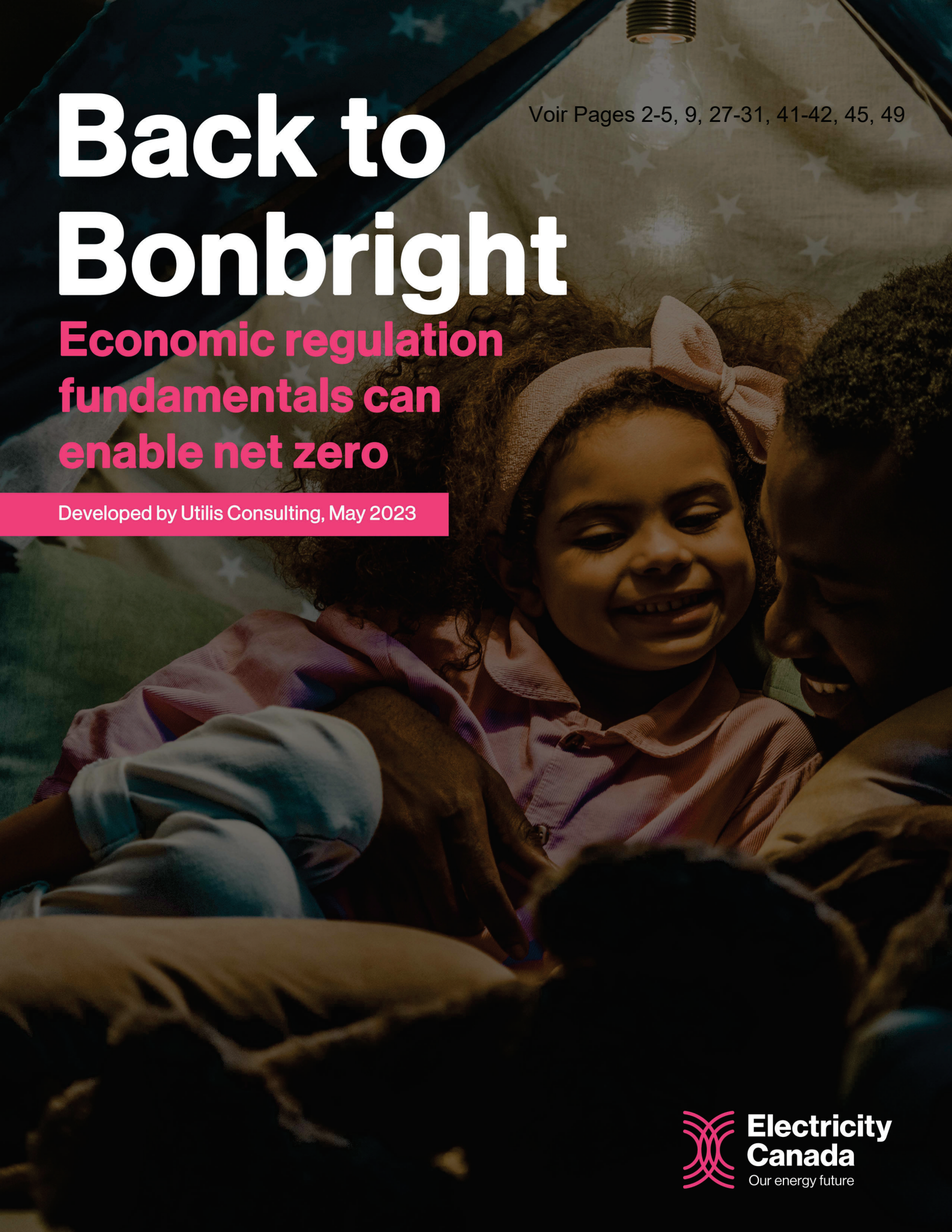

Back to Bonbright

Economic regulation fundamentals can enable net zero

Developed by Utilis Consulting, May 2023

Voir Pages 2-5, 9, 27-31, 41-42, 45, 49

Electricity Canada
Our energy future

Executive Summary

Recent studies are in agreement that, even under the best-case scenarios for the emergence of new technologies such as hydrogen, electricity will be required to play a central role in the energy transition. As a result, electric utilities are critical to achieving net zero. However, before tackling the literal and physical challenges of rising to this monumental task, relevant governing bodies must first ask (as this report does); do electric utilities operate within governance and regulatory structures capable of facilitating the achievement of net zero?

Like most developed countries, the energy regulation approaches employed across Canada are founded on the principles codified in the seminal work of James C. Bonbright, *Principles of Public Utility Rates, 1961*[1]. While Bonbright's 1961 work explores issues beyond the practice of rate-setting, the 'Bonbright Principles' are often summarized as the establishment of a revenue requirement, the fair apportionment of costs among customers, and optimal efficiency through rate design (otherwise known as the "Bonbright Principles"). Other common summaries include a longer list of more specific principles, as is the case in Section 5 of this Report. The Bonbright Principles are underpinned by a wealth of common law across Canada, the United States and elsewhere, but are also complemented by a series of tactical principles, framework elements, and approaches commonly utilized by regulators ("Regulatory Constructs"[2]). Some of these Regulatory Constructs are a matter of common law, while others have been codified as sound regulatory practice through their frequent use across numerous jurisdictions. Taken together, this constellation of commonly accepted guidance forms the basis of economic energy regulation across Canada and beyond. **This report asks whether the Bonbright Principles and commonly accepted Regulatory Constructs can accommodate the achievement of net zero**.

[1] James C. Bonbright, *Principles of Public Utility Rates,* 1961 (Bonbright, 1961); James C. Bonbright; Albert L. Danielsen; David R. Kamerschen, *Principles of Public Utilities Rates,* 1988 (Bonbright, 1988)
[2] This Report relies on a list of Regulatory Constructs outlined in Section 5, however alternative lists could easily developed of a higher level (i.e. fewer Regulatory Constructs) or more granular level (i.e. less Regulatory Constructs)

To complete this assessment, the authors of this Report conducted confidential and in-depth interviews with a broad cross-section of energy leaders involved in utility regulation, with diverse roles and jurisdictional representation across Canada. These interviews were undertaken to better understand the specifics of regulatory challenges associated with net zero achievement. To supplement these interviews, the authors researched and catalogued the Regulatory Constructs relied on for this Report, and mapped these items to provincial legislation. The authors also tested each principle against the likely pressures of achieving net zero both independently and during interviews; notably assessing the impacts of electrification of transportation and building heating, as well as decarbonization of the generation fleet. The result of this work is a series of recommendations to help shape the energy governance structures and regulatory frameworks required to enable net zero.

This Report concludes that:

- While some changes to commonly accepted Regulatory Constructs are required to enact the recommendations needed to facilitate the achievement of net zero, a fundamental revision of the Bonbright Principles is not needed.

- Bonbright's work has survived the test of time not due to creativity or prescriptiveness, but because the principles outlined are universal.

- The Bonbright Principles cut to core priorities regarding utility rates and the public interest. These principles will continue to be relevant in the future, even if net zero is achieved.

  In fact, it is the finding of this Report that facilitating the achievement of net zero will require a return to the foundational principles espoused by Bonbright, with consideration for the current context.

That said, there is room for improvement in commonly accepted Regulatory Constructs to ensure that the governance structures and regulatory practices employed in Canada's jurisdictions are best set up to facilitate the achievement of net zero. Further, the incremental nature of change required does not reduce the urgency to act quickly to evolve regulatory governance and approaches to facilitate the timely achievement of net zero.

With respect to the common Regulatory Constructs analyzed, this Report makes the following recommendations which will better align the practice of utility economic regulation with both net zero and Bonbright's principles:

- Establish flexible regulatory frameworks which allow for the proactive submission of utility investment or service proposals which are not bound by prescriptive timing requirements; allowing for multi-year investment plans or targeted requests submitted mid-rate-term. When new and innovative frameworks are a specific response to facilitate net zero policy, utilities should demonstrate that they are pursuing this end.

- In applying the principle which requires an asset to be "Used and Useful" to form a part of rate base and earn a return on equity, regulators need to acknowledge and place increased weight on utilities' obligation to serve in a time of significant forecast uncertainty.

- Enhanced incentive opportunities should be available based on demonstrated performance, which balance the potential for additional earnings with appropriate risk sharing.

- Enable utilities and regulators to leverage alternative Benefit-Cost Assessments (BCAs) to assess non-traditional utility investments. This can be accomplished through regulators establishing frameworks proactively, or through case-by-case decision-making for the use of different BCAs in different circumstances.

- Utilities should proactively monitor changes in customer consumption patterns within and across their rate classes for imbalances caused by the energy transition, and consider opportunities to correct these through cost allocation (inter-rate class) and rate design (intra-rate class).

- Where utilities propose new services or initiatives in direct response to government policy, opportunities to propose marginal cost pricing or comparable competitive cost pricing should be deemed appropriate by the regulator.

- Ensure regulators are sufficiently resourced and maintain their independent decision-making capacity, empowering them to review more novel and innovative proposals.

This Report also makes the following recommendations concerning energy governance structures to highlight the need for a crystal-clear definition of the roles and responsibilities of elected government, independent economic regulators, and utilities, as well as the empowerment of these entities to carry out their roles and responsibilities:

- Governments must utilize right-sized policy mechanisms, be they Mandate Letters[3], Regulation, or Legislation, to communicate timely, clear, and specific outcomes, which utilities and regulators are expected to facilitate without dictating *how* utilities achieve such outcomes or *how* regulators assess applications to achieve such outcomes.

- Ratepayers should not be expected to bear the financial burden of net zero alone. If the net zero policies of elected government are driving utility costs, some form of government funding assistance is warranted, which will also leverage Canada's progressive taxation system to mitigate impacts on vulnerable populations.

- The federal government must work with the provinces to provide appropriate support to those entities and persons affected by federal policies which impact a provincial area of jurisdiction, namely energy, natural resources, and electricity.

Elected Government

Set clear, outcome-based policy to provide regulators and utilities a common understanding of required objectives and outcomes.

Independent Regulators

Sufficiently resourced and empowered to review, reject, modify, or approve an increased number of novel proposals.

Utilities

Provided the flexibility to make innovative proposals with respect to investments, rate-setting structures, incentive structures, benefit-cost assessments, and rate design.z

[3] a.k.a. Letters of Direction, Special Directions, Decrees of Concern, and others

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1. Introduction

In light of the growing imperative to take meaningful action to mitigate the long-term effects of human-caused climate change,4 policies in Canada have become increasingly granular in their assessment of specific opportunities to advance positive change, as well as the barriers to such advancement. Though alternative approaches5 to achieving net zero by 2050 or earlier highlight the importance and urgency of making specific choices over the coming decade, recent studies agree that, even under the best-case scenarios for the emergence of new technologies such as hydrogen, electricity will be required to play a central role in the energy transition.6,7,8,9

The proliferation of Distributed Energy Resources (DERs), Demand Response, and energy storage are seen as opportunities to re-orient the electricity sector away from large, centralized generation, towards a more dynamic and dispersed electricity network. However, transitioning towards this new model will require electric utilities to invest in new assets, technology, and personnel to fundamentally change how they do business. Further, even in a more dispersed electricity future, there is a broad and credible expectation that significant expansion of electric capacity in Canada will be required, perhaps as much as 2.2 to 3.4 times current levels by 2050.10

These mounting pressures place electric utilities—whether they be generators, transmitters, distributors, or vertically-integrated combinations of the three—in a critical role for the achievement of net zero by 2050. There are legitimate questions to ask regarding the challenges of electric utilities in meeting such expectations, particularly in consideration of supply chain constraints[11] and human resourcing.[12] However, there is an initial challenge that must be tackled first; *do electric utilities operate within governance and regulatory structures that are capable of facilitating the achievement of net zero?*

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[4] SYNTHESIS REPORT 2 OF THE IPCC SIXTH ASSESSMENT REPORT (AR6), Summary for Policy Makers, March 19, 2023
[5] Guidehouse, Pathways to net zero Emissions for Ontario, prepared for Enbridge Gas Inc., June 2022
[6] Canadian Climate Institute, The Big Switch, May 2022
[7] Electric Power Research Institute, Canadian National Electrification Assessment: Electrification Opportunities for Canada's Future, 2021
[8] Energy Transitions Commission, Making Clean Electricity Possible: 30 Years to Electrify the Global Economy, 2021
[9] International Energy Association, net zero by 2050: A Roadmap for the Global Energy Sector, 2021
[10] Canadian Climate Institute, 2022, The Big Switch, p.9
[11] T&D World, Utilis Supply Chain Chaos, Teresa Hansen, July 2022, https://www.tdworld.com/utility-business/article/21246572/utility-supply-chain-chaos
[12] Ontario Independent Electricity System Operator, Pathways to Decarbonization, December 2022—Points to a potential six-fold increase in the energy workforce to accommodate the energy transition build-out

Like most developed countries, energy regulation approaches employed across Canada are founded on the principles codified in the seminal work of James C. Bonbright, *Principles of Public Utility Rates, 1961.* While Bonbright's 1961 work explores issues beyond the practice of rate-setting, the 'Bonbright Principles' are often summarized as the establishment of a revenue requirement, the fair apportionment of costs among customers, and optimal efficiency through rate design (otherwise known as the "Bonbright Principles"). Other common summaries include a longer list of more specific principles, as is the case in Section 5 of this Report. The Bonbright Principles are underpinned by a wealth of common law across Canada, the United States and elsewhere, but are also complemented by a series of tactical principles, framework elements, and approaches commonly utilized by regulators ("Regulatory Constructs"[13]). Some of these Regulatory Constructs are a matter of common law, while others have been codified as sound regulatory practice through their frequent use across numerous jurisdictions. Taken together, this constellation of commonly accepted guidance forms the basis of economic energy regulation across Canada and beyond. This Report assesses whether the Bonbright Principles and commonly accepted Regulatory Constructs can accommodate the actions necessary to achieve net zero. Further, the Report explores the specific and targeted areas where modification may be needed.

While this Report is interested in a regulatory approach that can facilitate net zero, exploring such a regulatory approach raises questions about energy governance. To achieve regulatory success, those questions cannot go unanswered. The governance structures of Canada's electricity sectors vary widely by jurisdiction, including a mix of private and public ownership. They all seek to strike the appropriate balance of responsibilities between elected government, independent regulators, and utilities.

This Report assesses the appropriate roles and responsibilities between these groups and offers guidance to policymakers, regulators, and utilities to work together to ensure that regulated energy governance structures across Canada are equipped to facilitate net zero.

[13] This Report relies on a list of Regulatory Constructs outlined in Section 5, however alternative lists could easily developed of a higher level (i.e. fewer Regulatory Constructs) or more granular level (i.e. less Regulatory Constructs)

As explored further in this Report, Canada's regulated electricity sector was developed in a different historical context. The governance structures and regulatory practices developed in that context were addressing different objectives than those increasingly expected of electricity utilities today and in the future. The basic context in which regulated electric utilities now operate are changing rapidly, as illustrated below:

Historical Context	Present and Future Context
Electric utilities are expected to provide safe and reliable service in a context of system maintenance, expansion paced with customer and consumption growth, and continuous improvement of costs and outcomes.	To achieve net zero, an aggressive build out of capacity will be required in a relatively short period of time to accommodate electric transportation and more (or all) heating demand.
Electricity technology was largely stable, with some notable advances such as nuclear, automation of control, and back-office functions.	Governments and customers expect utilities to accommodate increasingly diverse technologies on their systems. Some of these technologies, namely EVs and DERs, require utilities to have new systems and personnel capabilities to manage dynamic two-way power flow at the distribution level.
Customers generally had a degree of energy choice for different energy uses between gasoline and diesel for transportation, and natural gas, propane, oil, wood, or electricity for heating.	An increasing proportion of consumers' energy needs will be met by electric utilities; potentially the entirety of energy needs in a fully electrified net zero scenario.

In the face of significant energy change, participants in the sector must consider the following:

- Are utilities empowered to make the investments needed?
- Are objectives, incentives and risk allocation appropriately aligned?
- Are the correct costs and benefits being considered in weighing investment decisions?
- Are regulators resourced and empowered to make difficult decisions, be they rejections or approvals?
- Are elected governments directing the regulated electricity sector appropriately, or are they doing too much, or too little?

2. Report Objective, Scope & Methodology

2.1 Objective

The objective of this Report is to assess the following:

- The effectiveness of the Bonbright Principles and commonly accepted Regulatory Constructs to facilitate net zero achievement, including recommendations where changes may be necessary; and,

- The ideal governance structures between elected government, independent regulators, and electric utilities when dealing with energy regulation processes, particularly those associated with establishing utility rates.

The target audience of this Report includes energy leaders across elected government, regulators, and utilities, as well as relevant stakeholders. The outcomes of this Report are intended to inform discussion amongst these entities to ensure electricity regulation governance and practices are equipped to facilitate net zero achievement, including enacting legislation, regulation, or other policy directives as required.

2.2 Scope

2.2.1 Energy Governance and Regulatory Frameworks

One difficulty in assessing the barriers to the achievement of net zero is the sheer scope of challenges to consider. Even limiting analysis to regulated utilities' approach to net zero, opportunities abound for poor scoping given the importance of questions regarding technology priorities, economic impacts for various customer groups, Indigenous reconciliation, economic opportunities (or risks) for multiple business sectors, and various other societal priorities.

To overcome the challenges of scoping, analyses must focus on discrete issues at each level of governance rather than attempting in vain to solve the whole of governance in a single study. Accordingly, this Report addresses solely the governance and regulatory frameworks in which utilities and their economic regulators in Canada operate. It also assesses whether these constructs are purpose-built for a sector attempting to facilitate net zero.

While the Report may reference federal or provincial policies which enable an appropriate regulatory framework, the specifics of such policies are not the focus of the Report. Similarly, while some net zero-related utility investments are noted in this Report as a point of reference, advocacy for specific investments is not the focus of the Report.

2.2.2 Accommodating Multiple Paths to Net Zero

Another challenge for entities seeking to contribute to the achievement of net zero relates to the uncertainty of the specific path to reach net zero. Some point to full electrification as the most logical and practical path to achieving net zero, based on the assumption that all electricity generation can effectively and efficiently transition to a zero-emissions state. Other paths point to the development and broad deployment of hydrogen technologies, while still others point to a combination of carbon capture and hybrid systems which retain fossil fuel energy sources for peak energy demand periods.

This Report does not seek to predict or advocate for any one form of energy transition leading to a state of net zero. Instead, an appropriate and balanced regulatory framework should be equipped to respond to any number of investment needs or technology paths. Such a framework should apply to electric utilities, natural gas utilities, or other entities requiring the review and approval of economic regulators.

Accordingly, this Report seeks to explore such a regulatory framework, which will be positioned to enable necessary investments toward net zero in a flexible manner that accommodates whatever path ultimately transpires across Canada's diverse jurisdictions.

2.3 Methodology

Electricity Canada's approach to completing this Report was as follows:

- **Catalogue Regulatory Principles**: Work on this Report began with the specific cataloguing of the Bonbright Principles as well as commonly accepted Regulatory Constructs which are applied by Canada's energy regulators. One challenge often faced is that participants in regulatory processes have these principles so profoundly ingrained as part of their work that they are now utilized without active consideration or re-assessment of their application in present-day context. The outcomes of this cataloguing can be found in **Appendix A: Regulatory Principle Catalogue**

- **Legislation-Principles Cross-Reference:** Having catalogued the Bonbright Principles and Regulatory Constructs, the authors of this Report completed a cross-referencing exercise to establish where (if applicable) these principles were embodied in the legislation establishing and empowering Canada's economic regulators. Ultimately, a complete analysis would require legal experts in each jurisdiction to indicate where changes in the law may be required. Nonetheless, this national analysis will help inform the initial consideration of legal consistency between regulatory frameworks which facilitate net zero and existing legislation. The outcomes of this cross-reference can be found in **Appendix B: Legislation-Principles Cross-Reference**.

- **Interviews:** Based on a series of discussion questions and an early assessment of the consistency between the Bonbright Principles, commonly accepted Regulatory Constructs, and the facilitation of net zero, 14 interviews were conducted to test perceived challenges, as well as the merit of potential governance or regulatory solutions. The interviewees represented a broad cross-section of parties involved in utility regulation with diverse jurisdictional representation across Canada. To obtain candid and actionable input from interviewees, these interviews were confidential. None of the comments provided are specifically linked to the representatives of any particular entity or professional involved in energy regulation.

- **Regulatory Recommendations:** Based on the assembled knowledge and detailed discussions noted above, a series of recommendations were developed. These recommendations reflect on commonly accepted Regulatory Constructs which may benefit from enhancement to better facilitate net zero. Each recommendation is supported by a discussion of the core challenge faced by the electricity sector and regulators, the potential solutions to these challenges, and some of the trade-offs and pitfalls associated.

- **Governance Recommendations:** Based on assembled knowledge of governance and legislative structures across Canada affecting utility regulation, as well as detailed discussions with professionals directly involved with energy regulation across Canada, a series of recommendations was developed. These recommendations are intended to aid elected government, regulators, utilities, and relevant stakeholders in advancing energy governance structures conducive to the achievement of net zero. Each recommendation is supported by a discussion of the core challenge faced by the electricity sector and regulators, potential solutions to these challenges, and some of the trade-offs and pitfalls associated.

- **Implications for Bonbright and Regulatory Constructs:** Having determined a series of regulatory and governance recommendations which facilitate net zero, this Report then assesses what specific principles, whether they be they Bonbright's or commonly accepted Regulatory Constructs, might be impacted through implementation of the recommendations.

The discussion and recommendations included in this Report, as well as the implications for the Bonbright Principles and Regulatory Constructs, were tested and reviewed with interviewees and a broader group of relevant stakeholders who are knowledgeable of the sector. As such, while the discussion and recommendations can only be assigned to Electricity Canada and the authors of this Report, the refinement of these conclusions were informed by a broad and diverse set of consultations. While not all recommendations will apply equally to all jurisdictions, the report reflects an ideal state for energy governance and regulatory constructs that can be applied within the specific context of a given jurisdiction's energy regulation.

3. Regulatory Recommendations

The following sections address the core areas highlighted by interviewees while preparing this Report.

Each section opens with a succinct and clear recommendation (or recommendations) for regulatory approaches that facilitate net zero's achievement.

Second, a high-level overview of interviewees' comments is provided, focusing on the most pressing challenges faced by regulatory participants across Canada's jurisdictions.

Finally, each section discusses the underlying challenges described by interviewees and explores potential solutions to these challenges, including addressing potential trade-offs and pitfalls. These considerations ultimately led to the recommendation(s) provided.

While the regulatory recommendations expressed in this report represent evolution, as opposed to revolution, the urgency to address these issues is high. Left unaddressed, the issues discussed below represent credible barriers to achievement of net zero, which utilities are not positioned to overcome alone.

3.1 Flexible Regulatory Constructs

Regulatory Recommendation 1:

Establish flexible regulatory frameworks which allow for the proactive submission of utility investment or service proposals which are not bound by prescriptive timing requirements; allowing for multi-year investment plans or targeted requests submitted mid-rate-term. When new and innovative frameworks are a specific response to facilitate net zero policy, utilities should demonstrate that they are pursuing this end.

Comments

Comments from interviewees were varied with respect to the regulatory constructs and rules under which utilities apply for approval of investments, services, and, ultimately, rates. While some acknowledged that, in some respects, current regulatory approaches are not fit-for-purpose to achieve net zero, there was broad agreement that current regulatory approaches bring significant benefits that all parties should actively work to preserve. Some interviewees noted developments since the work of Bonbright and others in the 20th century to advance the standard Cost of Service regulation into multi-year, or Performance-Based, rate-setting, and noted that this was a significant evolution that did not require abandoning Bonbright's Principles or existing Regulatory Constructs.

A frequently cited challenge was the stringency of rules and procedures and, in some cases, apparent inertia when it comes to considering innovative proposals for investments, services, or rates. Prescriptive requirements for when an application must be filed (or not filed) and what type of application would (or would not) be permissible to file were cited as fundamental barriers to utilities proposing innovative solutions to known challenges.

Very few interviewees had fundamental disagreement with the Bonbright Principles. Focus was instead placed on the continued need to balance different principles against one another in rendering a regulatory decision. Additionally, the need to keep the present-day context in mind was a highlighted. In some assessments, the prioritization of rate stability has exceeded other vital principles and priorities by too far a margin.

Discussion

As noted, the scale and urgency of utility investments during the upcoming energy transition will likely exceed historical norms. Forecasts suggest that electricity capacity must increase somewhere between 2.2 to 3.4 times by 2050 to enable net zero.[14] Even in a more nuanced energy transition that is less focused solely on electrification, the cost of electric vehicle (EV) proliferation and grid modernization alone (on top of standard system investments like the maintenance of aging networks) should be expected to drive both capital and operational budgets beyond traditional tolerances. At the same time, the precise pace and nature of investment required remains highly uncertain, with government policy, technology changes, and consumer market dynamics all in flux. This combination of a need to invest in advance of surging demand and uncertainty surrounding the precise timing of such demand creates a significant challenge for traditional rate-making approaches.

Bonbright's work affirmed the original, longest-lasting regulatory approach: establishing cost-based rates through a Cost-of-Service review. In the purest implementation, a Cost of Service structure would require a full review of utility costs each year in order to ensure that the rates billed to customers are, in the aggregate, a reflection of the total revenue requirement needed by the utility to cover its prudently incurred costs. This would include the cost of capital (i.e. including the opportunity for a fair return on equity). Combined with minimum service requirements and an obligation to connect and serve customers, a clear set of incentives are assigned to the utility:

- Capital investments drive earnings; thus, capital investments are the preferred solution.
- Larger capital investments yield larger returns; thus, larger capital investments are generally desirable.
- Investments are right-sized because a utility must demonstrate that assets are used and useful, and that expenditures were prudent.
- Failing to demonstrate the above will result in exclusion of assets from rate base, rendering them ineligible to derive a return on equity invested.
- Failing to meet minimum service requirements or the obligations to connect may trigger compliance enforcement.

[14] Canadian Climate Institute, 2022, The Big Switch, p.9

While the specifics of present-day regulatory approaches vary from jurisdiction to jurisdiction, one commonly used approach is the establishment of rates for multi-year periods; an approach often termed Performance-Based Regulation (PBR).[15] Under PBR and similar multi-year rate-setting frameworks, the first year of the period is established based on a standard Cost of Service review, strongly aligned with the principles and practices outlined in Bonbright's work. Once rates are set based on a utility's costs, rates for the remaining years of the term are established based on gradual increases tied to an escalation index, often some derivation of inflation measurement. In some jurisdictions, the inflation index used is reduced from its pure result to incent utility productivity or 'stretch,' pushing utilities to prioritize investments and generally do more with less. With utility costs and revenues effectively disconnected from one another, costs below expectations can increase earnings, while costs above expectations will decrease earnings.

Constructs of multi-year rate-setting, particularly PBR, have worked well within the context in which they were deployed; namely a focus on system maintenance, expansion paced with customer and consumption growth, and continuous efficiency improvement. As a result, the regulatory burden of more frequent applications to the regulator is relieved, customers experience largely predictable rates, and utilities' incentives are aligned with those of customers from an economic standpoint.
However, the achievement of net zero creates a new operational context in which new levels of investment, net-new types of investment, or both may be required on an accelerated schedule. Such expedited investment may not be consistent with prior years, or the multi-year rate-setting approaches designed for it.

At its core, PBR and similar approaches assume that each year will be similar to the last, with incremental change and growth. With all rates established based on the first year of the term through a Cost of Service review, there is generally no opportunity to proactively consider investment needs in the later years of the rate term, even if the utility has credible evidence to suggest above-average investments are required in those years.

[15] London Economics International, prepared for Canadian Electricity Association, PERFORMANCE BASED RATEMAKING IN CANADA: Current Practice, Key Principles and Lessons Learned in Forming a Regulatory Regime, June 7, 2011, https://fileservice.eea.comacloud.net/FileService.Api/file/FileRoom/11702373

The options available under this scenario are not tenable. In theory, a utility could attempt to prorate future investments into its first-year Cost of Service budget; however, a regulator is unlikely to be able to approve costs in the first year's rates, that are not taking place in that year. Alternatively, a utility could 'self-fund' investments in the later years of the term, proactively accepting revenues below their costs in those years, which all else equal would redirect fair returns for the shareholder (public or private) towards depreciation, interest, and other costs. On returning to the regulator for its following Cost of Service review, the utility would need to defend its above-revenue investments as prudent and face a reasonable probability that some of these investments would not be entered into rate base and would thus not be eligible for cost recovery. Neither of these theoretical approaches bears practical merit at scale.

> "Account may be taken of future growth of capital investment and of net operating income as the company's plant and business expand in setting the reasonable rate…In estimating the rate of return that may be earned during the next year, or during some other future period, the commission will accept convincing evidence of changes in known and knowable operating expenses and in other operating deductions…a commission may substitute pro forma operating revenues and operating deductions designed to reflect current conditions."
>
> **Bonbright 1988, p.201**

To respond to this challenge, utilities must be permitted to submit innovative multi-year rate proposals that reflect their actual expectations of investment requirements, substantiated by sound evidence of needs, costs, and benefits. The Ontario Energy Board's (OEB) Custom Incentive Regulation (CIR) policy represents one approach to this, where a full 5-year forecast of costs and billing determinants are submitted for review to set rates. While the policy provides general direction, the specifics of how costs are recovered through rates are left to the utility applicant to propose[16] and the regulator to modify, reject, or approve (indeed, the OEB has done all three[17,18,19]). This is not to say the OEB's CIR is the ideal way, or the only way to achieve this. The vital principle is to allow utilities to comprehensively describe their longer-term investment needs and propose innovative solutions to meet them. While flexibility to propose multi-year rate-setting frameworks will address some needs driven by net zero, the high uncertainty surrounding the pace and specifics of the energy transition warrant consideration of additional mechanisms. Due to the significant volume of planning and work involved in preparing a comprehensive Cost of Service application, such efforts begin years before rates take effect. As such, the later years of a 5-year rate term will realistically be forecast as many as 7 or 8 years before the year in which assets are placed into service. For more uncertain investment needs, this creates a situation where otherwise robust utility applications may be denied due to a perception of insufficiently rigorous forecasts. Conversely, the approval of applications founded on insufficiently rigorous forecasts prepared too far in advance to achieve a reasonable level of accuracy is also sub-optimal.

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[16] Ontario Energy Board, Renewed Regulatory Framework, pp.18-22
[17] EB-2012-0459 – The OEB modified the structure Enbridge Gas Distribution Inc.'s proposal to index operating expenditures over the term
[18] EB-2013-0416 – The OEB rejected Hydro One's request for a 5 year Custom Cost of Service, issuing an approval for a only 3 year period instead and requiring a revised proposal for its next rate term
[19] EB-2014-0116 – The OEB approved the structure proposed by Toronto Hydro for inclusion of a capital "C Factor" in its annual rate index formula to escalate rates in line with a 5 year capital forecast

Uncertainty in pace, scale, and specifics, provides an opportunity for utilities to bring forward targeted, discrete, or novel proposals for investments or new services *during* their indexing rate terms, a time in which no such applications would traditionally be considered. This flexibility would allow utilities to make proposals to their regulators closer to the year in which such investments are required, significantly improving the accuracy of forecast needs, costs, and benefits. Such mechanisms exist in limited forms today in Canada's regulated jurisdictions and can provide a starting point for consideration of the mechanisms required for a regulatory framework that facilitates the achievement of net zero.

For example, the *Act Respecting the Régie de l'énergie* in Québec, though requiring 5-year rate terms with indexation in the intervening years, also provides Hydro-Québec the opportunity to submit applications mid-rate term for the establishment of a new rate.[20] In addition, the Alberta Utilities Commission (AUC) has continuously evolved an incremental capital funding mechanism into the present-day K Factor and K-bar constructs embedded in its PBR framework.[21] Similarly, the OEB has evolved its Incremental Capital Module (ICM)[22] through policy and case-by-case decisions since its initial establishment in the Renewed Regulatory Framework of 2012.
Each of these constructs have limitations however. While the *Act Respecting the Régie de l'énergie* may allow for new rate proposals, there is no similar provision for modifications to existing rates. The AUC's K Factor and K-bar constructs are relatively limited in their scope, pointing to specific investment circumstances for their use. The OEB's ICM is not available to utilities that take up CIR rate-setting, being generally limited to use for single-year projects, with no availability for capital programs. While the presence of these constructs is encouraging, restrictions such as those noted are likely to impede the investments and services required to facilitate net zero.

Adding to the tools in a utility or regulator's toolkit within this area are deferral and variance accounts, or 'trackers,' which allow for 'true-ups' of variance amounts relating to budgets which are inherently uncertain, or provides a deferral for review and recovery of amounts on a similar basis. When paired with other constructs or deployed on a standalone basis, such accounts can prove invaluable to both manage uncertainty and ensure that investments and decisions can be aligned in time with the information required to assess them.

It is reasonable for policymakers, regulators, or customer groups to expect mechanisms such as those listed above to be well designed and governed to avoid excess levels of investment. At least three protections should be evaluated to ensure this outcome. First, to the degree that the creation of such mechanisms explicitly responds to policy ends dictated by elected government (i.e. the facilitation of net zero), the use of the mechanism(s) should similarly be tied to fulfillment of those ends, with the onus on utility applicants to demonstrate that their proposals meet this test. Second, enabling these mechanisms places enhanced responsibilities on the regulator to critically review proposals, and stand willing to render both difficult and innovative decisions in a timely fashion, as discussed further in Section 3.5. Third, enhanced options for utility investments should be paired with enhanced frameworks to address incentives and risk allocation, as discussed in Section 3.2 below.

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[20] *Act Respecting the Régie de l'énergie*, Section 48.4
[21] Albera Utilities Commission, Decision 20414-D01-2016, pages 46-69
[22] Ontario Energy Board, EB-2014-0219, Report of the Board - New Policy Options for the Funding of Capital Investments: The Advanced Capital Module, September 18, 2014

Flexibility and regulator oversight are of particular importance for either of these innovative rate-setting approaches to function effectively.

The matter of regulator oversight is addressed in Section 3.5 below. Concerning flexibility, establishing (or improving) mechanisms to meet unique needs is of little use if they are too prescriptive to apply to unique situations. To be clear, regulatory certainty and predictability remain valuable and essential concepts. However, while the principles and tests underpinning the review of these rate-making mechanisms should be clear, prescriptive rules regarding why, when, how, and in what format proposals must be made should be given a lower priority by regulators. Tests should be tied to the highest priority principles such as basic prudence, benefits exceeding costs, lack of duplication from existing capital budgets, and materiality commensurate with the regulatory burden to review the application in question. In addition, these mechanisms should not be prescribed as applicable only to a specific type of investment or initiative, as this precludes the utility from proposing innovative solutions to novel problems arising through the energy transition.

3.2 Re-alignment of Objectives, Incentives and Risk Allocation

Regulatory Recommendation 2:

In applying the principle which requires an asset to be “Used and Useful” to form a part of rate base and earn a return on equity, regulators need to acknowledge and place increased weight on utilities’ obligation to serve in a time of significant forecast uncertainty.

Regulatory Recommendation 3:

Enhanced incentive opportunities should be available based on demonstrated performance, which balance the potential for additional earnings with appropriate risk sharing.

Comments

As the objectives and corresponding expectations of utilities expand, interviewees rightly questioned whether the incentives created by current regulatory approaches are aligned with net zero objectives. This question is important given that utilities are generally risk-averse. Utilities are expected to facilitate the proliferation of third-party non-wires alternatives on their systems and to oversee significant capacity expansions in a context of heightened uncertainty. It is reasonable to weigh whether the Bonbright Principles and current Regulatory Constructs appropriately align incentives. Interviewees noted that the current approaches applied in Canada primarily focus on short-term cost control and have no specific incentive associated with these new and expanded objectives.

Incentives can cut both ways. As one interviewee noted, if any non-regulated entity could double its size, it would have to answer to someone. While basic accountability is provided through regulator oversight, some interviewees communicated the need for all parties involved in the energy transition, including electric utilities, to put ‘skin in the game’.

Discussion

As noted, PBR and similar regulatory approaches are relatively effective in achieving the objectives they were established for, namely the meeting of minimum service requirements, as well as cost and rate control, regulatory efficiency, and the appropriate allocation of risk between ratepayers and utilities. However, as utilities' operating environments change, these regulatory approaches will stray further away from their ability to facilitate desired outcomes.

While the standard Cost of Service approach codified by Bonbright embedded its own set of incentives into regulatory processes, PBR and multi-year rate-setting added new incentives to pursue an expanded set of objectives. By indexing rates between Cost-of-Service years, a utility was assigned an incentive to control costs downwards during these years to either protect earnings at current levels by avoiding cost overruns, or to enhance earnings through cost reductions. This new construct continued to be based on the work of Bonbright and the Cost-of-Service model but recognized that such an enhancement could enable the pursuit of new and desirable goals.

Turning to the present-day context, the question must be asked; are the incentives of present-day regulatory constructs aligned with the objectives assigned to utilities? For example, what incentive does a utility have to build EV charging capacity before the demonstrated presence of an EV charging need? What incentive does a utility have to leverage third-party non-wires alternatives if such alternatives result in less capital expenditure and fewer earnings? What incentives do utilities have to reduce long-term costs through innovative energy storage or grid modernization technologies if such technologies bear a higher risk of disallowance from rate base relative to traditional capacity investments?

The answers to these questions matter as they have real-world consequences. For example, system expansions may not be built to accommodate future EV proliferation without proper incentives, requiring sub-optimal (i.e., more expensive) after-the-fact capacity expansion. Similarly, non-wires proliferation, energy storage, and grid modernization may continue to falter and make up a negligible portion of utility expenditures; replaced by traditional, reactive capacity investments that yield higher long-term costs.

Like establishing PBR and multi-year rate-setting, the opportunity exists through incentive enhancement to build on current, successful regulatory constructs to meet the changing objectives assigned to utilities. First, a given jurisdiction must articulate the new objectives of utilities clearly. This is determined by government policy, as further described in this Report, and should require a specific outcome to be facilitated by the electric utility and its regulator. Second, the modification of utility incentives to achieve this specific outcome.

The nature of the incentive modification required will vary based on the end objective sought. For example, in many respects, the facilitation of EV charging via enhanced capacity may be well aligned with current regulatory approaches, given that the solution required is likely a capital expenditure. In this case the enhancement relates more to the allocation of risk. Clear government policy expectations should provide reasonable assurances that these investments will be eligible for cost recovery in rates provided the expenditures themselves are demonstrably prudent. In this context, the regulator would need to prioritize the articulated objectives specified by government (e.g., EV proliferation) over other regulatory principles, such as the requirement that an asset be used and useful.

This relative weighing of regulatory principles already happens in current regulatory practice, particularly as it relates to the used and useful principle. For example, supply chain challenges and prolonged delays for critical components have become common since 2020, and for the most part it is deemed appropriate for a utility to procure and store such components, such as transformers, for future use even though these assets may not be used and useful for years. Capital projects are by nature 'lumpy'; often installing capacity well in advance of the full capacity being needed. To facilitate net zero however, regulators' application of the used and useful principle may need to test new grounds, as both the investments required and levels of forecast uncertainty exceed historical norms.

The appropriate allocation of risk in applying core Regulatory Constructs like the used and useful principle is critical not only to facilitate net zero, but also to maintaining cost-efficiency. Though investing in electrification capacity sooner rather than later may be a more cost-effective approach, utilities are unlikely to do so if risks are unacceptably high; resulting in lost opportunities and higher long-term costs. Similarly, the Cost of Capital, both debt and equity, is impacted by the relative risk a given utilities poses as a borrower or an investment. All else equal, greater risk and uncertainty will increase the Cost of Capital for a utility, and ultimately increase costs for ratepayers.

Other desired outcomes may require more active modification of the utility incentive structure, such as the proactive facilitation of non-wires alternatives; particularly in circumstances where they are enabled by third parties to the utility. Given the relative success of current regulatory practices, an approach which prioritizes incremental regulatory innovation is warranted to ensure that incentive modification is both targeted and commensurate with the scale of investment and outcome required.

PBR sought to provide utility management the opportunity to make trade-offs between capital and operational expenses by providing a means to enhance earnings through operating cost reductions. While this was relatively effective in controlling costs, the incentive structure did not advance to a point where utilities were incentivized to pursue operational solutions over capital investments to meet system needs. This creates a gap in incentives where approaches that may prove vital to achieving net zero, such as increased use of demand response or non-wires alternatives, are not accompanied by incentives for utilities to leverage them.

One targeted and straightforward approach is a weighted scorecard, which provides additional earnings opportunities for achieving targets across established success metrics. The mechanics of this incentive approach are important and must be the subject of detailed analysis and scrutiny by an empowered regulator. These constructs are not new to regulators, having been widely employed to incentivize the successful deployment of energy efficiency programming[23] as well as other objectives in the UK,[24] New York State,[25] Hawaii,[26] and elsewhere.

In adjusting risk allocation and incentive mechanisms, utilities and regulators must assess the appropriate tools to accomplish the task at hand; there are many logical ways in which deferral or variance accounts could facilitate the abovementioned approaches.

Balancing these changes is the need to ensure ratepayers continue to receive value for money, and are not subject to undue risk. Poorly designed or poorly implemented changes could lead to enhancement of utility earnings without commensurate benefit to customers and society. In a worst-case scenario, this ultimately shifts the risk profile of the utility towards a greater risk for the ratepayer, and without its commensurate benefits.

There are at least three key paths to avoiding this outcome. First, a government-funded solution may be appropriate to mitigate ratepayer risk, where changes in risk allocation and incentives are driven by government policy. For example, government policy could set a clear expectation that electric utilities will proactively build the capacity required in their systems to support widespread EV charging, even if the need for such capacity is not present today. One potential outcome could be that the widespread use of EVs occurs faster than anticipated, boosting customer demand and load, and driving revenues sufficient to offset the incremental costs incurred to increase system capacity. The EV demand and load could also conversely fail to materialize on the expected timeline, and ratepayers would be required to bear the cost of underutilized system capacity. To the degree government policy drove the investment in question, it is not unreasonable to expect the government to play a role in mitigating these risks.

Such mitigation could occur on the front end of investment through direct subsidy or on the back end through innovative risk-sharing mechanisms or rate relief. In this case, and as explored further in this Report, governments interested in seeing investments such as these made should also explore incentive structures outside of the rate-making construct.

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[23] e.g. Ontario's Natural Gas Demand Side Management Shareholder Incentive
[24] UK Office of Gas and Electricity Markets, Revenues using Incentives to deliver Innovation and Outputs (RIIO) ED-1
[25] NYS Public Service Commission, Case 14-M-010, May 19, 2016
[26] Hawaii Public Utilities Commission, DECISION AND ORDER NO. 37787, May 17, 2021

Second, it is reasonable to expect that a utility seeking enhanced earnings opportunities to achieve a new and expanded set of objectives, should also share in the enhanced risk profile of its investments. For example, if a weighted scorecard were used to incentivize the timely and efficient connection of distributed energy resources or non-wires alternatives to defer or avoid infrastructure investments, utilities and regulators should consider the appropriate consequences for the utility in the event such objectives are not met. Making a risk-free incentive construct for the utility stands to create a risk-prone construct for ratepayers. Utilities must be prepared to put 'skin in the game' to enable enhanced earnings opportunities. Like the scorecard itself, the mechanics at play are important and must be the subject of rigorous regulator review, but in large part, should be expected to resemble a sliding scale in which poor to excellent performance against targets results in an outcome reflecting a penalty to the downside and a reward to the upside. In another iteration, utilities and regulators might consider the proactive assumption of the worst possible "penalty" upfront in rates, with an incentive that only generates rewards, effectively avoiding the retroactive rate-making effect of after-the-fact penalties.

Third, allowing for enhancements or alterations to present-day incentives and risk structures requires regulators to be sufficiently resourced and empowered to provide a timely, thoughtful, and critical review of proposals. This need is further addressed in Section 3.5 below.

3.3 Clear and Comprehensive Benefit-Cost Analysis Testing

Regulatory Recommendation 4:

Enable utilities and regulators to leverage alternative Benefit-Cost Assessments (BCAs) to assess non-traditional utility investments. This can be accomplished through regulators establishing frameworks proactively, or through case-by-case decision-making for the use of different BCAs in different circumstances.

Comments

When it comes to Benefit-Cost Assessments (BCAs), several interviewees identified a gap in current regulatory constructs related to the facilitation of net zero. In several Canadian jurisdictions, there is active exploration, or implementation, of integrated resource planning and pursuit of non-wires alternatives to traditional infrastructure investment. A common challenge across these jurisdictions is the need for a set of tools to consistently evaluate disparate solutions to system and customer needs, utilizing methods shared and accepted by all parties in the regulatory process. While some regulators are exploring alternative forms of BCA, there is not a consensus regarding what tests should apply and under what circumstances.

On a separate but related note, interviewees pointed out the challenges that may arise during the energy transition relating to customer capital contributions and associated ratepayer cross-subsidy. It is generally accepted by participants in energy regulation that present-day methodologies which utilize customer contributions to avoid cross-subsidization are not always precise, as they are often designed to balance against the practicality of applying them. Questions were raised however, concerning whether new types of connecting customers in the early years of the energy transition may entail costs or benefits that are not currently captured by the industry's most commonly accepted methodologies.

Discussion

Though regulators are charged with protecting the public interest, economic regulators are generally not empowered to enact social ends of a non-economic nature; instead focusing on the protection of safe and reliable service at the lowest reasonable cost. As elected governments embed new, policy-driven objectives in planning and rate-setting, a new common language will be required in regulatory forums to 'economize' the outcomes sought. This common language must take the form of a Benefit-Cost Assessment (BCA) framework.

To receive approval of investments focused on expanding capacity or enhancing system performance, utilities must generally demonstrate that they have selected the most cost-effective option, though this may not necessarily be the least cost option. A common approach to completing this analysis is a basic Discounted Cash Flow (DCF) analysis which compares incremental costs amongst various alternatives on a Net Present Value (NPV) basis. Like other regulatory mechanisms analyzed, standard approaches to DCF analyses have proven effective in the status quo environment of the past several decades. However, their blanket application to new types and levels of utility investment in pursuit of net zero achievement may create challenges.

The scope of potential benefits included in a standard DCF is largely limited to the utility costs and cost reductions (if applicable) that a particular investment over a defined period will achieve. As new utility objectives push the proposal of innovative solutions, it is reasonable to conclude that some important options will be naturally disadvantaged in a standard DCF analysis. For example, the costs of non-wires alternatives such as demand response programs or energy storage embedded in a distribution grid are clear, with the former bearing year-over-year operational costs and the latter generating depreciation, interest, return on equity, income tax and operating costs. In contrast, it is possible neither of these utility expenditures generate revenue in rates or offset other operating costs. Both have the potential to defer or avoid traditional infrastructure investments however, which may prove to be more expensive than the non-wires alternative, but without a BCA to capture this benefit, there is no economic case for the investments.

Separate to utility system investments, where the investment is to connect a new customer or group of customers, any negative delta between incremental revenues and costs will be assigned to the connecting customer(s) as a capital contribution.[27]The concept of a capital contribution paid by a customer causing the utility to incur incremental costs greater than incremental revenues seems relatively straightforward. Indeed, this concept is highly consistent with Bonbright's Principle of fairness in apportioning the cost of service among different consumers. In some circumstances, however, the assignment of capital contributions can be challenging.

"…the acceptance of the enterpriser's cost as the only relevant cost is justified only under the important assumption that this cost reflects, with tolerable approximation, the sum total of costs or losses, both private and social, imposed upon the entire community or nation by the construction and operation of a utility plant…if the assumption is invalid, then the theory of cost pricing faces a dilemma—that the payment of cost by the consumers to the corporate producer does not constitute full payment of cost or losses by the consumers to the whole community.

But one must not assume that enterpriser costs always fall short of reflecting total social costs. Indeed, they may greatly exceed the net social costs of plant construction and operation, since they may include outlays by the public utility enterprise resulting in social benefits other than those derived from the use of the service…"

Bonbright 1988, p.114

[27] An upfront fee to the connecting customer which acts as a reduction to a utility's rate base, and theoretically brings incremental costs and revenues to neutral over the analysis time period. In practice, many capital contribution policies achieve this end through simplified approximations (e.g. allowing for a certain connection distance for free, with incremental cost per m afterwards)

In the case of upstream capacity expansions for example, in some instances, a customer may "trigger" the need for expansion. This could be due to their connection, or to the expansion of their facilities. The customer may be assessed a capital contribution, despite none of the previously connected customers taking up available capacity in that area being required to do the same. From one perspective, the investment is only required because of the single customer; from another, it is only the timing of this customer's connection or expansion which singles it out, while all other nearby customers may have received comparable capacity at no cost outside their standard rates.

Other challenges may arise where revenue forecasts are uncertain. For example, if an EV charging station wished to connect to an electricity distributor, a forecast of revenue (built with demand and consumption forecasts) would be required. A conservative forecast may competitively disadvantage the EV charging company, potentially even rendering the investment uneconomic, but it would be more likely to protect existing ratepayers from effectively subsidizing the EV charging company and may be perceived as more likely to receive regulatory approval as a result. On the other hand, a generous revenue forecast might provide the economic conditions necessary for the EV charging station to proceed but risks cross-subsidization from existing ratepayers to a competitive business, and likely bears regulatory risk for the utility. For this Report, the question for decision-makers to assess is whether other desirable outcomes that create societal benefit would be at play in this scenario and whether such benefits warrant being quantified for proper regulator assessment.

Though a standard DCF is the most commonly used BCA for assessing utility investments, and similar DCFs are typically used to inform capital contribution policies, it is far from the only economic test regulators utilize in Canada. Energy efficiency programming has long been subject to various economic tests assessing different costs and benefits, such as the Total Resource Cost Test[28] and the Societal Cost Test.[29] Natural gas transmission projects in Ontario continue to be assessed under the OEB's EBO 134[30] policy, in which stage 2 and 3 economic benefits are included in determining whether transmission expansion is economic. With many other available iterations of potential BCAs, the challenge is not the availability of methodologies. The challenge for individual jurisdictions is first to determine the appropriate tests to use for specific types of investments, and then to ensure regulators are appropriately empowered to consider the results of these tests in rendering their decisions.

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[28] Total Resource Cost Test: Frequently used in assessing energy efficiency and demand management initiatives, the test incorporates the benefits of avoided energy costs. Among other elements, the TRC test does not treat energy efficiency incentives as 'costs', given they are simply the shifting of ratepayer funds from one group (all rate payers) to a subset of that group (program participants)

[29] Societal Cost Test: Largely similar to Total Resource Cost Test, incorporating additional benefits. At a minimum, the SCT would be expected to include a cost of avoided carbon emissions and the use of a more favourable 'societal discount rate' rather than a Weighted Average Cost of Capital or other discount rate

[30] The Ontario Energy Board's EBO 134 policy, once applicable to both natural gas transmission and distribution expansion, is now only utilized for transmission expansion. The test considers additional economic benefits, such as the energy cost savings accruing to end-users through expanded use of natural gas (relative to more expensive fuels) and the economic benefits of construction and more competitive businesses (via reduced energy costs)

On the first matter, jurisdictions will, by definition, need to determine which tests are most appropriate for use. How this is achieved could be a matter of upfront government assessment and enabling policy, broad review through a regulator-initiated generic proceeding or consultation, or on a case-by-case analysis of proactive utility proposals. As was the case for energy efficiency, it is anticipated that early years of alternative BCA use may be characterized by disparate use of different tests. A national industry consensus is likely to emerge over time however, with remaining differences limited to jurisdictional-specific details. In all cases, jurisdictions exploring alternative BCAs would be prudent to look at broader industry initiatives, such as that of the Electric Power Research Institute,[31] to inform their considerations and increase the likelihood of industry alignment over time.

The empowerment of regulators in this area will largely depend on the specific mandate and authority of the regulator in question. In an ideal scenario, regulators could consider and appropriately weigh the outcomes of alternative BCAs independently, within a broader consideration of the public interest and the setting of just and reasonable rates. Indeed, there is consistency in leveraging appropriate BCA outcomes within the context of Bonbright's Principle that rates reflect all the present and future costs and benefits created by a service's provision. However, regulators may require government direction to empower them to consider benefits beyond traditional regulation. This would ideally be done through softer tools, such as Mandate Letters or similar. In some jurisdictions, modification to regulation or legislation may be required.

Most importantly, a reasonable level of discretion should be left with the regulators to determine the appropriate BCAs to be used for alternative investments, or for the utilities themselves to propose an appropriate BCA. A broad mandate for an economic regulator to "include the cost of avoided emissions" in its decision-making opens the door for considerable wrangling between parties arguing for different scopes of emissions to be included, different values of emissions to be included, and different weighting to be assigned to emissions' value in rendering decisions. Ideally, the regulator would be empowered to provide clear guidance, upfront or through sequential case-by-case analyses, regarding the appropriate BCAs and their mechanics.

[31] E.g. EPRI Guidebook for Cost/Benefit Analysis of Smart Grid Demonstration Projects, Aug. 20, 2015

3.4 Responsive Rate Design

Regulatory Recommendation 5:

Utilities should proactively monitor changes in customer consumption patterns within and across their rate classes for imbalances caused by the energy transition, and consider opportunities to correct these through cost allocation (inter-rate class) and rate design (intra-rate class).

Regulatory Recommendation 6:

Where utilities propose new services or initiatives directly responding to government policy, opportunities to propose marginal cost pricing or comparable competitive cost pricing should be deemed appropriate by the regulator.

Comments

All interviewees accepted that the energy transition will not affect all customers equally. While the end state envisioned for a fully electrified net zero economy may include all customers deriving their energy from electricity, this transition cannot practically happen uniformly. Some customers will electrify sooner than others, while all customers are expected to bear a portion of the costs to prepare electricity systems for electrification. Many interviewees shared the concern that costs may not naturally be apportioned to the customers that cause those costs. This concern is particularly acute regarding low-income customers. While discussing rate design as it relates to the energy transition, many interviewees questioned the degree to which present-day rates align with Bonbright's Principles, and what types of rates would be required to stay true to these principles in the future.

In addition, some interviewees noted the emergence of net new utility services and initiatives which may not be conducive to standard rate-making approaches, under which the cost of a particular service would be recovered from recipient ratepayers on a fully allocated basis.

Discussion

The Bonbright Principles reflect on the importance and practice of rate design, with particular focus on the need for fairness in apportioning the cost of service among different consumers. Across Canada's regulated jurisdictions, there is a deep and complex set of frameworks for the appropriate steps required to apportion a utility's costs across its various rate classes, considering asset classification, functionalization, and ultimate allocation of costs.

Less commonly examined is the relevance of considering cost causation and cost apportionment *within* a customer class, as the billing determinants used to collect revenues from customers per specific rate class are re-assessed with relative infrequency. In a status quo environment, neglecting to re-assess how a particular rate class is billed is not material, as customers are generally assumed to be of similar consumption patterns and volumes, and such patterns are unlikely to demonstrate meaningful change unnoticed.

As customers increasingly participate in the shift toward net zero and electrify, it seems highly probable that today's 'status quo' will gradually drift from reality. For example, it is reasonable to assume that residential customers will electrify at a pace dictated by their personal circumstances, disconnected from their fellow ratepayers within a given rate class. Given this, it is important to ask what an electrified customer's impact on electricity systems will be and which groups of residential customers are most likely to electrify first. The answers to these questions are intuitive. First, the demand of electrified customers on transmission and distribution systems will be significantly greater than that of their non-electrified peers. In some cases, these increased demands will require system investments. Second, unless there is significant policy intervention, the customers that electrify first will be those with the financial means to do so. Most electricity distributors employ a combination of fixed and variable charges to recover the distribution costs from residential customers, with some employing only a fixed charge to reflect the fixed nature of distribution costs. The outcome of such a situation is clear, and, if not mitigated, could result in low-income consumers subsidizing the electricity use of affluent customers with the financial means to purchase an electric vehicle and an air source heat pump.

Governments have an array of policy tools to alleviate circumstances such as those illustrated above. From a rate-making perspective however, this illustration highlights the potential for the energy transition to push rate designs away from the Bonbright Principles that informed them in the first place. While electrified residences will push annual electricity consumption upwards in the aggregate, the rate design challenge they present is one of coincident peak capacity. For example, if an electrified consumer is utilizing a Level II EV charger on a cold winter's day when the efficiency of their air source heat pump is low, their premises could have double or triple the average residential demand. These high-demand consumption patterns are what drives capacity investments, and rate designs that fail to recognize these changing patterns of consumption will no longer be consistent with the Bonbright Principles and the commonly accepted principle of cost causation.

Under these circumstances, utilities must maintain a heightened awareness of changes in customer consumption patterns and stand ready to propose alterations to rate design which re-aligns rates with core rate-making principles. Regulators, for their part, must be prepared to hear evidence and proposals for changes to rate design, even where these proposals stray from commonly accepted rate structures within their jurisdiction. Solutions to these challenges could take a number of forms: ranging from expanded use of demand (kW) charges for customers in rate classes that have typically not been billed on this basis, to the use of dynamic pricing or peak reducing rates, to the use of more careful alignment of marginal costs with marginal revenues driven by the billing determinants of variable rates. Expansion of alternative rate designs in general service classes, particularly residential rate classes, will no doubt require extensive customer engagement and a thoughtful and paced implementation plan. At the same time, it is possible that some inequities emerging during the energy transition are best addressed by government, as opposed to through rate design. If government policy is the ultimate driver for the emergence of these inequities, taxpayer subsidies or other interventions may prove to be more effective tools to alleviate them.

On a more targeted basis, utilities may also need to propose net new services to consumers in response to government policy. Traditional cost allocation and rate design practices in Canada suggest that the rates for such services should bear the full weight of the cost to provide service to recipient customers. While this may be appropriate, regulators should remain open to exceptions, particularly where proposals directly respond to government policy. Achievement of net zero will involve consumers making decisions outside the norms of past and present practice, such as purchasing an EV or participating in a hybrid gas-electric heating initiative. Like any new undertaking, in its nascent state, a new service will likely be burdened with start-up costs and high fixed costs relative to the number of participating and revenue-contributing customers. A reasonable level of cross-subsidization may be required to allow new services or initiatives to reach a critical mass, at which point self-sustaining rate-making can be assessed for viability. In such cases, utilities should be able to propose rate structures that reflect marginal or comparable competitive costs instead of fully allocated costs, where the value of the service or initiative can be substantiated, and the ends sought are directly tied to established government policy.

3.5 Appropriately Empowered and Resourced Regulators

Regulatory Recommendation 7:

Ensure regulators are sufficiently resourced and that their independent decision-making capacity is maintained to empower them to review an increased number of novel and innovative proposals.

Comments

In discussing the fundamentals of regulatory frameworks and governance, some interviewees questioned whether the core mandates of regulators could be expanded to facilitate net zero more explicitly. Conversely, others pointed out that at their core, regulators serve at the pleasure of statutes and have the power only to apply legislation, not create policy. When asked, most interviewees agreed that the unelected nature of Commissioners naturally limits the degree to which they should be empowered to lead on policy instead of following it. There was general support for the continued importance of regulators acting as well-informed, independent decision-makers and providers of transparency and assurance to utility customers and the general public. More than one interview highlighted that regulators are also uniquely positioned to act as providers of accurate and objective data and information about the energy sector.

Some interviewees noted that while there is limited benefit to the Commissioner that issues a bold decision, there is plenty of blame assigned should a decision result in sub-optimal outcomes. Furthermore, the often-referenced issue of information asymmetry[32] between utilities and regulators continues to present challenges, particularly in instances where regulators do not have the resources to provide the type of review that might be required for an innovative or first-of-its-kind proposal. The same principle applies to broad assessments or consultations on regulatory rules, guidance, or frameworks; without adequate resourcing, these initiatives simply will not happen.

[32] The commonly accepted challenge that utilities have in-depth knowledge of their business which is difficult to provide on a basis that is both comprehensive and digestible in the course of regulatory proceedings

Discussion

Flexible policies for investment proposals, adjustments to incentive and risk structures, consideration of alternative BCAs, and alterations to make rate design more responsive can only succeed in an environment where regulators are empowered and resourced to meaningfully and independently review utility applications, and provide clear guidance to regulated entities. In many respects, there is rarely an 'upside' for a Commissioner in issuing their Decision, while the presence of 'downside' is ever-present if a decision proves sub-optimal. If a regulator is insufficiently resourced and the objectives for the electricity sector are not made clear and certain by government, there is a risk of conservative decision-making. The net result of the enhancements to Regulatory Constructs proposed in this Report will require Commissioners to have the discretion to reject proposals which do not meet the evidentiary burden or substantiate the value of the investment. However, such policies also require governance structures that empower regulators to approve thoughtful, well-substantiated utility applications requiring rate-making constructs outside standard cycles and approaches. This requires both sufficient resourcing of regulators and the active maintenance of regulator independence to review the evidence and render sound decisions.

4. Governance Recommendations

First and foremost, this Report is interested in establishing regulatory principles and constructs to facilitate net zero's achievement. Exploring the constructs and principles required naturally raises energy governance questions, that are equally important to establishing a regulatory framework fit for net zero, and these questions cannot go unanswered.

The following section provides comments, discussion, and recommendations on three key areas of energy governance that must be addressed if any regulatory framework can accommodate net zero's achievement. These recommendations highlight the need for a clear definition of the roles and responsibilities of elected government, independent economic regulators, and utilities, as well as the empowerment of these entities to carry out their roles and responsibilities.

4.1 Rate-making is a Poor Substitute for Policy-making

Governance Recommendation 1:

Governments must utilize right-sized policy mechanisms, be they Mandate Letters, Regulation, or Legislation, to communicate timely, clear, and specific outcomes, which utilities and regulators are expected to facilitate without dictating *how* utilities achieve such outcomes or *how* regulators assess applications to achieve such outcomes.

Comments

The role of elected government in Canadian energy regulation is forefront in the minds of all stakeholders who participate in the regulatory arena. Despite being purposefully removed from the direct regulation of utilities, there is a broad appreciation for the irreplaceable role of elected representatives, in implementing policies that reflect the will of their constituency. Regulatory professionals are clear that no other entity can or should infringe on this responsibility.

There is a consistent view amongst interviewees that without clear and consistent policy direction, no entity, be it a regulator or utility, is empowered to take the actions necessary to facilitate net zero. A shared goal is required to ease the burden on all regulatory participants, and to enable proposal or approval of investments, services, or initiatives. Lacking specific policy-driven objectives from the government, economic regulation will, by design, default to its core mandate: managing utility costs and rates, and providing safe and reliable service, at the lowest possible cost. Further, some of the challenges encountered in the regulatory arena can only be determined through clear government policy. One frequently cited example is the coordination and future paths expected of different fuel providers; specifically electric and natural gas utilities.

There is a wide diversity of views concerning the means through which government should enact its policies affecting regulators and utilities. While some call for legislative amendments to enshrine new regulator priorities or powers in law, others caution that legislative amendments bear the risk of upsetting an approach to regulation which, despite shortcomings, has shown itself to be effective. While flexibility in policy implementation is desirable, there is also concern with establishing objectives which are too broad or ill-defined. Similar concerns exist that government policies affecting the regulatory process may become too numerous, resulting in increasing difficulty reconciling these objectives with one another, let alone reconciling new objectives with the fundamentals of the Bonbright Principles and commonly accepted Regulatory Constructs.

Across all interviewees, the worst-case outcome was clear; the government states an aspirational policy or plan but creates no law or directive and provides no funding.

Discussion

The regulator's role is to maintain consistent with the policies of its jurisdictional government, through the review of evidence, and setting of rates. It must not create social or economic policy of its own volition. While the Commissioners and Board Members of regulators have the expertise necessary for their role, they are not democratically elected representatives of the public empowered to affect any particular outcome outside of their mandates. This may sometimes lead to a perception among customers, interest groups, and energy sector participants that regulators themselves are a barrier to the achievement of net zero, or at the very least, that their enabling legislation forces them to act as such.

Clear and specific government policy is one potential solution to the perceived or real challenge of regulators acting as a barrier to net zero. Such policy could be as limited as specific targets for specific outcomes, or as broad as legislated expansion, or alteration of the economic regulator's mandate. There is merit to ensuring that economic regulators' mandates, tools, and authorities are fit for purpose, and we find this under active consideration in some of Canada's provinces. However, both policy-makers and sector participants must proceed with a high degree of caution in reshaping the mandates and enabling legislation of economic regulators for several reasons;

First, the effectiveness of an economic regulator is borne out of its independence from elected government, to assess evidence and make decisions within its established jurisdiction. Maintenance of this independence is paramount, and inadvertently disturbing this balance of jurisdiction and independence risks unravelling a system of governance that has been successful for a century or more. The roles and responsibilities of government and regulators must remain clear and distinct, with the government charged with setting policy and desired outcomes, and regulators charged to independently assess *how* such outcomes can be achieved within the context of applications brought before them by utilities. A government which strays into establishing *how* to achieve desired outcomes stands to sacrifice both a utility's effectiveness in delivering such outcomes and a regulator's independence in assessing potential solutions. Conversely, a regulator empowered to establish *what* specific outcomes are desired by the public has strayed into policy decision-making, which should ultimately remain the responsibility of democratically elected representatives.

Thus, while observers may fairly note that current regulatory governance constructs are not purpose-built for net zero achievement, the challenge may not be one rooted in the economic regulator's mandate. Regulators are generally empowered to oversee how outcome-based policies are implemented in the regulated arena, but such powers are of no use where the government has not established firm policies. Broad statements calling for emissions reductions, or unofficial plans and targets, are poor lines of support for a utility to make applications or for a regulator to rely on in rendering decisions. Where government emissions policy requires specific outcomes to be enabled by utilities and regulators, these requirements must be expressed clearly and directly to utilities and regulators. Only with a shared understanding of the required end-state can utilities be empowered with the certainty to develop and implement plans, and regulators be assured that approvals granted do not stray outside of their appropriate mandate.

Second, honouring the role of elected government in establishing policy does not require observers to ignore the challenges of the legislative process. Specifically, elected representatives are tasked with advancing the needs and preferences of their constituents across a wide variety of priorities, far beyond the limited scope of energy and energy regulation. This creates risk when legislative amendments are used to enhance the outcomes of regulatory processes, given that a tightly-scoped "tweaking" of an economic regulator's mandate can easily be overlain with legislative amendments to achieve any number of desired outcomes. Legislators would not be wrong to do this; it is their prerogative as the elected representatives of their constituents. The potential for well-intentioned and practically challenging legislative amendments remains.

For this reason, when the government seeks to lead with policy related to energy regulation, a full review of available tools should be explored. While uncodified statements of support or general intention do little to assist utilities and regulators in achieving desired outcomes, Mandate Letters, Letters of Direction, Decrees of Concern, or Special Directions from the government to the regulator, can be an effective tool. A thoughtful, targeted, and mandatory direction of this nature will empower the regulator to implement government policies without risking long-term, unintended consequences that might accompany more permanent alterations to mandates and powers. Changes to regulation presents as second choice, while full legislative revision presents itself as a third. This is not to say that revisions to regulation or legislation are inherently poor methods to effect change, merely that a government should survey its options to implement policy impacting economic regulators, and ensure that the tool used is the most appropriate for the task at hand.

Third, the efficiency of a regulatory proceeding may prove to be extremely sensitive to imprecise legal revisions of regulator mandates. By way of example, it is not unreasonable to view the inclusion of new and broad objectives for regulators as a viable means to facilitate net zero. In addition to setting just and reasonable rates, regulators could be empowered at a high level to “reduce greenhouse gas emissions” or “protect our natural environment.” Such revisions would likely be put in place to maximize the flexibility and independence of the regulator in carrying out its mandate, which is a laudable goal. However, in practice, the implementation of vaguely scoped objectives within a regulator’s mandate stands likely to initiate a never-ending debate in regulatory proceedings, as parties of all stripes submit evidence and argument to justify the position that applicants are doing too much, too little, or proceeding with the wrong actions entirely.

Precision is the key to effectively managing regulatory outcomes which facilitate net zero. While a generic mandate to “reduce greenhouse gas emissions” may be problematic, such an objective would be materially improved through specificity, for example, by requiring the regulator to enable “the reduction of greenhouse gas emissions from utility customers by XX% by 2030, XX% by 2035 and XX% by 2040”. Even this more specific version of an emissions reduction mandate may leave too much uncertainty in the regulatory process. As an initial step, governments might consider more specific outcomes, such as geographically defined access to electric vehicle charging for all residents by a certain date, or a specific capacity of distributed energy resource connections by a certain date. While prescribing *how* these outcomes are achieved may jeopardize the effectiveness of utilities and the independence of regulators, the more specific government policy is concerning *what* outcomes are desired, the more likely utilities and regulators will be to achieve such outcomes as effectively and efficiently possible.

While it will not always be easy for elected government to find the right balance between specific and non-prescriptive, the creation of clear and actionable government policy is one of the most urgent recommendations addressed in this Report. Without clear guidance from government, regulators and electric utilities are not positioned to play their important roles in facilitating net zero.

4.2 Democratically Enacted Policies Warrant Taxpayer Funding

Governance Recommendation 2:

Ratepayers should not be expected to bear the financial burden of net zero alone. If the net zero policies of elected government are driving utility costs, some form of government funding assistance is warranted, which will also leverage Canada's progressive taxation system to mitigate impacts on vulnerable populations.

Comments

Interviewees' views on the expected cost of achieving net zero are consistent and clear; any energy transition will require new levels of investment that significantly outpace historical norms. In some cases, participants in energy regulation made note that many utilities and regulators are experiencing challenges managing costs in a status quo environment, as a result of aging systems, steady customer and system growth, as well as the recently escalated costs of the materials and labour required to build and operate electricity systems. In addition, adding to existing pressures, the need to decarbonize electricity generation, modernize Canada's electricity grid, and significantly expand capacity relative to the present day elicits real fears of unmanageable rate increases. While some rightly point out that in a future state, significantly increased demand and customer consumption will provide mitigation of rates themselves, there is a great deal of uncertainty regarding the degree to which system investments can be perfectly timed with growth in electricity use.

There is an understanding amongst regulatory professionals that governments generally expect electric utilities to be there 'standing ready' with the required capabilities and capacity needed to achieve net zero, potentially on a fully electrified path. One frequently expressed concern is that governments considering policies to enable net zero genuinely do not appreciate the scale of investment required to achieve the desired end state and the accompanying rates that would result from these costs. However, there is also broad consensus amongst professionals that investments made to facilitate net zero are investments made in response to government policy, and not investments which would otherwise be made to facilitate the standard provision of electricity service as we understand it today.

Importantly, when asked whether ratepayers alone could bear the costs required to facilitate a transition to net zero, most interviewees answered unequivocally "No."

Discussion

In many respects, the achievement of net zero reflects a step-change in electricity service and does not resemble the 'business-as-usual' context for which traditional rate regulation was designed. However, the current approach to utility regulation has proven effective over the twentieth and early twenty-first centuries in managing utilities to meet system maintenance, incremental customer and load growth, and continuous gradual improvements in both cost and service.

Under any path to net zero, these characteristics are not anticipated to reflect utilities' future state and expectations accurately. Rather, the investments and services required of utilities to facilitate net zero may more closely resemble the original build-out of electricity grids, natural gas systems, railroads, or the United States' highway system. Original electrification and similar build-outs of history commonly relied upon a broad-based belief that completion of the infrastructure would serve a broader societal good and that some form of taxpayer subsidization was an appropriate means to recognize these anticipated future benefits.

Bonbright himself acknowledged this reality within his *Principles of Public Utility Rates*[33] and other works. For example, in one instance in 1941[34], Bonbright lists several examples of exactly this:

The first illustration is subsidized rural electrification, practiced for some years in Ontario, Canada, and elsewhere. Even the present rural electrification program in the United States is not subsidy-free. According to the cost-price principle, such a program is unsound. Yet that program has been defended on the ground that the benefits derivable from farm electrification not only to the farm customers themselves but also to the country at large outweigh the cost of subsidies.

A second illustration is the construction of public electric power plants during the recent business depression, with the aid of federal loans and outright grants made to provide unemployment relief. Here, the gross money cost of constructing the plant was deemed partly offset by a social gain not reflected by any benefits accruing to the customers of electricity.

Importantly, Bonbright highlights that "these and other deviations from a cost-price standard, [are] treated as exceptions to the general rule of rate making."[35] In these instances, the general cost-based approach to rate-making is overlaid with a policy objective, which underpins justification for taxpayer contributions to augment revenue collected from utility customers.

Climate change mitigation resembles past examples where some form of taxpayer subsidization was deemed desirable to achieve social or policy ends. Aside from being good corporate stewards, utilities do not have an inherent mandate to reduce emissions and fend off the worst potential impacts of human-caused climate change. Rather, utilities seeking to facilitate emission reductions are largely responding to the policies of democratically elected governments.

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[33] Bonbright, 1961 p.68
[34] Bonbright, Price and Policy Behaviour, 1941
[35] Bonbright, 1961 p.68

Of critical importance, is the possibility that a lack of planned government assistance on the front-end of the energy transition, may result in unplanned reactionary government intervention on the back-end. If customers begin to perceive electricity rates as unreasonably high, they have demonstrated in the past their willingness to engage elected government for relief of a reactionary nature. Government action could take softer forms of reactionary relief, such as Ontario's Electricity Rebate, which provides an on-bill credit to consumers. Reactionary government intervention can also have unintended consequences, however: the credit downgrades assigned to Nova Scotia Power by DBRS Morningstar in November and December of 2022, where Bill 212's prescriptive requirements were directly cited for rate increases. All else equal, planned government involvement on the front-end will yield better results for ratepayers (and taxpayers) than unplanned involvement of a reactionary nature.

The purpose of this Report is not to request taxpayer assistance in any specific form. Indeed, taxpayer assistance can come in any number of forms, from direct subsidization of capital costs, to income tax or capital cost allowance modifications, to direct rate relief for some or all electricity customers. However, the Report takes as a given that some form of taxpayer assistance will, by necessity, be provided. Electricity Canada is hopeful that the recommendations in this Report can inform regulatory constructs which more appropriately facilitate net zero, including the facilitation of ratepayer funding which goes beyond present-day constraints, but the ratepayers of individual utilities cannot alone bear the costs of achieving net zero. Beyond the basic principle that taxpayer funds should reasonably accompany significant policy-driven costs, the use of progressive taxation in Canada creates a natural opportunity to mitigate the cost impacts of net zero funding on the country's most vulnerable. Relative to Canada's taxation system, utility rates are intentionally regressive in alignment with Bonbright's principle of no undue discrimination in rates, focusing on the service provided instead of any particular societal end.

> *"…if public policy favors a reduction in income discrepancies, this objective can be accomplished by alternative instruments of social control, including (hypothetical) energy stamps, progressive taxation, social security, free public education, and vocational training more feasibly and less harmfully than by a system of discriminatory prices. In short, the more promising attack on perceived maldistribution of cash incomes lies in a more direct attack on the maldistribution or on its causes, not in the administration of antidotes."*
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> **Bonbright 1988, p.170**

4.3 Managing Energy Federalism in Canada

Governance Recommendation 3:

The federal government must work with the provinces to provide appropriate support to those entities and persons affected by federal policies which impact a provincial area of jurisdiction, namely energy, natural resources, and electricity.

Comments

There is broad agreement amongst interviewees that the federal government's role in provincial energy regulation is inherently challenging. On the one hand, the federal government has, in recent years, clearly enacted (and is planning to enact) policies which will directly impact electric utilities regulated at the provincial level. On the other, there is full recognition that respecting jurisdiction between the federal government and the provinces remains paramount under Canada's constitution and federalist system. Despite the acknowledged challenges of jurisdiction, interviewees generally agreed that the more coordinated Canada's levels of government can be, the more effective utilities and regulators can be in implementing the policies affecting them.

Discussion

While the regulatory constructs embodied in, and subsequently built around, the Bonbright Principles are consistent across much of the world, the governance constructs which sit above economic regulation vary widely from jurisdiction to jurisdiction. Similarly, the organizing characteristics of a country have a significant bearing on how such governance constructs are formed, with the dynamics of a federation varying greatly from the dynamics of a unitary state. In the case of Canada, the provinces have been assigned constitutional jurisdiction over natural resources, energy, and electricity[36], resulting in the largely independent development and regulation of the electricity sector intra-province.

[36] Subject to exceptions including but not limited to some inter-provincial energy matters, taxation and royalty policies on federal lands, and other exceptions

This constitutional division of powers creates an interesting dynamic when matters of national interest, specifically greenhouse gas emissions and human-driven climate change, stand to affect all jurisdictions in Canada regardless of their local decisions and actions. Notwithstanding the jurisdiction assigned to the provinces,[37] the recent Supreme Court of Canada decision[38] determining the federal *Greenhouse Gas Pollution Pricing Act, 2018* to be constitutional affirms the federal government's ability to enact law impacting these sectors where there is a national concern under the "peace, order and good government" clause of the Constitution.[39] Subsequently, the federal government is developing Clean Electricity Regulations, which will require the electricity sector nationwide to be net zero by 2035,[40] and more recently has announced the preparation of regulations which would require 100% of all new passenger vehicles sold to be zero-emissions by 2035.[41]

Thus, the federal government can, has, and will continue to enact policies driving toward net zero, which will have material implications for electric utilities nationwide, as well as the regulation of these sectors constitutionally assigned to the provinces. This assigns a new challenge to provinces and their economic regulators; to ensure governance and regulatory frameworks are capable of responding to this dynamic, but also begging the question of what role the federal government can and should play, in supporting the policies it has implemented at the national level.

This is not the first instance in which national requirements have implications for provincial jurisdiction. Complicated as it may be, the federal government's role must be to engage the provinces in developing their policies in a support role, with the ultimate objective of providing support of a financial nature to facilitate the implementation of policies dictated at the federal level. While not the subject of this Report, such support could range from incentive-based tax structures, to provincial transfer payments, to grant subsidies directed at utilities or consumers. Of the available support methods, preference should be granted to those most widely applicable, national or provincial, to avoid support flowing solely to persons or entities with the knowledge and capacity to seek access to such support proactively. Ultimately, to the degree that the federal government establishes policies with material impacts on the electricity sector and consumers, the federal government is responsible for finding innovative means to provide support for those affected instead of leaving the provinces to manage impacts on their own.

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[37] In this context, the Yukon and Northwest Territories are included in reference to "the provinces" in light of the federal government's assignment of administrative responsibilities to these territories for natural resources, with the understanding that similar arrangements are in progress for Nunavut

[38] 2021 SCC 11

[39] Ibid.

[40] Government of Canada, Clean Electricity Regulations, https://www.canada.ca/en/services/environment/weather/climatechange/climate-plan/clean-electricity-regulation.html

[41] Government of Canada, Let it roll: The Government of Canada moves to increase the supply of electric vehicles for Canadians, https://www.canada.ca/en/environment-climate-change/news/2022/12/let-it-roll-government-of-canada-moves-to-increase-the-supply-of-electric-vehicles-for-canadians.html

5. Implications for Bonbright and the Regulatory Compact

The preceding sections identify a series of core recommendations for the evolution of energy regulation governance and practice in Canadian jurisdictions, informed by in-depth discussions with a broad cross-section of professionals representing various perspectives within the regulatory arena. While the implementation of these recommendations may well advance the achievement of net zero through Canada's electric utilities and their regulators, the question remains whether they represent a fundamental shift beyond the Bonbright Principles and commonly accepted Regulatory Constructs.

While some change is required to enact the recommendations noted above and facilitate the achievement of net zero, the simple answer to the question as it relates to the Bonbright Principles is "No." James C. Bonbright's *Principles of Public Utility Rates* has survived as the seminal work on rate-making not due to creativity or prescriptiveness, but in light of its universalism. Bonbright's work is voluminous, and while present-day practitioners may revere his Principles as hard rules to be followed, his work reads more like a discussion of nuanced and complicated concepts, much like the regulatory process itself. Similarly, though academics and authors present the Bonbright Principles as a succinct list, as this Report does, such a list is an extreme simplification of hundreds of thoughtful pages detailing rationale, trade-offs, alternative methods, and pitfalls commonly associated with public utility regulation. The Bonbright Principles have stood the test of time because of their ability to cut to the core priorities at play in consideration of utility rates and the public interest, and as such, they will continue to be relevant in a future which prioritizes the achievement of net zero.

All of the above said, a wealth of Regulatory Constructs have evolved around Bonbright's work to make up a relatively common set of tools and practices utilized to one extent or another worldwide. While these commonly accepted Regulatory Constructs also largely hold true in a new status quo that prioritizes net zero's achievement, their more specific and prescriptive nature makes them more difficult to transpose verbatim into the next phase of electricity sector development.

The most notable alterations recommended to these Regulatory Constructs include the following:

- **Used and Useful**: The principle which requires an asset to be "Used and Useful" to form a part of the rate base and earn a return on equity will require regulators to adopt an interpretation which is highly responsive to the current context. A new weight and appreciation must be assigned to the reality that electric utilities have an obligation to serve, providing new capacity and capabilities to serve enhanced customer demands in an electrified future. At the same time, the pacing and specifics of that future remain uncertain, creating new degrees of forecasting risk without alteration to the obligation to serve. Utilities would not invest in uncertain requirements absent government policy and should not be expected to bear unreasonable forecast risk if actual demand is delayed relative to approved expectations and forecasts;

- **PBR / Multi-Year Rate-Setting:** As noted above, utilities should be allowed to propose alternative rate-setting approaches that create rates between Cost-of-Service years that exceed standard indexation approaches. Specifically, flexible regulatory constructs must allow for utility proposals setting rates that recover multi-year expenditure forecasts, as well as more discrete and specific proposals capable of being brought forth during a rate term (i.e. between Cost of Service years). While this arguably has an impact on the Bonbright Principle which promotes the stability and predictability of rates, this principle must be weighed against others in a regulator's decision-making process, and rates which exceed the rate of inflation are not inherently "unpredictable" under a sound and stable rate-setting approach;

- **Benefit-Cost Assessments (BCAs):** The consideration of all present and future private and social costs of service is a Bonbright Principle, however present-day BCAs (namely the most commonly used DCF of rate revenue vs. costs) are not always reflective of these values, particularly in an environment where electric utilities are expected to play a pivotal role in facilitating net zero; and,

- **Exceptions to Cost-Based Pricing:** Net new services or initiatives may struggle to proceed when burdened with the fully allocated costs embedded in an established utility business. Approvals for the use of marginal cost pricing, or comparable competitive cost pricing, should be considered and predicated on services and initiatives that can demonstrate the potential for long-term value to ratepayers. Further, the degree to which such services or initiatives directly respond to government policy should be given weight.

The table below lists one version of the Bonbright Principles and a series of commonly accepted Regulatory Constructs which naturally fall underneath each Bonbright Principle. From there, for each Regulatory Construct, the table outlines whether it requires no change relative to present practice, an interpretation change, or a more meaningful change to facilitate the implementation of the recommendations above and the achievement of net zero.

Bonbright Principles	Regulatory Constructs	Potential Changes
Rates with effectiveness of yielding total revenue requirements without socially undesirable expansion of the rate base or socially undesirable level of product quality and safety.	Just and Reasonable Rates: Utilities should expect approval of rates which are sufficient to fund their Cost to Serve.	**No Change:** Utility rates must continue to be sufficient to provide the opportunity to finance operating costs, the cost of debt, a reasonable return on equity, and any other costs reasonably included in the revenue requirement. Rates in-excess-of required revenue would not be just and reasonable, subject to earnings derived through PBR or an enhanced performance construct.
	Used and Useful: For an asset to enter a utility's rate base and be eligible for a return, the asset must be used and useful.	**Interpretation Change:** Subject to relevant government policy, regulators should adjust their interpretation of the Used and Useful principle to acknowledge enhanced forecasting risk caused by government policy and the pursuit of net zero. A utility's obligation to serve is unchanged, and utilities should not bear unreasonable forecast risk which is substantially brought about by government policy.

Revenue stability and predictability, minimizing expected changes seriously adverse to utility companies.	Fair Return Standard: Utility shareholders are entitled to earn a fair return on their equity invested.	**No change:** A utility remains entitled to "the opportunity" to recover its prudently incurred costs, including a return on equity. Interpretation of what that opportunity looks like may need to evolve in response to utility proposals allowing enhanced earnings opportunities with commensurate risk allocation. Enhancements to earnings opportunities should ensure credible ties to value for ratepayers and the achievement of new or expanded objectives.
	Cost-Based Pricing: The energy and energy delivery prices are established based on the Cost of Service for a given utility.	**No change:** Subject to enhancements to provide incentives for specific outcomes (much like the evolution from Cost of Service to PBR), the conditions establishing cost-based pricing as the most effective foundation for determining rates continue to apply.
	No Retroactive Rate-Making: The avoidance of setting future rates to allow a utility to recoup past losses or to refund ratepayers excess utility earnings.	**Interpretation Change:** New or evolved mechanisms to incentivize utility performance across an expanded set of objectives may involve incentives that are affected after-the-fact based on performance. These mechanisms may impact revenue stability. However, they should be designed in a predictable manner.
Stability and predictability of the rates themselves, minimizing unexpected changes that are seriously adverse to existing customers.	PBR / Multi-Year Rate-Setting: Separating Cost of Service reviews by multiple years, with indexation of rates in intervening years.	**Change:** Utilities may propose, and regulators may approve, alternative rate-setting approaches which create variances in rates between Cost-of-Service years relative to standard indexation approaches. At a minimum, this should allow for multi-year rate proposals based on a utility forecast, or more discrete proposals submitted during a rate term (i.e. between Cost of Service years).

	No Retroactive Rate-Making: The avoidance of setting future rates to allow a utility to recoup past losses or to refund ratepayers excess utility earnings.	**Interpretation Change:** As stated above, concerning potential after-the-fact adjustments for performance. However, mechanisms should consider built-in rate smoothing to mitigate the potential for negative impacts to rate stability.
Efficiency of the rate classes discouraging wasteful use of service while promoting all justified types and amounts of use.	Rate Design: The balance between fixed charges, demand charges (kW) and consumption charges (kWh).	**No Change:** However, when optimally implementing this Bonbright Principle, any rate design must be responsive to current conditions. Moving forward, rate design must be assessed more frequently to ensure the proper mix of price signals and appropriate cost recovery/allocation. For example, while a fixed monthly charge based on minimum system design may remain appropriate, greater use of $/kW demand charges, dynamic pricing, or riders may be required as subsets of rate classes increase their demand on distribution and transmission systems via electrification of transportation and heating.
	Postage Stamp Rates: Like customers should pay like rates, regardless of their location or the specific costs to serve them.	
Reflection of all the present and future private and social costs and benefits created by a service's provision.	Benefit-Cost Assessments: The test(s) used to assess the viability of investments to connect customers, expand capacity, or otherwise modify the system, as applicable.	**Change:** Current customer connection and expansion models are largely a DCF of revenue vs. rate costs. BCAs need to evolve to be more comprehensive where investments have demonstrated benefits to customers, which may not be reflected via revenue in rates. For example, to the degree investments are anticipated to avoid infrastructure investments in the future, the benefit of these avoided costs should be included on a generic or specific basis, as applicable.

	Capital Contributions: Where a specific, identifiable customer need(s) drives system investments and costs, the customer should pay a capital contribution equal to the difference between the NPV of revenue and costs in rates.	**Interpretation Change:** Connecting customers should still be subject to testing to assess whether the value they add to the system and broader ratepayers justifies the cost of connection or expansion. Notwithstanding the above, the slate of benefits considered in calculating capital contributions may need to evolve to include other economic benefits to the system not currently captured (e.g. DER connections with the potential to defer traditional infrastructure investments).
Fairness in apportioning cost of service among different consumers.	Cost Causation: Costs allocated among customers, or rate classes, should be allocated proportionately to the customer that caused such costs to be incurred.	**No Change:** Allocation of costs to customers should continue to reflect cost causation. However, where investments and costs are principally driven by government policy, some form of taxpayer assistance may be warranted.
	Functionalization, Classification & Allocation: The practice of appropriately categorizing utility assets and assigning their costs to customers.	**No Change**: While the principles underpinning functionalization, classification and allocation remain sound, changes to customer consumption patterns may warrant more frequent assessment and adjustment.
	Rate Design: The balance between fixed charges, demand charges (kW) and consumption charges (kWh).	**No Change**: As stated above.

Avoidance of "undue discrimination" and minimization of cross-subsidy.	Intergenerational Equality: Ratepayers in each period should pay only the costs necessary to provide them with service in that period.	**Interpretation Change:** To meet policy requirements and ensure sufficient capacity is available for increased electrification, investments may be made in the present which prove to be underutilized within the current rate period. While this represents a subsidy from present-day ratepayers to future ratepayers, the absence of such investments may create additional costs for future ratepayers due to sub-optimal investments deployed after-the-fact (rather than proactively), and due to unmitigated climate change. Some intergenerational cross-subsidy may be acceptable.
	Cost Causation: Costs allocated among customers, or rate classes, should be allocated proportionately to the customer that caused such costs to be incurred.	**No Change**: As stated above.
	Functionalization, Classification & Allocation: The practice of appropriately categorizing utility assets and assigning their costs to customers.	**No Change**: As stated above.
	Rate Design: The balance between fixed charges, demand charges (kW) and consumption charges (kWh).	**No Change**: As stated above.

Efficiency in promoting innovation and responding economically to changing demand and supply patterns.	PBR / Multi-Year Rate-Setting: Separating Cost of Service reviews by multiple years, with indexation of rates in intervening years.	**Change:** As stated above. In light of a pace of change in demand and supply patterns that far exceed historical norms, meeting this Bonbright Principle will likely require utility innovation in proposals and regulator innovation in reviewing and approving appropriate proposals.
	Exceptions to Cost-Based Pricing: The rates paid for a service or initiative should reasonably reflect the fully allocated cost to provide such service or initiative.	**Change:** Subject to a range of tolerance, rates are typically set such that the rate class in question pays a fair approximation of the full cost to serve the rate class. As customers and systems bring about new requirements, new investments and services may be needed to meet them. It may not be tenable for new investments or services to be immediately burdened with fully allocated costs. Use of marginal cost pricing or competition-proxy pricing may be warranted to allow a critical mass of service or asset use to materialize.

Conclusion

In conclusion, on assessment of the Bonbright Principles and commonly accepted Regulatory Constructs, the path future regulation must walk is one of evolution and not revolution. The principles that governed economic regulators in Canada in decades past have proven to be sound and successful. Any future regulatory framework should be built on the success of those models, not their destruction. The enhancements required are not borne out of past failures, but future needs which differ from the needs of electricity consumers and systems over the preceding 60 years.

In light of detailed discussions with a cross-section of energy regulation professionals across Canada, what is clear is the importance of governance structures that enable sound regulatory practice. Instead of being torn down or re-shaped, the respective roles of elected government, independent regulators, and utilities must be crystallized and strengthened relative to their current state. **Elected government** must lead with specific, outcome-based policies that clearly describe *the electricity industry's expected objectives* without prescribing *how* those objectives are achieved. **Independent regulators** must be appropriately resourced and see their independence maintained, empowering them to review, reject, modify, and approve an increased number of novel and innovative proposals. **Utilities** must be afforded greater flexibility to propose innovative solutions to complex new challenges, meeting the needs of customers and their systems through investments, rate structures, incentive structures, benefit-cost assessments, and rate designs that differ from practices seen to date, all in a manner that responds to the needs of customers in the decades to come.

APPENDIX A: Regulatory Principle Catalogue

Bonbright Principles	Regulatory Constructs	Potential Changes
Rates with effectiveness of yielding total revenue requirements without socially undesirable expansion of the rate base or socially undesirable level of product quality and safety	Just and Reasonable Rates: Utilities should expect approval of rates which are sufficient to fund their Cost to Serve	
	Used and Useful: For an asset to enter a utility's rate base and be eligible for a return, the asset must be used and useful	(LINK) The used and useful test is established in **law**. This test holds that utility investments and expenditures must be used and useful to the customers the company serves to be included in the firm's rate base. Also, investments that are no longer used and useful to the public because they are either technologically or economically obsolete can be excluded from the rate base. The used and useful test is intended to prevent a regulated company from deliberately overinvesting in plant and equipment to inflate the rate base and to discourage a utility's investment in assets that will not provide a tangible useful service to its customers. (LINK) **Law**: Smyth v. Ames, 169 U.S. 466 (1898) It may not fix its rates with a view solely to its own interests, and ignore the rights of the public; but the rights of the public would be ignored if rates for the transportation of persons or property on a railroad were exacted without reference to the fair value of the property used for the public or of the services rendered, and in order simply that the corporation may meet operating.

Revenue stability and predictability, minimizing expected changes seriously adverse to utility companies	Fair Return Standard: Utility shareholders are entitled to earn a fair return on their equity invested.	(LINK) The fair return standard is a matter of law, established by the Supreme Court of Canada and the United States Supreme Court and accepted by the National Energy Board as applicable to its proceedings. Examples mentioned in the link: Bluefield and Hope, and Northwestern Utilities v. City of Edmonton. (LINK) There are three separate criteria that govern a fair return, upheld by the Courts and relied upon by regulators across North America. The three criteria were spelled out in the seminal Hope decision by Justice Douglas: "By that standard the return on equity owner should be commensurate with returns on investments in other enterprises having corresponding risks. That return, moreover, should be sufficient to assure confidence in the financial integrity of the enterprise, so as to maintain its credit and to attract capital."
	Cost-Based Pricing: The energy and energy delivery prices are established based on the Cost of Service for a given utility.	Bonbright Principles, Chapter 4 (P.43) Electric Utility Cost Allocation Manual (Theory: Chapter 2 (P.21) - LINK)
	No Retroactive Rate-Making: The avoidance of setting future rates to allow a utility to recoup past losses or to refund ratepayers excess utility earnings.	Krieger (1996): THE GHOST OF REGULATION PAST: CURRENT APPLICATIONS OF THE RULE AGAINST RETROACTIVE RATEMAKING IN PUBLIC UTILITY PROCEEDINGS (LINK) Louisiana Power & Light Co. v. Louisiana Pub. Serv. Comm'n, 377 So. 2d 1023, 1029 (La. 1979); State ex rel. Util. Consumers Council v. Public Serv. Comm'n, 585 S.W.2d 41, 59 (Mo. 1979); State ex rel. Util. Comm'n v. Edmisten, 232 S.E.2d 184, 194-95 (N.C. 1977); Narragansett Elec. Co. v. Burke, Nos. 84-73-M.P., 84-232-M.P. & 84-342-M.P. at *4 (R.I. Mar. 11, 1986) (LEXIS, RI library, RI file)

Stability and predictability of the rates themselves, minimizing unexpected changes that are seriously adverse to existing customers	PBR / Multi-Year Rate-Setting: Separating Cost of Service reviews by multiple years, with indexation of rates in intervening years.	PBR is a regulatory approach that aims to provide incentives for regulated utilities to improve efficiency. PBR aims to mimic competitive pressures in a natural monopoly environment, providing incentives for utilities to meet a given level of service at the lowest/most efficient cost. In so doing, PBR regulation aims to determine an "optimal price" for monopoly services. Rather than examining individual costs in detail, it allows firms to make decisions regarding costs and inputs themselves to both: (i) maximize output relative to a given level of inputs and (ii) to ensure the most efficient allocation of competing inputs. PBR is typically viewed as an alternative to traditional cost of service ("COS") ratemaking (LINK)
	No Retroactive Rate-Making: The avoidance of setting future rates to allow a utility to recoup past losses or to refund ratepayers excess utility earnings.	Same as above
Efficiency of the rate classes discouraging wasteful use of service while promoting all justified types and amounts of use	Rate Design: The balance between fixed charges, demand charges (kW) and consumption charges (kWh).	(LINK) Bonbright Principle: Straight fixed/variable 1. Recovering the fixed costs in a fixed charge (most of distribution) Revenue for a class divided by the number of customers in the class 2. Recovering the variable costs in a variable charge (fuel costs for generation, losses, etc.) Based on variable cost 3. Capital attraction and certainty for investment. (LINK) Bonbright Principle: No undue discrimination Equals treated equally – Postage stamp rates: urban / suburban / rural (LINK) Postage stamp rates are the most common rate design employed in natural gas distribution utilities in Canada and the U.S.
	Postage Stamp Rates: Like customers should pay like rates, regardless of their location or the specific costs to serve them.	

Reflection of all the present and future private and social costs and benefits created by a service's provision	Benefit-Cost Assessments: The test(s) used to assess the viability of investments to connect customers, expand capacity, or otherwise modify the system, as applicable.	(LINK) Cost-benefit test practices were originally established by the California Standard Practice Manual (CSPM). The CSPM presents five tests. Three of the tests – the Utility Cost Test, Participant Cost Test, and Ratepayer Impact Measures Test – focus on costs from only one perspective: the utility, participant, or ratepayer. Two of the tests – Total Resource Cost Test (TRC) and Societal Benefits Cost Test (SBC) – take a more holistic view as the TRC combines the impacts for both the utility and participants and the SBC considers the same impacts as the TRC plus the impacts to society as a whole. (LINK) Overview of Cost-Effectiveness Tests
	Capital Contributions: Where a specific, identifiable customer need(s) drives system investments and costs, the customer should pay a capital contribution equal to the difference between the NPV of revenue and costs in rates.	(LINK) Economic Evaluation Models (LINK) Performance Valuation Metrics • Net present value (NPV) • Profitability index (PI) • Benefit-to-cost (B/C) ratio • Internal rate of return (IRR) • Modified internal rate of return (MIRR) • Simple payback and time-to-net-positive-cash-flow (TNP) payback • Annualized monthly bill savings (MBS) • Levelized cost of energy (LCOE) (LINK) Ontario Energy Board Guidelines For Assessing And Reporting On Natural Gas System Expansion In Ontario

Fairness in apportioning cost of service among different consumers	Cost Causation: Costs allocated among customers, or rate classes, should be allocated proportionately to the customer that caused such costs to be incurred.	(LINK) One or more allocation factors are selected for each functionalized and classified cost component, to distribute costs among rate classes. The allocation factors are chosen on the principle of "cost causation," which attempts to spread costs among classes in proportion to their contribution to the factors that caused costs to be incurred. To properly allocate costs, it is important to know the characteristics of each customer class: the number of customers (and the relative costs of providing them with shared services), the energy consumed, the voltage at which customers take service, and the contribution to the peak demands on the system. (LINK) To begin, electric space heating customers are likely to have different load characteristics from the non heating customers, with significantly more usage and a different daily load shape in the winter. For a winter-peaking system, this could mean that electric heating customers should be allocated proportionately more costs. Conversely, in a summer-peaking system, electric heating customers should be allocated proportionately fewer overall costs. However, this issue, which is essentially a question of a potential intraclass cross-subsidy between types of residential customers, can also be addressed through changes to rate design. Seasonally differentiated rates, if based appropriately on cost causation, can achieve the same distributional impact as separate rate classes for heating and non-heating customers while bringing additional benefits from the improved efficiency of pricing.
	Functionalization, Classification & Allocation: The practice of appropriately categorizing utility assets and assigning their costs to customers.	(LINK) Basic Frameworks for Cost Allocation (Chapter 6, P.71) Functionalization, Classification and Allocation practices pertaining to the US

	Rate Design: The balance between fixed charges, demand charges (kW) and consumption charges (kWh)	Same as above
Avoidance of "undue discrimination" and minimization of cross-subsidy	Intergenerational Equality: Ratepayers in each period should pay only the costs necessary to provide them with service in that period	(LINK) Under this principle, ratepayers in each period should pay only the costs necessary to provide them with service in that period. They should not have to pay for any costs incurred to provide service to ratepayers in another period. This principle is consistent with setting just and reasonable rates within each period. For example, a regulated entity is usually not allowed to earn a return on projects under construction. It's incurring this cost to provide service to future ratepayers, not ratepayers in the current period. Instead, the return is capitalized and recovered through depreciation over the period in which the assets are used to provide service.
	Cost Causation: Costs allocated among customers, or rate classes, should be allocated proportionately to the customer that caused such costs to be incurred.	Same as above
	Functionalization, Classification & Allocation: The practice of appropriately categorizing utility assets and assigning their costs to customers.	Same as above

	Rate Design: The balance between fixed charges, demand charges (kW) and consumption charges (kWh).	Same as above
Efficiency in promoting innovation and responding economically to changing demand and supply patterns	PBR / Multi-Year Rate-Setting: Separating Cost of Service reviews by multiple years, with indexation of rates in intervening years	Same as above
	Exceptions to Cost-Based Pricing: The rates paid for a service or initiative should reasonably reflect the fully allocated cost to provide such service or initiative.	(LINK) The “marginal cost pricing doctrine” is shorthand for the proposition that utility rates should be predicated upon marginal costs for the purpose of attaining economic efficiency by means of accurate price signals. The doctrine is in large part attributed to Alfred E. Kahn's influential two-volume book, The Economics of Regulation (1970 and 1971), and is explored in Bonbright, 1988

APPENDIX B: Legislation-Principles Cross-Reference (see here)