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RAP has written and presented extensively on solutions to the throughput incentive including two publications of note.[1] [2] I have contributed to these publications and presented often on this topic in my capacity as Director of US Programs. Before joining RAP in 2001 as a Principal, I was Commissioner of the Vermont Department of Public Service from 1991 to 2001. I previously held engineering positions at the VDPS and at Philadelphia Electric Company. I received engineering degrees from Brown University and Drexel University.

There is overwhelming evidence that the throughput incentive affects utilities. The throughput incentive occurs when utility earnings are materially affected by sales. Two characteristics of the throughput incentive are that earnings are affected by forces outside the control of the utility (weather, the economy), and that utility companies are motivated to increase sales and to avoid sales reductions.[3] Note well that for most businesses, increased volume driving earnings is good news. Utilities, with captive consumers of delivery service with incremental shared regulated costs driven by growth, subject to environmental constraints and affected with the public interest, are unlike most businesses. The financial effect in traditional regulation of short run benefits to net income from added sales and reduced net income from reduced sales is mathematical. Further, utility executives report being influenced by these relationships. A regulatory structure that disconnects sales from net income allows utilities to focus on other matters, such as service, reliability and innovation.

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[1] Lazar, J., Weston, F., Shirley, W. (2011) Revenue Regulation and Decoupling: A Guide to Theory and Application. Montpelier VT. Regulatory Assistance Project. Available at http://www.raponline.org/document/download/id/902

[2] Migden-Ostrander, J., Watson, E., Lamont, D., Sedano, R. (2014) Decoupling Case Studies: Revenue Regulation Implementation in Six States. Montpelier VT. Regulatory Assistance Project. Available at www.raponline.org/document/download/id/7209

[3] Moskovitz, David (2000) Profits & Progress through Distributed Resources. Gardiner ME. Regulatory Assistance Project. p. 17 Available at http://raponline.org/document/download/id/212

The commission asks about barriers to removing the throughput incentive. I am not a legal expert on PA law. That said, in my observation, reforming regulation to remove the throughput incentive encounters regulatory barriers. These include:

- Utilities changing views, tending to favor decoupling when sales growth is low to stabilize revenues, and opposing it when sales growth is high due to the attractive margins that add to net income in this situation.
- Utility-centric plans, understandably proposed by utilities, may be objectionable to others and parties are unable to navigate to an acceptable compromise.
- Staff (utility, commission) reluctance to consider decoupling, apparently due to comfort in existing practices, lack of familiarity for how it works and how to create a suitable mechanism.
- Consumer advocate skepticism; first about decoupling, notably changing rates between rate cases in what they interpret as single issue ratemaking, -- and also about straight-fixed variable rate design, adding significant repeating and uncontrollable costs to lower volume users, who have some correlation to low income households.

A good decoupling mechanism may be superior to traditional regulation as it changes the focus of a utility in a societally beneficial way due to the mechanism. In the long run, with sales no longer a driving force in utility financial performance, new and larger assets to support sales growth may be avoided, reducing overall costs. Management attention can focus on other service objectives.

A poor decoupling mechanism would be inferior to the status quo. Elements of this statement address avoiding a poor mechanism.

Straight Fixed Variable rate design, because of its bill effects on low volume users, because it tends to reset volumetric rates at below long run marginal cost and disrupting price signals to customers, and because decoupling can be designed successfully to address objectives of revenue stabilization in a superior way, is generally inferior to the status quo.

The commission asks about optimal rates for mass market customers. One must define optimal, and a given state will have its own interpretation. One universal objective in regulation is to maximize <u>value</u> of dollars invested for customer resources and for utility investment and operation. In a time-varying rate with a critical peak price, rates tend to reflect roughly value at any given time, while also presenting customers with a rate that can be understood and managed without the need for automation. A rate of this kind would have a customer charge that reflects local facilities only, and so is likely to be under $10 per month and could be much lower.[4] At a future time with ubiquitous opportunity for automation, a new optimal rate may emerge. At a future time with awareness of variations in long run marginal

[4] Lazar, J. and Gonzalez, W. (2015). *Smart Rate Design for a Smart Future*. Montpelier VT: Regulatory Assistance Project. Available at http://www.raponline.org/document/download/id/7680

distribution costs owing to enhanced distribution system planning, better information on value may be available that may find its way into tariffs, perhaps with a distribution credit overlay on a time varying rate. Decoupling works with the optimal rate, as decoupling is a mechanism, not a rate.

Decoupling has been adopted in many states. It might be said that if a decoupling mechanism is performing well for a state, then it is a best practice for that state. Forms of decoupling vary a great deal across the US, yet there are many satisfying examples. Some common considerations include:

- a collaborative process to create a decoupling plan in order to reflect priorities of stakeholders;
- applicability by customer class and excluding the industrial class especially if the industrial class is small in number of customers in order to guard against inadvertent inter-class inequities and a single customer having an unduly large effect on others in the class;
- a reconciliation period of no more than a year to avoid excessive unaddressed balances;
- reconciliations in either direction and a cap on annual reconciliations in either direction to address rate stability,
- a choice consistent with regulatory practice in the state on the carrying cost for any unamortized balance that may exist after a reconciliation due to an annual cap (noting that this balance is subject to the lowest of risks);
- some expectation for how long after it begins a decoupling plan shall be reset that reflects a duration over which decision-makers are comfortable with underlying assumptions;
- some formula that adjusts target revenue requirement during the life of the decoupling mechanism (potential drivers are many);
- the utility may be allowed to ask for a change in a decoupling mechanism based on conditions that are out of its control and that make a significant difference to the ability of the utility to deliver service;
- conditions specific to the utility and the time are typical, if energy efficiency performance is a rationale for decoupling a requirement for some level of performance is often attached.

As a retail choice state, Pennsylvania would tend to apply decoupling just to the delivery charge, which is appropriate even where utilities are vertically integrated. It is also important for PUCs to maintain supervision over the utility during a decoupling plan. There are many other features that come together to form a decoupling plan and there are multiple options and combinations that work well.

The following summarizes my assessment of pros and cons for several suggested answers to the throughput incentive:

- Why some like SFV – effective solution to the throughput incentive, easy to administer once rates are set, rates do not change outside a rate case
- Why some do not like SFV – it raises unavoidable cost for low volume users, which correlate to low income customers, it reduces volumetric prices to

levels below long run marginal cost that sends an inadequate signal to customers as to the system or societal effects of their energy investment choices from energy efficiency to demand response to self-generation, it reduces the business case from the customer perspective to energy investments they might be willing to make, it assigns to individual customers costs that have historically be shared by all on the system.

- Why some like LRAM – avoids making any change to regulation except to adapt to energy efficiency programs.
- Why some do not like LRAM – the throughput incentive remains, the calculation of LRAM adjustments is hard, controversial and prone to potentially time-consuming arguments about such assumptions as precise measurements of saved energy, avoided costs and discount rates that are hard to resolve definitively. Note, many states in the 1990s used LRAM. All but one, Kentucky, did away with it. LRAM is used in some states now and many of the issues that plagued the mechanism before remain now.
- Why some like decoupling – it relies on a settled revenue investigation, it can be tailored, it can produce results similar to frequent rate cases without the cost of frequent rate cases, it enables distributed resources and forward-looking rate design, rate changes tend to be modest and symmetric, it can promote cost control and other positive outcomes from the utility.
- Why some do not like decoupling – it changes rates between revenue investigations, lack of confidence in how the mechanism works, it makes rate cases too infrequent; it makes the opportunity to earn the allowed return a guarantee.
- Why some like incentive regulation – it motivates utility performance in a manner more consistent with societal priorities than would otherwise be the case, it provides earnings from a source other than rate base, for the utility it is an opportunity to add to earnings and to reward employees for performance consistent with societal priorities not just corporate priorities.
- Why some do not like incentive regulation – it provides earnings to utilities for what they should be doing anyway, performance metrics are hard to design to be easily measurable or managed or immune from utility gaming, for utilities it is an opportunity to see deductions from earnings.

Reduced utility risk will tend to reduce the required cost of capital. Changes in utility risk are perceived by market analysts (not just intended or deemed by regulators) in order to be reflected in equity and debt prices. Decoupling and SFV have the effect of providing greater measures of stabilization of utility cash flow to cover embedded costs. In cases in which introducing decoupling is tentative (it may be billed as a pilot) or is surrounded in controversy suggesting it may be withdrawn within a few years, the market's perception on the effect of decoupling may be roughly zero and real cost of capital may not change until the perception of temporariness or controversy dissipates.

Decoupling is sometimes introduced with an imputed reduction in cost of capital. This practice is essentially a down payment on the anticipated effects of decoupling. Evidence supporting an imputation of this kind at the start of decoupling is generally from inferences to comparable situations elsewhere. Note that this imputation can be accomplished by adjustment in the return on equity or by an adjustment in the debt/equity ratio as each can accomplish a target weighted average cost of capital.

In a majority of instances, no adjustment in advance is made. Effectively, the regulator here is saying, let's see how decoupling actually works, and we will see what the markets do. At a future time, perhaps at consideration of a successor plan, the regulator will apply its traditional cost of capital tools (including using other utilities with decoupling for comparable utilities), to measure the market's response. The regulator at this stage and with the benefit of experience can choose to impute a weighted average cost of capital adjustment.

Annual rate adjustment caps in decoupling mechanisms are typical. They seem to reflect typical or perceived rates of inflation, which for some time have been 2-3%. Introducing inter-rate case rate adjustments is not done lightly. Consumers should have an expectation that this flexibility on rates, which has dividends for all, will be managed with sensitivity to the rate stability principle. Balances can be managed through regulatory asset accounts. From year to year, excesses and deficiencies can be wiped out as sales are under or over the baseline billing determinants.

A basic question is how different is the decoupling rate outcome from the outcome of frequent rate cases. The answer should be: not much. An attrition form of decoupling will tend to come closer to what frequent rate cases would produce than other forms of decoupling, recognizing that specific circumstances can be unique.

All similarly situated customers are treated similarly in conventional decoupling. It is possible to add a feature to decoupling that reflects changed demographics and resulting in appropriate revenue adjustments. For example, in a revenue per customer decoupling mechanism (where the revenue per customer was calculated in a recent revenue case), the revenue added for added residential customers could be greater than the calculated average revenue from existing customers in a situation in which, say, the average residence might be, say 1800 sq. ft., but the average new residence is 2400 sq. ft., dramatically larger, with corresponding increased energy use (even accounting for some inherent efficiencies in new buildings). Likewise, if there is evidence that per customer energy use is declining, as is the case in some natural gas distribution systems, that forward-looking change can be built into the mechanism. All customers would still be treated similarly.

Periodic revenue cases are recommended. The cost of service basis for decoupling and its inherent assumptions have a shelf life. Longer term mechanisms have limits in reliability of base assumptions. Generally, 3-7 years provides stability and value of a multi-year process without going too far. A decoupling order may specify a duration, requiring a new proposal by a date certain (and may direct the utility to stay out for some minimum period) or the commission may rely on the utility to come in with a revenue case when needed and require any revisions to the decoupling mechanism at the same time.

If the revenue requirement has a solid class cost of service based on a good cost allocation method, the decoupling mechanism can be applied by class and does not have to be applied utility wide. In this way, inter-class cost shifts can be minimized.

Intra-class cost shifts are likely to exist in every residential and small commercial rate design. Urban/rural, high use – low use, single-family / multi-family – each of these distinctions is prone to some customers within the class paying less than the cost to serve them, while others pay more. Does decoupling do anything to these? No, unless there is some change to the underlying rate design. Here is an example where such a change can be built into an inclining block rate. An experimental form of the decoupling reconciliation applied upward rate adjustments to the tail block and applied reductions to the first block. This would shift costs from low users, which have correlation to low income households, to high users.

In the long run, decoupling is meant to reflect the outcome of annual rate cases (without having to experience them) AND is meant to change the utility incentive to resist cost reducing load reductions. If this is accomplished, if costs are reduced, volatility will not go up (could be more smaller rate changes rather than fewer larger rate increases) and the trajectory of costs should be lower owing to changed utility investment and operating behavior.

The commission is interested in conditions that might accompany instituting decoupling. Issues unique to each state and instance suggest that case specific conditions are most typical. Generically, if a key motivation for decoupling is to align utility business incentives with public policy about energy efficiency and perhaps other customer resources, then specific requirements for performance in these categories is sensible.

Another condition may emerge to address the possibility that the utility could improve its financial outcomes under decoupling by cutting costs that support key service areas like customer service or reliability by cutting customer service staff or slowing right of way maintenance. Conditions to address this concern for cost cutting could be performance standards that would expose the utility to scrutiny and potentially penalties if they do not meet the standards. Naturally, it is important for such standards to be objectively measurable, and for results to be reported and to be auditable. The performance system could include rewards for exceptional performance, but the primary purpose here is to avoid destructive cost cutting.

If there is an attrition or other revenue adjustment associated with the mechanism which is driven by some commitment by the utility for capital deployment or service availability, then these commitments could find their way into conditions.

Limits to annual rate changes is one way to address the concerns of vulnerable customers. It is appropriate to consider the needs of and risks to vulnerable customers and other societal priorities as conditions to decoupling, though the commission will need to balance conditions that have a cost with the objective to control or reduce costs.

Some events affecting the utility and its financials are very hard to predict and could have a significant effect. For example, decades ago there was a dramatic change in the federal tax code affecting utilities. Such an exogenous change could be fairly reflected in the mechanism as a condition to allow the mechanism to be adjusted or prematurely ended in the event of a sufficiently significant event. A high standard for triggering this condition is appropriate as the decoupling mechanism is meant to reflect numerous unpredictable and countervailing events during its course.

If decoupling has the effect of motivating utilities to offer superior energy efficiency programs, while also maintaining volumetric rates at levels approximating long run marginal costs (which would generally not occur in SFV), then customer participation in energy efficiency may improve due to sound offers and sound price signals. Performance incentives for program administrators such as those in use in many states can motivate superior programs and savings that exceed requirements or that are achieved in hard to serve market segments.

Decoupling may maintain or change utility profitability. By itself, decoupling should have no effect on profitability as it is designed to deliver the revenue previously determined to be necessary to provide safe and reliable service, other public interest requirements and an opportunity for a reasonable return. There may be a reduction in profitability that would otherwise occur in the instance where sales are growing stimulated by underlying economic strength or the weather. In this instance sales margins owing to the fact that incremental sales cost less to deliver than the delivery rate (MC < AC) would be reconciled automatically into a lower rate by the decoupling mechanism. The utility would lose this incremental revenue and incremental net income. The converse would occur in an anemic economy or weather-induced sales shortfall, providing protection against lost profits due to exogenous factors.

Many suggest overlaying a performance system on top of decoupling in order to motivate societally beneficial behavior. The design of such a system can offer the utility an opportunity to earn super-normal net income if performance targets are exceeded.

If a decoupling mechanism is designed with opportunities to increase or decrease revenues and net income, the mechanism can include provisions for what to do with these increments. Tools include deadbands, sharing, caps and symmetry.

A deadband would produce no change to rates owing to changes in net income within a range of results. Typically, the deadband has a range above and below the expected value. A deadband furthers rate stability.

A sharing plan would provide for some change in rates owing to a sufficient change in net income. The mechanism could have one sharing split, or multiple ones limited by the tolerance for complexity. For example, the mechanism can provide a deadband of 10 basis points around the target ROE is used – earnings results in this band cause no change in rates, the mechanism could provide a sharing of 50-50 for net income above or below the deadband range. In order to return the share of higher net income to consumers, rates would be adjusted down, while lower net income would add the customers' share to rates.

The mechanism can cap these effects. For example, the sharing mechanism could limit additional earnings to 100 basis points, and rates would be adjusted down to reflect any additional net income. The cap could also apply to under-earning, which would cause rates to rise to recover deficient net income from customers.

The examples so far have presumed symmetry for ease of illustration – effects above and below expected values are the same. Symmetry can be adjusted so that outcomes above expected earnings may be treated differently that those below. Mechanism designers are wise to describe in words the risks and outcomes that stakeholders need to be addressed and any bedrock principles that need to be represented, and to design any deadband, sharing, cap and symmetry to address these real concerns, recognizing that some dilemmas are likely. This approach shares risks between the utility and customers and can be tailored to balance that sharing.

Technical assistance to better appreciate the quantitative effect of a particular form of decoupling is available from Lawrence Berkeley National Laboratory's Energy Analysis and Environmental Impacts Division. The Financial Impacts of Distributed Energy Resources Model, known as the FINDER Model, characterizes decoupling and lost revenue mechanism options for an actual or prototypical utility and returns insight about effects on customers (program participants and non-participants) and total utility costs and utility returns.[5]

Rate design is a distinct activity from creating a decoupling mechanism. Rate design also has a range of techniques, and is grounded in principles well-articulated by Bonbright in 1961.

The commission asks about the need for a fixed rate element. The only change to traditional rate design practices (which tend to assign local customer-specific costs to a customer charge, where there are customer charges) is if the regulator decides to use rate design as means to change utility revenue recovery assurance. Revenue

[5] Further information and publications are available at https://eaei.lbl.gov/tool/financial-impacts-distributed-energy

recovery assurance can also be accomplished by decoupling. With an effective decoupling mechanism, no change to the customer charge is needed. Many states are entertaining rate design reforms designed for consumption rates to reflect system value. This suggests movement toward time varying rates set to reflect long run marginal costs. This would tend in the opposite direction from moving to higher monthly customer charges.

The commission asks about the prospect of introducing demand charges for mass market customers. This question appears to emerge from the same concern as the idea of increasing the customer charge: utility revenue assurance. My response is similar. In the case of a demand rate, principles suggest it may be appropriate for local assets directly serving customers, as distinct from common assets serving all, though this would produce a small demand charge and may not be worth doing.

If the commission considers a demand charge, there are a few important considerations. The commission should consider the ability of a customer to manage this charge. An inadvertent coincidence of plug loads and automated loads (refrigerator motor, water heater, boiler pump) could produce a peak demand that may surprise the customer and which would be hard to manage. On the other hand, new customer choices in automation, self-generation and storage could make revenue from a demand rate less certain than it has been heretofore as customers are increasingly able to use home area networks to build logic into the way buildings and the equipment in them work. The commission should also consider whether the relevant demand factor is non-coincident (the customer peak) or coincident (customer use at the system peak), and whether there should be a yearly, monthly or daily ratchet. Going into these variables in detail would take this statement into detail that may not be timely for this session though I will be willing to entertain questions that address that detail.[6]

Rate design changes are sometimes raised as an effort to fairly allocate embedded fixed costs. This is an important consideration in the rate design process and is properly done in the class cost of service allocation process. Retail utility prices are unique in their ability to signal to customers the value of their energy choices, the ones facing them in the future. Regulators must consider carefully their rationale for burdening retail prices with other considerations, like revenue adequacy, especially if they can be accomplished satisfactorily in other ways.

The experience of neighboring Maryland and the decoupling plans of its utilities is useful in assessing the interaction with storm restoration, a topic raised by the commission. As a former state energy official myself, I would expect officials with similar responsibilities to want an expeditious and competent response to customer outages due to inevitable storms under all circumstances, including the presence of a decoupling mechanism. Here are two ways to avoid backsliding of utility restoration efforts.

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[6] Lazar, Gonzalez (2015)

One is to include an explicit performance incentive for outage duration that includes a significant penalty for actual durations above some threshold.

Another can be used with the revenue per customer form of decoupling and would adjust the customer count for customers out of service. This adjustment could apply to all outages big and small, or could be triggered by extreme outages triggered by numbers of customers out or outage duration. As a simple example, a single customer with an outage of 36 ½ days would count as a .9 (nine-tenths) customer in the RPC calculation. If 10% of customers were in this predicament, this would result in a 1% reduction (10% of customers out 10% of the year) in the target revenue. This effect would reduce the target revenue in the reconciliation process, and motivate the utility to reduce outage time for all customers.

A performance metric addressing outage duration and putting a penalty system in place for total outage duration in terms of customer-hours addresses this concern directly and can motivate superior utility actions in storm preparation. A commission should consider that the effects of extreme storms can exceed any well-prepared and competent utility's efforts to avoid outages of long duration for many customers. A way to think about this is to recognize the risk of such an event and to strike a balance of risk between customers and the utility.

Pennsylvania regulatory practice includes a rider called a Distribution System Improvement Charge. This rider addresses replacing and upgrading aging facilities. A basic decoupling mechanism would have no effect on this rider, as the rider is designed to collect revenue from consumers for specific costs associated with relevant investments. There could be a connection with a decoupling mechanism under the following circumstance. If the decoupling mechanism allows the utility to earn above the target return on equity due to an allowance for the utility to keep some portion of revenues above the target level, then it is possible for this excess to trigger the cap in the DSIC. There may be other connections that are beyond my experience with the DSIC to appreciate.

In closing, it is important to note that an obvious option is to leave regulation as it is. This is the state of many states. Service continues, and regulators retain the power to order utility behavior. The principal problem with traditional regulation in 2016 is the structural conflict between a utility business model of profitability and rate design that rewards and encourages throughput at a time when the financial and environmental costs and risks of more throughput are high, while the means to reduce throughput without diminishing productivity or quality are ever-improving. This observation, then credits any state that chooses to consider alternatives for increased harmony between utility and public interests. This concludes my prepared statement.