Making Sense of Multi-Year Rate Plan Options

Technical Brief

By

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ABSTRACT

In recent years, capital and operating costs faced by electric utilities in North America have increased at a faster pace than the long-term average. When costs increase, utilities must file rate applications for cost recovery. Multi-year rate plans ("MYRPs") provide a framework for setting rates that can reduce the frequency of utility rate cases, even in an inflationary environment. MYRPs are facilitated by rate adjustments that either follow industry cost and productivity trends or align with the company's own costs—actual or forecasted. Depending on their design, MYRPs can include cost efficiency incentives for the utility, which may yield higher profits to the utility and slower rate escalation to customers. This white paper presents the four broad categories of MYRPs currently in place in North America and discusses benefits and challenges of each: (1) price caps, (2) revenue caps, (3) forecasted test years, and (4) formula rates.

INTRODUCTION

In recent years, capital and operating costs faced by electric utilities in North America have increased at a faster pace than the long-term average.[1] To maintain revenues commensurate with costs in an inflationary environment, utilities will generally propose new rates through a rate application filing before the state or provincial regulator. When cost pressures accelerate, rate applications are likely to become more frequent. This can be problematic because, often, such rate applications are viewed as administratively burdensome and costly.

Multi-year rate plans ("MYRPs") provide a framework for setting rates that can reduce the frequency of utility rate cases, facilitated by rate adjustments that either follow industry cost and productivity trends or align with the company's own costs—actual or forecasted. Depending on their design, MYRPs can include cost efficiency incentives for the utility, which may yield higher profits to the utility and slower rate escalation to customers.[2] If costs exceed expectations, however, returns may decline, with the impacts to net income associated with cost overruns borne by shareholders.

MYRPs have existed for decades in some jurisdictions, but no two MYRPs are exactly alike. This white paper presents the four broad categories of MYRPs currently in place in North America and

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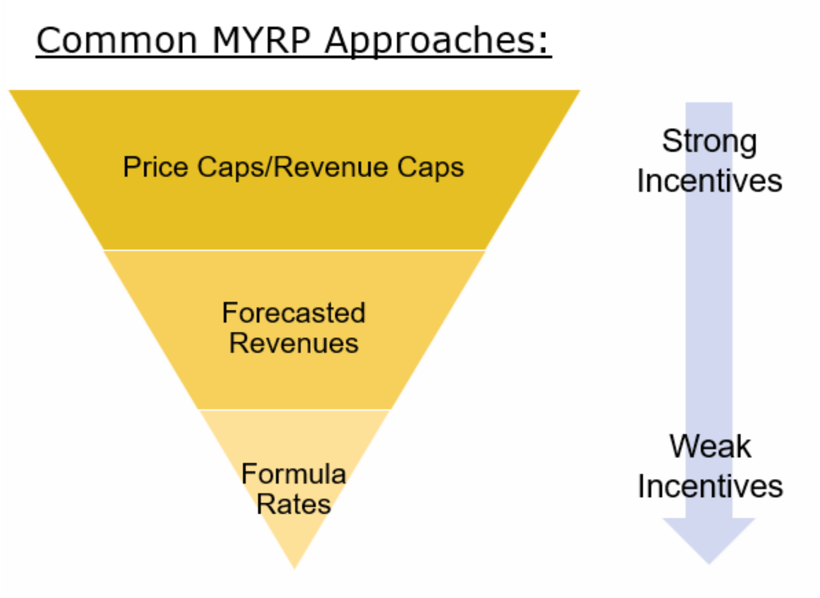
[1] Crowley, Nicholas, and Daniel McLeod. "Trends and drivers of distribution utility costs in the United States: A descriptive analysis from 2008 to 2022." *The Electricity Journal.* Volume 37, Issue 3, April 2024.

[2] Crowley, Nicholas, and Mark Meitzen. "Measuring the price impact of price-cap regulation among Canadian electricity distribution utilities." *Utilities Policy.* Volume 72, October 2021.

discusses benefits and challenges of each: (1) price caps, (2) revenue caps, (3) forecasted test years, and (4) formula rates. As depicted in Figure 1, each approach has different implications for utility cost efficiency incentives. Price caps and revenue caps provide a financial reward to the utility for superior cost efficiency performance relative to the industry average but inflict a financial penalty for sub-par cost efficiency. The framework imposes strong incentives on the utility because the company's price/revenue trajectory is set not based on its own costs, but on industry trends. In this way, price caps and revenue caps mimic the pressures of a competitive market.

Forecasted revenues provide an incentive to keep costs within the company's allowed revenue each year, but since the initial revenue trajectory is set with the company's own forecast rather than industry trends, the MYRP does not impose efficiency pressure comparable to a competitive market. Also, forecasted revenue MYRPs tend to cover a shorter time period than price caps and revenue caps, and shorter MYRPs provide less time for the utility to find and benefit from cost efficiencies. Finally, formula rates, which operate like an annual cost-of-service true-up, provide weak incentives, as the mechanism allows the utility to recover any prudently incurred costs and does not reward cost reductions.

Figure 1: Cost Efficiency Incentive Implications of MYRP Frameworks



We discuss each MYRP approach individually and conclude this technical brief with a summary of recent work involving MYRPs conducted by Christensen Associates Energy Consulting ("CA Energy Consulting").

PRICE CAPS

Price caps limit adjustments to customer rates over a pre-specified period of time, allowing rates and costs to diverge as the utility works to find cost efficiencies to earn superior returns. At the end of the price cap term, typically around five years, the utility files a ″rebasing″ rate application, resetting rates according to its cost to serve. Price caps were originally introduced to utility regulation because they provide utilities with cost efficiency incentives that mimic those of competitive markets. In contrast, traditional rate-of-return regulation is criticized for its "cost-plus" approach, which grants cost recovery on any expenses not disqualified by the regulator.

Although customer price growth is restricted under this approach, revenues are not restricted. The utility can increase its revenue over the plan term through sales growth. Thus, the utility can improve profits both by increased sales and by cost reduction. Conversely, however, the utility can experience revenue losses, and therefore reduced profits, if sales declines occur and/or if costs increase.

Under a price cap, energy, demand, and customer charge adjustments are made each year of the MYRP term according to an inflation rate minus industry productivity formula, generally called the "I-X" formula. By common practice, the inflation rate is updated each year using government data, while the X factor remains fixed over the plan term.[3] Table 1 depicts the mechanics of a price cap. Note that for the Residential customer, both the customer and energy charges are adjusted each year by the percentage obtained from I-X. For the Business customer, the customer, energy, and demand charges are all adjusted by this same percentage.

Table 1: Illustrative Example of a Price Cap

Term Year	I	X	I-X	Residential		Business		
				Customer	Energy (kWh)	Customer	Energy (kWh)	Demand (kW)
Year 1				$10.00	$0.080	$120.00	$0.080	$3.000
Year 2	2.00%	-1.50%	3.50%	$10.35	$0.083	$124.20	$0.083	$3.105
Year 3	2.10%	-1.50%	3.60%	$10.72	$0.086	$128.67	$0.086	$3.217
Year 4	2.00%	-1.50%	3.50%	$11.10	$0.089	$133.17	$0.089	$3.329
Year 5	2.50%	-1.50%	4.00%	$11.54	$0.092	$138.50	$0.092	$3.463

In most current price (and revenue) cap plans currently in place in North America, the X factor is set equal to zero, even though analysis of industry data indicates negative productivity growth in recent years. Under the assumption of a zero X factor, prices adjust by the rate of inflation.[4]

The price cap form of incentive regulation may provide benefits to customers in the form of slower rate escalation over time relative to regulatory structures that do not provide such cost efficiency incentives. Given current pressures on utilities as a result of price inflation, price caps could provide utilities with one tool to address customer cost concerns.

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[3] The X factor is generally calculated by productivity experts, like those at CA Energy Consulting.

[4] Inflation is generally a weighted average of labor inflation (e.g. "average weekly earnings") and non-labor inflation (e.g., CPI), based on company splits of labor and non-labor operating expenses.

REVENUE CAPS (WITH REVENUE DECOUPLING)

Many of the incentive qualities of price caps also apply to revenue caps. As with price caps, both the utility and its customers can obtain benefits through cost efficiencies under a revenue cap if the plan is structured properly. However, some features distinguish the two approaches.

A revenue cap adjusts the utility's allowed revenues according to a formula and is generally paired with revenue decoupling.[5] The revenue cap formula includes inflation and productivity, but differs from the price cap formula in its inclusion of a growth factor set equal to annual growth in the number of customers. Under both revenue caps and price caps, revenues grow as the number of customers served increases—however, the structure of the formula looks different because the price cap formula applies to customer rates, while the revenue cap formula applies to the utility's allowed revenues.

For a utility with concerns about falling sales, a revenue cap with revenue decoupling may be preferred because revenue caps adjust the utility's allowed revenue according to the I-X formula, and revenue decoupling adjusts rates according to differences between the utility's expected and actual sales. Together, a revenue cap with decoupling provides the utility with revenue adjustments each year of the plan proportional to industry average cost growth regardless of sales. In this way, a revenue cap approach with decoupling (relative to a price cap framework) can reduce risk for a utility concerned about falling demand for electricity, particularly if it recovers some of its fixed costs through an energy charge. Under both price caps and revenue caps, however, the utility faces the risk that its costs could rise faster than the annual adjustment in revenues (or rates).

Table 2 depicts an illustrative example of a revenue cap. In Year 1, the utility's revenue requirement is set equal to its cost to serve ($1 billion). In each subsequent year of the five-year plan, the allowed revenue is adjusted according to an inflation rate (I), the X factor, which is based on industry productivity, and company-specific growth in the number of customers served (G). The inflation rate is updated each year of the plan, using published government data. The company also updates G using its most recent annual customer count growth rate. As with the price cap formula, the X factor remains fixed over the plan term. The allowed revenue in each year equals the previous year's allowed revenue, adjusted by I-X. A revenue decoupling mechanism can be used to true up realized revenues and allowed revenues each year.

Table 2: Illustrative Example of a Revenue Cap[6]

Term Year	I	X	G	I-X+G	Revenue Cap (Millions USD)
Year 1					1,000
Year 2	2.00%	-1.00%	1.25%	4.25%	1,043
Year 3	2.10%	-1.00%	1.00%	4.10%	1,085
Year 4	2.00%	-1.00%	0.75%	3.75%	1,126
Year 5	2.50%	-1.00%	1.00%	4.50%	1,177

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[5] As explained in the appendix, if a revenue cap operates without a decoupling mechanism, it is effectively a price cap.

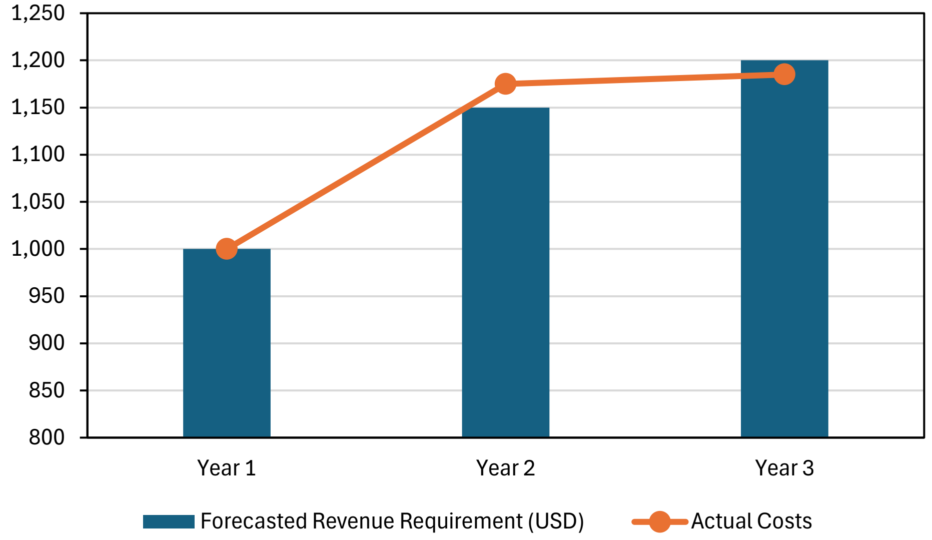
[6] Note that the X factor for a revenue cap generally differs from the X factor for a price cap.

FORECAST MYRP

Whereas price caps and revenue caps rely on industry average adjustments (exogenous to the company), a forecast MYRP relies on the company's own forecasts of its revenue requirement over a period of time. The forecast MYRP approach establishes the utility's revenue requirement each year during the plan's duration, and therefore requires more company-specific data to be developed and filed as part of the rate application. As a result, this approach provides more oversight and control over the utility's revenues (both for the utility and for the regulator). The forecast approach also may result in lower cost efficiency because the initial revenue trajectory is set with the company's own forecast rather than industry trends that would impose efficiency pressure comparable to a competitive market.

As shown in Figure 2, the utility's actual costs may vary year-to-year relative to its forecasted revenue. However, the company may only collect the forecasted revenues—regardless of the costs incurred. This imposes some cost efficiency incentives on the firm, allowing it to earn profits for better-than-expected cost management (as in Year 3). Conversely, the firm incurs losses if its costs exceed allowed revenues (as in Year 2). To protect consumers from the utility cutting spending at the expense of service quality or planned capital expenditures under this mechanism, the regulator may introduce performance incentive mechanisms ("PIMs") or impose rules requiring capital to be placed into service before related revenues can be collected by the company.

Figure 2: Illustrative Example of Forecasted MYRP



FORMULA RATES

Under formula rates, a utility adjusts its rates each year according to its cost to serve. The rate adjustments use a pre-defined mechanism that temporarily removes the need for a formal rate application. In some cases, the mechanism works by measuring deviations from the firm's allowed return on equity ("ROE"), reducing or increasing revenues with a rate rider in the following year if realized earnings exceeded or fell short of the company's target ROE, respectively.

Formula rates can reduce the frequency of rate applications and keep costs and revenues closely aligned. However, this form of MYRP has lower cost efficiency incentives relative to the other MYRP approaches because the utility's earnings are insulated by annual cost-based rate true-ups. Any new costs can be recovered through rates, as long as they are prudently incurred. Likewise, any increases in ROE due to cost efficiency improvements will be returned to customers the following year. Thus, both the carrot (higher profits) and the stick (losses) embedded in the other MYRP frameworks are not present in formula rate plans.

SUMMARY TABLE

Table 3 summarizes the characteristics of each MYRP.

Table 3: Benefits and Challenges of Approaches to MYRPs

Approach	Benefits	Challenges
Price Caps	• Provides an annual rate adjustment equal to the rate of inflation minus industry productivity over the MYRP term • Utility can increase revenue and profits through sales growth • Provides cost efficiency incentives	• May result in intervenor resistance to automatic rate increases • Does not protect the utility against sales declines
Revenue Cap + Decoupling	• Provides an annual rate adjustment equal to the rate of inflation minus industry productivity, plus customer count growth over the MYRP term • Protects utility against sales declines • Provides cost efficiency incentives	• May result in intervenor resistance to automatic revenue increases • Does not allow for revenue increases beyond the I-X+G adjustment, even if sales increases occur
Forecast MYRP	• Provides an annual rate adjustment proportional to the revenue forecast established at the beginning of the MYRP • Provides utility with opportunity to request revenues according to expected costs • Protects utility against sales declines	• Intervenor resistance to automatic revenue increases • Requires more regulatory scrutiny over spending forecasts • Strength of cost efficiency incentives not well established in economics literature
Formula Rates	• Reduces rate application frequency • Aims to keep revenues and costs closely aligned	• Has the lowest cost efficiency incentives

RECENT WORK ON MYRPS BY CA ENERGY CONSULTING

CA Energy Consulting LLC and its parent company Christensen Associates, Inc. have been involved in developing the theoretical foundations and practical design of incentive regulation plans dating back to the inception of incentive regulation in North America in the 1980s. Our team leads on performance-based regulation ("PBR") issues across North America, having worked closely with clients to develop tailored, effective regulatory strategies that work for the utility, the regulator, and consumers, including the latest hybrid PBR frameworks. The team consists of utility consultants who have assisted a range of parties, including investor-owned utilities, commission staff, municipal utilities, cooperatives, and environmental non-profit organizations. The firm has also conducted work on regulation across network industries beyond gas and electric utilities, including telecommunications, railroads, and the postal service. Our work is driven by economic theory, empirical research, and a desire to improve utility regulation.

Our consulting experience includes designing MYRPs, reviewing utility performance incentive mechanisms ("PIMs"), reviewing service quality indicators, and benchmarking utility performance across a variety of metrics. The team's recent involvement in designing MYRPs for major gas and electric utilities has included broad surveys of the North American regulatory landscape with a focus on incentive regulation. This primarily includes revenue caps and price caps, though we have also evaluated forecasted MYRPs on behalf of state regulatory authorities.

In recent years, we have filed reports and testimony on these issues in Massachusetts, New Hampshire, Alberta, British Columbia, and Ontario. The firm also provides consulting expertise on a wide range of topics in regulatory economics, including rate design, demand response evaluations, cost allocation/cost-of-service studies, marginal cost analysis, cost of capital/rate of return calculations. In these areas, the firm has filed reports and testimony in jurisdictions across North America, including Canada, the United States, and the Caribbean.

Reach out with questions:

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APPENDIX: A NOTE ON REVENUE CAPS WITHOUT DECOUPLING

If a utility operates under a "revenue cap" without decoupling, that is, allowed revenues are updated each year and rates are set according to test year billing determinants, but actual and allowed revenues are not trued-up, then the revenue cap is effectively a price cap.

Table A.1 demonstrates that if revenues adjust each year by the I-X formula, but billing determinants remain the same, the MYRP is, in fact, a price cap. Column A represents the utility's allowed revenue, adjusted by the I-X formula (note that these values are drawn from Table 2). In this example, the utility's "allowed revenue" is capped, but its rates, as shown in column D, are based on the test year (i.e., Year 1) billing determinants. As a result, the company's rates are restricted, as they would be under a price cap. However, since the company's billing determinants change each year (as shown in Column C), the company's realized revenues are not capped. Since this scenario depicts capped prices and not capped revenues, it is a price cap.

Table A.1: Revenue Cap using Test Year Billing Determinants to Set Rates

	A	B	C	D=(A/B)	E=(C*D)
Term Year	**Allowed Revenue**	**Test Year MWh**	**Actual kWh**	**Rate ($/kWh)**	**Realized Revenue**
Year 1	1,000	10,000	10,000	0.100	1,000
Year 2	1,043	10,000	10,300	0.104	1,074
Year 3	1,085	10,000	10,609	0.109	1,151
Year 4	1,126	10,000	10,927	0.113	1,230
Year 5	1,177	10,000	11,255	0.118	1,324

ABOUT THE AUTHORS

Nicholas A. Crowley, MS (University of Wisconsin–Madison). Mr. Crowley is a Vice President. He has filed testimony and reports that design and review utility incentive regulation frameworks across North America. He has prepared memoranda, presented to utility executive teams, participated in technical conferences, and organized conference workshops on alternative regulatory regimes currently in place in both Canada and the United States. He has calculated total factor productivity measures for the electricity and gas sectors and developed indexes for use in performance-based ratemaking. He has also performed cost benchmarking analysis and assessed earnings sharing mechanisms for use in PBR frameworks. Mr. Crowley's research has appeared in *The Electricity Journal* and the journal *Utilities Policy*. Prior to joining CA Energy Consulting, Mr. Crowley served as an economist at the Federal Energy Regulatory Commission, where he assisted with energy industry benchmarking, the incentive regulation of oil pipelines, and the review and evaluation of natural gas pipeline rate cases.

Dan McLeod, PhD (University of Wisconsin–Madison) is an Economist with experience working in the areas of antitrust and competition, economic cost measurement in the airline and railroad industries, and productivity measurement in the postal and electric utility industries. Additionally, in the energy practice, he has been involved in the calibration of price and revenue caps, helped design and evaluate incentive regulation plans, performed and critiqued cost benchmarking studies, and estimated the load impacts of EV smart charging algorithms and critical peak pricing demand response programs. Dr. McLeod's work has been published in *The Electricity Journal.*