utility inefficiency, since it is $10 million above the level that the utility knows it could achieve with prudent management.

strongest when a commission relies on a historical test year that disregards expected developments during the rate year. Assume that a certain operating cost has trended upward (e.g., 2 percent per year) over the past several years. Assume also that the commission allows only a historical test year. In this example, the utility is likely to under-recover this cost item. What effect this outcome would have on the utility's overall rate of return depends on (1) the magnitude of any cost increase relative to the utility's earnings and (2) whether other costs fell while new rates were in effect.

As a practice, commissions do not expect utilities to earn exactly their authorized rate of return during each future period over which new rates are in effect.[66] Commissions implicitly impute a risk premium in the authorized rate of return, partially to account for volatility in earnings from unexpected fluctuations in costs or revenues. Out-of-rate-case mechanisms intend to mitigate business risk. "Business risk" refers to the uncertainty linked to the operating cash flows of a business. Business risk is multi-dimensional, inclusive of sales, cost, and operating risks. Both commissions and utility management can affect business risk.

To the extent that an FTY better projects costs and sales for future periods, as argued by FTY proponents, it should improve a utility's financial condition (e.g., interest coverage, credit rating) and lower its risk.[67] If so, should not a commission contemplate lowering the utility's authorized rate of return?[68] After all, FTYs do not decrease overall risk; instead, they shift risk from utility shareholders to customers. At least, that is the utilities' intent, as they would tend to overstate their costs and understate their revenues under current rates. Although utilities would have a similar incentive under an HTY, their ability to avoid misreporting detection would be greater under an FTY. One reason is that utilities can more easily hide "inflated costs" when making forecasts rather than reporting their actual costs, which are subject to strict audits. When a utility makes a false report of its actual costs, it can suffer a severe sanction. No such penalty occurs when the utility makes an inaccurate forecast.

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[66] This statement supports the contention that commissions do not intend the prices they set in a rate case to reflect a utility's actual cost of service for each future year. Commissions, however, judge that the prices they approve will allow the utility an opportunity (i.e., a reasonable chance) to earn its authorized rate of return or some return within a specified "dead band."

[67] *See*, for example, Mark Newton Lowry et al., *Forward Test Years for U.S. Electric Utilities*, prepared for the Edison Electric Institute, August 2010, 49-52 at http://www.eei.org/whatwedo/PublicPolicyAdvocacy/StateRegulation/Documents/EEI_Report%20Final_2.pdf.

[68] How much commissions should lower the authorized rate of return is a difficult question. By shifting risk from utility shareholders to customers and decreasing the risk of under-recovery, an FTY should reduce the utility's cost of capital. In other words, an FTY should reduce the risk premium that prospective investors place on a utility.

L. Bridging historical data with forecasts

As part of standard reporting in rate cases, commissions should require a utility to provide a verifiable link or bridge between an historical and future test year as a point of reference.[69] Without this benchmark, parties reviewing a utility's filing would lack essential information for judging the validity of the forecasts. They would find it difficult, for example, to understand the foundation or basis for the forecasts.

M. Identifying the preferred forecasting approach

The preferred approach for forecasting depends on the traits of individual costs and revenues elements. For some costs, assuming no change or a change based on recent trends or on inflation indices could be appropriate. A utility using these simple methods should justify their use and the assumptions underlying them. For other cost items, a more sophisticated approach, such as statistical modeling, might produce better forecasts.[70] Below are six general approaches for forecasting:

1. **Inflation factor:** Global Insight, for example, forecasts inflation rates for labor, materials and services used by utilities; it also provides price indexes for detailed O&M expenses itemized in the Uniform System of Accounts. A utility might also use some macro inflation index, such as the GDP Implicit Price Index. The assumption is that a particular cost item will grow only because of inflation, with no change in labor, materials or other resources.

2. **Change in both activity level and inflation:** The change in cost component "i" (e.g., administration expenses) can equal $\Delta Cost_i = \Delta Activity_i \cdot \Delta Cost\ per\ Activity_i$, which depends on both the change in activities and the inflation rate for labor and other inputs. In evaluating a cost change, commission staff and interveners should review the utility assumptions about the inflation rate and change in activity levels, with each quantified and properly supported. If the utility assumes more maintenance activities, for example, it should explain the reason and measure the effect on cost.[71]

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[69] The historical test year can represent the base year. One definition of the base year is the most recent calendar year for which the utility had information in preparing its rate case.

[70] These models can include time-series models that produce price forecasts based on past values of price; and econometric models that relate cost or sales to variables (i.e., predictors) that explain their movements over time. Statisticians refer to time-series models as *autoregressive models*. In an autoregressive model, a cost or sales component in the current period represents a weighted average of past observations of the same component going back several periods, plus a random disturbance in the current period. *See*, for example, Robert S. Pindyck and Daniel L. Rubinfeld, *Econometric Models and Economic Forecasts* (New York: McGraw-Hill Book Company, 1976), 458.

[71] Utilities will often forecast their O&M costs based on budget data. Some analysts consider budgets "wish lists" and not best-guess cost estimates for specific utility functions. Budgets may not

3. **Historical average:** If a cost or revenue component displays erratic behavior, the best approach might be to use a multi-year (e.g., three-to-five-years) average rather than assigning a high weight to the latest observation.

4. **Modeling:** For some cost and sales components, accurate forecasts require an analytical framework with good predictive capability and data.

5. **Trends:** A trend is the persistent tendency of a cost or sales element to move in one direction, either upward or downward; if sales exhibit a linear trend, it is then growing or shrinking at a constant rate over time. Detecting trends require observations over a number of years.[72] Some analysts argue that five years of historical data is the minimum for recognizing past trends.

6. **No change:** The latest observation is appropriate, assuming no expected change in the cost or sales element. The utility might expect, for example, wages to remain constant over the rate year or the price of postage stamps to stay the same.

Rather than evaluating the utility's forecasts, commission staff and interveners might want to derive their own forecasts. They will find this approach costly and subject to tough cross-examination and rebuttal by the utility if their forecasts differ greatly from the utility's and support a lower rate increase than what the utility proposes.

N. The risk associated with selecting the wrong test year

Applying the wrong test year can lead to either excessive or deficient rates:

- Using an FTY when the market environment is stable may lead to excessive rates because of forecasting error and utility gaming (i.e., biased projections). Some costs and sales elements are inherently difficult to forecasts even just for a year ahead.

- An HTY can produce deficient rates when utility total cost is rising faster than sales, causing a utility's rates to fall below its average cost.

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always align with sales or other costs, violating the "matching principle" that is essential for a test year. For example, if a utility develops a budget for each function separately and not jointly with other budgets, inconsistency among different budget items may result.

[72] What is the relationship, for example, between sales in a historical context and expected sales during the period of new rates? Assume that natural gas sales (in therms) over the last five years are as follows: 15 million, 16 million, 14 million, 13.5 million, and 17.5 million. What sales level is representative of expected sales over the period of new rates? What factors should a utility consider? What are the major determinants of sales? Do past sales reflect a trend or a cyclical pattern? Does the recent high growth in sales indicate robust growth over the next few years?

In either instance, utility rates would not satisfy the "just and reasonable" standard that most commissions define for ratemaking. How a commission decides on the test year hinges on its risk aversion toward selecting the wrong test year and its interpretation of the available information.[73] Would a commission more disfavor excessive or deficient rates? Which test year would estimate the most accurate costs and sales over the test period or the first 12 months of new rates?

Decision making under uncertainty sometimes accounts for what analysts call *Type I* and *Type II* errors (*see* Table 1). Errors in the context of test years relate partially to how much a utility's actual ROR deviates from its authorized ROR. In deciding on the appropriate test year, a Type I error can cause a dead-weight loss from excessively high rates, as the utility captures more of the economic welfare gain (i.e., of the otherwise consumer surplus[74]) from sales. The utility also might have the incentive to realize its inflated-cost forecast (i.e., cost inefficiency) to avoid a "ratchet effect" (as discussed earlier) and lost credibility of its forecasting capability in future rate cases. Another possible adverse outcome is the utility earning excessive returns because of biased projections not detectable by commission staff or interveners.

A Type II error can lead to a utility not investing in facilities and undertaking other actions that would benefit customers in the long run. The utility might encounter serious financial difficulties because of rates lagging behind costs. The utility sees its credit rating drop, it suffers cash-flow problems, and its actual rate of return is (say) at least 100 basis points below its authorized return. These outcomes depend on the availability of other ratemaking mechanisms to mitigate regulatory lag, such as cost trackers and revenue decoupling.

Because utilities assign a high cost to a Type II error, their preference is for a FTY. In contrast, because consumer groups would tend to place a high value on avoiding a Type I error,

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[73] One commission, the Public Service Commission of Utah, identified eight factors for selecting a test year. They are: (a) the general inflation rate; (b) changes in the utility's investments, revenues or expenses; (c) changes in utility services; (d) the availability of accurate data to non-utility parties; (e) the ability to match the utility's investments, revenues, and expenses; (f) whether the utility's costs are increasing or decreasing; (g) incentives to efficient management; and (h) the expected length of time for new rates. (Public Service Commission of Utah, *In the Matter of the Application of PacifiCorp for Approval of Its Proposed Electric Service Schedules and Electric Service Regulations, Order Approving Test Period Stipulation*, Docket No. 04-035-42, October 20, 2004.)

[74] *Consumer surplus* is the difference between the value that consumers place on a good or service and the amount that they actually pay. Technically, consumer surplus is the area under the demand curve and above the price. When customers pay a higher utility rate, their consumer surplus decreases by the sum of (a) the loss in net benefits from less consumption and (b) the additional payment for consuming at the actual level compared with what they would have paid at the same consumption level under a lower rate. When the higher rate is above the utility's prudent costs, it results in what economists call a "deadweight loss" (i.e., aggregate economic-welfare loss).

their preference is for an HTY.[75] A commission must trade off the two types of error in reaching a decision: Reducing one type of error compromises the other. For example, in reducing the risk from an FTY (Type I error), the commission takes the chance in selecting an HTY that produces deficient rates and financial problems for the utility.

If a commission views the two errors in terms of an excessively high or low ROR, it might want to consider an earnings-sharing plan or what some analysts call a *formula rate plan*. A formula rate plan is a ratemaking method in which the utility adjusts periodically (e.g., annually) its base rates without a general rate case, conditioned on an actual ROR on equity that falls outside some commission-defined band. The band might encompass, for example, 100 basis points above and below the ROR on equity authorized by the commission in the last rate case.[76]

Table 1: The Risk of Choosing the Wrong Test Year

Test year	**Actual risk**	
	Stable conditions	*Dynamic conditions*
Future	***Type I error***	Preferred
Historical	Preferred	***Type II error***

[75] This observation is consistent with the prevalent opposition by consumer groups to an FTY, evident in their position and testimony in rate cases.

[76] Supporters argue that these plans help stabilize a utility's rate of return without a full-blown rate case review, thereby avoiding serious financial problems and preventing excess profits. Opponents argue that they shift risk to customers and give utilities weak, or even distorted, incentives to manage their costs.

VII. Recommendations for State Utility Commissions

Those commissions studying or applying FTYs for ratemaking might want to keep the following points in mind:

1. **The merits of an FTY depend on the availability of other ratemaking mechanisms that mitigate regulatory lag.**
   These mechanisms include CWIP in rate base, revenue decoupling, trackers, surcharges and formula rates.[77] Should a commission consider an FTY as a first or last resort for mitigating regulatory lag?[78] When a commission allows adjustment mechanisms triggering cost recovery between rate cases to protect the utility from unpredictable costs, sales, and other outcomes, an FTY has less justification as a ratemaking tool for utilities.

2. **Commissions should not underestimate the challenges of information asymmetry as it relates to FTYs.**
   A seminal economics article on the market for "lemons" (i.e., defective products) concludes that in markets plagued by information asymmetry, the market player holding an information advantage will likely dominate the outcome at the expense of others. For an FTY, the implication is that any outcome would be favorable to the utility in achieving higher profits or other goals that are harmful to its customers.[79] Information asymmetry reflects the relatively little knowledge that a commission has on the relationship between forecasted costs and utility-management competence. When a utility files a cost forecast, how does the commission know whether it reflects competent management? The analyst or auditor can evaluate the forecast applying state-of-the-art techniques; still, a level of uncertainty remains that leaves unknown the utility's level of competence embedded in the forecast. Supporters of an FTY seem to understate the seriousness of information asymmetry. States with large commission staffs might also not regard information asymmetry as a major problem, but smaller commissions and consumer groups would undoubtedly have a different view.

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[77] A primary intent of these mechanisms is to mitigate risks to utilities from bad projections for test-year costs and revenues.

[78] This paper makes no judgment on the superiority of any one mechanism in reducing regulatory lag. Each has its advantages and disadvantages, making it difficult to rank them based on their capability to best advance the public interest.

[79] George A. Akerlof, "The Market for 'Lemons': Quality Uncertainty and the Market Mechanism," *The Quarterly Journal of Economics*, Vol. 84, No. 3 (August 1970): 488-500.

3. **Commissions may want to consider developing a rule or policy statement.** They can specify conditions for acceptability of an FTY filing. A commission can prescribe a standard format or a set of minimum requirements for presenting FTY data. This mandate would help parties to facilitate the interpretation and evaluation of the utility's forecasts.

4. **Commissions could hold a technical conference or workshop.** This recommendation is especially relevant for states allowing or requiring an FTY for the first time. An FTY involves myriad technical issues that parties should try to resolve prior to rate cases. (The Appendix contains a list of questions that address the major issues.) Otherwise, rate cases themselves will involve their resolution, which deducts from the time for covering other rate-case matters. The commission will inevitably suffer through a "learning curve" before reaching a comfort level with FTYs.

5. **Commissions may want to look closely at the incentives that an FTY provides utilities for reporting their costs and sales.** In avoiding a "ratchet effect," a utility might inflate its costs to align its forecasted and actual costs. The consequence is customers overpaying for utility service and the utility's credibility maintained because of its apparent "reasonable forecasts." Since an FTY weakens the incentive effect of regulatory lag in addition to making it more difficult for commissions to exclude imprudent costs in rates, cost inefficiency is more likely to occur. Utility customers inevitably shoulder the excessive costs in the form of higher rates.

6. **Commissions should understand that applying forecasting methods for setting rates places a higher premium on accuracy than for other applications.** Commissions should consider demanding a small tolerable margin of error for costs and sales forecasts.[80] For example, the utility's projecting a sales increase of 0.5 percent when the actual increase was 1.5 percent could have a significant effect on its rate of return. A commission might ask whether it can rely on costs and sales forecasts for setting "just and reasonable" rates when accuracy is so important, as alleged by critics of an HTY. Often forecasters in different contexts express their predictions as a range of values within which an event (e.g., future sales) has a high probability of occurring. The uncertainty of predicating costs and sales gives theoretical support for commissions to look at a range of possible future scenarios, rather than focusing only on the most probable future state (i.e., the "best guess" forecast). In other words, for different decisions commissions should not put all of their faith in one forecast, even if that forecast is superior to all other forecasts. Yet in setting rates, commissions have no choice but to select a single forecast, knowing with almost absolute certainty that it will

[80] Assume that a utility inflates its costs by 3 percent and that its profits or margins are 20 percent of costs. The utility's margins or ROR would increase by 15 percent. If the authorized ROR on equity is 10 percent, the actual ROR would increase to 11.5 percent.

contain a margin of error. In some instances, forecasts are no more than an educated guess, which makes them especially suspect for setting rates. The policy question ultimately reduces to: Are forecasts sufficiently accurate for use in setting rates that are unlikely to result in an "extreme" rate of return, especially on the high side?

7. **Commissions will need to decide whether (a) they should rule at the beginning of a rate case the appropriate test year or (b) utilities should have the discretion to select a test year.**
   One view is that commissions should have the discretion to choose the test year, assuming they have the authority. The preferred test year from a public-interest perspective depends on the actual conditions facing a utility.[81] Why should commissions allow the utility to select the test year when they should expect a utility to choose one that best advances its interest rather than the public interest? What happens, for example, if a utility proposes an FTY and the commission staff, along with interveners, believes it is incapable of evaluating the forecasts? In this instance, the utility has a distinct incentive to inflate its costs and hopes that the commission would not detect them. This utility prerogative is akin to allowing the utility to choose rate design or a cost-of-service methodology, with the commission relegated to a secondary role in fine-tuning the proposals. Most commissions would understandably find this status unacceptable. Legislatures threaten the independence of state commissions when they mandate the use of a specific test year, no matter the circumstances or actual conditions faced by a utility

8. **Commissions may want to select a test year in individual cases based on a risk-based framework.**
   The preferred commission decision comes down to its risk aversion toward negative outcomes, given the available information. Some parties might have more concern with the possibility of using an FTY under stable conditions and risking excessive rates—what we previously called a Type I error. Other parties (namely, utilities and their investors) might assign a high risk to using an HTY under dynamic conditions—what we previously called a Type II error. Consistent with the "balancing act" feature of regulation, a commission must inevitably weigh the different outcomes in selecting a test year for the public good.

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[81] For example, *Section 54-4-4(3) of the Utah Code Annotated* states:

> If in the commission's determination of just and reasonable rates the commission uses a test period, the commission shall select a test period that, on the basis of evidence, the commission finds best reflects the conditions that a public utility will encounter during the period when the rates determined by the commission will be in effect.

The commission must then consider which test year would better represent future conditions over the rate year. For example, when it expects a utility's average cost to increase and deems the utility's forecasts to be reasonably accurate, an FTY would seem more appropriate than an HTY.

Appendix: Questions to Ask about Future Test Years

State utility commissions should ask several questions about FTYs, a simple concept, but as examined in this paper, posing tough challenges for state public utility commissions. The questions include:

1. Does the use of an FTY motivate utilities to overstate costs and understate revenues under present rates? If so, how can a commission address this problem?
2. Does an FTY advance the "balancing act" aspect of public utility regulation? Does it, for example, unduly favor utilities at the expense of their customers?
3. What conditions should hold to justify the use of an FTY?
4. What are the risks associated with using the wrong test year?
5. Can utilities manipulate their costs and revenue forecasts to inflate rates with unlikely detection by the commission and interveners?
6. What incentive does a utility have under different test years to control costs between rate cases?
7. Does an FTY improve a utility's financial condition to justify a lower authorized rate of return?
8. What rules should a commission have on forecast updates?
9. Does the commission have adequate staff resources to adequately evaluate utility forecasts?
10. How can a commission know the reasonableness of a utility's forecasts?
11. What is the level of forecasting errors that a commission should tolerate?
12. Who should bear the consequences of large forecasting errors?
13. How can a commission evaluate past forecasts to guide future forecasts?

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