PERFORMANCE-BASED REGULATION

Aligning utility incentives with policy objectives and customer benefits

A 21st Century Electricity System Issue Brief

By Advanced Energy Economy

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ABOUT ADVANCED ENERGY ECONOMY

Advanced Energy Economy (AEE) is a national association of businesses and business leaders who are making the global energy system more secure, clean and affordable. Advanced energy encompasses a broad range of products and services that constitute the best available technologies for meeting energy needs today and tomorrow. AEE's mission is to transform public policy to enable rapid growth of advanced energy businesses. AEE and its State Partner organizations are active in 26 states across the country, representing roughly 1,000 companies and organizations in the advanced energy industry. Visit www.aee.net for more information.

ABOUT THIS ISSUE BRIEF

The U.S. utility sector has entered a period of foundational change not seen since the restructuring of the late 1990s. Change is being driven by new technologies, evolving customer needs and desires, environmental imperatives, and an increased focus on grid resiliency. With these developments come challenges, but also new opportunities to create an energy system that meets the changing expectations of consumers and society for the coming decades. We call this the *21st Century Electricity System:* a high-performing, customer-focused electricity system that is efficient, flexible, resilient, reliable, affordable, safe, secure, and clean. A successful transition to a 21st Century Electricity System requires careful consideration of a range of interrelated issues that will ultimately redefine the regulatory framework and utility business model while creating new opportunities for third-party providers and customers to contribute to the operation of the electricity system.

To support this transition, Advanced Energy Economy (AEE) has prepared several issue briefs that are intended to be a resource for regulators, policymakers, and other interested parties as they tackle issues arising in the rapidly evolving electric power regulatory and business landscape.[1] This issue brief on **Performance-Based Regulation (PBR)** describes this emerging regulatory approach, provides various performance incentive design options, and lays out recommended steps to follow to implement PBR.[2]

SUMMARY

Performance-based regulation (PBR) is an alternative regulatory framework designed to better align the financial interests and actions of regulated investor-owned utilities with public interest objectives and consumer benefits. A PBR framework rewards utilities for achieving well-defined outcomes (performance metrics) as opposed to incentivizing capital investment (inputs), which is the primary driver today of utility revenue and profits. Regulatory reforms, such as PBR, have the potential to change how utilities, customers and third-party providers generate, deliver, and use energy.[3]

AEE believes that PBR, in its various forms, can serve as a foundational regulatory framework of the electricity grid of the future. Future infrastructure investments must be evaluated in light of technological innovations and judged on the basis of the value delivered by and through those investments. In this regard, AEE supports regulatory mechanisms that enable value creation, long-term viability of the utility business model, and deployment of the modern technologies that will form the basis of a 21st century electricity grid. In support of these goals, this issue brief lays out the basic concept of performance-based regulation, considers different performance incentive design options, and offers implementation recommendations.

INDUSTRY & REGULATORY EVOLUTION

The U.S. utility sector is in a period of significant change, driven largely by information technology and falling costs for distributed energy resources (DER)[4] and renewable energy technologies At the same time, U.S. electric investor-owned utilities continue to invest on the order of $100 billion annually, as aging infrastructure is replaced and modernized.[5] Those investments must be consistent with the evolving needs of customers and must be guided by regulators to ensure long-term compatibility with the grid of the future.

The energy infrastructure and markets of the future will be more complex, will include a greater number and variety of actors, and will present technical challenges (such as managing two-way power flows over the electricity distribution system and a much larger number of interconnected devices) as well as business challenges (such as the long-term viability of a utility business model now built around increasing capital deployment and rising energy sales). With these developments come challenges, but also new opportunities. If managed successfully, these changes present opportunities for greater customer choices and engagement, the creation of a more efficient and resilient energy system, and opportunities for utilities to embrace new business concepts that will sustain them in the decades to come.

AEE views new regulatory approaches as necessary for enabling a modern energy infrastructure. Traditional regulatory approaches have supported a rigorous evaluation of investments to control costs of service provision. However, utilities and regulators alike note that these traditional approaches are not designed to foster grid evolution. A future grid characterized by greater intelligence, two-way flow of information and electricity, technological innovation, and high penetration of DERs requires changes to regulatory decision-making. PBR is one option to consider, as it enables utilities to earn incentives for achieving specific outcomes that will be essential to creating the grid of the future.

CORE CONCEPT

The electric utility industry is one of the most capital-intensive industries in the world. Historically, cost-of-service based regulatory frameworks have developed and evolved to provide a stable business environment to promote healthy capital spending by utilities to meet the energy and reliability needs of customers. PBR represents an evolution from this traditional regulatory approach in which regulatory goals, utility earnings opportunities, capital investment incentives, and regulatory processes are adjusted to focus on

[6] and desired outcomes. These outcomes are tied to an index of performance in addition to, or in place of, the cost of providing services. PBR also can include other elements of regulatory reform, such as revenue decoupling and multi-year forward-looking rate plans. Used together, these enhancements to cost-of-service regulation can better align regulated utility earnings with desired outcomes.

performance. In addition to continuing to provide for the recovery of investments needed for a reliable, low cost grid to serve consumers and businesses, PBR provides an alternative approach to incentives to invest in new technologies or to establish new market structures. Table 1 below contrasts traditional and PBR frameworks.

Regulatory agencies establish PBR by creating links between regulated utility financial incentives

PBR frameworks can also accelerate the way regulation reacts to market dynamics. Traditional regulatory processes can lag industry developments. This regulatory lag may unintentionally limit economic growth potential, slow technological advances and deployment, and negatively impact utility financial performance.

Table 1 – Core PBR Concepts Compared to Traditional Regulation

	Traditional Regulation (Cost of Service)	Performance-based Regulation
Goals	Focus on reliability, affordability, adequacy of highly centralized electricity delivery systems. Consumers are protected from monopolistic power through reasonable rates and careful regulatory oversight.	Focus on traditional regulatory goals, as well as specific outcomes defined by policymakers, utilities, and stakeholders. Consumers receive reliable services. Facilitates opportunities for customer and third-party value creation and innovation.
Incentives for Utilities	Revenues (expenses + depreciation + taxes + return on rate base) are designed to match costs. Regulators approve costs, which are recovered in rates, often based on per-unit (volumetric) energy usage. The utility is incentivized to increase usage to drive up revenues.	Revenues are earned through a variety of rates and programs. Incentives are designed, communicated, and evaluated. More sophisticated rates are designed to facilitate reliable services and technology deployment. Utility earnings incentives are aligned with policy outcomes rather than increased usage.
Earnings	Regulators evaluate prudent cost of expenditures for services, with the level of capital expenditure primarily driving earnings.	Utilities optimize total expenditures (capital and operating) and regulators reward valued outcomes. Regulated earnings remain, but can be enhanced based on performance against specific metrics.
Timescale	Short-term focus on cost minimization with a traditional long-term capital planning process.	Balanced focus on short-term cost minimization/near-term grid reliability investments and longer-term investment in future grid architecture, improving performance and achieving public policy goals.

IMPLEMENTING PBR

There is no one-size-fits-all solution for successful PBR deployment. Nevertheless, experience suggests that the following basic framework can be used to help policymakers and utilities design and implement changes that best fit their specific needs and circumstances.

ESTABLISHING AUTHORITY TO IMPLEMENT PBR. When evaluating PBR, stakeholders must operate within the jurisdiction's unique circumstances, including legal, institutional, utility, and financial market considerations. In many states, the utility regulator is uniquely positioned, and has statutory authority, to act related to PBR objectives. However, it must be clear which governmental entity has authority to define what PBR means for the state. This includes a clear ability to act on utility incentives, including valued outcomes. Incentives that align utility revenues and cost recovery with effective performance encourage utilities to invest in a wider array of programs and technologies than they might otherwise consider under existing cost-of-service regulation. When designed appropriately, PBR can enhance traditional regulation of rates and costs with innovation in energy services and technologies and improved performance.

Case Study from Illinois' Smart Grid Act

In October 2011, Illinois passed the Energy Infrastructure Modernization Act (EIMA), which became law as Public Act 097-0616.[7] As part of the broader act, the legislation required Commonwealth Edison and Ameren Illinois to file multi-year metrics to achieve performance goals over a 10-year horizon. This requirement ultimately led to the establishment of tracking and performance measurement on an array of categories, including reliability indices, peak demand reductions, renewable energy adoption, greenhouse gas reductions, reductions in estimated bills, and the adoption of new smart grid technologies.

It is important to identify opportunities and limitations that may impact a PBR framework. Many states have strong foundations that can serve as a basis for establishing PBR. For example, many state regulatory commissions already have authority to connect outcomes (e.g., performance on reliability indices, customer satisfaction metrics, or demand-side management goals) to utility financial opportunities. However, there may be authority that is limited, requiring either scoping a few areas of PBR, or seeking additional authority from lawmakers to pursue additional areas.

STAKEHOLDER ENGAGEMENT.

Stakeholder input is crucial to PBR success. To increase transparency and stakeholder involvement, regulatory processes should ensure stakeholders are part of establishing the critical aspects of PBR plans – such as setting performance targets and incentives. Utilities might understandably try to set achievable targets, whereas a regulatory body or other stakeholders may argue for targets that seemed unachievable. Engaging in a collaborative process, with the overarching policy objectives guiding the discussion, is more likely to result in a set of targets and incentives that will promote success and achieve meaningful outcomes.

For example, in Massachusetts, utility-sponsored energy efficiency programs have a strong performance component. An independent Energy Efficiency Advisory Council, made up of a variety of stakeholders, helps set energy efficiency targets and the associated incentive levels. The Massachusetts program is a good start that provides useful real-world experience with a successful program that is large, is embraced by the state's utilities, and combines PBR principles with other complementary polices (such as revenue decoupling), and could in the future apply to a wider range of utility activities.

DEFINING PERFORMANCE. To implement PBR, legislators, regulators, and stakeholders should work together to define, prioritize, and incentivize desired performance. Performance objectives may be specific to a given jurisdiction. Examples of broad categories of performance include customer empowerment, operational reliability and efficiency, environmental sustainability, and market innovation. Specific metrics that can assess performance across these categories are then defined (see *Establishing Metrics and Incentives* below).

The level of incentive is another important consideration. For PBR to be successful, incentives must be large enough to have the desired effect on utility behavior, but capped to protect consumers. In the UK, where they have implemented a comprehensive PBR framework,[8] incentive levels are relatively large (+/- 300 basis points) but subject to an overall revenue cap, which prevents the utility from "gold plating" investments to drive up earnings without providing incremental benefits to customers. In New York State, which recently implemented a more modest version of PBR as an overlay to cost-of-service regulation, incentives are limited to a maximum of 100 basis points (positive only), but without a revenue cap. In situations where there is no revenue cap, we recommend converting incentives from basis-point adders to an absolute dollar figure, to avoid the situation where the utility may seek to drive up its rate-base investments to increase profits from PBR. For example, in Massachusetts, the incentive levels within its energy efficiency program are set at specific dollar amounts for specific levels of achievement.

ESTABLISHING METRICS AND INCENTIVES. Generally, performance targets and metrics should be designed around the most important, forward-looking assumptions that impact the business case of a proposed utility investment. Although metric categories should be similar for all utilities in a jurisdiction, actual targets can vary from utility to utility to reflect differences in the customer base, system condition, or other factors.

While each jurisdiction should develop metrics most relevant to its goals, below are examples of specific metrics that are consistent with the evolving nature of the electricity system.

- **Safety & Reliability:** SAIDI[9], SAIFI[10], or other indices, if not already subject to performance requirements.
- **Data access:** Consumer access to standardized and actionable energy consumption data; third-party access to system data.
- **Energy efficiency:** Quantifiable reductions in total electricity usage.
- **Peak load reduction**: Targeted demand reductions during peak periods – a primary driver of utility costs.
- **Third-party resource deployment:** Distributed energy resource deployments by third parties (including on behalf of customers).
- **Interconnection:** Volume and processing speed of filling requests to connect resources to the electricity system.

PLANNING IN THE PBR CONTEXT.

Incentives are provided when a utility achieves certain goals (outputs); however, these new output incentives need to be considered in the context of the input incentives under which utilities currently operate. Broadly, output incentives are rewards for achieving certain outcomes, which are the result of a combination of investments, management, and operational decisions (and potentially the decisions of customers and other actors), while input incentives focus on rewarding the capital invested in certain types of assets. When it comes to investments, utilities have short, medium, and long-term considerations. PBR should not lead utilities to focus on short-term gains at the expense of future performance. Any form of PBR must therefore include planning that provides insight on the impacts of the inputs over all time frames. An important foundation for effective PBR is thus a planning process that can show the reasonable alternatives for various investment and operating choices. This enables effective target-setting against the metrics developed in the PBR framework.

OPTIMIZING BETWEEN CAPITAL AND OPERATING EXPENSES. One goal of a PBR framework is to put operating expenses on a more equal footing with capital investments, particularly when non-capital spending can provide a superior solution.[11] This could be, for example, in procuring load reductions from customers and third parties deploying DER in lieu of a traditional distribution infrastructure upgrade. Another example could be incentivizing permanent peak reduction with targeted energy efficiency investments by building owners that help with near-term operational needs. Under a PBR framework, which does not just reward utilities for capital investment, utilities look at a broader array of potential solutions knowing that those based on operating expenses (e.g., contracts for demand response services, administration of energy efficiency programs) also provide earnings opportunities. For example, in New York, Consolidated Edison is earning on energy efficiency incentives and recovering those costs as a regulatory asset over a period of 10 years, recognizing that the investment provides benefits to all customers for more than just one year. Furthermore, incentives and rates could be adjusted regularly pursuant to a review of utility performance and service quality metrics. In some cases, regulators may consider additional fees on certain O&M expenses to provide some earnings equivalence to encourage non-capital solutions.

PRIORITIZING METRICS AND LEARNING. The foregoing discussion suggests that there are many potential metrics and incentive structures from which to choose. Thus, some prioritization is necessary to make the implementation of PBR manageable. Regulators and other stakeholders should focus performance objectives where there is most need for improvement, where there are opportunities to pursue regulatory priorities, and where there is opportunity for change.

It is important to provide utilities with a reasonable set of initial metrics to gain experience with PBR. Experience in other states with PBR suggests beginning with a few, clear metrics.[12] While metrics should obviously be aligned with regulatory policy priorities, we suggest two other basic criteria in developing a recommended list of initial metrics. These are (i) the ability for near-term implementation and (ii) the ability of individual metrics to inform multiple areas of performance within the broad categories of interest.

COMPLEMENTARY POLICIES. When considering PBR, regulators and policymakers should consider various complementary policies that can make PBR more effective. These are generally targeted at countering the utility bias toward increasing capital investment, which can be an obstacle in making a shift toward rewarding performance. These include:

- **Revenue decoupling**, which removes the disincentive for utilities to reduce volumetric sales.
- **Multi-year forward looking rate plans**, in which base rates are set based on an approved multi-year investment plan but are reconciled annually with actual investment.
- **Comprehensive benefit-cost analysis**, which is used as a basis for developing multi-year rate plans.

CONCLUSION

PBR offers the potential to achieve policy objectives and improve public welfare while also retooling the utility business model for success in meeting those objectives. Experience shows that, with thoughtful design processes, rewarding performance can work well. Implementing PBR in each jurisdiction needs to be considered in the context of a utility system that is becoming increasingly complex. This suggests that a move toward introducing a PBR framework should also involve considerations of adjustment to the regulatory process as a whole. This should include greater involvement by interested stakeholders that will ultimately play an integral role in the utility being able to meet its performance targets.

To support PBR as described in this issue brief, utilities and regulators will also need to agree on a form of advanced planning that can better identify the benefits that come from all advanced technologies.

ENDNOTES

[1] http://info.aee.net/21ces-issue-briefs

[2] Advanced Energy Economy (AEE) is comprised of a diverse membership. As such, the information contained herein may not represent the position of all AEE members.

[3] PBR as a regulatory framework applies mainly to investor-owned utilities, although some of the concepts may also apply to public power entities such as municipal utilities and cooperatives.

[4] DER is defined broadly to include distributed generation of all types, demand response, energy efficiency, energy storage, microgrids and electric vehicles, and as such, includes options for generating and managing electricity.

[5] Edison Electric Institute. *Delivering America's Energy Future: Electric Power Industry Outlook.* February 8, 2017. URL: http://www.eei.org/resourcesandmedia/industrydataanalysis/industryfinancialanalysis/Documents/Wall_Street_Briefing.pdf

[6] Incentives can be positive (rewards) or negative (penalties). Positive-only incentives may get greater buy-in from all stakeholders and may be more suitable for performance metrics that are not core service requirements, such as safety and reliability.

[7] http://www.ilga.gov/legislation/publicacts/97/097-0616.htm

[8] Known as RIIO, which stands for Revenue = Incentives + Innovation + Outputs

[9] System Average Interruption Duration Index which is the average outage duration for each customer served.

[10] System Average Interruption Frequency Index which is the average number of outage interruptions for each customer served.

[11] For more see our Issue Brief on Optimizing Capital and Service Expenditures http://info.aee.net/21ces-issue-briefs

[12] For example, New York selected four metrics for initial inclusion in its "Earnings Adjustment Mechanisms" as part of its Track 2 Order in the Reforming the Energy Vision proceeding (Order Adopting a Ratemaking and Utility Revenue Model Policy Framework. New York Public Service Commission, May 19, 2016. Proceeding 14-M-0101).