Corporate finance and sustainability:
The case of the electric utility industry

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Introduction

The transition toward a more sustainable energy economy raises substantial – and insufficiently investigated – questions about the use of investor capital for such a monumental undertaking. The speed of the transition would be historically unprecedented.[1] Significant shifts from one major energy source to another, such as wood to coal, occurred gradually over the span of many generations.[2] The required transition of a sector now of much greater size, and on which far more societal stability and safety depend, must proceed at a significantly faster rate and will require enormous amounts of capital. Deploying an additional worldwide solar capacity of 1 terawatt by 2030, for example, would require $1 trillion in investment, mobilized largely from private sources.[3] Can existing systems and principles help to streamline and accelerate a transition of the scope and scale envisioned?

A fierce debate is underway about the potential role for electric utilities in such a transition. This debate takes various forms, but the primary strategic choices with which state utility regulatory commissions are grappling nationwide have to do with the connections among infrastructure design (e.g., centralized versus distributed energy generation), ownership (e.g., utility, customer, third-party, or some combination), and the features and capabilities of the modern electric grid (e.g., basic services versus "smart" homes). An argument that utilities may pose barriers to sustainable energy transitions aligns with some persuasive empirical data.[4]

As the debate regarding the best path forward for utilities remains front and center in policy circles, it is important to remember that electric utilities were designed more than a century ago to make it easier and more feasible to use large amounts of private capital to create large-scale developments in electric power infrastructure. Throughout that time, utility stocks have done well on a risk-adjusted basis, even in the challenging 21st century financial market environment. The average annual total return from January 2000 to December 2017 for utility stocks was 7.3 percent; the average annual total return for stocks in the nine largest sectors of the

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[1] Janos Pasztor (2017) The Need for Governance of Climate Geoengineering, Ethics & International Affairs, 31(4): 419-430.
[2] James Meadowcroft, (2009) What about the politics? Sustainable development, transition management, and long term energy transitions, Policy Sciences, November 2009, 42:323; 2; Grubler, Arnulf (2012) Energy transitions research: Insights and cautionary tales, Energy Policy 50: 8–16.
[3] SustainableBusiness.com. International Solar Alliance to Mobilize $1 Trillion, April 28, 2016
[4] Graffy, Elisabeth and Steve Kihm (2014) Does Disruptive Competition Mean a Death Spiral for Energy Utilities? Energy Law Journal 35(1).

economy as a whole was 6.4 percent.[5] Furthermore, utility stocks produced higher returns with lower-than-average volatility.[6]

Despite the potential for major disruption to electric utility operation and investment resulting from the transition to a more sustainable future; investors continue to see electric utilities as good long-term investments. One reason for the lack of concern on the part of investors may be that the pace of evolution in the electric industry has historically been slow; in noticeable contrast to what climate change advocates suggest is necessary on a going forward basis. Most states still use cost-of-service (COS) regulation, which emerged in its current form in the 1940s. Under that model, utility executives have an incentive to make capital investments as a means of driving their stock prices higher, assuming the earned return is in excess of the minimum expected return.[7] Such an incentive might not be consistent with a long-run sustainable electric utility future and will largely depend on the type of assets developed with that capital.

That is not to say that all electric utilities and all regulators are transitioning towards a more sustainable energy sector at a slow place under COS regulatory models. While fossil fuel generation still dominates in the aggregate (i.e., fossil fuels are still used to generate at least 50 percent of the electricity), cleaner energy sources (e.g., wind generators, large scale solar plants) have recently become the preferred alternatives for some utilities because they are presently the most economic choices in terms of delivering power at the least cost. Forecasts indicate a continued decline in the costs of developing and operating renewable energy projects into the next decade and beyond.[8] And while traditional COS regulation is still standard practice, a few pioneering commissions have made, or are looking to make, fundamental changes to the way they regulate utilities. Despite these admirable steps, as an industry level, the pacing issue still looms large.

Corporate Finance to the Rescue?

In this paper, we critically examine the potential for the powerful institutional capacities of regulated utilities and principles of shareholder value creation to accelerate large-scale sustainable energy transitions and find significant unrealized potential. For the proper analysis of

[5] Based on average annual total returns (dividends and capital gains) for the following SPDR Select Sector portfolios: Consumer Discretionary (XLY) 7.9%; Consumer Staples (XLP) 7.5%; Energy (XLE) 7.5%; Financial (XLF) 4.1%; Health Care (XLV) 7.1%; Industrial (XLI) 7.2%; Materials (XLB) 7.1%; Technology (XLK) 2.2%; and Utility (XLU) 7.3%. Source: Authors' calculations based on data from Compustat.

[6] Standard deviations are: Consumer Discretionary (XLY) 17.9%; Consumer Staples (XLP) 11.6%; Energy (XLE) 21.3%; Financial (XLF) 21.3%; Health Care (XLV) 13.7%; Industrial (XLI) 18.0%; Materials (XLB) 20.6%; Technology (XLK) 23.6%; and Utility (XLU) 14.9%. Source: Authors' calculations based on data from Compustat.

[7] If the return utilities earn just equals the return investors require, adding plant creates zero net present value and therefore does not lead to higher stock prices. If the return lies below investor requirement, net present value is negative and adding plant then leads to lower stock prices.

[8] IRENA (2018), Renewable Power Generation Costs in 2017, International Renewable Energy Agency, Abu Dhabi.

investment incentives that can align the goals of policymakers and shareholder-focused utility executive, we identify four key insights in corporate finance:

1. In an efficient market, investors price the stocks of all companies facing similar risk so as to produce the same expected return to investors, regardless of the corporate return (e.g., return on equity (ROE)) that the individual firms will earn when they invest that capital;
2. This makes stocks of companies that earn low corporate returns just as attractive to new capital providers as the stocks of companies that earn high corporate returns. If the return the utility can earn exceeds the return that new investors require, executives will have an incentive to raise capital from these new investors, implicitly "paying" them the required return at the time of stock issuance. The value of any extra return above the required return inures to the benefit of the existing shareholders, not new investors, in the form of a capital gain;[9]
3. Investment in a utility asset that produces the most shareholder value is not necessarily the one that earns the highest return, has the least risk, or has the largest scale. Value derives from the joint interaction of those three key drivers, which determine the impact on utility stock prices. With that understanding, shareholder-focused executives and regulators could better identify and create incentives for utilities to invest capital in sustainable resources; [10] and
4. Corporate finance principles also invite into the policy discussion an item that is largely missing in regulatory analyses: utility stock valuation models. Without such models, it is virtually impossible to determine how proposed policy changes may benefit investor-owned electric utilities.

With these four insights in mind, we first describe a conceptual model of shareholder value formation, and apply it to empirical data to illustrate its incentive properties. We then use this model to directly dissect the incentives associated with two actual regulatory reforms, one that has been substantially implemented (New York) and one that is under development (Minnesota) as an alternative to the traditional model. We show that finance principles provide insights as to how these reform initiatives affect incentives to create shareholder value and how uncertainty can also cloud that assessment.

A Conceptual Framework

Shareholder-focused utility executives will consider whether their existing shareholders are better served by investing equity capital to build either a new coal-fired power plant, a

[9] Myers, S. (1972). The application of finance theory to public utility rate cases. *Bell Journal of Economic and Management Science*, 3: 58-97, p. 80.

[10] Given the space limitations for this article, we do not consider the problems raised by potential principal-agent conflicts, ones in which managers pursue agendas based on their own self-interest rather than protecting shareholder interests. For example, growth by acquisition is rarely a winning proposition for the shareholders of the acquiring firm, but it does tend to produce higher salaries and greater prestige for CEOs. Several major utilities have adopted acquisition strategies. Incorporating agency theory into this framework would enhance its analytical precision.

combined cycle plant, a utility-scale solar or wind farm, or none of the above, conditioned by three elements: (1) the return on equity the utility can expect to make on each project (i.e., the corporate return); (2) the investors' required return on equity capital for each project (i.e., what investors expect to make on the stock if they are to buy it); and (3) the size of the investment (i.e., the scale of the proposed project in terms of equity capital investment). The following conceptual model translates this idea into a simple equation, one that allows for basic policy analysis. This is essentially a conceptual form of the well-established economic value added (EVA) model.[11]

$$V = (r - k)I$$

Where V is the annual incremental shareholder value created, r is the return on equity or ROE the utility can expect to earn on the project could vary from project to project), k is the return investors require if they are to invest in the stock (could also vary from project to project, depending on systematic risk differences), and I is the scale of the project (measured in dollars that will also vary from project to project). Any new incremental V translates into higher stock prices.

If regulators wish to move capital in the direction of clean, sustainable resources, and away from fossil-fuel-based sources, then they should create conditions under which incentives for utilities to seek capital and create more wealth for existing investors are greater when they add sustainable resources than when adding traditional resources. As the formula shows, it is the *difference* between the corporate return (r) and the investors' required return (k), not r alone, that determines the economic value of similarly scaled utility investment projects. If the two returns are equal, there is no incentive to invest, no matter how large the investment scale is. Nevertheless, even a small positive difference between r and k can be determinative if the scale (I) is large enough. In other words, large-scale investments in a project with modest (r - k) benefits could produce more value for investors than smaller projects, even if the (r - k) gap is relatively greater in the latter case. Because this value proposition holds, regardless of the type of project, regulatory guidance must take such comparisons into account.

An Analytical Example

We analyze a publicly traded electric utility, Portland General Electric (symbol POR), to show why the main policy tool that regulators' have historically focused on (i.e., the authorized ROE) might not be as powerful – alone – to create an incentive for utilities to move capital. Using a current stock price and projections from *The Value Line Investment Survey*, the standard dividend discount valuation model suggests that the implied investor required return supporting

[11] Stern Stewart Management Services (1993), *The Stern Stewart Performance 1000 Database Package: Introduction and Documentation*, New York: Stern Stewart Management Services.

POR's stock price is 7.9 percent. See Appendix A. Value Line projects a long-run return on equity of 9.5 percent for the utility, which is higher than the investor required return. Therefore, increasing capital investment should lift POR's stock price; decreasing capital investment should lower it.[12] We explore a "base case with innovation scenario" in which the regulator restricts new capital investment to a level only required to maintain the existing system. Any facilities necessary to serve new load or to provide new services will be provided by third parties, using distributed renewable energy resource (DER) options.[13]

The valuation model suggests that POR's stock price will decline upon announcement of the new policy, falling by 12 percent. Note that even though the return on equity (r) is unchanged, if r exceeds k, any movement to a sustainable path that lowers utility capital investment from planned levels will reduce shareholder value, potentially resulting in a lack of support from shareholder-focused utility executives. One could propose increasing the utility's return (r) as compensation for slower capital growth. Yet, increasing the return on equity to 10.0 percent when moving to the slower-growth path will still leave POR's stock price 6 percent lower than it was before the new policy was announced. POR's shareholder-focused executives would therefore prefer the original higher-growth scenario because even though the utility earns a lower return on equity under the original scenario, it sees a higher stock price. The return on equity must rise to 10.5 percent to make the utility indifferent between the two scenarios.

The model allows us to conduct other policy analyses. Assume that in lowering the utility' future capital spending expenditures, the regulator has reduced the utility's exposure to risk to some extent (i.e., constructing new assets is typically riskier than operating existing ones) so investors now require a slightly lower return on POR stock (k = 7.5 percent). Holding the return on equity at 9.5 percent, the model shows that this mitigates some of the lost investment opportunity, but doesn't eliminate all of it. POR's stock price is still 5 percent lower than it was before the new policy was announced.

In response, the utility could suggest a willingness to support the low-growth path if regulators: (1) set r at 10.2 percent; and (2) provide some additional cost recovery guarantees, further reducing risk, lowering the investors' required return to 7.2 percent. The model suggests that this combination would push POR's stock price to a level that is 10 percent *higher* than the original price. The valuation model informs which components to change and by how much to create a positive value proposition for shareholders.

Regulatory Policies Through a Corporate Finance Lens

[12] See Appendix A for the valuation model analysis and scenario results calculations.

[13] Reducing investment scale is not the only approach that regulators could take to promote a transition towards a more sustainable future. We simply present this as a single example, among many approaches that could be taken.

The principles discussed earlier can guide regulators who wish to create incentives for utilities to invest capital in particular types of energy resources or infrastructural designs. Regulators may consider impacts of their decisions on specific groups of customers, in addition to shareholder value. We look at two significant initiatives currently underway in New York and Minnesota to illustrate the application of corporate finance concepts to the reforms being envisioned and/or implemented.

Regulatory Reform in New York

New York's Reforming the Energy Vision (REV) initiative seeks to fundamentally alter the role of the distribution electric utility from a wires and delivery entity to a platform provider with a consumer-centered approach that harnesses new and existing technology and markets.[14] Through this policy change, REV envisions a utility that looks very different from the utility of just ten years ago.

Based on the decisions and guidance orders the New York Public Service Commission (NYPSC) has made to date, the various impacts of REV on utility investment scale, risk, and return, when taken jointly instead of independently, suggest an opportunity for utility stock prices to rise. In comparison to the previous regulatory model in New York, on net: (1) investment scale is likely to be larger; (2) risk is likely to be lower; and (3) returns are likely to be higher, as discussed more below. But that assessment holds only for the short term (i.e., next 3-5 years). What the longer term end-state eventually looks like is very unclear, especially as it relates to investment opportunities, utility market opportunities, and regulatory reforms. This is critically important because most of the value impounded in utility stocks relates to long-run cash flows. How investors price that uncertainty will have a large impact on how REV affects utility stock prices both now and over time.

To provide more specific details, this transformation of the electric utility from the traditional wires-only model to the platform model will require substantial investment in new infrastructure, likely resulting in an increase in utility scale. For example, the NYPSC is allowing Consolidated Edison, the state's largest utility, to spend up to about $1 billion on advanced metering infrastructure (AMI), which is necessary for it to play its new role as the distribution system platform.[15] AMI is one of a number of infrastructure investments the electric utility will make requiring new capital. As such, the increased scale and return on equity greater than cost of equity will put upward pressure investor-owned utility stock prices in New York higher.

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[14] NYPSC (2015) *Proceeding on Motion of the Commission in Regard to Reforming the Energy Vision: Order Adopting Regulatory Policy Framework and Implementation Plans*, State of New York Public Service Commission, Case 14-M-0101, Issued February 26, 2015.

[15] NYPSC (2017) *Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Consolidated Edison Company of New York, Inc. for Electric Service: Order Approving Advanced Metering Infrastructure Business Plan Subject to Conditions*, State of New York Public Service Commission, Case 15-E-0050, Issued March 17, 2016.

REV also envisions roles for the private sector to supplant activities that used to be the sole purview of the utility. For example, the NYPSC required each of the state's investor-owned utilities to identify opportunities to pursue alternatives to distribution system plant investment (e.g., microgrids) that would maintain reliability, resiliency, and provide other grid services but at lower cost to utility ratepayers.[16] Because the utility will forego certain capital investment activities they would have otherwise made, this has the potential to reduce investment scale going forward putting downward pressure on New York utility stock prices.

The NYPSC is hoping to see dramatic increases in customer investment in distributed energy resources, in part to support the avoidance of costly infrastructure investments just discussed, resulting in lower retail electric sales to consumers. Utilities will play the role of enabler by creating opportunities for third-parties to promote DERs (e.g., rooftop solar and microgrids) but the utilities will generally be excluded from directly or indirectly competing in such markets.[17] This could adversely affect the ability of the utilities to earn authorized returns, as the utility is selling less electricity.[18] However, recent efforts to reform approaches taken to pay third parties for excess electricity production could result in lower future DER investment, which would substantially mitigate this affect.[19]

The NYPSC has also begun to implement a series of regulatory reforms to help achieve REV goals that are likely to affect New York utilities' achieved returns.[20] For example, a series of metrics have been defined in order to reward the utility monetarily for exemplary performance

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[16] NYPSC (2015) *Proceeding on Motion of the Commission in Regard to Reforming the Energy Vision: Order Adopting Regulatory Policy Framework and Implementation Plans*, State of New York Public Service Commission, Case 14-M-0101, Issued February 26, 2015.

[17] The NYPSC identified a few exceptions to this position. In particular, where markets are failing to adequately develop, then the public interest may warrant utility investment to support such development. See NYPSC (2015) *Proceeding on Motion of the Commission in Regard to Reforming the Energy Vision: Order Adopting Regulatory Policy Framework and Implementation Plans*, State of New York Public Service Commission, Case 14-M-0101, Issued February 26, 2015.

[18] All investor-owned utilities in New York charge residential and smaller commercial customers with solar PV systems based on the amount of electricity (kWh) they consume in a billing cycle. Consolidated Edison is piloting a different rate design that charges consumers a lower rate for the electricity (kWh) but adds a new charge for the maximum demand of electricity (kW) during the billing cycle. See Consolidated Edison (2016) *Proceeding on Motion of the Commission in Regard to Reforming the Energy Vision: Advanced Metering Infrastructure Customer Engagement Plan*, State of New York Public Service Commission, Case 14-M-0101, Filing on July 29, 2016.

[19] Excess compensation reform in New York resulted in a movement away from the traditional full-retail rate, that has been an integral part of NY and other states' net-energy metering policies, to a system based on a stack of different value streams which will inherently be worth less than the system it replaces. See NYPSC (2017) *In the Matter of Value of Distributed Energy Resources: Order on Net Energy Metering Transition, Phase One of Value of Distributed Energy Resources, and Related Matters*, State of New York Public Service Commission, Case 15-E-0751, Issued March 9, 2017.

[20] NYPSC (2016) *Proceeding on Motion of the Commission in Regard to Reforming the Energy Vision: Order Adopting a Ratemaking and Utility Revenue Model Policy Framework*, State of New York Public Service Commission, Case 14-M-0101, Order Issued and Effective May 19, 2016.

in the areas of customer engagement, system efficiency improvements, DER deployment, among others. In addition, the NYPSC envision entirely new business opportunities for the state's utilities, known as Platform Service Revenues (PSR). These policies have the potential to increase returns (r).

NYPSC did not explicitly apply the corporate finance principle explored in this paper when designing and implementing REV. However, our conceptual model has shown that the portfolio of REV reforms may align with a shareholder-focused executive, such that the electric utilities will support a more sustainable electric industry in New York.

Regulatory Reform in Minnesota

Minnesota is responding to changes and challenges in the electric industry through the formation of a collaborative (i.e., the e21 initiative)[21] and, more recently, opening a regulatory investigation within the Minnesota Public Utility Commission (MNPUC).[22] Changes currently undertaken and proposed for the future in Minnesota's utility regulatory models appear to focus on transitioning towards performance-based ratemaking (PBR) while maintaining existing electric utility roles and responsibilities. This regulatory model attempts to regulate and compensate utilities based on their ability to meet pre-defined performance metrics while also providing more revenue certainty through multi-year rate plans (MRPs).[23] From a corporate finance perspective, the issue is how this change in regulatory policy would affect utility risk, return, and scale, and ultimately, shareholder value.

There are opportunities for incremental capital investment in the utilities' distribution networks. If the return the utility earns continues to exceed investor requirements, this investment should create shareholder value. For example, Xcel Energy proposed investments in metering infrastructure and data management systems to modernize its grid; though, the scale of the proposal was quite modest at about $40 million and representing less than 1 percent of its total rate base on an annual basis.[24] Recall that we must look at the manner in which proposals affect r, k, and I. Here the small scale is a noticeable characteristic, potentially limiting shareholder value even though the relationship between r and k are favorable.

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[21] Minnesota's e21 initiative was launched in 2014 and was a collaborative outside the adjudicated regulatory process to develop recommendations on changes to Minnesota's regulatory model, among other issues.

[22] MN PUC (2017). Notice of Comment Period. *In the Matter of a Commission Investigation to Identify and Develop Performance Metrics and, Potentially, Incentives, for Xcel Energy's Electric Utility Operations*. Docket 17-401. September 22

[23] Lowry, M. and Woolf, T. (2016) Performance-Based Regulation in a High Distributed Energy Resources Future. Future Electric Utility Regulation. Lawrence Berkeley National Laboratory, Berkeley, CA. January. Report No. 3.

[24] Xcel Energy (2015). Grid Modernization Report. *In the Matter of the 2015 Minnesota Biennial Transmission and Distribution Projects Report.* Docket 15-962. October 30.

The e21 initiative seeks, in part, to promote broader adoption of DERs and potentially use these assets to provide grid services. Specifically, if Minnesota utilities are required to create opportunities for distributed energy resources to defer or avoid future capital investments in generation, transmission, and/or distribution assets (similar to what is being implemented in New York), the utilities may see a negative impact on investment scale. Again, if the utility return exceeds the return required by investors, this should put downward pressure on shareholder value. However, it may be possible for Minnesota electric utilities to make broader capital investments (e.g., distribution automation, sensing technologies, etc.) to support efforts to manage the desired large additions of distributed energy resources. On net, it is not clear if total investment scale will increase or decrease in the medium- to long-term under these reforms.

Unlike the New York situation, both the current regulatory proceedings and conceptual frameworks under consideration in Minnesota do not suggest changes from the utility's historical vertically integrated roles, meaning that they provide the entire spectrum of activities from power generation through transmission and distribution to end users. Increased competition from third-party energy service providers is not under consideration, in sharp contrast to New York. Under e21, thus far, utilities retain a broad array of assets to maintain and the potential for new capital-intensive projects. These factors create multiple opportunities for utilities and investors to play a strong role in state-level transitions (e.g., investments in grid-scale renewable generation assets). There is, however, considerably more change underway in Minnesota's regulatory framework.

Minnesota has begun a transition to PBR by establishing rates and investment levels on a forward-looking basis (e.g., 3 to 5 years), and may account for growth in future rates tied to an index (e.g., inflation and productivity). The e21 initiative also conceptualizes a continuum of regulatory model reforms concerning the different sources of utility earnings. Figure 1 depicts the e21 initiative's points along its continuum of reform showing shifts in earnings away from the authorized return on utility investment under the current COS model towards earnings from performance incentives and revenues from new products and services.

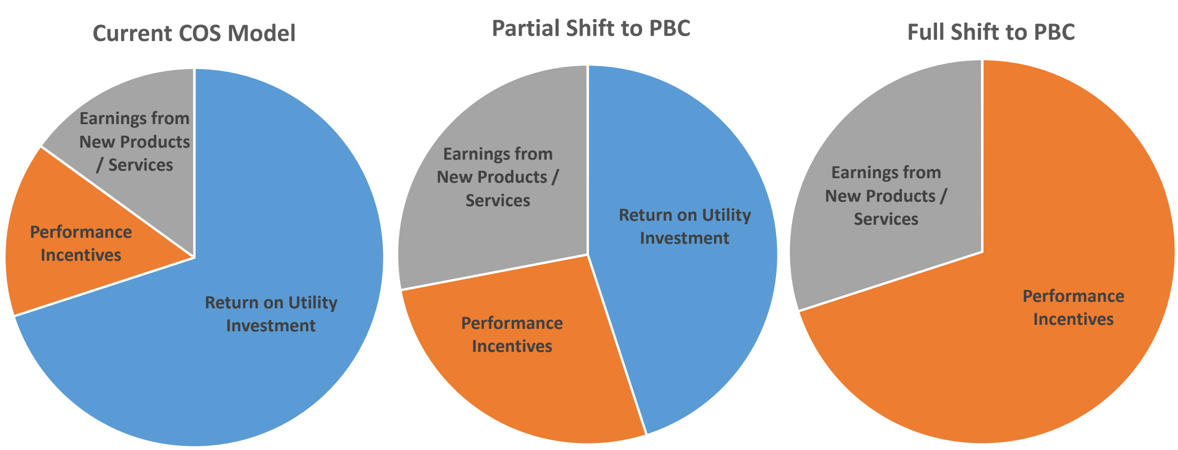

Fig. 1 Potential transition in regulatory mechanism in Minnesota

The r in our model would include any of the Minnesota defined earnings opportunities: returns on existing and new utility investment plus net earnings from any of these new non-traditional revenue sources. The aggregate impacts of such shifts in the sources of utility earnings opportunities could have profound impacts on utility stock prices depending on both the division of earnings among the different pieces, as well as whether the total size of earnings will increase or decrease.

Performance incentives compensate the utility for meeting established goals. Depending on the instituted performance goals and metrics, their application may suggest increased scale, risk, and returns for utility shareholders. For example, performance incentives for driving electric vehicle (EV) adoption may allow the utility to make incremental capital investments in EV charging infrastructure (i.e., increase in I) and the incentive itself would directly provide additional earnings (V). More explicitly tying utility earnings to achievement of goals may result in less predictability and greater variability in utility earnings, which could increase k if the risk is systematic. Likewise, a larger share of earnings from new products and services (i.e., contributing to V) might also lead to greater variability in utility earnings, which could result in higher systematic risk (k).

Taken all together, as in New York, the net effect of e21 reforms on changes in I and changes in the difference between r and k will dictate the level of support from shareholder-focused utility executives in Minnesota and thus the pace of transition to a more sustainable energy future as the MNPUC envisions. Unlike in New York, the transformation of electric utility regulatory and business models in Minnesota is at the very early stages of evolving with many details yet to be worked out and even some policy goals yet to be determined. As such, the directional impact on utility shareholder value is more difficult to ascertain than in New York where the end-state has already been largely defined.

Conclusion

The electric utility industry is in transition and needs to be moving even faster if we are to meet the climate change goals many see as necessary. Yet, the utility industry has historically moved cautiously, placing a premium on maintaining system stability. Policies and regulatory approaches aiming at transitions to greater environmental sustainability face the challenge of doing so without reinforcing the status quo. Incentive-oriented policies and redesigned regulations that aim to ramp up innovation must likewise balance environmental sustainability with economic sustainability if electric utilities are to play a leading role. Corporate finance principles can provide guidance here and help design more effective policies.

We showed that all three elements of our conceptual model (i.e., risk, return, and scale) require attention by regulators and policymakers in order to create value for shareholders. As the case studies illustrate, applying our conceptual model to existing regulatory and utility business model initiatives illustrates how state policies and regulatory decisions can create powerful incentives for shareholder-focused utility executives to support such transitions.

Appendix A
Valuation Model Analysis

$$P = \frac{BVPS(r)(1-b)}{k-b(r)}$$

Where P = estimated per-share stock price; $BVPS$ = book value per share; r = return on equity; b = earnings retention ratio; and k = investors' required return. To find k given all other inputs, we transform the model as follows:

$$k = \frac{BVPS(r)(1-b)}{P} + b(r) = \frac{\$27.25(0.095)(1-0.45)}{\$39.18} + 0.45(0.095) = 0.079$$

The initial model for policy analysis is therefore:

$$P = \frac{\$27.25(0.095)(1-0.45)}{0.079-0.45(0.095)} = \$39.18$$

Scenario results are shown below. Note b is adjusted using the formula $b = 0.02 / r$ to maintain a 2.0 percent long-run growth rate in all but the base case.

Capital Growth	**Compensating Adjustment**	***BVPS***	***r***	***b***	***k***	***P***	**Change in *P* Compared to Base Case**
base case (4.3%)	---	\$27.25	9.5%	45.0%	7.9%	\$39.18	---
reduced (2.0%)	---	\$27.25	9.5%	21.1%	7.9%	\$34.59	-12%
reduced (2.0%)	raise *r* to 10.0%	\$27.25	10.0%	20.0%	7.9%	\$36.89	-6%
reduced (2.0%)	raise *r* to 10.5%	\$27.25	10.5%	19.1%	7.9%	\$39.18	---
reduced (2.0%)	lower *k* to 7.5%	\$27.25	9.5%	21.1%	7.5%	\$37.16	-5%
reduced (2.0%)	raise *r* to 10.2% lower *k* to 7.2%	\$27.25	10.2%	19.6%	7.2%	\$42.97	+10%