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Designing performance incentives to advance New York State's policy agenda

Benjamin Mandel[1]

This is the second in a two-part policy brief series that recommends performance-based regulation (PBR) reforms to address the multifaceted policy objectives of New York's "Reforming the Energy Vision (REV)" proceeding. The first policy brief proposes that New York transition to "Integrated PBR" by broadening performance incentives and employing benchmarking to ensure that base revenues only compensate efficient costs. This brief focuses on the first of those components—performance incentives—and discusses the steps New York regulators should take to design and implement performance incentives that can steer utilities toward REV priorities.

Introduction

To realize the ambitious policy objectives of the "Reforming the Energy Vision (REV)" proceeding,[2] regulators in New York State should advance their use of performance-based regulation (PBR) by incorporating a broader set of performance incentives.[3] Performance incentives enable regulators to steer utilities to address policy outcomes of interest. Frequently, these measures adjust base revenue allowances upward if a utility meets or exceeds stated performance targets or downward if a utility fails to meet targets. Even in the absence of financial rewards or penalties, reputational effects from public performance reporting may allow performance incentives to influence utility behavior.

New York's current regulatory regime, like many others elsewhere, deploys a narrow set of performance incentives that reinforce conventional regulatory priorities (e.g., reliability) that may suffer when utilities are encouraged to economize costs.[4,5] However, the emergence of environmental and social policy priorities (e.g., reduced emissions, improved efficiency and resilience, and enhanced customer engagement)[6] demands a broader range of performance incentives.

To tailor a performance incentive framework to broader policy goals, the New York State Public Service Commission (PSC) can build upon the approaches taken by regulators in Great Britain and Ontario to link utility performance to desired outcomes. Great Britain's "Revenue = Incentives + Innovation + Outputs

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[1] benjamin.mandel@nyu.edu, (212) 992-6197

[2] *See* Case 14-M-0101: Proceeding on motion of the Commission in regard to Reforming the Energy Vision, DPS staff report and proposal (N.Y. Pub. Serv. Comm'n, Apr. 24, 2014).

[3] *See* Benjamin Mandel, *Toward policy-responsive performance-based regulation in New York State* (Policy brief), New York University School of Law (2015). *Available at* http://guarinicenter.org/toward-policy-responsive-regulation-in-new-york/.

[4] *See* National Regulatory Research Institute (NRRI), *Where does your utility stand? A regulator's guide to defining and measuring performance*, No. 10-12 at 18 (2010a). *Available at* http://www.nrri.org/pubs/multiutility/NRRI_performance_measures_aug10-12.pdf.

[5] For discussions and empirical evidence of the tradeoff between cost efficiency and service reliability, *see* Virendra Ajodhia & Rudi Hakvoort, *Economic regulation of quality in electricity distribution networks*, 13 UTIL. POL. 211 (2005) and Anna Ter-Martirosyan & John Kwoka, *Incentive regulation, service quality, and standards in U.S. electricity distribution*, 38 J. REGUL. ECON. 258 (2010).

[6] *See* Synapse Energy Economics, Inc., *Utility performance incentive mechanisms: A handbook for regulators* at 19 (2015). *Available at* http://www.synapse-energy.com/project/performance-incentives-utilities.

(RIIO)" model[7] and Ontario's "Renewed Regulatory Framework for Electricity Distributors (RRFE)"[8] both aim to "deliver value for money"[9] by incorporating performance incentives for both conventional and emergent objectives. They also benchmark revenue allowances against external measures of efficiency to improve the cost-effectiveness of delivering enhanced performance.

Drawing from the PBR literature and the processes employed by regulators in Britain and Ontario, this policy brief offers recommendations to the PSC on how to design policy-responsive performance incentives. There are four essential steps to crafting effective performance incentives:

1. Identifying desired performance outcomes;
2. Selecting metrics by which to gauge performance;
3. Setting targets that correspond to desired levels of performance; and
4. Deciding how to incentivize utilities to meet targets.

This brief considers each step in turn, describing the approaches taken by regulators in Britain and Ontario and proposing a plan of action for New York State.

1. Identifying desired performance outcomes

The outcomes that regulators aim to achieve through performance incentives can influence the customer value of utility services.[10] This section presents criteria for identifying desired outcomes across multiple dimensions, describes how other regulators have gone about this process, and assesses the suitability of REV's stated outcomes as the foundations of a new performance incentive framework.

1.A. Outcome criteria

To ensure that performance incentives cover priority areas comprehensively and efficiently, regulators should identify a set of desired outcomes that is both broad and cohesive.

Broad – The narrow sets of performance incentives deployed in New York and elsewhere can create "incentive gaps" for areas not covered by incentives.[11] To mitigate the risk of exposing newer environmental and social priorities to these gaps, designated outcomes must be broad enough to cover the full range of prevailing policy objectives.[12]

Cohesive – A utility's performance along one dimension can have important spillover effects that affect its ability to pursue other outcomes, either positively or negatively. A cohesive incentive package can encourage innovative solutions that harness complementarities, such as those between customer engagement and system efficiency. One way for regulators to identify cohesive outcomes is to set out a unifying vision for desired outcomes.

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[7] *See* Office of Gas and Electricity Markets (U.K.) (Ofgem), *RIIO: A new way to regulate energy networks. Final decision.* (2010). *Available at* https://www.ofgem.gov.uk/ofgem-publications/51870/decision-doc.pdf.

[8] *See* Case EB-2010-0379, Renewed Regulatory Framework for Electicity Distributors: A performance-based approach (Ontario Energy Board, Oct. 18, 2012).

[9] *See, e.g.,* Ofgem (2010) at 4 and Renewed Regulatory Framework for Electricity Distributors: A performance-based approach at 1 (Ontario Energy Board, Oct. 18, 2012), respectively.

[10] *See, e.g.,* National Regulatory Research Institute (NRRI), *How performance measures can improve regulation*, No. 10-09 at 8 (2010b). *Available at* http://www.nrri.org/pubs/multiutility/NRRI_utility_performance_measures_jun10-09.pdf.

[11] *See* DPS staff report and proposal at 52 (N.Y. Pub. Serv. Comm'n, Apr. 24, 2014).

[12] *See* NRRI (2010a) at 18.

1.B. Outcome identification in RIIO and RRFE

The regimes that preceded RIIO and RRFE used narrow sets of performance incentives to mitigate unintended consequences (e.g., reliability erosion and electricity losses) of revenue cap regulation.[13] In formulating new regulatory paradigms, regulators in both jurisdictions (Britain's Office of Gas and Electricity Markets (Ofgem) and the Ontario Energy Board (OEB)) convened extensive stakeholder processes to help determine which environmental and social objectives should be incorporated into broader policy agendas.

The identification of outcomes (or what Ofgem labels "output areas") for RIIO was guided by overarching goals of facilitating a sustainable energy sector and delivering value for money. Ofgem solicited feedback on the types of network activities that stakeholders value, then grouped these activities into six outcome categories that are "clear to [utilities] and do not create any perverse incentives"[14]:

- customer satisfaction;
- safety;
- reliability;
- conditions for connection;
- environmental impact; and
- social obligations.[15]

Similarly, in developing RRFE, OEB requested stakeholder views on objectives that would not only deliver value to customers, but also align the interests of customers with those of distributors and accommodate differences between distributors. Subsequently, OEB identified four performance outcomes for utilities to pursue, and sought to provide a more concrete link between these outcomes and utility performance by subdividing each outcome into multiple "performance categories"[16] (categories in parentheses):

- customer focus (service quality and customer satisfaction);
- operational effectiveness (safety, system reliability, asset management, and cost control);
- public policy responsiveness (conservation/demand management and connection of renewable generation); and
- financial performance (liquidity, leverage, and profitability).[17]

1.C. Appraisal of desired REV outcomes

In contrast to the bottom-up stakeholder processes that informed the selection of outcome areas for RIIO and RRFE,[18] the outcomes guiding REV were first set out in a 2013 order in which the PSC designated "core policy outcomes"[19] of its reform efforts. The desired outcomes for REV were identified as:

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[13] Revenue caps (as well as price caps) are generally smaller than base revenue allowances under cost-of-service regulation, which pressures utilities to economize costs, potentially including maintenance activities. *See, e.g.,* Tooraj Jamasb & Michael Pollitt, *Incentive regulation of electricity distribution networks: Lessons of experience from Britain*, 35 ENERGY POL. 6163, at 6171 (2007).

[14] *See* Office of Gas and Electricity Markets (U.K.) (Ofgem), *Strategy decision for the RIIO-ED1 electricity distribution price control: Outputs, incentives and innovation* at 10 (2013). *Available at* https://www.ofgem.gov.uk/ofgem-publications/47068/riioed1decoutputsincentives.pdf.

[15] *See* Frontier Economics, *RPI-X@20: Output measures in the future regulatory framework* (2010). *Available at* https://www.ofgem.gov.uk/ofgem-publications/52022/rpt-outputs.pdf.

[16] *See* Case EB-2010-0379, Performance measurement for electricity distributors: A scorecard approach at 9 (Ontario Energy Board, Mar. 5, 2014).

[17] *See* Renewed Regulatory Framework for Electricity Distributors: A performance-based approach at 56-57 (Ontario Energy Board, Oct. 18, 2012).

[18] Since initiating the REV proceeding, however, the PSC has convened numerous public meetings to disseminate information and collect comments.

- reduction of carbon emissions;
- enhanced customer knowledge and bill management tools;
- system reliability and resilience;
- system-wide efficiency;
- market animation and leverage of ratepayer contributions; and
- fuel and resource diversity.[20]

As the guiding outcomes of REV, these are likely to form the foundation of New York's new performance incentive framework. These outcomes are similarly multifaceted to those targeted by RIIO and RRFE, but are arguably even more ambitious owing to New York's overarching emphasis on transforming the role of distribution utilities as a means of satisfying these objectives.[21] Yet while these outcomes would be broad enough to address REV goals, setting out six distinct areas of emphasis for utilities to pursue makes it increasingly crucial that the stated outcomes be cohesive. The PSC appears to recognize as much, noting that "the most effective outcome paradigm may be one that creates a network of incentives with an enterprise-wide effect."[22] To this end, the outcome dimensions undergirding New York's REV follow the lead of the designated outcomes for RIIO and RRFE by serving a unified vision, which in this case is "ensuring economic, efficient [and] reliable electric service while reducing emissions including greenhouse gases."[23]

In order to select outcomes that are cohesive and complementary, the PSC's designated outcomes should all serve this vision. However, the objective of fuel diversity may be at odds with components of New York's vision statement. For example, a more efficient system—either in terms of energy or cost input—is not necessarily associated with a more diversified fuel mix. Similarly, an electricity system that prioritizes diversity of resource inputs may not optimize reliability; for example, New York can reduce its dependence on natural gas by adding more variable and intermittent renewable generation, but this could adversely impact grid reliability. Moreover, determining a desired level of fuel diversity requires consideration of economic, environmental, and national security factors; fuel diversity should thus be viewed as a means to achieving the desired balance of these considerations rather than as an end goal in its own right.[24] For these reasons, the PSC should omit fuel diversity as a desired outcome of performance incentives in the interest of keeping outcomes cohesive.

2. Selecting metrics by which to gauge performance

Establishing appropriate metrics for desired outcomes allows regulators to track utilities' progress toward the achievement of these outcomes. This section asserts criteria for selection of performance metrics, describes the choices that regulators in Britain and Ontario have made for metrics in their new PBR regimes, and finally proposes metrics that can gauge performance toward most of New York's desired outcomes.

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[19] *See* Case 07-M-0548: Proceeding on motion of the Commission regarding an Energy Efficiency Portfolio Standard, Order approving EEPS program changes at 21 (N.Y. Pub. Serv. Comm'n, Dec. 26, 2013).

[20] *See* Case 14-M-0101: Proceeding on motion of the Commission in regard to Reforming the Energy Vision, Developing the REV market in New York: DPS staff straw proposal on Track One issues at 1 (N.Y. Pub. Serv. Comm'n, Aug. 22, 2014).

[21] *See* Case 14-M-0101: Proceeding on motion of the Commission in regard to Reforming the Energy Vision, Order adopting regulatory policy framework and implementation plan at 30 (N.Y. Pub. Serv. Comm'n, Feb. 26, 2015).

[22] *See* DPS staff report and proposal at 52 (N.Y. Pub. Serv. Comm'n, Apr. 24, 2014).

[23] *See* Order approving EEPS program changes at 21 (N.Y. Pub. Serv. Comm'n, Dec. 26, 2013).

[24] *See* Ken Costello, *A perspective on fuel diversity*, 18 ELECTR. J. 28, at 42 (2005) and Ken Costello, *Diversity of generation technologies: Implications for decision-making and public policy*, 20 ELECTR. J. 10 (2007).

2.A. Metric criteria[25]

To institute a fair and accurate system for performance measurement, regulators should select metrics that gauge factors over which utilities have control, that are measurable, and that are comparable over time and across utilities.

Controllable – Performance incentives can only be effective to the extent that utilities can respond by changing operations or decisions. To identify areas where performance can be improved, regulators must consider which factors are within a distribution utility's control as a product of their operations and investments. Regulators should make allowances for external factors that can influence utility performance (e.g., the effect of extreme weather on reliability) to isolate aspects of performance that utilities can reasonably control.[26]

Measurable – Where possible,[27] metrics should be measurable and objective, which requires that relevant data be made available by utilities.[28] Quantitative metrics ensure that utilities understand the kinds of performance they are asked to deliver and improve the ability of all stakeholders to assess firm performance. Importantly, to ensure that metrics can reasonably be controlled by individual distribution utilities, metrics must be measurable on the service territory, rather than statewide or national, level.

Comparable – To standardize performance reporting, metrics should be comparable both between periods and across utilities. Comparable metrics help to standardize performance reporting and make it transparent, and to provide data that regulators can use to improve benchmarking of targets (see Section 3) and that third parties can use to develop innovative product offerings.[29]

2.B. Metric selection in RIIO and RRFE

To gauge progress toward the outcomes identified through stakeholder consultation, Ofgem has set out several performance metrics or "primary outputs" within each outcome category. In RIIO scoping documents, Ofgem indicated that these metrics "would relate to consumers' and network users' experience of network services"[30] and asserted that metrics should be controllable, measurable, auditable, and comparable.[31]

Ofgem subsequently introduced performance metrics to be included on annual performance reports, for four out of six outcome categories.[32] Though most primary outputs are quantitative measures, Ofgem has also introduced measures to encourage utilities to pursue outcomes more qualitatively, such as taking actions that help to reduce network electricity losses, better engage stakeholders, and facilitate new distributed generation

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[25] Criteria used for metrics are based in part upon suggested principles of metric selection in two reports on performance incentives. *See* NRRI (2010a) at 18-21 and Synapse Energy Economics (2015) at 28-31.

[26] *See* NRRI (2010a) at 20. For example, RIIO-ED1 allows for 25,000 customer interruptions and 2 million customer minutes lost before figures count against reliability targets. *See* Ofgem (2013) at 35.

[27] If deemed necessary, regulators can introduce discretionary measures for performance that can only be gauged qualitatively.

[28] *See, e.g.,* Synapse Energy Economics (2015) at 29 and NRRI (2010a) at 18.

[29] *See, e.g.,* NRRI (2010a) at 20.

[30] *See* Office of Gas and Electricity Markets (U.K.) (Ofgem), *Regulating energy networks for the future: RPI-X@20 recommendations* at 24 (2010b). *Available at* https://www.ofgem.gov.uk/ofgem-publications/51901/rpi-xrecommendations.pdf.

[31] *See* Ofgem (2013) at 9.

[32] RIIO price controls for electric transmission, gas distribution, and gas transmission went into effect in April 2013, and will go into effect in April 2015 for electric distribution. This section focuses only on electric distribution (RIIO-ED1). The two outcome categories with no primary outputs in RIIO-ED1 are safety, rendered inapplicable by existing legislated standards, and social obligations, deemed insufficiently controllable by network operators. To review all performance metrics chosen for RIIO-ED1, *see* Ofgem (2013) at 13.

connections. Ofgem will use its discretion to determine whether utilities have met desired levels of performance on these qualitative measures.[33]

For RRFE, OEB has embraced a scorecard approach that requires utilities to submit annual performance data for metrics that relate to the identified performance outcomes. The performance scorecard is intended to make utility performance more transparent to customers, signal to OEB whether corrective action should be taken, and provide standardization so that utilities can be compared.[34] To better link performance measures to outcomes of interest, OEB has assigned metrics to the performance subcategories within each outcome area. The metrics selected for RRFE are customer-focused, encourage continuous improvement; and are measurable at a point in time and over a period of time.[35]

2.C. Proposed REV performance metrics

See **Table 1** for a list of the performance metrics selected for the regimes outlined above, as well as those proposed for REV. Metrics are grouped into five overarching priority areas for easier comparison of the three regimes: environment, customer service/engagement, reliability and resilience, system/cost efficiency, and market stimulation. The following recommendations are metrics that the PSC can use to standardize performance reporting across all New York distribution utilities in order to pursue desired outcomes in light of the above criteria and case studies.

Reduction of greenhouse gas emissions[36,37]

Energy efficiency savings [megawatt-hours (MWh)] – Energy efficiency is a familiar approach to reducing greenhouse gas emissions from centralized power plants. The PSC has administered an Energy Efficiency Portfolio Standard (EEPS) since 2008,[38] but has recently announced that it intends to make energy efficiency a more integral component of the utility business model.[39] Incorporating energy efficiency savings as a metric within a performance incentive framework would allow the PSC to achieve its desired streamlining of regulatory programs. The relevant metric (i.e., MWh reductions) would be the same as in the current EEPS program, but would be calculated over entire service territories rather than, as at present, for individual energy efficiency programs.[40] For instance, a utility would report MWh savings below a PSC-projected baseline level of energy consumption throughout its service territory, rather than for each of the relevant programs it administers (e.g., commercial HVAC efficiency). Such a measure would also complement efforts to improve system-wide efficiency and support animation of markets for demand management tools. This metric is similar to RRFE's use of net annual peak demand savings to gauge energy conservation, but would offer a

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[33] For descriptions of discretionary measures, *see* Ofgem (2013).

[34] *See* Performance measurement for electricity distributors at 7 (Ontario Energy Board, Mar. 5, 2014).

[35] OEB's metric selection was influenced by the NRRI reports cited in this brief. To review all performance metrics chosen for RRFE, *see* Performance measurement for electricity distributors at 37 (Ontario Energy Board, Mar. 5, 2014).

[36] The most direct metrics for this outcome are those related to greenhouse gas emissions, but the PSC cannot reasonably enforce service territory-level targets for such metrics. For one, the vast majority of industry emissions comes from fossil fuel combustion at power plants, which fall outside the regulatory ambit in New York. In addition, procurement of energy from a statewide wholesale pool makes it impossible to determine the carbon attributes of electricity delivered in each service territory.

[37] For environmental performance incentives that have been proposed for other regulatory contexts, *see* Sonia Aggarwal & Edward Burgess, *Performance-based models to address utility challenges*, 27 ELECTR. J. 48, at 49 (2014) and Synapse Energy Economics (2015) at 27.

[38] *See* Case 07-M-0548: Proceeding on motion of the Commission regarding an Energy Efficiency Portfolio Standard, Order establishing Energy Efficiency Portfolio Standard and approving programs (N.Y. Pub. Serv. Comm'n, Jun. 23, 2008)

[39] *See* Order approving EEPS program changes at 20 (N.Y. Pub. Serv. Comm'n, Dec. 26, 2013).

[40] In a December 2013 order, PSC staff proposed to streamline its administration of the EEPS program, in part by reducing the number of energy efficiency measures eligible for EEPS participation. *See* Order approving EEPS program changes at 14 (N.Y. Pub. Serv. Comm'n, Dec. 26, 2013).

more representative view of year-round performance by tracking cumulative energy savings rather than an instantaneous reduction in power demand.

Procurement of renewable energy [MWh] (share of delivered MWh) – Utilities can also displace centralized carbon-intensive electricity generation in their roles as aggregators and procurement agents[41] for renewable energy.[42] For one, utilities can aggregate clean distributed generation (DG) into distribution networks, which would strengthen customer engagement, help to activate markets for DG, and may reduce network electricity losses. In addition, utilities can enter into power purchase agreements with utility-scale renewable energy projects, which would allow the PSC to administer its renewable portfolio standard (RPS) through an existing regulatory channel.[43] To improve compatibility with RPS targets that, when based on production rather than distribution, were specified as renewable energy production as a share of total energy production, a renewable energy procurement metric should similarly be expressed as a share of total delivered energy. Increasing procurement of renewable energy can also address fuel diversity concerns by reducing reliance on natural gas generators. While both RIIO and RRFE offer incentives for timely connection of new clean generation facilities, neither contains a metric for the amount of renewable energy production facilitated by utilities.

Enhanced customer knowledge and bill management tools

Qualitative assessment of customer-centric solutions deployment – Most of the methods that utilities can use to better engage customers are not quantifiable, such as broad stakeholder consultations or the provision of energy dashboards that allow customers to monitor usage patterns. To capture qualitative forms of customer engagement, the PSC should set out a discretionary measure that encourages utilities to promote products and services that enable more informed electricity decisions and improve the transparency of billing practices.[44] Examples of such solutions include digital energy management dashboards, mobile apps, time-varying pricing options, electric vehicle support (e.g., submetering[45]), and demand response programs that compensate demand reductions during peak events. Notably, most of these solutions either require or are significantly facilitated by the use of advanced metering infrastructure (AMI).[46] Such a discretionary measure could arguably align with RIIO's discretionary stakeholder engagement incentive or selected components of the customer satisfaction surveys used in both RIIO and RRFE. However, some observers view customer satisfaction surveys as subjective and unreliable measures of how customers interact with their utility,[47] so a qualitative measure may be better suited to addressing this outcome.

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[41] A recent PSC order prohibits utility ownership of distributed energy resource (DER) assets in most circumstances, effectively limiting utilities' interactions with DG to a procurement role. *See* Order adopting regulatory policy framework and implementation plan at 70 (N.Y. Pub. Serv. Comm'n, Feb. 26, 2015).

[42] Qualifying energy sources could be those that are eligible for credit under New York State's Renewable Portfolio Standard. *See* http://www3.dps.ny.gov/W/PSCWeb.nsf/All/1008ED2F934294AE85257687006F38BD?OpenDocument.

[43] The PSC may shift from a central procurement model for meeting state renewable energy targets to one that requires utilities to demonstrate compliance. *See* DPS staff straw proposal on Track One issues at 52-53 (N.Y. Pub. Serv. Comm'n, Aug. 22, 2014).

[44] *See, e.g.,* Aggarwal & Burgess (2014) at 49.

[45] For example, California has introduced a Plug-In Electric Vehicle Submetering Pilot Program. *See* http://www.cpuc.ca.gov/PUC/energy/altvehicles/Plug-In+Electric+Vehicle+Submetering.htm.

[46] The PSC has defined AMI as "a grid edge technology that enables real time visibility and control up to and beyond the meter with significantly greater granularity and frequency than traditional meters." *See* DPS staff straw proposal on Track One issues at 2 (N.Y. Pub. Serv. Comm'n, Aug. 22, 2014).

[47] *See* Danielle Spiegel-Feld & Benjamin Mandel, *Reforming electricity regulation in New York State: Lessons from the United Kingdom* (Roundtable report), New York University School of Law at 11 (2015). *Available at* http://guarinicenter.org/reforming-electricity-regulation-in-new-york-state-lessons-from-the-united-kingdom/.

System reliability and resilience

Interruptions indices (CAIDI and SAIFI) – New York was the first state to introduce standards for the quality of electric service in 1991,[48] so the PSC has considerable experience applying industry-standard metrics for reliability—customer average interruption duration index (CAIDI) and system average interruption frequency index (SAIFI). Some utilities have suggested that reliability reporting could be simplified by using a single metric—system average interruption duration index (SAIDI), which is the product of CAIDI and SAIFI.[49] However, because CAIDI captures a utility's outage restoration performance on a per-event basis, it can also proxy for system resilience. The PSC should therefore retain both CAIDI and SAIFI, just as regulators in Britain and Ontario elected to continue to use their respective standard metrics for duration and frequency of outages.[50]

Qualitative assessment of action to promote resilience – New York has also communicated a focus on storm hardening and resilience. To address this outcome through utility regulation, the PSC can establish a discretionary measure that encourages utilities to enhance network resilience through strategic use of energy storage or microgrids. Resilience-enhancing measures, particularly battery storage, also entail auxiliary benefits like market animation for energy services in addition to the spillovers of successful research and development (R&D) activities.[51] In contrast, neither RIIO nor RRFE includes measures to promote resilience, as neither regime included this as one of its guiding principles.

System-wide efficiency

Load factor (ratio of average MW demand to peak MW demand) – The REV staff report discussed the issue of low system utilization as an important driver of reform, meaning that large amounts of capacity remain idle for most of the year for use during infrequent peak demand events.[52] The PSC can proxy for system utilization using load factor, calculated as average power demand as a share of peak power demand, which was approximately 55% for all of New York State in 2013.[53] Load factor can be calculated on an individual service territory basis by dividing average load in the territory over a given period by its peak load during that span. Encouraging utilities to improve their load factors can bolster efforts to reduce peak demand on their networks, including through energy efficiency and demand response programs. Shaving peak demand also abates generation from the most inefficient, carbon-intensive units in the system. Unlike RIIO and RRFE, which measure efficiency in predominantly financial terms,[54] monitoring load factors in each service territory allows the PSC to address REV's emphasis on a broader conception of system efficiency.

Network electricity losses [MWh] (share of delivered MWh) – Distribution utilities can trim wasted generation by reducing the amount of electricity that is lost in transit through network equipment (particularly power lines

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48 *See* Case 90-E-1119: Proceeding on motion of the Commission to consider establishing standards on reliability and quality of electric service, Order adopting standards on reliability and quality of electric service (N.Y. Pub. Serv. Comm'n, Jul. 2, 1991)

49 *See* Cases 02-E-1240 and 02-E-0701: Proceeding on motion of the Commission to examine electric service standards and methodologies, Order adopting changes to standards on reliability of electric service (New York Pub. Serv. Comm'n, Oct. 12, 2004).

50 OEB also uses CAIDI and SAIFI, while Ofgem uses customer minutes lost and customer interruptions to measure outage duration and frequency, respectively.

51 Alternately, the PSC can provide competitive funding opportunities for R&D projects that advance storage and microgrid technologies. However, competitive funding opportunities are likely better administered by a state agency such as NYSERDA.

52 *See* DPS staff report and proposal at 5-6 (N.Y. Pub. Serv. Comm'n, Apr. 24, 2014).

53 *See* New York Independent System Operator (NYISO), *Power trends 2014: Evolution of the grid* at 16 (2014). *Available at* http://www.nyiso.com/public/webdocs/media_room/publications_presentations/Power_Trends/Power_Trends/ptrends_2014_final_jun2014_final.pdf.

54 RIIO provides an information quality incentive (IQI) to encourage utilities to meet total cost targets, but Ofgem administers this measure outside of its performance incentive framework. *See* Ofgem (2013) at 91.

and transformers). Traditionally, utilities have been indifferent to the extent of such losses, as their associated costs are passed through to customers.[55] To hold utilities accountable for electricity losses through their infrastructure, the PSC can enforce an incentive scheme based on electrical energy losses as a share of total electricity demand. Though it can be difficult for utilities to improve in this respect over short time horizons, they can address it over the medium and long term by phasing in more efficient network infrastructure as they retire old equipment. A metric for network losses also helps to reduce greenhouse gas emissions by effectively reducing end-use demand for fossil-fueled electricity.[56] This metric is analogous to RIIO's discretionary reward for electricity loss reductions, but would provide a more concrete signal to the industry by requiring reporting against a targeted loss rate.

Market animation

Capacity of DER commitments [MW] (share of peak MW) – The future role of distribution utilities as distributed services platform (DSP) providers[57] will require that customers and third parties interface with utilities to build sustainable and robust markets for distributed energy resources (DER).[58] The PSC can therefore use the capacity of DER that customers or third parties commit to the distribution grid—as by interconnecting DG or contracting to provide demand response, energy efficiency, or storage services—as a metric to gauge animation of DER markets. This metric would also effectively allow the PSC to track the progress of utilities' transition to DSP providers. Greater DER penetration fosters customer engagement and (generally) reduces greenhouse gas emissions. Moreover, measuring DER penetration as a share of peak demand would complement utilities' efforts to improve system efficiency. Relative to metrics related to market stimulation in RIIO's "customer connections" and RRFE's "connection of renewable energy" outcome areas, which primarily aim to speed new interconnections of renewable energy, a DER capacity metric would allow the PSC to provide a more technology-agnostic measure that more appropriately gauges penetration.

3. Setting targets that correspond to desired levels of performance

Targets send a signal to market participants and customers about the level of performance that regulators expect from utilities, and standardized metric reporting can reveal whether utilities are delivering deficient performance, meeting expectations, or exceeding them. This section briefly describes criteria to guide target-setting, outlines how Ofgem and OEB have (or have not) set performance targets for RIIO and RRFE, and proposes guidelines for how the PSC should approach setting targets for REV performance measures.

3.A. Target criteria[59]

To establish appropriate performance expectations, regulators should set targets that are at once ambitious but attainable, while retaining sufficient flexibility to accommodate uncertainty and variability.

Ambitious – Many jurisdictions employ benchmarking to determine efficient expenditure levels for utilities.[60] Regulators can apply similar data-driven performance assessments to some of the noneconomic dimensions

[55] *See* Benjamin H. Mandel, *Performance-based regulation to improve upstream energy efficiency*, 27 ELECTR. J. 20, at 23 (2014).

[56] Network electricity losses are treated here as a metric of system efficiency rather than environmental performance since more efficient networks would be desirable even when all electricity is generated from zero-carbon sources.

[57] "The DSP is an intelligent network platform that will provide safe, reliable and efficient electric services by integrating diverse resources to meet customers' and society's evolving needs. The DSP fosters broad market activity that monetizes system and social values, by enabling active customer and third party engagement that is aligned with the wholesale market and bulk power system." *See* Order adopting regulatory policy framework and implementation plan at 31 (N.Y. Pub. Serv. Comm'n, Feb. 26, 2015).

[58] DER encompasses energy efficiency, demand response, clean distributed generation, and energy storage. *See* DPS staff report and proposal at 12 (N.Y. Pub. Serv. Comm'n, Apr. 24, 2014).

[59] Some criteria derived from Synapse report on performance incentives. *See* Synapse Energy Economics (2015) at 34.

driving the policy agendas of comprehensive PBR programs. In the absence of externally determined targets (e.g., renewable portfolio standards for renewable energy procurement targets), the PSC should use some form of benchmarking to determine desired levels of performance.[61] To set the boldest stretch targets, regulators can use linear programming methods such as data envelopment analysis (DEA) that determine "frontier" performance rather than average performance, which often reflects underperformance.[62] For metrics that depend on many factors, regulators can use econometric benchmarking to determine appropriate targets for a given utility's characteristics. Indexing, though easier to implement, can produce unreliable results in the absence of a suitable peer group and should therefore be a last resort.[63]

Attainable – To ensure that targets are also attainable within reason, regulators should pursue negotiated settlements with interested parties, rather than unilaterally mandating performance targets. In the course of reaching such settlements, regulators can weigh their benchmarking results against targets proposed by utilities and interested stakeholders to identify the range of performance that is more ambitious than utility proposals but arguably more attainable than PSC estimates.

Flexible – To accommodate the inherent uncertainty of benchmarking results and the variability of utility performance, regulators should include deadbands around targets within which performance can acceptably vary. In addition, regulators should allow targets to evolve as utilities adapt to regulatory expectations, such as by specifying a schedule for target progression throughout a rate period. Finally, to prepare for unforeseen changes, regulators should build in reopeners that allow them to revise targets during a rate period.

3.B. Target-setting in RIIO and RRFE

For each metric, Ofgem specifies a company-specific or sector-wide performance "baseline" for utilities to target. These targets are informed by consumer research, existing laws and policies, consultation with stakeholders, and past utility performance.[64] Importantly, while Ofgem uses econometric benchmarking techniques to set base revenue allowances, benchmarking is not used to set targets for noneconomic measures.[65] In their business plans, utilities can propose performance targets that deviate from Ofgem base levels, but they must clearly explain how their proposal improves value for consumers.

In Ontario, OEB aspires to establish targeted minimum levels of performance for most scorecard measures in accordance with the level of service customers should expect to receive at reasonable rates.[66] For select measures, such as those related to cost control and customer service, OEB will determine performance targets from benchmarking analysis using data from all Ontario distribution utilities.[67] However, the initial RRFE rate plans only include performance targets for measures that OEB has administered in the past—

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[60] *See, e.g.,* Tooraj Jamasb & Michael Pollitt, *Benchmarking and regulation: International electricity experience*, 9 UTIL. POL. 107 (2001).

[61] *See* National Regulatory Research Institute (NRRI), *Utility performance: How can state commissions evaluate it using indexing, econometrics, and data envelopment analysis?*, No. 10-05 (2010c). *Available at* http://www.nrri.org/pubs/multiutility/NRRI_utility_performance_mar10-05.pdf for descriptions and comparisons of these methods. *See also* Jamasb & Pollitt (2001) for an overview of benchmarking techniques used by utility regulators around the world.

[62] *See, e.g.,* NRRI (2010b) at 11.

[63] Such was the case for the cost benchmarking the PSC employed in the 1990s. *See* National Association of Regulatory Utility Commissioners (NARUC), *Performance-based regulation in a restructured electric industry* at 19-25 (1997).

[64] *See* Ofgem (2013) at 10.

[65] Ofgem does use econometric benchmarking for its IQI incentive (*supra* note 54). *See* Ofgem (2013) at 91.

[66] Note, however, that OEB will not set targets for metrics related to financial performance. *See* Performance measurement for electricity distributors at 29 (Ontario Energy Board, Mar. 5, 2014).

[67] For benchmarking in other performance areas, OEB will consider both econometric and DEA methods. *See* Case EB-2010-0379, Rate setting parameters and benchmarking under the Renewed Regulatory Framework for Ontario's Electricity Distributors at 23 (Ontario Energy Board, Nov. 21, 2013).

service quality, reliability, and power/energy savings. For new measures, OEB will monitor performance scorecard results to determine reasonable targets at a later date.[68]

3.C. Proposed guidelines for REV performance targets

To set appropriate stretch targets for utility performance in areas not guided by external goals, the PSC should adopt benchmarking, either econometric or linear programming techniques, similar to Ontario's plans for calibrating its performance targets. These techniques require that regulators have reliable data to work with for the metrics it selects. For metrics with historical data that utilities or the PSC have collected, such as energy efficiency savings, CAIDI, and SAIFI, the PSC can begin benchmarking exercises in the near term and set numerical targets in the medium term. However, if utilities cannot furnish retrospective data on some of the metrics proposed in section 2.C, the PSC will need to gather data over several years before it can generate robust results from benchmarking. The PSC can continue its current target-setting practices for more traditional metrics (e.g., CAIDI, SAIFI, energy efficiency savings) until it has sufficient data to set more analytical numerical targets for both traditional and non-traditional metrics in the medium-to-long term.

Reduction of greenhouse gas emissions

Energy efficiency savings – The PSC has set utility-specific EEPS targets through negotiations with utilities based upon the technical potential that each side deems feasible for various energy efficiency programs (e.g., residential HVAC, multifamily refrigerator replacement, etc.).[69] The PSC can set more ambitious multi-year targets using econometric benchmarking to set cumulative targets across all energy efficiency measures. This can reduce the need for detailed technical assessments while reflecting the heterogeneous features of utility service territories that influence their savings potential. Annual targets should increase incrementally toward multi-year goals.

Procurement of renewable energy – Targets for renewable energy penetration should reflect long-term external goals, such as renewable portfolio standard mandates and/or a desired degree of fuel diversity. Annual targets should incrementally progress toward those goals, and targets for individual utilities should reflect locational variations in available resource potential (e.g., from solar PV, community solar).

System reliability and resilience

Interruptions indices – The PSC can likely set more ambitious targets than are in place currently by performing DEA frontier analysis benchmarking to set initial targets for rate periods. Targets should then decrease incrementally each year during the rate period to encourage continual performance improvement.

System-wide efficiency

Load factor – Because load profiles vary greatly by region and are influenced by many factors, initial targets should be set through econometric benchmarking that can account for many heterogeneous parameters across utilities. Targets should increase annually to encourage sustained improvements.

Electricity losses – Since losses are a function of load patterns,[70] which in turn vary with many factors, initial loss targets should be set through econometric benchmarking with annual improvements.

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68 *See* Performance measurement for electricity distributors at 10 (Ontario Energy Board, Mar. 5, 2014).

69 *See* Case 07-M-0548: Proceeding on motion of the Commission regarding an Energy Efficiency Portfolio Standard, Order approving utility target adjustments (N.Y. Pub. Serv. Comm'n, Feb. 17, 2012).

70 *See, e.g.*, Oak Ridge National Laboratory (ORNL), *Determination analysis of energy conservation standards for distribution transformers*, No. ORNL-6847 at 2-6 (1996).

Market animation

Capacity of DER commitments – Because past data are unlikely to be available for this metric, benchmarking would not be a reliable method for setting targets. Instead, targets should be informed by technical analyses that factor in each service territory's DER potential and power flow considerations (e.g., feeder capacity, voltage control). The PSC can also decide whether to disaggregate the types of DER to set distributional goals among energy efficiency, demand response, clean DG, and storage.

4. Deciding how to incentivize utilities to meet targets

The size and structure of financial incentives can have a significant bearing on utility performance, insofar as the expected consequences of performance influence decision-making. When considering how to incentivize desired performance outcomes, the PSC must carefully decide whether the financial incentives attached to performance should be rewards, penalties, both, or neither (i.e., reputation-only incentives). This section discusses general criteria for financial terms of incentives, as well as those (if any) that accompany incentives in RIIO and RRFE, before proposing broad guidelines for the PSC's use of financial incentives.

4.A. Financial term criteria[71]

To mitigate the risk of unintended consequences that may distort utilities' incentives to the detriment of customers, regulators should structure financial incentives in a politically sensitive fashion, size them in a way that is justified in light of customer benefits and utility compliance costs, and ensure that the combined financial effect is substantial enough to influence utility behavior.

Politically sensitive – From a purely economic standpoint, utilities should be indifferent to whether financial incentives are rewards or penalties; failure to earn a 1% reward can be viewed as an *economic* loss of 1%, even if it is not reflected as an *accounting* loss. But whether an incentive is reward-only, penalty-only, symmetric, or semi-symmetric (skewed around zero) can have political implications. For instance, two-sided incentives may best approximate results of market discipline and be best suited to apply competitive pressure.[72] However, penalty-only incentives are favored for measures that address "essential" requirements of utility service, such as reliability, since outperformance in these areas confers little incremental value to customers. Conversely, reward-only mechanisms may be appropriate to encourage outperformance or innovation.[73]

Justified – To maximize the societal net benefits associated with performance incentives, regulators must balance the customer benefits of multifaceted utility performance against the compliance costs to utilities and the regulatory costs from measuring and evaluating performance.[74] If utilities do not believe that the potential financial ramifications outweigh their incremental costs—whether concrete or intangible—of meeting targets, they can opt simply to avoid these costs.[75] At the same time, financial incentives flow back to customers as higher or lower rates in subsequent periods, so incentives should be smaller than the value they confer to ratepayers. To justify the magnitude of financial terms associated with performance incentives to both customers and utilities, regulators must therefore gather information on the incremental costs of performance compliance and the value to ratepayers.

[71] This includes the possibility of no financial incentives—i.e., reputational incentives.

[72] *See* Aggarwal & Burgess (2014) at 50.

[73] *See* Synapse Energy Economics (2015) at 41.

[74] *See* NRRI (2010b) at 8.

[75] The REV staff report notes that "revenue adjustments should be sized so that companies will perform to standards rather than finding it economic simply to pay penalties." *See* DPS staff report and proposal at 50 (N.Y. Pub. Serv. Comm'n, Apr. 24, 2014).

Substantial – The combined financial size of the set of incentives determines the priority that regulated firms should place on the achievement of incentivized outcomes.[76] If performance incentives are allowed to comprise a substantial share of a utility's total earnings potential, the utility should invest proportionate effort in the pursuit of desired objectives, making for a more policy-responsive PBR regime.[77]

4.B. Financial terms in RIIO and RRFE

Under RIIO, Ofgem decides how to incentivize the pursuit of performance outcomes on a metric-by-metric basis. Taking into account the nature and quality of metrics used, potential overlap or complementarity with other regulations, and the broader context of the whole incentive package, Ofgem decides whether incentives should be financial or reputational (i.e., publicly reported but with no direct financial consequence) as well as whether financial incentives should be structured as reward-only, penalty-only, or two-sided mechanisms.[78] Any rewards earned from performance incentives increase the amount of revenue a company is allowed to raise from customers, and any penalties decrease permitted revenues. Based on information regarding customers' valuation of desired outcomes and the cost of compliance for utilities, Ofgem places upper and/or lower limits on the revenue adjustments from a particular financial mechanism to minimize the risk of perverse incentives that would distract utilities from delivering long-term value to customers.[79]

For the distribution price controls that will go into effect in mid-2015, financial incentives introduce total potential revenue variations of ±5% around a base revenue target return of 6%.[80] While most incentives offer a share of base revenue in either direction to encourage utilities to meet targets, selected incentives are discretionary; for instance, operators can compete for up to £32 million in discretionary rewards over an eight-year RIIO term for taking actions to reduce network electricity losses. These and other measures, such as the business carbon footprint of each utility, are also subject to reputational incentives from the public dissemination of annual performance data.

In Ontario, OEB has scarce experience with explicit financial performance incentives. Accordingly, OEB has opted to adopt a "development path" to incentivize performance measures.[81] One factor raised for consideration by OEB staff during the development of RRFE was that expected benefits of performance measures must outweigh anticipated costs of establishing them.[82] Perhaps because of current uncertainty regarding such cost-benefit considerations, all RRFE performance scorecard metrics, including the few with specified targets, are incentivized strictly reputationally at inception.[83] However, OEB staff has suggested that its approach to incentivizing RRFE performance measures may evolve (including to the use of financial

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[76] *See* Richard Sedano, *Experience with performance regulation in the U.S.*, presented at 2014 CLIMATE AND ENERGY FUNDERS GROUP ANNUAL MEETING, Cleveland, OH at 19 (2014).

[77] *See, e.g.,* Mandel (2015).

[78] *See* Ofgem (2010b) at 40.

[79] *See* Ofgem (2013).

[80] *See* Office of Gas and Electricity Markets (U.K.) (Ofgem), *RIIO-ED1: Final determinations for the slow-track electricity distribution companies* at 46 (2014).

[81] *See* Case EB-2010-0379, Staff discussion paper on defining & measuring performance of electricity transmitters & distributors at 47 (Ontario Energy Board, Nov. 8, 2011).

[82] *See* Staff discussion paper on defining & measuring performance at 38 (Ontario Energy Board, Nov. 8, 2011).

[83] The purely reputational role of incentives may be further explained by the predominantly municipal governance structure in Ontario—of the 73 distribution utilities in operation in Ontario, one is investor-owned, one is provincially owned, and the rest are municipally owned. Municipal utilities may be more responsive to non-financial signals than investor-owned utilities. Still, OEB staff points out that performance reporting can indirectly influence financial outcomes, as regulators use scorecard results in ratemaking determinations like the discretionary "stretch factor" component of price caps or in applications for cost recovery.

incentives) as the industry and OEB gain experience delivering, monitoring, and valuing the types of performance these measures encourage.

4.C. Proposed guidelines for REV financial performance incentives

As regulators in both Britain and Ontario have acknowledged, the cost-benefit proposition of performance measures must be considered when structuring financial incentives. Lacking the sort of information that Ofgem has gathered or estimated for its desired outcomes, the PSC should proceed with a similarly cautious approach to the one chosen to accompany the implementation of RRFE in Ontario.

Functionally, this cautious approach means that the PSC should introduce the new set of REV performance measures as primarily reputational incentives, as in Ontario. Because financial incentives influence both utility operations and ratepayer value, it is critical that the PSC only attach financial consequences to performance metrics once it has properly calibrated them. Fortunately, a critical component of the REV proceeding is the development of a benefit-cost framework that could utilize annual performance data to quantify the societal net value of performance measures (including both utility costs and ratepayer benefits).[84] While it may take years to gather necessary data to evaluate newer measures in such a framework, the PSC can include a smaller set of interim financial incentives for more traditional measures (e.g., reliability and energy efficiency).

A transitionary period of two or three years should allow New York's utilities to gain familiarity with standardized reporting of both traditional and new performance metrics, and would allow the PSC to better assess the benefits and costs of utility performance compliance (and non-compliance). After this transitionary period, the PSC can introduce financial incentives for a progressively greater number of measures: two-sided incentives to induce competitive pressure for most measures, retaining penalty-only mechanisms for reliability and using reward-only incentives for qualitative discretionary measures to foment innovation.

5. Conclusion

To effectively advance the multifaceted policy objectives of REV, the PSC must broaden its set of performance incentives for utilities. Simply expanding the range of performance incentives is not sufficient, however. Instead, regulators must also pay close attention to the individual components of performance incentive design to mitigate the risk of unintended consequences.

Importantly, New York lacks the experience and data that have empowered British regulators to assert financial incentives at RIIO's inception. Accordingly, the PSC may be justified in starting with a more cautious approach by using reputational incentives for newer measures, akin to what Ontario has done, while maintaining interim financial incentives for traditional measures. This would allow New York's utilities to become familiar with nontraditional metrics while the PSC gathers necessary information to make sound determinations regarding targets and financial terms. Over time, this framework can evolve into a robust set of financial incentives along the lines of what RIIO offers. So while this program may operate at less than full strength for the first few years, it will enable New York to boast a more comprehensive PBR regime that ultimately gets the incentives right.

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[84] *See, e.g.,* Order adopting regulatory policy framework and implementation plan at 117 (N.Y. Pub. Serv. Comm'n, Feb. 26, 2015).

Table 1. *Performance incentives in RIIO (Great Britain), RRFE (Ontario), and REV (proposed, New York)*

		Outcome		Metric	Target	Incentive
Environment	RIIO	Environmental impact		Qualitative assessment of actions taken to reduce network electricity losses		Reward up to £32m
				Greenhouse gas emissions attributable to utility operations and supply chain		
	RRFE	Public policy responsiveness	Conservation and demand management	Net annual peak demand savings [MW]	Firm-specific	
				Net cumulative energy savings [GWh]	Firm-specific	
	REV	Reduction of GHG emissions		Energy efficiency savings [MWh]	Benchmarked, increasing	Reward/penalty
				Procurement of renewable energy [renewable MWh procured / total MWh delivered]	Based on long-term RPS goal	Reward/penalty
Customer service/ engagement	RIIO	Customer satisfaction		Customer satisfaction survey score	8.2	±1% of base revenue
				Complaints index score	8.33	-0.5-0% of base revenue
				Qualitative assessment of stakeholder engagement activities		0-0.5% of base revenue
	RRFE	Customer focus	Service quality	Share of new residential services connected within five days [%]	90%	
				Share of scheduled appointments met on time [%]	90%	
				Share of telephone calls answered within 30 seconds [%]	65%	
			Customer satisfaction	Customer satisfaction survey score		
				Success in meeting customer needs the first time utility is contacted		
				Success at issuing accurate bills to customers		
	REV	Customer engagement		Qualitative assessment of customer-centric solutions deployment (e.g., energy dashboards, pricing options, demand response programs, etc.)		Reward only
Reliability and resilience	RIIO	Reliability and availability		Customer interruptions (CI)	Firm-specific	±2.5% return on regulatory equity
				Customer minutes lost (CML)	Firm-specific	
	RRFE	Operational effectiveness	Safety	TBD		
			System reliability	System average interruption duration index (SAIDI)	Firm-specific	
				System average interruption frequency index (SAIFI)	Firm-specific	
	REV	System reliability and resilience		System average interruption frequency index (SAIFI)	Benchmarked, decreasing	Penalty only
				Customer average interruption duration index (CAIDI)	Benchmarked, decreasing	Penalty only
				Qualitative assessment of actions to promote resilience (e.g., microgrids)		Reward only
System/cost efficiency	RRFE	Operational effectiveness	Asset management	Progress on system plan implementation		
			Cost control	Overall efficiency assessment ranking (using total cost benchmarking)		
				Total cost per customer		
				Total cost per kilometer of line		
		Financial performance	Liquidity	Current ratio [current assets / current liabilities]		
			Leverage	Total debt-to-equity ratio		
			Profitability	Achieved regulated return on equity		
	REV	System-wide efficiency		Load factor [average MW demand / peak MW demand]	Benchmarked, increasing	Reward/penalty
				Electricity losses [MWh lost / MWh delivered]	Benchmarked, increasing	Reward/penalty
Market stimulation	RIIO	Customer connections		Time to quote [business days]	8.21 (single connection)	0-0.4% of base revenue
					11.73 (small project)	
				Time to connect [business days]	42.08 (single connection)	
					52.70 (small project)	
				Qualitative assessment of engagement with customers for larger projects		-0.9-0% of base revenue
	RRFE	Public policy responsiveness	Connection of renewable generation	Share of renewable generation Connection Impact Assessments completed within applicable timeline [%]	Prescribed by Ontario Regulation 326/09	
				Share of new micro-embedded generation facilities connected on time [%]	90%	
	REV	Market animation		Capacity of DER commitments [DER MW / peak MW demand]	Based on technical analysis	Reward/penalty

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