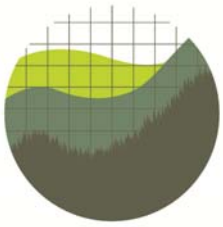

Institute *for*
Policy Integrity
NEW YORK UNIVERSITY SCHOOL OF LAW

October 26, 2015
Hon. Kathleen H. Burgess, Secretary
New York State Public Service Commission
Three Empire State Plaza
Albany, New York 12223-1350

VIA ELECTRONIC SUBMISSION

Attn: Case No. 14-M-0101, Proceeding on Motion of the Commission in Regard to Reforming the Energy Vision
Subject: Party Comments on New York State Department of Public Service, Staff White Paper on Ratemaking and Utility Business Models, Docket No. 416(July 28, 2015)

Dear Secretary Burgess:

The Institute for Policy Integrity at New York University School of Law[1] ("Policy Integrity") respectfully submits the following comments[2] on the New York State Department of Public Service's Staff White Paper on Ratemaking and Utility Business Models. Policy Integrity is a non-partisan think tank dedicated to improving the quality of government decisionmaking through advocacy and scholarship in the fields of administrative law, economics, and public policy. Policy Integrity has extensive experience advising stakeholders and government decisionmakers on the rational, balanced use of benefit-cost analysis, both in federal practice and in New York.

We are grateful for the Commission's consideration of these comments.

Sincerely,

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[1] No part of this document purports to present New York University School of Law's views, if any.
[2] These comments incorporate by reference into the record all of the documents cited herein.

INTRODUCTION

In recent years, New York has continued to strengthen its role as a leading state in modernizing its electrical grid in the face of a changing world. As part of these efforts, through the Reforming the Energy Vision ("REV") proceeding, the Public Service Commission ("Commission") is thoughtfully considering how best to adapt technology and infrastructure, as well as rates and business models for the future.[3] The Commission released its "Track One" order, focused on developing distributed resource markets, on February 26, 2015.[4] At the Commission's request, the Department of Public Service Staff ("Staff") has now compiled its extensively researched "Track Two" White Paper on Ratemaking and Utility Business Models ("White Paper"), with recommendations on both near- and longer-term reforms to New York's ratemaking structure.[5] Staff has now submitted this White Paper for further public comment, including input on a number of specific questions. Staff has done an excellent job researching and analyzing many of the important issues surrounding ratemaking reforms in the face of a changing electrical grid. Staff and the Commission can take certain steps to improve the ratemaking process even further. In particular, Staff and the Commission should:

- Modify the suggested performance-based regulation approach to: (1) directly factor in environmental effects through an earnings impact mechanism, rather than a scorecard factor; (2) use symmetric, rather than one-sided incentives with smooth formulas for incentive payments; and (3) offer a menu of earning sharing contracts.
- Update the approach to distributed energy resource ("DER") compensation so that it is fully reflective of all of the benefits and costs of these resources with proper granularity, including the full scope of environmental benefits even during the gradual implementation of a comprehensive rate reform.
- Reflect environmental attributes fully in rates directly, rather than just through incomplete, indirect instruments like the Regional Greenhouse Gas Initiative ("RGGI").
- Strengthen the proposed rate design reforms to include more dynamic and cost reflective tariffs to ensure the success of REV.

As requested by Staff, the remainder of these comments will follow the outline structure of the White Paper. The document will list all of Staff's topic headings in order for clarity, but will add detailed comments only as applicable.

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[3] Proceeding on Motion of the Commission in Regard to Reforming the Energy Vision, Order Adopting Regulatory Policy Framework and Implementation Plan, PSC Case No. 14-M-0101 (Feb. 26, 2015) [hereinafter Adoption Order].

[4] *Id.*

[5] Proceeding on Motion of the Commission in Regard to Reforming the Energy Vision, Staff White Paper on Ratemaking and Utility Business Models, PSC Case No. 14-M-0101 (July 28, 2015) [hereinafter White Paper].

I. INTRODUCTION AND SUMMARY

A. Introduction
B. Purpose, Scope, and Process of this White Paper
C. Summary of Proposals
D. Legal Authority

In order to satisfy its enabling statute and maintain consistency with prior proceedings and the goals of REV, the Commission should ensure that it approaches ratemaking from the perspective of maximizing net social welfare and properly incorporates environmental externalities into its ratemaking. The Commission's enabling statutes—as well as statutory interpretations by the courts and by the Commission itself—mandate that the Commission promote the public interest, which includes promoting public health and environmental preservation. New York Public Service Law Section 5 states that the Commission "*shall encourage* all persons and corporations subject to its jurisdiction to formulate and carry out long-range programs . . . for the performance of their public service responsibilities with economy, *efficiency*, and care for the public safety, the preservation of environmental values and the conservation of natural resources."[6] In economics, "efficiency" is defined as maximizing net social welfare, which requires the consideration of social externalities, like environmental harm.[7]

The mandatory term "shall" is also telling, and courts have recognized that these factors have "become an avowed legislative policy"; [8] in particular, this section confers the Commission with authority to promote energy conservation and public health.[9] Though the Commission has discretion in meeting these goals, its determinations must "bear[ ] a reasonable relationship to the purpose of the enabling legislation."[10] As Section 5(2) demonstrates, the enabling legislation includes goals of promoting the public interest and preserving environmental values.

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[6] N.Y. PUB. SERV. LAW § 5(2) (McKinney 2012) (emphasis added); *see also id.* § 66(2) ("The commission *shall* . . . examine or investigate the methods employed . . . in manufacturing, distributing and supplying gas or electricity . . . and [has] *power to order* such reasonable improvements as will *best promote the public interest*, *preserve the public health* and protect those using such gas or electricity.") (emphasis added).
[7] *See*, *e.g.*, N. GREGORY MANKIW, PRINCIPLES OF ECONOMICS 5 (5th ed., 2008) ("[E]fficiency: the property of society getting the most it can from its scarce resources.").
[8] *See* Multiple Intervenors v. Pub. Serv. Comm'n, 569 N.Y.S.2d 522, 524 (3d Dept. 1991) (internal citations omitted).
[9] N.Y. PUB. SERV. LAW § 5(2) (McKinney 2012); *see also* Proceeding on Motion of the Commission to Review Generation Retirement Contingency Plans, Order Accepting IPEC Reliability Contingency Plans, Establishing Cost Allocation and Recovery, and Denying Requests for Rehearing, PSC Case No. 12-E-0503, at 15 (Nov. 4, 2013) (also interpreting Section 5(2)).
[10] *Multiple Intervenors*, 569 N.Y.S.2d at 524.

The Commission has acknowledged that the environmental and health goals of Section 5(2) are mandatory. In 2007 proceedings to establish long-term electric infrastructure plans, the Commission stated that its decision to begin the planning process was based on its "obligations" under the Public Service Law, which "requires" the Commission to "ensure safe and *adequate service* at just and reasonable rates, *preserve environmental values*, *conserve natural resources*, . . . and *care for the public safety*.[11] The Commission defined "adequate service" as "service that is *reliable*, *environmentally compatible* and *sustainable*."[12] Due to this obligation, the Commission found that "matters such as . . . environmental externalities, energy efficiency, environmental justice, . . . economic development, . . . global warming emissions, . . . and other issues critical to the public interest may be considered."[13] In its February 2014 Order in the Con Ed ratemaking proceeding, the Commission indicated that, in the resiliency context, Con Edison should assess "societal cost factors," such as "[t]he risks and probabilities of future climate events, . . . the impact of outages of varying duration on affected customers, and the potential risk to critical facilities," and monetize them in benefit-cost analysis "to the extent that reasonable values can be established and will be of practical relevance."[14]

In its Track One Order in the REV proceeding, the Commission designated "system wide efficiency" and "reduction of carbon emissions" as two of the six main goals of REV.[15] The Commission further explained, "Accounting for environmental factors in analyzing investment decisions, and internalizing them into market transactions, are priorities of REV and are a logical continuation of past Commission policies, as well as being consistent with the State Environmental Quality Review Act and the Draft State Energy Plan."[16] In order to fully achieve these goals, the Commission must approach its ratemaking from the perspective of maximizing net social welfare and properly integrate all significant costs and benefits into the ratemaking process, including environmental externalities.

II. LIMITATIONS OF CONVENTIONAL COST-OF-SERVICE RATEMAKING

A. The Foundation of Traditional Regulation, Efficient Investment, and Innovation in New York

B. The Limits of Conventional Cost-of-Service Ratemaking in the Context of REV

III. ALIGNING CUSTOMER VALUE WITH EARNING OPPORTUNITIES

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[11] Proceeding on Motion of the Commission to Establish a Long-Range Electric Resource Plan and Infrastructure Planning Process, Order Initiating Electricity Reliability and Infrastructure Planning, PSC Case No. 07-E-1507, at 5 (Dec. 24, 2007) (emphasis added).
[12] *Id*. at 5 n.11. (emphasis added)
[13] *Id*. at 5–6.
[14] Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Consolidated Edison Company of New York, Inc. for Electric Service, Order Approving Electric, Gas, and Steam Rate Plans in Accord with Joint Proposal, PSC Case No. 13-E-0030, at 68 (Feb. 21, 2014).
[15] Adoption Order, *supra* note 3, at 4.
[16] Adoption Order, *supra* note 3, at 124–25.

A. Summary
B. Market-Based Earnings in a Fully Developed Market
    1. Platform Service Revenues, Customer Enhancements, and Synergy Opportunities
    2. Benefits of the MBE Model
    3. Pricing and Revenue Sharing

C. Modifications to the Utility/DSP Revenue Model
    1. Capital Expenditures and Operating Expenses
    2. Public Policy Achievement
    3. Earnings Impact Mechanisms, Scorecards, and Outcomes

For important goals, such as environmental protection, the Commission should tie performance metrics directly to shareholder earnings rather than relying on purely informational "scorecards." Tying incentives to utility earnings is key to ensuring that utilities are motivated to act on those incentives. As Staff points out, "a primary purpose of [earnings impact mechanisms] is to align utilities' profit motive with market-driven outcomes."[17] Shareholder incentives have been proven to successfully change utilities' activities; for instance, they can catalyze "significant increases in energy efficiency program spending."[18]

a. <u>Shareholder incentives are the preferred method of changing utility behavior</u>

Scorecards that merely require data disclosure for particular metrics are inappropriate for the distribution utility context. Scorecards are meant to encourage "the autonomy (and quality) of individual decision making" by removing asymmetric information barriers for consumers, thereby increasing efficiency in markets.[19] Moreover, they can inform investment decisions for utility shareholders. For scorecards to have an effect, the individuals receiving disclosed information must possess decision-making power. Therefore, it is no surprise that disclosure regulations often apply in markets for consumer goods.[20] In the retail electricity market, however, consumers have little choice about the utility distributing their power, regardless of whether they have access to information

[17] White Paper, *supra* note 5, at 59–60.
[18] SARA HAYES ET AL., AM. COUNCIL FOR AN ENERGY-EFFICIENT ECON. (ACEEE), REPORT NO. U111, CARROTS FOR UTILITIES: PROVIDING FINANCIAL RETURNS FOR UTILITY INVESTMENTS IN ENERGY EFFICIENCY 10 (2011), *available at* http://aceee.org/sites/default/files/publications/researchreports/U111.pdf.
[19] George Lowenstein, Cass R. Sunstein & Russell Golman, *Disclosure: Psychology Changes Everything* 18 (Regulatory Policy Program Working Paper RPP-2013-20, 2013), *available at* http://zuckermanfellows.harvard.edu/index.php/content/download/70729/1255726/version/1/file/RPP_2013_20_Loewenstein+et+al_.pdf.
[20] *Id.* at 9.

about that utility's performance.[21] Though some consumers are able to select their electricity supplier in New York through the state's retail choice programs,[22] distribution utilities have a significant advantage over competitive energy suppliers due to consumer inertia and incumbent brand advantage.[23] If utilities are not faced with demand-side impacts arising from data disclosure, the incentive to improve on scorecard metrics for the sake of a better report is lost. Without a link between earnings and environmental performance, shareholders also have little incentive to call for improvements or withdraw their investment from the utility. By connecting performance metrics to utility revenues, the Commission can ensure that utilities are motivated to improve performance going forward.

States with existing performance-based mechanisms have structured them in ways that strengthen the connection between performance and earnings. For instance, the Massachusetts Department of Public Utilities implemented a performance-based mechanism where utilities that fail to meet targets for service quality face negative revenue adjustments. In doing so, the Department had to address utility concerns about the impact on earnings. The Department responded to these concerns by reminding utilities that they could avoid undue earnings impacts simply by striving to meet the service quality targets.[24] The Department stated that its intent was to create a penalty mechanism that would "make it unambiguous that certain actions or failures in maintaining [service quality] measures will have direct revenue consequences."[25]

Minnesota and Illinois have also tied performance incentives to utility earnings, as has New York. The Minnesota Department of Commerce oversees the state's Energy Conservation Improvement Program, which requires electric utilities to invest at least 1.5% of their annual gross operating revenues into conservation improvement programs meant to bolster energy efficiency.[26] The state also has an Energy Efficiency Resource Standard that

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[21] "Retail choice" programs are available through certain utilities in New York. *See Energy Choices—The Facts from the PSC*, N.Y. STATE DEP'T OF PUB. SERV., http://www3.dps.ny.gov/W/PSCWeb.nsf/All/52770E53410005A185257687006F39D2?OpenDocument (last visited Oct. 24, 2015). However, these programs are not ubiquitous; moreover, distribution utilities easily maintain significant market shares where such programs exist due to phenomena like consumer inertia and incumbent brand advantage. *See* Ali Hortaçsu, Seyed Ali Madanizadeh & Stephen L. Puller, *Power to Choose? An Analysis of Consumer Inertia in the Retail Electricity Market* 2 (Nat'l Bureau of Econ. Research, Working Paper 20988, 2015), http://www.nber.org/papers/w20988.pdf.

[22] *See Energy Choices—The Facts from the PSC*, *supra* note 21.

[23] *See* Hortaçsu, Madanizadeh & Puller, *supra* note 21, at 2.

[24] Investigation by the Dep't of Telecomm. and Energy on its own Motion to Establish Guidelines for Service Quality Standards for Electric Distribution Companies and Local Gas Distribution Companies Pursuant to G.L. c. 164, § 1E, D.T.E. 99-84, at Part IV.C (Mass. Dep't Telecomm. & Energy Aug. 17, 2000) [hereinafter Mass. Interim Order 99-84].

[25] *Id.*

[26] MINN. DEP'T OF COMMERCE, MINNESOTA CONSERVATION IMPROVEMENT PROGRAM ENERGY AND CARBON DIOXIDE SAVINGS REPORT FOR 2010-2011, at 8 (2013).

requires electric utilities to achieve savings equivalent to 1.5% of average annual retail sales.[27] Electric utilities that achieve savings at or above the 1.5% target receive a positive financial incentive averaging $0.09/kWh saved.[28] While Minnesota's program focuses on positive financial incentives, the Illinois mechanism contemplates negative revenue adjustments. In 2011, the Illinois legislature enacted the Energy Infrastructure Modernization Act, which includes performance metrics for reliability, energy efficiency, and other goals that utilities must achieve in increments within the next ten years.[29] If a utility does not meet its statutory performance requirements, it faces financial penalties in the form of downward adjustments to its return on equity.[30] New York has already developed some familiarity with earnings impact mechanisms along the lines of those deployed in Minnesota and Illinois. For instance, the Energy Efficiency Portfolio Standard established in 2008 includes the potential for both positive and negative revenue adjustments based on performance.[31] Ensuring utility motivation for important metrics like those measuring environmental performance should be a priority for the Commission as it shapes this updated performance-based mechanism.

b. Shareholder incentives are especially important for metrics that cannot be valued by usual market forces

Because carbon emission reductions and overall system efficiency are part of the main goals of REV, the Commission should include environmental objectives and metrics to measure progress toward those objectives in the performance-based regulatory mechanism for electric distribution utilities. When incentives are designed in a way to cause the utility to maximize its benefits minus its costs instead of maximizing social benefits minus social costs, the utility behavior will be biased towards programs with low costs to the utility.[32] Therefore it is important to make sure the utility incentives align with social goals, not just with market-based outcomes.

By definition, the effects of externalities accrue to parties other than those involved in a market transaction. Thus, aligning the incentives of a utility with social goals requires its earnings to directly depend on its performance on metrics related to social costs or benefits. Tying a utility's earnings to its performance on environmental impact measures

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[27] In the Matter of Commission Review of Utility Performance Incentives for Energy Conservation Pursuant to Minn. Stat. § 216B.241, Subd. 2c, Order Adopting Modifications to Shared Savings Demand Side Management Financial Incentive Mechanism, Docket No. E,G999/CI-08-133, at 7 (Dec. 20, 2012).

[28] *Id.*

[29] 220 ILL. COMP. STAT. 5/16-108.5(f)(1)-(8) (2015).

[30] *Id.* at 5/16-108.5(f-5)

[31] Proceeding on Motion of the Commission Regarding an Energy Efficiency Portfolio Standard, Order Concerning Utility Financial Incentives, P.S.C. Case No. 07-M-0548, at 1-2 (Aug. 22, 2008).

[32] S. STOFT, J. ETO & S. KITO, LAWRENCE BERKELEY LAB., LBL-36580, DSM SHAREHOLDER INCENTIVES: CURRENT DESIGNS AND ECONOMIC THEORY 11 (1995), *available at* https://emp.lbl.gov/sites/all/files/lbnl%20-%2036580.pdf.

aligns with the stated public policy objectives for the REV proceeding, particularly the goal of reducing carbon emissions.[33]

Using scorecards as a disclosure mechanism for environmental metrics is unlikely to affect consumer or shareholder behavior to a level sufficient to prompt utility performance improvements, in part because these metrics provide information about externalities. Consumer disclosure is most effective as a policy option when the market failure at issue is asymmetric information, rather than externalities.[34] While there may be some information asymmetry regarding consumers' knowledge about how dirty their electricity usage is, the main source of market failure is that the cost of environmental pollution is not borne by market participants. As long as polluters in the industry are able to continue without internalizing these costs, disclosure requirements will not address the basic market failure.

The current Staff proposal, which includes only one environmental scorecard measure, the Carbon Free Acquisition Rate,[35] is not only insufficient to align the utility incentives with the goals of reducing carbon emissions, but it is also insufficient to address broader environmental and health consequences of other pollutants. By designing its performance-based mechanism to incorporate metrics and incentives that assess reductions of air pollutants other than just carbon emissions,[36] New York will better position itself to achieve its public policy objectives as stated in the Track One Order [37] and maintain its place on the leading edge of energy regulation.

4. Earnings Sharing Mechanisms

Staff suggests that the current Earnings Sharing Mechanisms that are already in use in New York could be adapted to an outcome-based ratemaking approach.[38] Properly designed earning sharing mechanisms can indeed be very successful in achieving REV goals. However, the Commission should carefully review different structural elements of these plans such as performance targets, rewards and penalties, and set them in an integrated manner to ensure that the overall earning sharing mechanism leads to incentives that are

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[33] Proceeding on Motion of the Commission in Regard to Reforming the Energy Vision, Order Instituting Proceeding, PSC Case No. 14-M-0101, at 2 (Apr. 25, 2014).
[34] *See* Lowenstein, Sunstein & Golman, *supra* note 19, at 2 (explaining that disclosure, when "properly designed, . . . should also increase efficiency, helping to avoid cases of market failure resulting from incomplete and asymmetric information coupled with misaligned incentives.").
[35] White Paper, *supra* note 5, at 65.
[36] MELISSA WHITED, TIM WOOLF & ALICE NAPOLEAN, SYNAPSE ENERGY ECON., INC., UTILITY PERFORMANCE INCENTIVE MECHANISMS: A HANDBOOK FOR REGULATORS 27 tbl.14 (2015).
[37] Adoption Order, *supra* note 3, at pp. 124–25 ("Accounting for environmental factors in analyzing investment decisions, and internalizing them into market transactions, are priorities of REV and are a logical continuation of past Commission policies, as well as being consistent with the State Environmental Quality Review Act and the Draft State Energy Plan.").
[38] White Paper, *supra* note 5, at 66.

consistent with REV objectives. In particular, the Commission should offer a menu of gain-sharing contracts that have smooth formulas for calculating incentive payments and both positive and negative revenue adjustments.

a. The Commission should offer a menu of gain-sharing contracts

In regulated markets, there is an inherent information asymmetry between the regulator and the utility about the utility's ability and managerial efforts to improve performance on different metrics such as energy efficiency or cost savings. Further, observed outcomes may not be perfectly correlated with the utility's ability or efforts in some instances. For example, even if a utility puts in the effort to implement a desirable peak-reduction program at a prudent cost, other factors such as unusually high temperatures may cause less-than-ideal outcomes. Alternatively, it may also be the case that a cold summer drives down the peak demand even if the utility decides against having a peak-reduction program because it would hurt its profits. In addition, the regulator is at a disadvantage, as she is not perfectly informed about the inherent cost opportunities of the firm which may vary due to differences in other exogenous factors, such as technologies available to the firm or populations served. Essentially, the regulator is facing both an adverse selection problem—in which she seeks to identify whether a firm is a high-cost or a low-cost firm, in order to limit the rent-extraction of the more-informed firm and improve consumer welfare—and a moral hazard problem—in which she seeks to ensure that managerial efforts of a private, profit-maximizing firm are in line with societal goals.

In such cases, incentive regulation can be used to align the firm's incentives with societal goals so that the firm displays socially desirable behavior at the lowest possible cost to ratepayers, while affording the firm discretion in how those goals are achieved.[39] This discretion allows the firm to use its superior knowledge about its ability and its potential cost opportunities to achieve such goals as efficiently as possible.

There are different mechanisms a regulator can use. A cost-of-service mechanism, in which the firm is compensated for all of the costs it actually incurs, solves the adverse selection problem, as the firm has to reveal whether it is a high-cost or a low-cost firm to get fully compensated for its incurred expenses. However, with this type of regulation, there is no incentive for exerting any managerial effort to reduce costs, as the firm is compensated for all of the incurred costs and hence, moral hazard problems arise. On the other hand, a price-cap regulation, which allows the firm to keep any costs savings as profits, gives the utility the highest incentives to try fully to achieve cost reductions, solving the moral hazard problem. However, as the uninformed regulator will have to set a high enough price cap to ensure that the firm's costs are covered even when the firm's cost is high, this type of regulation is insufficient to address the adverse selection problem.

A better regulatory approach to address both of these problems is to use profit-sharing mechanisms in which the allowed revenue of the firm is partially fixed and partially

[39] David E.M. Sappington et al., *The State of Performance-Based Regulation in the U.S. Electric Utility Industry*, 14 THE ELEC. J. 71, 72 (2001).

depends on the firm's realized performance. Even though the current common practice is to offer a single profit-sharing contract option,[40] the optimal regulatory mechanism involves offering the utility a choice among a well-designed menu of regulatory contracts with different sharing provisions. [41] Such a menu would lead to a more desirable outcome compared to a single profit-sharing contract.[42] Offering a menu of contracts allows a better balance of managerial efficiency and rent extraction than offering a single profit-sharing contract when the regulator does not know the inherent characteristics of the firm.[43] The optimal menu includes a low-powered scheme, which is closer to a cost-of-service regulation that a higher cost firm would prefer, and a high-powered scheme, which is closer to a price-cap regulation that a lower cost firm would prefer.[44] The optimal menu can be generalized to include more options depending on the number of firm types.[45] Such menus or sliding scale contracts have previously been implemented in the United Kingdom[46] and are shown to provide welfare gains compared to a price-cap regime.[47] Similarly, offering a carefully constructed menu of gain-sharing contracts to promote energy conservation increases consumer welfare.[48]

The Commission should use carefully designed menus of gain-sharing contracts to ensure that all utilities face incentives to exert effort to achieve policy goals, regardless of their inherent ability to meet a potentially too high performance target set by the Commission. Menus will allow utilities to self-select performance goals based on their own private information about their ability, cost opportunities and accepted level or risk. A high-powered incentive scheme for a metric that provides high rewards for exceptional performance may be chosen by a utility that is particularly able on that metric. A low-powered scheme with low rewards for small improvements may be chosen by a utility that knows it would be too costly to achieve high performance on a particular metric. Offering a menu gives the utility the flexibility to use its informational advantage to improve performance and help achieve policy goals.

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[40] PAUL L. JOSKOW, INCENTIVE REGULATION IN THEORY AND PRACTICE: ELECTRICITY DISTRIBUTION AND TRANSMISSION NETWORKS 7 (2006).

[41] JEAN-JAQUES LAFFONT & JEAN TIROLE, A THEORY OF INCENTIVES IN PROCUREMENT AND REGULATION ch. 1 (1993).

[42] *Id.*

[43] JOSKOW, *supra* note 40, at 26.

[44] *Id.* at 11–12.

[45] LAFFONT & TIROLE, *supra* note 41, at 137.

[46] *See* JOSKOW, *supra* note 40, at 41–42 & fig.13.

[47] *See* David Hawdon et al., *Optimal Sliding Scale Regulation: An Application to Regional Electricity Distribution in England and Wales*, SURREY ENERGY ECON. DISCUSSION PAPER SERIES (Nov. 2005), *available at* http://www.seec.surrey.ac.uk/Research/SEEDS/SEEDS111.pdf

[48] Leon Yang Chu & David E.M. Sappington, *Designing Optimal Gain Sharing Plans to Promote Energy Conservation*, 42 J. REGUL. ECON. 115, 117 (2012).

b. The Commission should use smooth functions when calculating incentive payments

Setting performance targets properly is another element crucial to the success of REV. In determining these targets, the Commissions' goal should be to balance the costs and benefits of achieving a particular target. Ideally, a performance target should be set at a level at which the incremental social benefit from increased performance is equal to the incremental social cost of achieving that increased performance. Setting an unreasonably high target that a utility cannot achieve would discourage the utility from exerting any effort. Setting a low target that can be met with no effort would similarly fail to properly motivate the utility to exert any effort, as it can costlessly reach the target, leading to unnecessarily high incentive payments and harming consumers. Once a target is set, the Commission has to decide how to design rewards and penalties to induce the utility to accomplish these targets.

The Commission should also use smooth functions in designing its penalty and reward payments. In other words, penalties and rewards should increase continuously as the utility's performance improves or declines. The rate of change of the incentive payment with respect to the change in the performance metric—the marginal incentive rate—affects the utility's incremental motivation to improve performance, and thus, should be carefully considered.[49] If this rate is too low, some of the observable net benefit will not be captured.[50] For example, marginal incentive rates in deadbands[51] are zero, and therefore the utility does not have an incentive to exert effort if it believes that its effort will not achieve an outcome outside of the deadband. If the marginal incentive rate is too high, the utility will exert more effort than is socially optimal, and hence the incurred costs would exceed net benefits. For example, a shared savings mechanism employed for demand-side management programs of Southern California Edison ("SCE") in 1993 had marginal incentive rates that varied from 6,015% to 55,000% leading SCE to file for a $66 million incentive payment rather than the initial forecasted payment of $5.1 million, while achieving about $11 million in net benefits.[52]

In determining the marginal incentive rates, the Commission should avoid sharply increasing rewards or penalties for small differences in performance. For example, the Commission should avoid an approach like rewarding the utility for achieving an outcome that is 0.50 standard deviations above the performance target, but not for achieving an outcome that is only 0.49 standard deviations above the performance target. Imposing sharp thresholds for payments could cause perverse incentives and "may induce a utility to engage in unsafe or unsound practices in order to avoid a large penalty or receive a large

[49] STOFT, ETO & KITO, *supra* note 32, at 25.
[50] *Id.* at 34.
[51] "Deadbands" are zones where no action occurs if the metrics fall within the zone's established boundaries.
[52] STOFT, ETO & KITO, *supra* note 32, at 32.

reward."[53] In addition, "the performance evaluation process can become very contentious" when small differences in performance metrics can cause big swings in earnings.[54]

For example, California experienced problems with its energy efficiency incentive program as a result of using thresholds around which shareholder incentives dramatically increased or decreased, and redesigned its program to address these problems. Before the revision, if a utility achieved 84% of its energy efficiency savings target, it would receive no penalty or reward, but if it achieved 85% of its target, it would receive a 9% shared savings award.[55] This flawed mechanism "led to differences in incentive earnings across the utilities that did not reflect meaningful differences in performance."[56] There was strong disagreement between the California Public Utilities Commission ("CPUC") and the regulated utilities on the proper measurement methodology for counting energy efficiency savings, and eventually the CPUC abandoned the *ex post* true-up of incentives.[57] The Commission has previously recognized this problem, as well, stating that "abrupt thresholds have the potential to encourage inefficient behavior, and also assume a precision of evaluation that is not realistic."[58] Using smooth incentive functions would help the Commission avoid such inefficient behavior.

However, in designing smooth incentive formulas, the Commission should take into account the degree of uncertainty regarding the optimal level of performance targets for different metrics, the difficulty in their estimation, and high random variance in outcomes due to factors beyond the utilities' control, which may make the use of deadbands appropriate in some cases. When such concerns are high, the Commission should balance the utility risk against the insufficient incentive the deadbands provide as the marginal incentive rates in deadbands are zero.

c. The Commission should use both positive and negative revenue adjustments

The goal of incentive regulation is to align utility behavior with the best interest of the society at least cost to ratepayers. Such an alignment can happen only if the utility earnings are affected by the utility actions in the same way as the net social welfare is affected by the utility actions. Therefore, once an optimal performance target is set, it is important that incentive regulation uses both positive and negative revenue adjustments to ensure that

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[53] WHITED, WOOLF & NAPOLEAN, *supra* note 36, at 44.
[54] *Id.*
[55] SANGEETHA CHANDRASHEKERAN, JULIA ZUCKERMAN, & JEFF DEASON, CLIMATE POLICY INITIATIVE, RAISING THE STAKES FOR ENERGY EFFICIENCY: CALIFORNIA'S RISK/REWARD INCENTIVE MECHANISM 8 (Jan. 2014), *available at* http://climatepolicyinitiative.org/wp-content/uploads/2014/01/Raising-the-Stakes-for-Energy-Efficiency-Californias-Risk-Reward-Incentive-Mechanism.pdf.
[56] *Id.* at 17.
[57] *Id.* at 9, 29–31.
[58] Proceeding on Motion of the Commission Regarding an Energy Efficiency Portfolio Standard, Order Concerning Utility Financial Incentives, PSC Case No. 07-M-0548, at 42 (Aug. 22, 2008).

the utility incentives are aligned with social welfare. The reward that a utility gets for surpassing a performance target should reflect the corresponding incremental increase in net social welfare, and the penalty that a utility gets for substandard performance should reflect the corresponding decrease in net social welfare of substandard performance.[59]

Staff advocates that several important earnings impact mechanisms be structured with positive incentives only, with no possible penalties to utilities for substandard performance.[60] However, if an earnings impact mechanism uses positive incentives only, utilities may lack incentives to improve their performance if they think that they already will fail to meet the threshold for earning a reward. If for example, a utility knows that it will be too costly to meet a certain performance target to earn a small positive revenue adjustment and that it would not get penalized for failing to meet that target, the utility will have incentives to exert no effort. However, the desired outcome of the REV proceedings is to ensure that all utilities exert the effort to improve on important societal metrics even if a particular utility's gains are small compared to other, more able utilities. Thus, for proper incentives, negative revenue adjustments should be used for substandard performance in important areas, in addition to the positive revenue adjustments for high performance.

The risk of using only rewards is the converse of the potential problem with solely using penalties for performance-based incentives, which has been well documented in the reliability context. If only penalties apply, utilities become "reluctant to invest to improve reliability when they are close to their target if this could lead to higher-than-target reliability for which they will not be rewarded."[61] In addition, using only penalties can induce utilities to oppose the regulatory mechanisms, making it harder for the Commission to work cooperatively with utilities, as shown by events in California.[62] Staff recognized the same problem in an earlier proposal in the REV proceeding, and suggested modifying the Commission's existing negative-only incentives to symmetrical ones.[63]

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[59] PHILIP Q. HANSER ET AL., THE BRATTLE GRP., REVIEW AND ANALYSIS OF SERVICE QUALITY PLAN STRUCTURE IN THE MASSACHUSETTS DEPARTMENT OF PUBLIC UTILITIES INVESTIGATION REGARDING SERVICE QUALITY GUIDELINES FOR ELECTRIC DISTRIBUTION COMPANIES AND LOCAL GAS DISTRIBUTION COMPANIES 4 (2013).

[60] White Paper, *supra* note 5, at 61–62.

[61] SERENA HESMONDHALGH, WILLIAM ZARAKAS, & TOBY BROWN, THE BRATTLE GRP., APPROACHES TO SETTING ELECTRIC DISTRIBUTION RELIABILITY STANDARDS AND OUTCOMES 14–15 (2012), *available at* http://www.brattle.com/system/publications/pdfs/000/004/670/original/Approaches_to_Setting_Electric_Distribution_Reliability_Standards_and_Outcomes_Hesmondhalgh_Zarakas_Brown_Jan_2012.pdf?1378772119. This report from the Brattle Group, which surveys reliability standards in a wide range of U.S. states and other countries, recommends using both penalties and rewards for this reason.

[62] PG&E, one of the major electric utilities in California, requested to terminate its photovoltaic solar acquisition program due to the "asymmetrical risk and reward mechanisms" created by the California Public Utilities Commission. This was a program that PG&E had originally proposed. WHITED, WOOLF & NAPOLEAN, *supra* note 36, app. A at 69.

[63] Proceeding on Motion of the Commission in Regard to Reforming the Energy Vision, DPS Staff Report and Proposal, PSC Case No. 14-M-0101, at 53 (Apr. 24, 2014).

However, the use of penalties in conjunction with positive incentives is vital to achieving the objectives contemplated by a performance-based mechanism. While rewards encourage utility engagement and beyond-target improvements, penalties are required to help ensure that utilities that fail to both maintain and improve performance will face consequences for those decisions. As Staff indicates, the use of penalties such as negative revenue adjustments can "further motivate utility focus and success."[64] Various states have incorporated penalties into their performance-based schemes based on similar reasoning.

For instance, Massachusetts uses a penalty-based scheme to regulate electric utilities' service quality. When the Massachusetts Department of Public Utilities first issued service quality guidelines in 1999, it also created a penalty system for utilities falling short of the plan's requirements.[65] The service quality plan that the Department envisioned was meant to avoid degradation in service quality, measured utility by utility; thus, it incentivized utilities to maintain existing service quality rather than improve.[66] The associated penalty system imposed penalties on earnings for utilities falling short of a target zone of performance on any metric analyzed.[67] For superior performance in a metric, utilities garnered revenue offsets that could neutralize penalties incurred on other metrics.[68] The Massachusetts Department of Public Utilities noted that "performance-based regulation is not intended to provide a 'reward' for *maintaining* pre-[performance-based regulation] service quality standards."[69] The Department also identified a potential perverse incentive for utilities in a symmetric mechanism: while penalties should exceed savings from service quality reduction, rewards would need to exceed costs of improving service quality, which could lead to inflated expenditures on the part of utilities.[70]

The Massachusetts experience with performance-based regulation illustrates the importance of not only including penalties in any incentive-based scheme, but also properly tailoring those penalties according to desired outcomes. Though the initial service quality plan operated on penalties rather than rewards, those penalties fell short of

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[64] White Paper, *supra* note 5, at 54–55.
[65] Investigation by the Department of Telecommunications and Energy on Its Own Motion to Establish Guidelines for Service Quality Standards for Electric Distribution Companies and Local Gas Distribution Companies Pursuant to G.L. c. 164, § 1E, Order Opening A Notice of Inquiry/Generic Proceeding, D.T.E. 99-84, at 2 (Mass. Dep't Telecomm. & Energy 1999).
[66] Investigation by the Department of Public Utilities on Its Own Motion Regarding the Service Quality Guidelines Established in Service Quality Standards for Electric Distribution Companies and Local Gas Distribution Companies, D.T.E. 99-84 (2001) and Amended in Service Quality Standards for Electric Distribution Companies and Local Gas Distribution Companies, D.T.E. 04-116 (2007), Order Adopting Revised Service Quality Guidelines, D.P.U. 12-120-C, at 13 (Mass. Dep't Pub. Utils. Dec. 22 2014) [hereinafter Mass. Order 12-120-C].
[67] Mass. Interim Order 99-84, *supra* note 24, at Part IV.C.
[68] HANSER ET AL., *supra* note 59, at 5.
[69] Mass. Interim Order 99-84, *supra* note 24, at Part IV.C. (emphasis added).
[70] *Id.*

incentivizing better performance by utilities. In 2014, the Department revised its service quality standards in light of a shift in priority from maintaining existing service quality to encouraging improvement of service quality.[71] The Department made several changes that resulted in increasingly stringent standards. For instance, metrics shifted to statewide benchmarks rather than benchmarks based on each utility's historical performance.[72] This reflects the Department's desire to incentivize performance improvements rather than entrench the status quo.[73] Its order states that "exacting penalties is not the Department's purpose; instead, we update the [Service Quality] Guidelines to provide appropriate direction and incentives for Companies to achieve improved service quality in important areas."[74]

It is understandable that Staff is concerned with the initial uncertainty surrounding the REV implementation and is reluctant to employ two-sided incentives until desired outcomes develop. Such risk is especially high given the information asymmetry about the ability and cost of achieving certain outcomes, uncertainties related to a new regulatory design, and risk aversion of utilities. While the concern may be valid, the Commission should employ designs that do not distort the utility's marginal incentives. For example, the Commission could offer a carefully designed menu of gain-sharing contracts that would allow the utility to choose a contract with a risk level it is willing to accept given its private knowledge about its ability to achieve a certain outcome. Alternatively, the Commission can consider earning and penalty caps, or flatter marginal incentive rates for performance outcomes that are either too high or too low, to reduce risk at the early stages of transition.[75] Even though such caps are generally not desirable, as they distort marginal incentives for too high or too low performance outcomes, they are preferable to using only positive incentives.

[71] Mass. Order 12-120-C, *supra* note 66, at 13–15.
[72] *Id.* at 23, 26.
[73] *Id.* at 38.
[74] *Id.*
[75] STOFT, ETO & KITO, *supra* note 32, at 37–41.

F. Potential Compensation Mechanism Reforms

Though the White Paper recommends leaving net metering intact in a number of circumstances,[76] the current net metering approach does not maximize the net social welfare because it fails to take into account the real effects—both positive and negative—of DERs. Using a rate that does not take into account the external societal benefits would lead to too little distributed generation penetration compared to the socially optimal level. Not considering the additional costs that distributed generation imposes on the grid due to bi-directional power flows would similarly be inefficient. Thus, unless the retail rates can be modified to reflect all costs and benefits of DERs, the Commission should modify its net metering policy to better compensate DERs for the value they create.

a. Net metering is insufficient to properly value distributed generation given the current rate design

At its core, the idea of compensating a product or a service at the prevailing retail price through net metering is not an economically unsound idea. In fact, that is what should happen in perfectly competitive markets. In such markets, there are many buyers and sellers, none with any market power. Thus, they all buy and sell the product at the same market clearing price. So, if a new firm decides to sell one more unit of the product, the price that it would get in a perfectly competitive market for that unit would be that prevailing market clearing price, which is also the marginal cost of production. In other words, if the electricity market were a competitive market with no externalities, net metering—the practice of reimbursing a producer at the prevailing retail price—would be the right policy and the Commission would be right to use this straightforward and predictive policy.

However, the complex structure of electricity markets and the inefficiently designed retail electricity tariffs make the seemingly simple application of basic economic principles more complicated. As long as the retail rates underlying net metering do not reflect the incremental social cost of providing electricity, which includes externalities, net metering will lead to economic inefficiency. To ensure that the most socially desirable policy is achieved, DER compensation policies should be designed in tandem with retail electricity rates, [77] as the Commission is making efforts to do here.

Before reviewing the drawbacks of keeping the net metering policy as-is for mass-market customers, as suggested by Staff, it is helpful to review why properly designing retail rates is crucial to unlocking the full value of the DERs. Using a more dynamic cost-reflective tariff would not only improve overall system efficiency, but it would also improve the value of distributed generation for several reasons. First, a flat volumetric rate insulates both the consumers and producers from receiving the correct price signals about the true societal cost of providing energy. This prevents the consumers from adjusting their usage based on the actual cost of electricity. More importantly, a flat rate prevents prices from being

[76] White Paper, *supra* note 5, at 94.
[77] *E.g.*, JAMES C. BONBRIGHT, PRINCIPLES OF PUBLIC UTILITY RATES 383–84 (2nd ed. 1988).

interpreted as efficient investment signals. Correct price signals ensure an efficient allocation of resources by directing distributed generation investments to where they are needed the most. If distributed generators are getting the same compensation for the energy they export to the grid at all times even though the cost of electricity is higher at certain times, they do not have any incentive to guide their investments towards peak demand times. If, on the other hand, the retail prices reflect such variations, and consequently net metering policies compensate distributed generators at a higher price when it is costlier to generate electricity, more distributed generation would be installed to take advantage of these higher returns, leading to investments decisions that are the most beneficial for society overall.

Second, using a flat volumetric rate undercompensates distributed generation for other benefits it provides, such as reducing grid congestion when the system is close to capacity during peak hours. Consumers' maximum demand during system peak periods is the main driver of any new system capacity investment.[78] Hence distributed generation systems that help customers reduce their maximum demand during these time periods have more value to society that cannot be captured by flat volumetric rates. This value varies significantly with location. For example, while the capacity deferral value of distributed solar panels is $6/kW-yr when averaged over Pacific Gas & Electric's service territory, the capacity value can be as much as $60/kW-yr when analyzed at a more granular feeder level.[79] As this variation is not reflected in the current retail rates, net metering cannot sufficiently capture the value of distributed generation.

Third, a flat volumetric rate creates perverse incentives for customers during the installation phase. As net metered customers are compensated using the same flat rate regardless of what time they send energy to the grid, they have incentives to install solar panels with the goal of maximizing their total production rather than overall system benefits. These incentives lead to most of the solar panels being installed facing south to maximize production.[80] If, instead, the rates reflected overall systems benefits and hence customers were provided incentives to install the solar panels facing west, production would be maximized during the peak demand period between 2:00 p.m. and 8:00 p.m., providing more value to the system overall by curbing the need to dispatch more expensive peaker plants.[81]

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[78] Paul Simshauser, *Network Tariffs: Resolving Rate Instability and Hidden Subsidies* 6 (AGL Applied Econ. and Policy Research Working Paper No. 45, 2014).
[79] M.A. COHEN, P.A. KAUZMANN & D.S. CALLWAY, ENERGY INST. HAAS, ECONOMIC EFFECTS OF DISTRIBUTED PV GENERATION ON CALIFORNIA'S DISTRIBUTION SYSTEM 16 (2015).
[80]Barry Fischer & Ben Harack, *9% of Solar Homes Are Doing Something Utilities Love. Will Others Follow?*, OPOWER BLOG (Dec. 1, 2014), http://blog.opower.com/2014/12/solar-homes-utilities-love/.
[81] Herman K. Trabish, *How California Is Incentivizing Solar to Solve the Duck Curve*, UTIL. DRIVE (Oct. 13, 2014), http://www.utilitydive.com/news/how-california-is-incentivizing-solar-to-solve-the-duck-curve/317437/. *See also* NAÏM R. DARGHOUTH, ET AL, LAWRENCE BERKELEY NAT'L LAB., LBNL-183185, NET METERING AND MARKET FEEDBACK LOOPS: EXPLORING THE

Fourth, today's retail electricity rates do not fully reflect the external damage caused by externalities such as greenhouse gas emissions. Therefore, current volumetric rates are insufficient to compensate distributed generation owners for the clean energy they provide. Using these rates would lead to undervaluation and hence to under-deployment of distributed generation.

Finally, the amount of displaced greenhouse gas emissions as a result of distributed generation varies with time and location. The amount of this change depends on the emissions rate of the generator that is on the margin when the distributed generator sends electricity to the grid. Once again, using a flat volumetric rate that does not granularly reflect the changes in the external costs of electricity generation prevents the realization of the full value of distributed generation.

If the tariffs are more cost-reflective so that the volumetric charge no longer reflects the fixed costs, and reflects only the volumetric social costs of providing energy at a particular location and time including generation capacity payments and the full cost of externalities, then reimbursing distributed generation using this rate would not affect the recovery of the utility's fixed network costs, and would not cause cost shifting. Further, using this rate would properly reward distributed generation for the environmental and health benefits it provides due to avoided emissions, as well as for the avoided generation capacity investments. Not rewarding distributed generation for capacity harms consumer welfare.[82] If distribution network charges are calculated according to cost-causation principles and are imposed so as to capture each user's contribution to total system costs, overall system efficiency would be improved, even when net metering is used. For example, consider a network tariff in which network costs are recovered using a two-part tariff that includes a basic fixed charge for connected load[83] and a coincident demand charge per-kilowatt that is based on a customer's maximum demand during the distribution network's peak period. Individual connected load charges allow the already incurred basic network costs to be distributed fairly across different customer classes based on the amount they contribute to the system costs.[84] A maximum demand charge that is properly designed, unlike an unnuanced fixed charge that can hurt the deployment incentives for distributed generation,[85] provides strong incentives for customers to reduce their kW demands, especially during distribution system peak periods, giving customers more incentives to

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IMPACT OF RETAIL RATE DESIGN ON DISTRIBUTED PV DEPLOYMENT 9–10 (2015), *available at* http://www.eenews.net/assets/2015/07/10/document_ew_01.pdf.

[82] DAVID BROWN & DAVID SAPPINGTON, OPTIMAL POLICIES TO PROMOTE EFFICIENT DISTRIBUTED GENERATION OF ELECTRICITY 19–20 (2015).

[83] Amhad Faruqui, The Brattle Grp., The Global Movement Toward Cost-Reflective Tariffs, presentation at EUCI Residential Demand Charges Summit (May 14, 2015).

[84] IGNACIO PEREZ-ARRIAGA & ASHWINI BHARATKUMAR, MIT CTR. FOR ENERGY AND ENVIRON. POLICY RESEARCH, A FRAMEWORK FOR REDESIGNING DISTRIBUTION NETWORK USE-OF-SYSTEM CHARGES UNDER HIGH PENETRATION OF DISTRIBUTED ENERGY RESOURCES: NEW PRINCIPLES FOR NEW PROBLEMS (Oct. 2014).

[85] DARGHOUTH, ET AL., *supra* note 81, at 16–20.

install distributed generation systems.[86] Since capital investments to expand or maintain utility infrastructure are driven by the utility's obligation to meet maximum consumer demand at all times, demand charges would align consumer payments with the cost they impose on utilities.[87] Such tariffs would improve a utility's ability to recover its energy distribution costs while rewarding distributed generation to the extent that it helps delays future distribution capacity expansions.

Given that such a rate design would alleviate concerns about cost recovery, it eliminates the need for a net metering cap to the extent that the grid can accommodate uncontrolled energy export. Further, if rates can be designed such that distributed generation owners can be compensated for the incremental environmental and health benefits they provide due to avoided emissions while bearing the incremental costs related to bi-directional power flows that they impose on the grid, these price signals should be sufficient to achieve a socially optimal level of distributed generation, and thus eliminate any need for an artificial cap. An arbitrary cap out on net metering in the case of proper rates would lead to under-deployment of distributed generation.

b. Suggested tariff modifications are inadequate to justify the continuation of the current net metering policy, so the Commission should modify the existing policy to ensure that DERs are properly valued

While not changing net metering policy and compensating distributed generation at the prevailing retail rate could have been an optimal decision if the proposed rate designs were strong enough, the current proposal fall short of achieving the reforms necessary to ensure efficient price signals. In order to maximize the net social welfare, the Commission would need to align the market price of electricity that is used at a particular time and location with the true marginal social cost of production—the private cost of providing one more unit of electricity plus the value of any associated externalities.[88] Such efficient price signals are especially important for the owners of distributed generation systems, who are making both consumption and production decisions. So the challenge is not only to ensure efficiency in consumption, but also efficiency in production. However, the suggested tariff modifications are not enough to achieve this goal. Even if the Commission properly calculates the system value of DER as the Locational Marginal Price ("LMP") plus the distribution delivery value ("D"), and even if the value of D reflects all the costs and benefits of DERs including the values that are not related to the distribution system, such as capacity and avoided emissions as suggested by Staff, [89] if these values are not reflected in retail rates with proper granularity, net metering policies will fail to adequately value

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[86] AHMAD FARUQUI & RYAN HLEDIK, THE BRATTLE GRP., SALT RIVER PROJECT, AN EVALUATION OF SRP'S ELECTRIC RATE PROPOSAL FOR RESIDENTIAL CUSTOMERS WITH DISTRIBUTED GENERATION 19 (2015).

[87] ROBERT BORLICK & LISA WOOD, EDISON FOUND., NET ENERGY METERING: SUBSIDY ISSUES AND REGULATORY SOLUTIONS 4 (2014).

[88] *Id. See also, e.g.*, JIM LAZAR ET AL., REGULATORY ASSISTANCE PROJECT, PRICING DO'S & DON'TS: DESIGNING RETAIL RATES AS IF EFFICIENCY COUNTS (2011).

[89] White Paper, *supra* note 5, at 91.

distributed generation and send efficient investment signals. Therefore, the Commission should consider changing net metering for mass-market consumers contrary to the suggestion of Staff.

The Commission should also ensure that the DER compensation tariffs consistently reflect the real value of different types of resources. In particular, the Commission should not offer different valuation mechanisms for net metering of distributed solar generation as compared to other types of DERs, since this may inefficiently favor one kind of resource over another. The commission should formulate a consistent compensation mechanism based on the benefits and the costs of DERs and use that for all DERs, not just distributed generation.

Likewise, the underlying tariffs for all net metered customers should be the same so that similarly situated distributed generation owners are paid the same price. If one customer uses a "smart home" rate while another uses a time-of-use rate, the compensation each of these customers would receive under net metering would be different. The Commission should clarify the proposed retail rate structures for net metered customers, and ensure that the compensation for all distributed generation owners, including the compensation for the participants of the community distributed generation projects as determined by the outcome of the proceeding on Community Net Metering Program,[90]is equitable.

In a recent order,[91] the Commission temporarily lifted the net metering cap until the DER valuation efforts in REV can be completed and incorporated into tariffs.[92] In the same order, the Commission concluded that "once the interim period closes, the ceiling limits, where needed, can be set automatically at the percentage of load that accommodates those DG projects that should remain entitled to net metering."[93] However, the Commission simply stated that "any other issues related to moving from net metering to DER will also be decided,"[94] showing no indication about its thoughts on whether a new cap would be put in place for customers on new tariffs once REV concludes. To the extent that the LMP+D value reflects the true value of the DERs, which includes *all* private and social costs and benefits, and the demand charges help with cost recovery issues, the Commission should not institute a cap on DER interconnection. Pricing based on the true value of DER will be sufficient to guide the market toward a socially efficient level of DER penetration, eliminating the need for an artificial cap.

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[90] Proceeding on Motion of the Commission as to the Policies, Requirements and Conditions For Implementing a Community Net Metering Program, Notice Instituting Proceeding, Soliciting Comments, and Providing for Stakeholder Meeting, PSC Case No. 15-E-0082 (Feb. 10, 2015).
[91] Orange and Rockland Utils., Inc.—Petition for Relief Regarding Its Obligation to Purchase Net Metered Generation Under Pub. Serv. Law § 66-j, Order Establishing Interim Ceilings on the Interconnection of Net Metered Generation, PSC Case No. 15-E-0407 (Oct. 16, 2015).
[92] *Id.* at 10.
[93] *Id.* at 11.
[94] *Id.*

Staff is understandably worried about the predictability of DER compensation mechanisms for potential investors. However, continuing a policy that is not sustainable at high penetrations of residential distributed generation systems solely for the purposes of short-term predictability may indeed be the wrong policy for the state in the long-term. Hawaii, a state in which one in nine residences has PV systems,[95] has recently stopped its net metering program.[96] The Public Utility Commission of the State of Hawaii stated that net metering was "not designed for DER deployment at the scale experienced today,"[97] and that the challenge facing Hawaii today is to ensure that "DER continues to scale in such a way that it benefits *all* customers."[98] New York Staff mentions that "REV will result in much greater adoption of DERs"[99] and that "[s]trategies that were adopted to promote clean DER from a state of near-zero penetration may not be optimal for DER that is widespread."[100] Continuing net metering as-is would be a shortsighted policy especially in the face of this awareness of Staff.

An alternative way to bring predictability to the market is to look forward, design an innovative compensation mechanism that could be viable even at high levels of DER penetration, and commit to such a policy for an extended period of time. The recent order in Hawaii, for example, establishes two new tariffs for distributed generation systems: a self-supply option[101] that allows a limited amount of inadvertent export to the grid with no compensation for such exports if they happen, and a grid-supply option[102] that enables the customer to export excess energy to the grid at a rate equal to the average on-peak avoided cost for 12 months.[103] The same order also establishes a three-period time-of-use rate for DER customers with a mid-day period rate set at the marginal cost of generation, in addition to the standard peak and off-peak periods, to improve efficiency in consumption and production.[104] While the designs in Hawaii may not be directly applicable in New York due to the difference in market and regulatory structures, and the new tariffs in Hawaii may indeed be undervaluing environmental benefits of clean generation, the Commission can and should encourage development of similarly innovative and forward-looking designs that are consistent with REV goals so that New York does not find itself between rate orders in a situation similar to that of Hawaii, with high DER penetration and rate

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[95] Eric Wesoff, *Hawaii's Utility Is Approving a Backlog of More than 3,000 Solar Installations*, GREENTECH MEDIA (Apr. 1, 2015), http://www.greentechmedia.com/articles/read/Hawaiis-Utility-is-Approving-a-Backlog-of-More-Than-3000-Solar-Installati.

[96] Instituting a Proceeding To Investigate Distributed Energy Resource Policies, Decision and Order No. 33258, Hawaii PUC Case No. 2014-0192 (Oct. 12, 2015) [hereinafter Haw. Order No. 33258].

[97] *Id.* at 160.

[98] *Id.* at 161.

[99] White Paper, *supra* note 5, at 81.

[100] *Id.* at 82.

[101] Haw. Order No. 33258, *supra* note 96, at 118.

[102] *Id.* at 126.

[103] *Id.* at 138.

[104] *Id.* at 152.

designs inadequate to sustain such penetration, and therefore having to spend resources on a new rate reform proceeding.

c. DER compensation should be granular enough to reflect the full system value that such resources provide

As the current retail rates are not granular enough to reflect temporal and locational variation in costs of providing energy or environmental benefits, net metering policy is insufficient to properly compensate distributed generation. If the retail rates do not reflect the temporal variation in energy costs, then DERs should be compensated differently depending on the time of energy export to the grid. If retail rates do not reflect the locational variation in the capacity costs, then DERs should be additionally compensated for the capacity value they provide based on their location. If the retail rates do not fully internalize the external damage from greenhouse gas emissions, then DERs should be rewarded for avoided emissions in an amount that reflects the portion of the damage that is not internalized in retail rates.

Unless DER compensation is modified to reflect such benefits with proper granularity, not only will DER penetration be inefficiently low, but price signals will be insufficient to guide investments to ensure efficient allocation of resources among different DERs. For example, if the temporal and locational dimensions are not taken into account, then all types of DERs that reduce the demand from the bulk system by the same amount would be rewarded based on the same average quantity of avoided emissions. However, the emissions benefits of different types of DERs are not the same. For example, energy efficiency is likely to reduce the bulk demand on average, while distributed solar generation is likely to reduce the bulk demand during peak periods. If DER compensation does not reflect this temporal variation in avoided emissions, the market incentives will lead to more investment in the cheaper resource regardless of whether it is the most beneficial for the society when externalities are taken into account, leading to under-deployment of the most socially desirable type of DER. Therefore, the Commission should ensure that the new compensation mechanism for DERs is granular enough to reflect the full system value they provide.

G. Potential Rate Design Reforms

1. Rate Design Principles for REV

In citing Bonbright's traditional rate design principles, the White Paper acknowledges that "[r]ates should encourage desired market and policy outcomes including energy efficiency and peak load reduction, improved grid resilience and flexibility, and reduced environmental impacts in a technology neutral manner."[105] Likewise, in the REV proceeding, the Commission has already acknowledged that one of its main policy goals is "reduction of carbon emissions" and that another of its main goals is "system wide

[105] White Paper, *supra* note 5, at 95.

efficiency,"[106] reflecting the importance of maximizing overall social welfare, including the consideration of externalities.[107] In order to ensure that environmental effects are properly considered in electricity use decisions, the rates must fully reflect those environmental outcomes. As externalities, environmental effects are not fully reflected in market prices, and even programs like RGGI do not fully internalize the externality. Because RGGI prices[108] are lower than the marginal damage from carbon pollution,[109] the RGGI program by itself is not sufficient to help the market fully internalize the external damage.[110] As such, in order to provide the proper incentives, the Commission should provide for electricity rates to directly reflect environmental externalities.

a. Electricity rates should reflect the full value of externalities to ensure that REV can successfully achieve reduction in greenhouse gas emissions

Internalization of externalities in retail rates is crucial to the success of REV. Using time- and demand-variant pricing does not automatically resolve environmental or health concerns related to emissions. It is important to note that while dynamic tariffs provide more incentives for distributed generation deployment and thus result in a decrease in the energy demanded from the bulk system, unless the externalities are internalized in retail rates, dynamic rates may also cause consumers without distributed generation systems to shift their loads to periods where dirtier plants are on the margin. Understanding these two effects is crucial in preventing an inadvertent increase in overall greenhouse gas emissions.

As peaker plants are often less efficient and dirtier,[111] overall emissions decrease when distributed generation reduces the need for the electricity generated from such plants. However, if time-varying rates shift consumption to other periods, calculating the net effects requires a more careful analysis. If the load is shifted from a period when an

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[106] Adoption Order, *supra* note 3, at 4.
[107] Adoption Order, *supra* note 3.
[108] *Allowance prices and Volumes (by Auction)*, REGIONAL GREENHOUSE GAS INITIATIVE, http://www.rggi.org/market/co2_auctions/results (last visited Oct. 24, 2015).
[109] Proceeding on Motion of the Comm'n in Regard to Reforming the Energy Vision, Staff White Paper on Benefit-Cost Analysis in the Reforming Energy Vision Proceeding, PSC Case No. 14-M-0101, Filing No. 392, at 32. (July 1, 2015)
[110] For a more thorough explanation of why the RGGI program does not fully account for climate effects, see Case 14-M-0101, *Proceeding on Motion of the Commission in Regard to Reforming the Energy Vision*, Institute for Policy Integrity Comments on Staff White Paper on Benefit Cost Analysis (filed Aug. 21, 2015).
[111] *See* Robin Bravender & Collin Sullivan, *Utility to Build First Power Plant with Greenhouse Gas Emissions Limits in California*, SCI. AM. (Feb. 5, 2010), http://www.scientificamerican.com/article/power-plant-greenhouse-gas/; *California's Electric System is Not Being Efficiently Utilized*, California Energy Storage Alliance (2013), http://www.storagealliance.org/sites/default/files/Presentations/Energy%20Storage%20Cost%20Effectiveness%202013-09-23%20FINAL.pdf; *Flexible Peaking Resource*, ENERGY STORAGE ASS'N, http://energystorage.org/energy-storage/technology-applications/flexible-peaking-resource (last visited Oct. 24, 2015).

inefficient oil-fired plant is on the margin to a period when a more efficient gas-fired unit is on the margin, the overall greenhouse gas emissions would decrease. If, however, the load is shifted to a period when a dirtier plant is on the margin, overall carbon emissions may increase even if this shift lowers overall energy generation costs. Further, as New York State moves forward with plans to comply with the Clean Power Plan, there may be a shift in the times when the fossil fuel fired plants are on the margin, so the idea that peak shaving or peak shifting due to dynamic rates would lead to a reduction in emissions cannot be guaranteed unless the prices reflect the full external damage of emissions.

Additionally, if the temporal dimensions are not taken into account while calculating environmental and health benefits, and if all distributed energy resources are rewarded based on the same average quantity of avoided emissions, then the market incentives will lead to more investment in cheaper distributed energy resources, regardless of whether they are the most beneficial for the society when externalities are taken into account. Therefore, the Commission should ensure that the externalities are fully reflected in electricity prices.

2. General Approach

3. Proposed Rate Design Reforms

Opening this proceeding strengthened New York's role as a leading state modernizing its electrical grid in the face of a rapidly changing energy landscape. REV has become of interest to even parties outside of the state as the proceeding promises a new regulatory paradigm that will "improve system efficiency, empower customer choice, and [result in] a greater penetration of clean generation and energy efficiency technologies."[112] The Commission's goal is ambitious. So is the task of redesigning the electricity rates to achieve REV goals both in the retail electricity markets and the distributed energy resources market. However, these are challenges that New York is well-equipped to tackle.

Staff has done an excellent job of discussing the considerations and the challenges of designing rates that are consistent with REV goals. It is clear that Staff has put considerable effort into reviewing the rate design literature and considerable thought into how it can apply the results in New York. It is also clear from the bibliography that Staff is aware of the studies related to nationwide and worldwide implementation and success of different types of time-variant rates and demand charges and of the efficacy of opt-in and opt-out rates. However, as it stands now, there is not a concrete roadmap to turning the ambitious vision of REV into a rate design that will clearly be able to achieve its goals. Setting out concrete policy plans now, even if they are phased in over time or subject to change as warranted, will help to actualize the vision of REV. The incremental rate reforms proposed will only delay, and could potentially even derail, REV's ambitious vision. As a first step, New York needs to catch up with its peer states in installing advanced metering

[112] Proceeding on Motion of the Commission in Regard to Reforming the Energy Vision, Order Instituting Proceeding, PSC Case No. 14-M-0101, at 4 (Apr. 25, 2014).

infrastructure.[113] In conjunction, the Commission should go beyond its transitional plans for an opt-in time-of-use rate and general consideration of demand charges to articulate a clear plan for phasing in more dynamic time- and demand-variant rates that take externalities into account.

a. The Commission should strengthen the rate design proposals and establish a clear timeline for a gradual transition

Given the uncharted territory of increased DER penetration and the unknowns in the rapidly evolving energy sector, Staff's caution with respect to implementing "new" tools may be understandable. However, relying on the "familiar" is not necessarily the most appropriate approach in a new territory. If the Commission wants to capture all the benefits that a distributed system platform and DERs can achieve, it is imperative that it considers new unbundled and cost-reflective retail tariff rate structures that take externalities into account.

Tariffs that provide consumers and producers proper price signals that reflect the actual cost of providing electricity, including the associated externalities outlined in the benefit-cost framework, will improve economic efficiency in several ways. First, such tariffs will ensure that when customers make their decisions about electricity consumption, they will be taking into account the true costs of electricity at that particular time and location, and hence the observed market outcome will be a socially desirable one. Second, these tariffs will ensure that market price is actually signaling the true value of providing electricity and other related services to society and hence will guide investments to where they would be most beneficial.[114] And finally, cost-reflective tariffs that allow for valuation of several different dimensions of benefits including externalities will provide a versatile compensation tool that could reduce inefficiencies caused by attempting to integrate new and cleaner energy resources into the existing system with today's limited tariff designs.

To ensure that REV can be successful, the Commission should clearly state the ultimate goal of implementing such versatile tariffs and establish a clearer timeline for a gradual transformation from today's rates to multi-part tariff designs instead of the inadequate designs and the vague timelines stated in the current proposal.

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[113] As of June 2014, only about 25,000 of the roughly 5 million advanced meters installed across the U.S. were installed in New York. EDISON FOUND., UTILITY SCALE SMART METER DEPLOYMENTS: BUILDING BLOCK OF THE EVOLVING POWER GRID 14 (2014), *available at* http://www.edisonfoundation.net/iei/Documents/IEI_SmartMeterUpdate_0914.pdf.

[114] Severin Borenstein, *The Private Net Benefits Of Residential Solar PV: The Role Of Electricity Tariffs, Tax Incentives And Rebates* 17–19, (Nat'l Bureau of Econ. Research, Working Paper No. 21342, 2015).

b. The Commission should encourage the development of menus of tariffs similar to the ones developed in other multi-sided platform markets

The Commission should learn from the experience of other multi-sided platform markets such as telecommunications, and encourage the development of innovative tariffs similar to those seen in such markets. There is no reason why utilities should offer one time-of-use rate for each class of customers; they should be encouraged to offer a menu of different tariffs for consumers with different preferences for different services. There are multiplicities of phone plans that include different number of minutes for peak, off-peak, and shoulder times. There are pay-as-you-go plans as well as prepaid plans, talk-only plans as well as add-on charges for different services such as call-waiting and internet. Such variety allows customers to pick services they value and pick a plan that is consistent with their needs and level of risk aversion. If the final intent of REV is to "harness markets to achieve innovative and cost-effective solutions,"[115] the utilities should be encouraged to develop similar menus of tariffs.

c. Direct transfer programs aimed at low-income customers are better policy solutions than distorting the prices

The Commission is rightfully concerned with low-income customers.[116] However, trying to keep electricity rates artificially low is not the optimal solution to such equity concerns regarding vulnerable low-income energy customers. After all, similar concerns exist for many other essential goods such as food or health insurance. Instead of distorting the prices of many basic food items, food stamps are given to low-income customers to partially cover their food spending. Instead of regulating health insurance premiums, subsidies are given to lower-income consumers to defray the cost buying health insurance. Lifeline programs exist for low-income telecommunication customers.[117]

The Commission should work to strengthen the existing similar programs aimed directly at low-income customers, as being discussed in a separate proceeding,[118] instead of distorting price signals crucial to the success of REV. It is important to keep in mind that net social welfare is maximized when the market price equals the marginal private and social cost. Once such a price is established so that the maximum possible net benefits can be realized, distributing this net value among different groups of stakeholders is best done with direct transfer programs that have specific policy goals such as crediting low-income customers with fixed amounts on their energy bills. Distorting the prices for everyone with the sole goal of protecting low-income customers, may indeed be hurting them as overall economic efficiency is impaired.

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[115] White Paper, *supra* note 5, at 2–3.
[116] White Paper, *supra* note 5, at 103.
[117] *Lifeline Program for Low-Income Consumers*, FCC, https://www.fcc.gov/lifeline (last visited Oct. 24, 2015).
[118] *See generally* Proceeding on Motion of the Commission to Examine Programs to Address Energy Affordability for Low Income Utility Customers, PSC Case No. 14-M-0565.

CONCLUSION

Through REV, Staff and the Commission are making great strides in reframing the traditional approaches to electricity policy, in light of a changing grid. However, in order for the goals of REV to be realized, the theory must bear out in practice. It is essential to implement performance-based regulation approaches, distributed energy resource compensation formulas, and well-designed tariffs that all help to achieve the goals of REV. The White Paper takes steps in this direction, but its approach could be improved further by ensuring that the performance-based regulation mechanisms properly consider environmental effects and incentives on utilities; that compensation for distributed energy resources fully reflects all its benefits and costs, and that rates reflect environmental attributes directly.