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RATE DECOUPLING: ECONOMIC AND DESIGN CONSIDERATIONS

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EXECUTIVE SUMMARY

THE BASICS

In an era of flat sales, escalating infrastructure costs and increased policy maker interest in energy efficiency and distributed energy, utility company concerns with under recovery of costs and frequent rate cases are prompting renewed interest in rate decoupling policy.

Electric and gas utility companies charge their customers regulator-approved rates in exchange for products (e.g. gas, electricity) and services (e.g. delivery of products). With traditional methods of ratemaking, electric and gas utilities make more money by selling and delivering more product. This rate structure can become financially problematic to utilities when sales do not keep pace with the costs to obtain and deliver these products.

RATE DECOUPLING POLICY IS PRIMARILY USED TO REDUCE UTILITY OPPOSITION TO ENERGY EFFICIENCY AND DISTRIBUTED ENERGY POLICIES.

Rate decoupling policy is an incremental adjustment to the traditional ratemaking model that is primarily used to reduce utility opposition to energy efficiency and distributed energy policies that result in foregone sales.

In simple terms, rate decoupling reduces the importance of sales levels in achieving the utility's revenue requirement, the total amount the utility is allowed to charge its customers. This is done by allowing the utility's per KWh service rates to customers to fluctuate in response to total system sales in order to keep the revenue requirement constant. So if total system sales are lower than expected, the per KWh charge increases. If sales are higher than expected, the per KWh charge decreases.

There are alternative policy options to decoupling meant to ensure a utility covers the costs of providing service in specific scenarios. Alternatives examined include straight fixed variable (SFV) rates, high customer charges, and minimum bills. Policymakers need to carefully match the use of these policy tools with intended policy goals. Comparatively, decoupling may be the best choice if the goal is to reduce barriers to energy efficiency while helping ensure utilities achieve their revenue requirement.

ECONOMIC CONSIDERATIONS

Utility customers can benefit from decoupling policy through reduced bill volatility and reduced utility opposition to energy efficiency and distributed generation. However, customers are the most vulnerable to the potential drawbacks of decoupling policy.

Reduced ratemaking transparency and price signal dampening are important consumer impacts to consider when evaluating the ability of decoupling policy to achieve broader energy efficiency policy goals.

Decoupling policy primarily benefits utility companies by providing greater revenue certainty, thus reducing financial risk. There is significant regulatory debate about monetizing the value decoupling policy provides for utility companies. Specifically, since decoupling policy reduces revenue uncertainty for utilities, should this reduced risk equate to a lower regulator-granted profit margin?

Access to analysis of the relationship between decoupling policy and equity cost of capital impacts is limited. However, Wharton (2015) finds no statistically significant reduction in the cost of capital resulting from adoption of decoupling policy. Vilbert (2014) postulates this may be due to the policy's inability to impact volatile market expectations, non-diversifiable risk, and net risk reduction. A case-by-case assessment by regulators is required to evaluate the impact a specific decoupling policy design will have on a specific utility company's cost of equity. Hempling (2011) presents five key questions that regulators can use to evaluate this relationship on a case-by-case basis.

CUSTOMERS ARE THE MOST VULNERABLE TO THE POTENTIAL DRAWBACKS OF DECOUPLING POLICY.

The "Averch-Johnson effect" states that a utility will have an incentive to overinvest if its regulated rate of return is greater than its cost of capital. Decoupling is not meant to address the Averch-Johnson effect, however, in certain instances (i.e. when the rate of return is set higher than the utility's cost of capital) decoupling may serve to strengthen the effect when sales are low by realizing the allowed revenue requirement.

POLICY DESIGN CONSIDERATIONS

If decoupling is to be pursued the following policy design considerations may be helpful to maximize benefits and reduce drawbacks.

Consumer Benefits and Protection

Decoupling adjustments must be bidirectional to offer benefits to both utilities and consumers.

Test consumer reactions to decoupling policies through pilot programs before full implementation.

Decoupling adjustment amounts can be limited or capped, to protect consumers.

Evaluate decoupling impacts within the context of other automatic adjustments and bill riders.

Minimize Economic Inefficiencies

Calculate and apportion adjustments appropriately on a per rate class or rate schedule basis.

Develop and implement a systematic method to evaluate return on equity impacts.

Evaluate price-dampening impacts to ensure consumers maintain price signals sufficient to incent cost-effective energy usage reductions.

Achieve Policy Goals

Identify goals first, then determine if decoupling or alternatives are the best fit.

Only full decoupling (as opposed to limited or partial decoupling) has the ability to break the link between utility sales and profitability.

Complementary policies may be needed to actively promote efficiency and distributed energy goals, as decoupling serves only to reduce barriers.

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INTRODUCTION

With traditional ratemaking, utilities (e.g. gas, electric) generally become more profitable as they sell more product. This creates a host of economic complications, especially as policymakers seek to promote energy efficiency and conservation programs that require utilities to reduce sales. Or as policymakers promote distributed energy generation that displaces utility sales. The regulator must simultaneously respect and support the profitability of the private company—that is providing capital for public benefit—while also scrutinizing and limiting economic returns to protect ratepayers.

Decoupling is an approach to ratemaking that seeks to remove the link between utility revenues and volumetric (i.e. commodity) sales and is typically used to reduce utility company opposition to energy efficiency policies.

Section I of this paper provides basic background about the problem decoupling addresses, details different types of decoupling, explains why enhanced fixed cost recovery is used as an alternative to decoupling, and reviews some potential benefits and drawbacks of decoupling policy.

Section II explains how decoupling can take some cost control out of the hands of consumers and reviews two potential economic consequences of decoupling policy—dampening price signals to consumers and potentially impacting the utility's cost of capital.

These two issues are significant, as they affect consumers and the ability of rate decoupling to achieve certain policy goals.

Section III provides decoupling policy design considerations meant to maximize benefits and limit drawbacks.

SECTION I – BASIC BACKGROUND

DEFINING THE PROBLEM

Let's first talk about how utilities make money. Electric and gas utilities are in the business of selling a service (i.e. ability to safely and reliably deliver a product) and a product (e.g. electricity or gas). There are fixed and variable costs associated with utility services and products:

Fixed Costs

These costs are **fixed** (in the short term) and do not change with the amount of energy sold. These costs are generally associated with providing a service. An example of fixed costs includes:

Customer Costs—These are basic business costs such as the costs of metering energy usage to determine bill amounts, and administrative costs associated with billing and payment processing. Utilities typically recoup these costs from customers through a flat monthly fee.

Variable Costs

These costs **vary** with the amount of energy demanded by customers and are typically billed on a per unit basis (e.g. cents/kilowatt hour). In areas where utility generation is regulated, these costs may be bundled into one rate. In deregulated areas, the costs may be unbundled and broken out into generation (or commodity), transmission and distribution charges. Variable charges are generally related to utility products.

Commodity Costs—For example, the cost of fuel or purchased power.

Blended

These costs have both fixed (e.g. infrastructure) and variable (e.g. wear and tear) components, for example:

Delivery Costs—Include infrastructure costs—such as poles, wires, substations and transformers—required to maintain system safety and reliability and ensure delivery of product to end-use consumer. A portion of these costs are fixed, but some of these costs will change as usage increases. For example, increased load may cause wear and tear on transformers or could increase system costs through congestion. Traditionally, utilities recoup these costs through a volumetric (i.e. per unit) charge that varies with energy usage.

With traditional ratemaking, the majority of a utility's fixed costs are recovered through volumetric rates. According to Sotkiewicz (2007), the rationale for this is because it is simple for customers to understand, is aligned with general customer beliefs that if they don't consume they shouldn't pay, and it benefits small volume (presumably poorer) users through large volume (presumably wealthier) user cross-subsidization.

This cross subsidization is somewhat implicit in the regulated monopoly construct.

Utilities are allowed to earn a reasonable rate of return (RoR) on their investments to support fixed costs. Variable costs are generally passed through to the customer with no RoR to the utility. When blended costs are recovered through the volumetric charge, a few outcomes can result.

If energy use is reduced (compared to baseline), utilities may not recoup their fixed costs and associated RoR, negatively impacting profitability. If energy usage increases (above baseline), utilities may be overcompensated by customers for fixed costs plus the RoR, creating a windfall for the utility. This construct results in a rational incentive for utilities to increase both variable (throughput incentive)[1] and fixed (Averch-Johnson effect)[2] costs.

To explore this further, in traditional ratemaking, a utility commission holds a rate case to determine the total amount a utility is allowed to charge (called the revenue requirement) based on a certain level of sales (e.g. base case or test year). From these data the commission derives monetary rates per unit (e.g. KWh) that can be charged to customers. The revenue requirement is composed of the utility's total costs to serve the public plus a reasonable rate of return on investments in utility assets. The volumetric rates for each customer class are multiplied by the total units of expected sales and added to any fixed customer charges to equal the revenue requirement.

So, assuming the utility's baseline or test year expected sales reflect actual sales, the utility should achieve its revenue requirement. However, expected sales rarely align exactly with actual sales, so there is always uncertainty about achieving the revenue requirement between rate cases.

Not only are forecasts about future customer energy demand often inaccurate, sales volumes can also be impacted by other criteria outside of the utility's control, such as weather (e.g. a very cold winter will increase gas usage) or general economic activity (e.g. a recession will reduce energy demand).

THE BASICS OF DECOUPLING

Rate decoupling seeks to reduce the throughput incentive in order to reduce utility opposition to energy efficiency, conservation, and distributed generation.[3] Decoupling does not address the Averch-Johnson effect, nor does it affirmatively promote efficiency or distributed generation. For policymakers interested in promoting energy efficiency and distributed resources, complementary policies that require or incent these activities may be needed to achieve policy goals.

In general, utility companies will not be interested in pursuing decoupling policy when sales are growing, as such policy could reduce profitability. However, when sales are flat or declining (for example, due to energy efficiency initiatives) utilities may be interested in decoupling to help maintain profitability.

The most basic form of decoupling provides for an adjustable rate (as opposed to a constant rate) to be applied to volumetric sales to reach a utility's revenue requirement. To understand the theory of decoupling, consider the establishment of a per unit rate that is allowed to fluctuate between rate cases, correcting for sales variability and ensuring the revenue requirement is met.

Table 1 provides a basic example of the concept of decoupling (leaving out any fixed charges). If a utility's revenue requirement breaks down to $13 million and expected sales are 83,000,000 KWh, a per KWh rate of

Table 1: *Simplified Concept of Decoupling (monthly example, excluding fixed charges)*

	Traditional	Decoupling (High Sales)	Decoupling (Low Sales)
Revenue Requirement	$13,000,000	$13,000,000	$13,000,000
Sales (KWh)	83,000,000	85,000,000	81,000,000
Rate ($/KWh)	$0.157	$0.153	$0.160

[1] The "throughput incentive" is the incentive for utilities to increase sales (or throughput across their wires) above levels projected in the most recent rate case. This allows the utility to keep the additional revenue as profit.

[2] The "Averch-Johnson Effect" states that if a firm's regulated rate of return is greater than its cost of capital, there will be an incentive to over invest in fixed assets.

[3] Distributed generation can displace utility sales, raising concerns about fixed cost recovery.

15.7 cents would be established in the initial rate case. This 15.7 cents per KWh would be what customers pay to the utility company. However, if sales decrease below the expected 83,000,000 KWh, the utility might not achieve its revenue requirement and may or may not cover its costs. With decoupling, the per unit rate is adjusted up or down to ensure the revenue requirement is met. The decoupling methodology, adjustment mechanism, frequency of adjustments and other factors can take numerous forms.[4]

Decoupling can benefit utilities as shown in the example below by creating more financial certainty when sales decline (raising the rate to 16 cents per KWh) and can benefit customers by lowering rates (to 15.3 cents per KWh) when sales increase. It is important to note that even with decoupling, the utility still bears risks associated with cost overruns. For example, if the cost of system or infrastructure service increases beyond what has been allowed in the most recent rate case.

There are three general categories of decoupling: full, partial or limited.

Full Decoupling—This construct fully protects a utility's revenue requirement. For example, if a $1 million revenue requirement shortfall is created because actual sales are lower than expected sales, the adjustment would make the utility whole by recouping the $1 million. Only full decoupling breaks the link between utility profits and sales, making the utility indifferent to consumer consumption.[5]

Partial Decoupling—This mechanism protects only a portion of the utility's revenue requirement. For example, if a $1 million revenue requirement shortfall is created because actual sales are lower than expected sales, a partial decoupling policy might only protect 50% of the revenue requirement, leaving the utility with a $500,000 shortfall.

Limited Decoupling—These policies only protect utility revenues that are associated with specific programs or causes. For example, a decoupling adjustment or true-up may only be applied to sales fluctuations due to weather variations (e.g. weather normalization adjustment) or lost revenues from implementation of an energy efficiency program (e.g. lost-margin or lost revenue adjustment mechanisms).

Under a lost revenue adjustment mechanism, if an energy efficiency program achieves a two percent reduction in sales that would translate into a $500,000 loss in revenue, that $500,000 shortfall would be recouped by the utility through an adjustment. This would happen independent of increases or reductions in sales that are unrelated to the efficiency program.

THE ENHANCED FIXED-COST RECOVERY ALTERNATIVE

In an era of flat sales growth, policy promotion of efficiency and distributed generation, and increasing fixed costs, utilities across the country may pursue enhanced fixed-cost recovery policies as an alternative to decoupling in order to stabilize financial health.

There are (at least) three emerging approaches to enhancing fixed-cost recovery—straight fixed variable (SFV) rates, high customer charges, and minimum bills—each with respective benefits and drawbacks. Policymakers need to align their choice of rate design option with intended policy goals to achieve desired outcomes.

Straight Fixed Variable Rates—SFV rates are an alternative to decoupling. Although SFV rates break the link between utility revenues and sales, customers receive reduced financial benefits from lowering usage. This is because SFV rates aim to recover all fixed costs through an enhanced fixed monthly charge with only variable charges being recovered through the volumetric rate. Due to the revenue requirement formula, shifting all fixed costs to the fixed charge will result in a much smaller per unit variable rate. The result is customer bills vary less with usage increases and decreases. Efficiency advocates maintain this makes usage reduction activities less financially attractive.

[4] The basic process in establishing the adjustment amount will be a comparison between the authorized versus actual revenues. The mechanism by which this adjustment is implemented can come in many forms. For example, periodic adjustments or true-ups can be made to achieve the allowed revenues. Adjustments can happen more frequently (e.g. per billing cycle) or less frequently (e.g. annually) and can be in the form of credits, surcharges, etc. The decoupling methodology can be based on an "accrual revenue per customer", "current revenue per customer", "accrual attrition" or "distribution only" basis.

[5] However, there may still be an incentive for utilities to promote consumer consumption if it leads to an increase in its rate base.

Like decoupling, SFV rates help reduce the financial impact on utilities from sales fluctuations. SFV rates do not ensure achievement of the revenue requirement, however, all of the utility's fixed costs are recovered and sales-related deviations in variable costs above or below the rate case base year are simply passed through to the consumer.

Although decoupling seemingly creates a greater benefit to utilities by ensuring achievement of the revenue requirement, SFV rates may still be preferred. For example, decoupling policies may or may not require additional legal authority or oversight before implementation, whereas SFV rate design is likely easier to implement by the local commission via existing authorities in a rate case.

High Customer Charges—Utilities across the country have proposed and successfully obtained increases to their monthly fixed customer charge. This is a similar strategy to SFV rates, with important differences. Unlike SFV rates where all fixed costs are recovered through the fixed charge, higher customer charges mean more (but not all) fixed costs are being recovered through the fixed charge, with the remainder of fixed cost recovery happening through the volumetric rate.

This strategy does not break the link between utilities sales and revenues. Since a portion of fixed costs are recovered through the volumetric charge and the revenue requirement is not guaranteed, there will still be an incentive for utilities to boost sales and oppose policies to reduce usage. Efficiency and distributed generation advocates also maintain these high customer charges decrease the economic benefits of reducing grid power. Like SFV rates, high customer charges may be preferred to decoupling policy due to the ability to approve via existing commission authority.

Minimum Bill—This approach includes the traditional small flat customer charge, per unit commodity charge, and a distribution rate or minimum bill charge. The minimum bill charge could apply to all customers or may be applied only to certain customers (such as distributed generation owners) whose energy usage is below certain thresholds. In absence of the minimum bill, these distributed generation customers may on net be selling energy to the grid and not contributing to recovery of distribution system costs. Minimum bill fees ensure that all users of the grid contribute to distribution system costs. The usefulness of this rate approach will depend on the penetration of distributed generation on the local system and the level of the minimum bill.

Policymakers need to be careful to match the policy tool with their intended goals.

Goal: Recover grid costs associated with high distributed generation areas. If policymakers are most concerned that certain customers are not contributing to grid costs (for example, in areas of high rooftop solar penetration) and less interested in promoting efficiency, the minimum bill or high customer charge approach may be appropriate.

Goal: Recover grid costs. If the primary goal is to ensure utilities are recovering fixed costs, but energy efficiency and distributed energy are not priorities, then high customer charges or SFV rates may be a reasonable choice.

Goal: Achieve revenue requirement while reducing utility barriers to efficiency and renewables. If maintenance of total utility revenues are a concern while promoting efficiency and distributed generation policy goals, then decoupling may be the best choice.

SOME BENEFITS AND DRAWBACKS

In theory, decoupling can create a host of benefits and drawbacks for a wide range of stakeholders from consumers and utility companies, to regulators, policymakers, advocates, and vendors. However, the parties that are primarily impacted by decoupling policies are consumers and utilities, groups that remain the focus of this section.

Customer Benefits

Reduce Barriers to Energy Efficiency, Distributed Generation—This is one of the primary reason decoupling is promoted—to address the utility throughput incentive that creates barriers to energy efficiency and distributed generation.

Smooth Price Volatility—With full decoupling and an adjustment mechanism that is allowed to both increase and decrease, customers could benefit from the smoothing of cost spikes that occur as energy use increases during extremely hot (summer electricity load) or cold (winter gas demand) periods.

Utility Benefits

Enhance Financial Certainty for Utilities—Ensuring achievement of the revenue requirement provides value to utilities. Rating agencies tend to positively view decoupling policies, for example, "Moody's views full revenue decoupling for both electric and gas services and weather normalization for gas as material credit-positive features."[6]

Correct for Uncertainties—With decoupling, utility companies can reduce financial risks related to activities that impact sales but are outside of the company's direct control, such as sales variability from weather or economic recession.[7] Some, like Lazar (2011), argue that by reducing the impact that these external variables have on profits, utilities can establish a more direct relationship between profitability and management efficiencies and cost-containment.

Reduce Rate Case Frequency and Controversy—According to Glatt (2010), decoupling policies may reduce the frequency, length and cost of rate cases as well as reduce rate case controversy as assumptions can be revisited and adjusted.

Political Expedience—Brennen (2010) theorizes that the main benefit of decoupling may not be on economic grounds or to change utility behavior in the marketplace. Rather, political considerations might drive the importance of decoupling policy, to reduce utility opposition to efficiency and similar policies.

There are a variety of ways decoupling can potentially create negative outcomes, depending on how the policy is implemented. Some of these negative outcomes are detailed below. In general, customers are most vulnerable to potential decoupling drawbacks.

Customer Drawbacks

Dampen Consumer Price Signals—Critics argue that decoupling dampens price signals for consumers. Dampening occurs, for example, when customers who engage in efficiency actions see less-than-expected savings on their bills, due to the increase in distribution rates (when overall system sales are low). Efficiency advocates believe this price dampening can reduce the financial incentive to engage in energy efficiency activities. This topic is explored in greater detail in Section II.

Shift Risk from Utilities to Ratepayers—Some, such as ELCON (2007), argue decoupling policy essentially shifts business risk from the utility shareholder to ratepayers. Parties with these concerns believe shareholders are best able to diversify business risk, whereas ratepayers are least able to do so. These critics also suggest decoupling may reduce utility incentives to manage sales risk, promoting mediocre management.

Imbalanced Outcomes with Partial Decoupling—Some of the limited or partial forms of decoupling might not truly break the link between sales and profits, potentially failing to create benefits for both customers and utilities. A lost revenue adjustment may allow utilities to recoup all of the revenues lost from implementing an energy efficiency program, but this policy fails to look at the broader fiscal picture. For example, if in the same year the utility implements this efficiency program, it may have experienced an overall increase in sales (perhaps due to weather or economy-related factors). In this limited decoupling construct, the utility could receive a double benefit from increased sales-related revenues, plus the efficiency program decoupling adjustment.

Reduce Reliability—Some argue that reducing utility dependency on sales will harm reliability. The argument is the utility will work harder to maintain reliability when profitability is tied to sales, correcting outages faster to ensure customers can buy power and maintain sales levels.

Reduce Ratemaking Transparency—Critics argue that automatic decoupling mechanisms reduce the

[6] Moody's Press Release, "Moody's changes Consolidated Edison's outlook to positive", July 30, 2013, available at https://www.moodys.com/research/Moodys-changes-Consolidated-Edisons-outlook-to-positive--PR_278150

[7] Weather-only normalization mechanisms can be complements or alternative to decoupling. This policy adjusts rates down in severe weather (when usage increases) and up in mild weather (when usage drops), protecting consumers and utilities from force majeure. However, this mechanism does not address the thoughput incentive.

transparency of the ratemaking process, allowing potentially significant cost fluctuations between rate cases. In addition, the calculation of the decoupling adjustment can be complicated and expensive to administer.

Utility Drawbacks

Eliminate Windfall Potential—Full decoupling policies eliminate the potential for windfall revenues when sales exceed expectations.

SECTION II – EXAMINING ECONOMIC CONSEQUENCES

Decoupling has the potential to create important and often overlooked economic consequences that can positively or negatively impact consumers, investors, and policymakers.

Decoupling policy can dampen price signals to consumers, confounding expectations about energy efficiency-related cost savings. In addition, by reducing investor risk, decoupling has the potential to lower a utility's cost of capital, which could translate into reducing the rate of return that ratepayers are charged for utility investments. This has cost-saving potential for consumers.

Policymakers need to be aware of these issues as they have important potential impacts on consumers and can impact the ability of decoupling to achieve policy goals related to efficiency and distributed generation.

DAMPENING PRICE SIGNALS

When considering decoupling or an alternative, it is important to understand how these approaches may impact consumer behavior by dampening price signals and how these impacts may inhibit achievement of policy goals (e.g. energy efficiency). The following discussion is limited to decoupling and one alternative, SFV rates.

This section provides a few very simplified scenarios to compare the utility and consumer perspectives of traditional ratemaking, decoupling and SFV rates.

Utility Perspective

Table 2 provides an example of how total system sales could impact a utility under two different rate designs. For the utility, a traditional rate case would establish a $5 per month fixed charge, 10 cent per KWh charge for electricity generation and 4 cent per KWh distribution charge. The utility serves 103,750 customers at 800 KWh per month for total base system sales equaling 83,000,000 KWh per

Table 2: *Example Monthly Utility Rate Breakdown with Tradition, Decoupling and Straight Fixed Variable Rates under Base, Low and High System Sales Scenarios*

Utility's Perspective						
Average Usage (KWh) 800 **Total Customers** 103,750	**Base Case**	**Decoupling (Low System Sales)**	**Decoupling (High System Sales)**	**SFV Base Case**	**SFV (Low Sales)**	**SFV (High Sales)**
Monthly System Sales (KWh)	83,000,000	81,000,000	85,000,000	83,000,000	81,000,000	85,000,000
Fixed Charge	$5.00	$5.00	$5.00	$30.00	$30.00	$30.00
Commodity Rate	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10
Distribution Rate	$0.04	$0.043	$0.037	$0.009	$0.009	$0.009
D-Rate Delta		*$0.0035*	*$(0.0033)*			
Total Bill (800 KWh useage)	$117.00	$119.77	$114.36	$117.00	$117.00	$117.00
Total Bill Delta		*$2.77*	*$(2.64)*			
Revenue Requirement	$12,138,750	$12,138,750	$12,138,750	$12,138,750	$11,921,250	$12,356,250
Revenue Req. Delta		*- $*	*- $*	*- $*	*$(217,500.00)*	*$217,500.00*

month. The utility's (monthly) revenue requirement is established at $12,138,750.

Decoupling yields the same revenue requirement ($12,138,750) under the high sales, low sales and base case scenarios. This is due to the adjustable distribution rate that rises (from 4 cents to 4.3 cents) when systems sales reduce below the base (83,000,000 KWh) and lowers (from 4 cents to 3.7 cents) when systems sales increase.

With SFV rates, the utility experiences a $217,500 revenue reduction (from the revenue requirement) when sales fall short of the base case and a $217,500 revenue increase when sales increase beyond the case. However, with SFV rates, the utility may be indifferent to these reductions or increases in revenue since they correspond to variable costs that are passed on to the consumer with no regulated rate of return.

Consumer Perspective with Decoupling

For consumers, the picture is a bit different. With decoupling, customer bills may be affected by overall system sales as well as by individual usage. Consider the following scenarios, as show in Table 3.

Base Case (expected) System Sales—In this scenario, overall system sales (83,000,000 MWh) equal the level projected in the most recent rate case, and therefore there is no decoupling adjustment.

Base Customer Usage—the customer will pay $117 per month for the base case usage of 800 KWh.

Low Customer Usage—the customer will pay $103 if they reduce usage by 100 KWh to 700 KWh.

High Customer Usage—the customer will pay $131 if they increase usage by 100 KWh to 900 KWh.

High System Sales—In this scenario, overall system sales (85,000,000) are above what was projected in the rate case (83,000,000), triggering a decoupling adjustment that would essentially reduce the per KWh distribution rate from 4 cents to 3.7 cents.

Base Customer Usage—the customer will pay $114.36 for the base case 800 KWh.

Low Customer Usage—the customer will pay $100.69 if they reduce usage by 100 KWh to 700 KWh.

High Customer Usage—the customer will pay $128.04 if they increase usage by 100 KWh to 900 KWh.

Low System Sales—In this scenario, the overall system sales (81,000,000) are lower than what was projected in the rate case (83,000,000), triggering a decoupling adjustment that would essentially increase the per KWh distribution rate from 4 cents to 4.3 cents.

Base Customer Usage—the customer will pay $119.77 for the base case 800 KWh

Low Customer Usage—the customer will pay $105.42 if they reduce usage by 100 KWh to 700 KWh.

High Customer Usage—the customer will pay $134.11 if they increase usage by 100 KWh to 900 KWh.

Given these data, Table 4 examines how customer expectations about bill amounts can be impacted

***Table 3:** Example Customer Decoupling Rate Breakdown and Monthly Bill Amounts under Various System and Usage Scenarios*

Consumer Perspective			
	Base System Sales	High System Sales	Low System Sales
Monthly System Sales (KWh)	83,000,000	85,000,000	81,000,000
Fixed Charge	$5.00	$5.00	$5.00
Commodity	$0.10	$0.10	$0.10
Distribution	$0.04	$0.037	$0.043
Base Usage (800 KWh)	$117.00	$114.36	$119.77
Low Usage (700 KWh)	$103.00	$100.69	$105.42
High Usage (900 KWh)	$131.00	$128.04	$134.11

through decoupling rate design. For example, given a fixed monthly charge, fixed commodity rate, and fixed usage of 800 KWh, a customer will expect their bill to be $117. However, with decoupling, a customer's bill can increase or decrease based on overall system sales, decreasing to $114.36 with system sales are high and rising to $119.77 when sales are low.

Holding fixed charges and commodity rates constant, we can examine how customer expectations might be confused with decoupling as overall system sales fluctuate. Using the base case scenario and corresponding cost of $117 per month, we can examine various outcomes.

Under the base system sales scenario—a customer will save $14 by decreasing usage by 100 KWh per month and spend an extra $14 to use an additional 100 KWh per month.

When system sales are high—a customer will save $16.31 when they reduce usage by 100 KWh, saving an additional $2.31 beyond the $14 savings in the base system sales, low usage scenario. Customers will spend $11.04 to increase usage by 100 KWh, saving $2.96 compared to the $14 they spend under the base system sales scenario. This creates a significant benefit to consumers, making energy savings and consumption more attractive, with no additional effort required by the consumer.

However, when system sales are low—the customer experience will be quite different. Customers who would save $14 by reducing usage by 100 KWh in the base system sales scenario will only save $11.58, receiving $2.42 less in savings. Similarly, customers who would pay $14 for increasing usage by 100 KWh will pay $17.11, paying $3.11 more.

These data suggest that with decoupling:

Holding all other things equal, bill amounts are impacted both by customer actions (i.e. usage) and actions outside of the customer's control (i.e. overall system sales).

Since customers do not typically receive information about overall system sales, customers will have reduced transparency about bill impacts.

Due to lack of transparency, customers will have reduced ability to plan for changes in bill amounts that are not related to actions within their own control (i.e. usage).

Customer expectations about financial savings and outlays could be confounded, with reduced benefits experienced when systems sales are low and increased benefits when system sales are high.

Consumer Perspectives with SFV Rates

With SFV rates, the customer's experience will be more predictable since the distribution rate does not vary with overall system sales and customer bill impacts depend only on customer usages (assuming fixed charges and commodity charges are held constant).

A customer will pay the same $117 per month for 800 KWh of usage whether overall system sales are the base (83,000,000 KWhs), high (85,000,000 KWhs), or low (81,000,000 KWhs) levels. Similarly, they will pay the same $106.13 bill when they reduce usage by 100 KWh/month and the same $127.88 bill when they increase usage by 100 KWh under all system sales scenarios.

Table 4: *Comparing Customer Bills under Decoupling Scenarios*

Customer Perspective			
	Base System Sales	**High System Sales**	**Low System Sales**
Base Usage (800 KWh)	$117.00		
Low Usage (700 KWh)	$(14.00)	$(16.31)	$(11.58)
High Usage (900 KWh)	$14.00	$11.04	$17.11
	Low usage	$(2.31)	$2.42
	High usage	$(2.96)	$3.11

Table 5: *Comparing Customer Bills under Traditional and SFV Rates*

Customer Perspective			
	SFV	Traditional	Delta from Base
Fixed Charge	$30.00	$5.00	
Commodity	$0.10	$0.10	
Distribution	$0.009	$0.04	
Base Usage (800 KWh)	$117.00	$117.00	
Low Usage (700 KWh)	$106.13	$103.00	$3.13
High Usage (900 KWh)	$127.88	$131.00	$(3.13)

Table 5 shows that comparing SFV with traditional rates under the base usage (800 KWh/month) and corresponding $117 per month bill yields different outcomes than the decoupling scenarios. Due to the higher fixed charge and lower volumetric distribution rates associated with SFV rates, customers will save $3.13 less under SFV compared to traditional rates when they reduce usage by 100 KWh. On the other hand, customers will save $3.13 compared to traditional rates when they increase usage by 100 KWhs. As such, energy efficiency advocates object to SFV rates because it makes efficiency incrementally less attractive and consumption incrementally more attractive.

For policymakers interested in promoting efficiency, the economic consequences of decoupling (and a popular alternative, SFV rates) need to be understood. With decoupling, customer bills can unexpectedly be impacted. All things being equal, a customer who keeps usage steady at 800 KWhs per month expects to have the same bill from month to month.

But with decoupling, all things are not equal, because the distribution rate adjusts to overall system sales. So a customer expecting to pay $117 per month could pay $114.36 or $119.77, depending on system sales. Decoupling can dampen or enhance price signals for efficiency depending on whether overall utility sales are above or below base level expectations. Utility interest in decoupling typically rises in times of low system sales. SFV rates provide more bill predictability for customers, compared to decoupling. However, SFV rates clearly dampen price signals, making efficiency less attractive and increased consumption more attractive, potentially creating disincentives for energy efficiency actions and investments.

Decoupling and/or SFV rates may be seen as reducing economic efficiency, due to price dampening. However, recall that utilities are regulated monopolies (at least with respect to their distribution service) that are by definition not subject to the same rules of economic efficiency as competitive firms. In the regulated (albeit justified) monopoly construct, there may never be true market efficiency.

An added measure of economic inefficiency may be accepted if the policy priority is to stabilize utility revenue and reduce barriers to energy efficiency that result in customer or societal benefits. However, the level of dampening or inefficiency that is chosen should be balanced with reasonable consumer price expectations.

Lastly, decoupling and other policies are rarely implemented in a vacuum. Therefore, when examining the price signal impacts of decoupling or SFV rates, one must consider all the other riders (including cost trackers, pre-approvals, surcharges) that are being implemented. For example, a utility may have weather-normalizing, infrastructure improvement, renewable energy, and energy efficiency adjustment mechanisms in place. The dynamic impacts of the full portfolio of riders may not be appreciated by regulators or understood by consumers. Many of these mechanisms are independently and automatically adjusted, reducing the ability to forecast or communicate cost changes, further confusing consumers.

IMPACTS ON THE COST OF CAPITAL

The imposition of decoupling and other riders complicates the regulator's ability to determine the utility's cost of capital (specifically the cost of equity) and set reasonable levels of return. The basic premise is decoupling reduces risk for utilities and reduced risk should translate into lower costs and therefore lower returns for investors. While the comparable risk, comparable return principle seems straightforward, in practice it is often murky, generalized and controversial.

To better understand the issue, consider that a utility's cost of capital is based on an assessment that considers (among other things) the utility's financing instruments related to debt and equity. These include known factors, such as the cost of debt (i.e. interest rates on debt) and unknown factors such as the cost of equity (an estimate of investor expectations about stock prices, growth and dividends).

Due to the speculative nature of investor expectations, developing the rate of return on equity (RoE) is more challenging than establishing the rate or return on debt (RoD). Understanding the cost of capital and setting an appropriate rate of return is critical to supporting utility credit quality, financial health, and attracting energy investments. If the RoE is set too low, utility underinvestment occurs. However, if the rate is set too high, ratepayers may be paying unfair prices and incenting overinvestment.

Decoupling provides revenue stability to utilities, reducing investment risk and, in theory, reducing the utility's cost of capital especially as it relates to ROE. As such, many have argued that implementation of a decoupling policy should be accompanied by a reduced allowable RoE for the utility. According to Hempling (2011), the regulatory debate about the impact of riders (such as decoupling) has been more oppositional than factual, with two main arguments emerging:

> "Riders reduce risk, and reduced risk means reduced cost of equity; therefore we must lower the authorized RoE."

> "The utility faces new risks, and the rider does no more than to mitigate those risks; therefore we should not lower the RoE."

Pollock (2010) suggests that adoption of piecemeal riders should immediately result in a reduction in a utility's allowed RoE, since these piecemeal riders reduce regulatory lag and risk for the firms. However, Wharton (2015) performed an empirical test of the effects on gas and electric utility cost of capital from decoupling policy during the 2005 -2014 period. This analysis found there is no statistically significant reduction in the cost of capital resulting from the adoption of decoupling policy. Vilbert (2014) postulated several potential reasons for this phenomenon:

Reducing the volatility of revenues does not reduce the volatility of market returns. RoE is determined through a market analysis of prices and returns for comparable investments. Net income is an accounting term for base revenues minus fixed costs. Decoupling has the ability to reduce base revenue volatility, but it does not impact fixed costs nor can it control market volatility.

Risk type matters. Diversifiable risk—that can be corrected through holding a portfolio of assets—does not impact the cost of equity capital. For example, weather extremes can cause volatility in a single utility company's earnings. To diversify against weather fluctuations, an investor can maintain a portfolio of investments in various utilities in different climatic zones. Non-diversifiable (business or market) risks remain after diversification and impacts the cost of equity capital. Vilbert et al postulate that decoupling may primarily impact diversifiable risk, therefore not directly impacting the cost of equity capital. Cost of debt capital may be impacted by decoupling by decreasing total risk and improving credit ratings, however, this does not impact RoE.

Consider all risks. Vilbert et al point out that decoupling is never implemented in a vacuum. For decoupling to reduce the cost of equity capital, investors would have to perceive the policy overriding other factors that increase non-diversifiable risks (e.g. new public policies that negatively impact sales). To reduce the cost of equity capital, emphasis must be on net risk reduction, which decoupling may or may not have the ability to drive.

Hempling (2011) outlines five critical questions that regulatory commissions should be asking when evaluating a rider's impact on the cost of equity. He maintains that openly and transparently answering these questions can help policymakers make RoE decisions based on facts instead of generalizations.

What is risk's role in determining the total cost of equity? There are various methods used to calculate the cost of equity for a utility rate case, some of which rely on some sort of risk premium analysis. A risk premium analysis may likely reflect a risk-free rate (e.g. treasury bill), corporate bond risk rate (e.g. risk of default), and equity risk premium (e.g. market risk). Hempling argues that riders only impact the equity risk premium (not the risk free interest or corporate bond risk) portion of the total cost of equity.

How important is the rider-reduced risk within the utility's full universe of risk? Shareholders risk not receiving the expected return on their utility investment because of deviations from expectations including: low sales, low demand, high costs, high delinquencies, or through commission-reduced revenues. A rider will usually target risk mitigation in one or more of these five areas. Hempling argues that full decoupling reduces all of these risks.

How large is the rider-related expenditure, relative to the utility's total expenditures? Analyzing the impact of a rider must be taken in the context of the share of total earnings the rider addresses. For example, full decoupling has a much larger potential risk reduction impact than limited or partial decoupling. Hempling argues that, 1) a RoE for a specific rider-related expenditure should be identified, 2) the RoE be applied to only that expenditure, and 3) that value be rolled into the overall cost of equity creating a weighted average approach.

What are the rider's specific features? Reducing authorized RoE due to rider implementation can occur due to faster and more certain cost recovery outside of a rate case. However, the specific features of the rider impact these assumptions. Hempling suggests examining the following aspects of the rider:

- Does the rider reduce new risk (i.e. no decrease in RoE) or existing risk (i.e. decrease RoE)?
- Does the pre-approval have cost caps or reviews? Depending on specific details, the imposition of caps or reviews may not add the certainty needed to reduce RoE.
- Does the rider have a balanced or unbalanced impact on the test year? For example, is the rider bidirectional (can go up or down) or unidirectional?
- Is the rider itself balanced? For example, does the rider require a certain level of performance before risk is reduced?
- What is the method of recovery? For example, cost recovery on a per unit (e.g. KWh) basis can lead to over or under recovery (with no risk reduction) unless there is a true-up feature to align expectations with actual outcomes.
- What are the timing issues? For example, what is the frequency of true-ups? What is the regulatory lag with recovery? How long will the mechanism be in place?
- What is the extent of the commission's discretion? Mechanisms created by legislation tend to be more permanent and dependable than mechanisms created by the commission's jurisdiction.

Are there factors external to the riders that affect the company's risk situation? Is the utility in a regulatory or market environment that impacts risk? For example, a rider may have little risk-reduction value if a utility operates in a jurisdiction where the commission is deferential to the utilities, holds frequent rate cases and typically uses deferrals. Similarly, is the utility in a situation where it has to make large capital expenditures to serve the public?

There is no clear answer to understanding the impacts rate decoupling may have on an individual utility's cost of equity capital. As such, it seems prudent to examine the impact decoupling has on utility shareholder risk by using the criteria outlined above on a case-by-case basis. It is important to understand if decoupling policy can create customer savings related to reductions in the utility's cost of capital.

ACHIEVING POLICY GOALS

Setting the appropriate rate of return on utility capital can have major implications on decoupling policies and the ability to achieve other policy outcomes. The Averch-Johnson effect states that a utility has the incentive to acquire additional capital if the regulated rate of return is greater than the company's cost of capital. In simplistic terms, it is good business decision to raise $1 million at a 5% rate to invest in building a power plant where the investment receives a 10% regulated rate of return.

According to Kihm (2009), when the Averch-Johnson effect holds, the incentive to boost sales to drive capital expansion may be too great, even with decoupling. Kihm maintains that if the investment is large enough (e.g. power plant) it may drive the firm's stock price above book value, creating a significant benefit for existing shareholders. Regulators can set the RoR at or above the cost of capital, depending on their interpretation of what is fair and reasonable.

Decoupling is not meant to address the Averch-Johnson effect. In some cases, decoupling may serve to strengthen the Averch-Johnson effect when system sales are low and decoupling adjustments increase actual revenues up to the authorized level (realizing the allowed rate of return, which is above the cost of capital). According to Kihm, realization of decoupling's effectiveness to achieve policy goals may well be predicated on the RoR equaling the firms cost of capital.

This point helps highlight the fact that decoupling policy is not sufficient to achieve policy goals. Policymakers interested in using decoupling to spur energy efficiency, renewables, and distributed generation need to be aware that decoupling only reduces opposition. Complementary policies are needed to promote and incent utilities to invest in efficiency and other desired activities.

When implementing decoupling policy, one can imagine a positive scenario where energy efficiency policy is met in absence of utility opposition, consumers pay a lower rate of return on utility investments while enjoying savings when usage is reduced, and consumers and utilities benefit from reduced price volatility and revenue certainty, respectively.

On the opposite end of the spectrum, a negative scenario could occur if decoupling can't overcome more powerful economic pressures to increase the utility rate base, consumers overpay for utility investments and consumer opposition is raised when energy efficiency activities result in less than expected savings. There are many other scenarios in between these extremes that could occur. Proper decoupling policy design, with ample focus on consumer protection, can maximize positive outcomes.

SECTION III - DESIGN TO REDUCE DRAWBACKS

If decoupling is to be pursued, the policy design should strive to ensure both consumers and utilities benefit. The following are a few policy design recommendations meant to help maximize benefits and reduce drawbacks. Since consumers are vulnerable to the majority of decoupling's potential drawbacks, great detail must be paid to reducing negative outcomes for consumers.

CONSUMER BENEFITS AND PROTECTION

Bidirectional adjustments. The decoupling adjustment must be allowed to increase when sales are low (delivering benefit to utilities) and decrease when sales are high (benefitting consumers).

Pilot program and education first. Due to price signal concerns, it may be beneficial to provide education and test consumer reactions to decoupling policies through small-scale pilot programs before larger scale roll out. It will be important to understand how customers will react if/when bill costs are not in line with expectations, due to the impacts of the adjustable decoupling rate.

Limit adjustment amount. If policymakers are concerned about cost volatility for consumers associated with the decoupling adjustment amount, the adjustments can be limited to a certain maximum percent per year.

This cap on adjustments may inhibit decoupling policy's ability to reduce utility opposition to efficiency and distributed generation and may fail to deliver the risk reduction needed to lower a utility's cost of capital.

On the other hand, Lesh (2009) suggests that in practice actual decoupling adjustments have been incremental, under 2 percent positive or negative, with most being under 1 percent.

Evaluate decoupling impacts within the context of other riders. Consumers may be faced with a complex portfolio of riders that impact overall costs. The rider values may be hard for consumers to understand and manage. Imposition of additional riders, such as rate decoupling, should be reviewed within this broader portfolio context.

MINIMIZE ECONOMIC INEFFICIENCIES

Apportion adjustments appropriately. Adjustments should be calculated on a per rate class or rate schedule basis and rebates or surcharges should be apportioned to that class or schedule accordingly.

Examine RoE levels. Regulators should create a systematic and transparent way to evaluate how implementation of decoupling impacts utility risk and cost of capital in its consideration of authorized return on equity. A detailed example of key questions and criteria to consider are included in Section II of this paper.

Evaluate price-dampening impacts. As shown in the section II, decoupling (and SFV rates and high customer charges) can dampen price signals to consumers. For policymakers interested in promoting energy efficiency, decoupling policy should balance utility benefits with consumer benefits, ensuring that consumers maintain price signals sufficient to incent cost-effective usage reductions.

ACHIEVE POLICY GOALS

Decoupling alternatives. Policymakers need to first be clear about goals and priorities. Decoupling may or may not be the best choice if the goal is simply to ensure recovery of fixed costs. Similarly, alternatives, like SFV rates, may not be the best fit if the goal is to reduce barriers to energy efficiency.

Full decoupling. Only full decoupling (as opposed to limited or partial decoupling) has the ability to break the link between utility sales and profitability, removing from the utility a powerful barrier to energy efficiency.

Complementary policies. Decoupling only serves to reduce utility opposition to efficiency and distributed generation. In order to achieve certain efficiency or distributed generation goals, complementary policies may need to be implemented.

SECTION IV - CONCLUSION

Utilities across the country are facing a complex reality—sales growth levels are stubbornly low, policymakers are promoting energy efficiency further reducing sales, and big infrastructure investments are needed to secure and modernize energy systems. Rate decoupling policy is increasingly examined as a potential solution to create revenue certainty for utilities, reducing opposition to sales-lowering policies like efficiency, renewables, and distributed generation. There are many forms of decoupling and policy design choices are critical to achieving desired outcomes. Decoupling policy is not a panacea, however. Decoupling's adjustable rates may create confusion for customers, as bills are impacted not only by customer usage but also by overall utility company sales. In addition, two critical economic consequences of decoupling must be considered—specifically, how to limit price dampening and how to evaluate decoupling impacts on the utility's cost of capital. Policy design recommendations are presented to limit negative outcomes and maximize benefits. Since consumers are the most vulnerable to experiencing negative outcomes with decoupling, special attention to consumer protection must be given.

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