Policy Framework to Optimize Efficiency of the Electrical Energy System

Phase 2 Report of the Citizens League's Electrical Energy Project

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Citizens League

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Common ground. Common good.

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Executive Summary

The world of electricity – and energy in general – is changing rapidly. New innovations are creating policy and business opportunities and challenges that we are only beginning to understand. In the midst of all this change, Minnesota and the rest of the country are grappling with energy solutions that can best meet current and future needs while balancing competing environmental, business, and consumer interests. Despite the success of our century-old utility business model in electrifying the nation, increasingly our collective energy focus has shifted from *more* to *better.*

Over three-and-a-half years, the Citizens League convened a diverse, cross-sector base of stakeholders to craft a common vision, defining what "*better*" means for Minnesota. Participants established a set of evaluative principles that carefully balances our common interests: conservation, cost, sustainability, reliability and quality, safety and public health, security, and economic development. With energy efficiency being a key consensus area, both for mitigating environmental impacts and reducing costs for customers – and simply because two-thirds of all electrical energy generated in the U.S. is lost before it even reaches the consumer – prioritizing it is a natural focus for potential policy changes.

Minnesota's conservation efforts have successfully familiarized energy efficiency amongst our state's utilities and customers. However, as our expectations of the electrical system have shifted, our utility business model remains largely unchanged. Clearly our core utility business model, which evolved during a time when the goal was to expand the grid and consistently increase sales, is in conflict with our patchwork of mandates to meet new state pollution and efficiency standards.

In order for Minnesota to enable service providers to continuously optimize the efficiency of the energy system while delivering services to their customers, we must modernize our electrical energy regulatory model to reward a utility doing business in a way that achieves our ideal energy system and maximizes system-wide energy efficiency.

For these reasons, we recommend**:**

- **Minnesota transition to an electrical regulatory framework centered on rewarding utilities for achieving the efficient delivery of reliable, affordable and clean electricity.** Minnesota's current regulatory framework remains rooted in a century-old model that rewards utilities for capital assets and energy units, kilowatt hours (kWh), sold. In measuring reliability, affordability and environmental impact of our electrical system, we recommend a new framework be developed relying on existing metrics already in use by regulators, utilities, environmental advocates and consumer advocates.

- **Minnesota makes this transition methodically and conservatively.** Today's most prevalent service providers, investor-owned utilities (IOUs), rely heavily on capital investments and the financial institutions that fund electrical infrastructure. Minnesota's ratepayers will best be protected by a stepwise approach limiting risk to the electrical system, ratepayers, utility investors and the environment.

- **Minnesota uses a transparent process that maximizes stakeholder engagement.** We recommend that the Citizens League continues its role as a convener, with participants drawn from utilities, regulators, consumer advocates, lawmakers, and other industry experts.

I. Introduction

Minnesota's electrical energy system is undergoing rapid change. Emerging technologies and increasing public pressure for a cleaner energy system is providing the state with a unique opportunity to transform its electrical energy system to fit the needs of the 21st century.

Minnesota's electrical energy policy framework has been designed around the century-old business model of centralized power plants connected to customers by a system of large wires, with a single utility managing the sales. In the early 20th century, when the national challenge was to expand the electrical grid to all corners of the United States, electric utilities had to invest large amounts of capital in power plants and transmission and distribution systems. As a result, Minnesota and many other states agreed to compensate and reward investor-owned utilities using a formula that relied predominately on two measures: 1) the total dollar amount of capital invested in new assets like power plants and power lines, and 2) the total amount in kilowatt hours of electricity sold to customers, also referred to as "ratepayers".

For decades, as Minnesota's economy rapidly expanded and consumers demanded more electricity, utilities invested in new power plants and power lines. As more efficient technologies emerged for generating and transmitting electricity, utilities replaced aged capital equipment with newer facilities, including natural gas-powered generators and better-performing transmission lines.

In the 1970s, the Legislature and other Minnesota policymakers began passing several utility mandates to address a wide range of environmental and other public policy concerns, resulting in a clear message that our state's energy priorities were no longer simply about providing *more,* but providing *better* electrical energy services that fit the present and future needs of Minnesotans.

Through the 1990s and early 2000s, investor-owned utilities (IOUs) continued investments in new capital and sold increasing amounts of kilowatt hours to consumers, even as customer-level energy conservation activity increased. As a result, utilities continued to provide safe and reliable electrical service, and were viewed as sound investments for investors.

In order to focus on achieving a higher quality energy system, Minnesota must ask itself: "How can public policy and related industry changes authentically and effectively motivate system-wide efficiency in the electrical energy system?"

This question is as timely as it has ever been. In spite of technologic gains in generation and energy efficiency, inefficiencies persist in the overall electrical energy system. As recently as 2013, Lawrence Livermore National Laboratory estimated that 67% of all electrical energy generated in the U.S. is lost as a result of inefficiencies in the process of generating, transmitting, distributing, and using the electricity (Figure 1)[1].

[1] "Energy Flowcharts." Lawrence Livermore National Laboratory. Lawrence Livermore National Laboratory, 2012. Web. 3 March 2014. <https://flowcharts.llnl.gov/>.

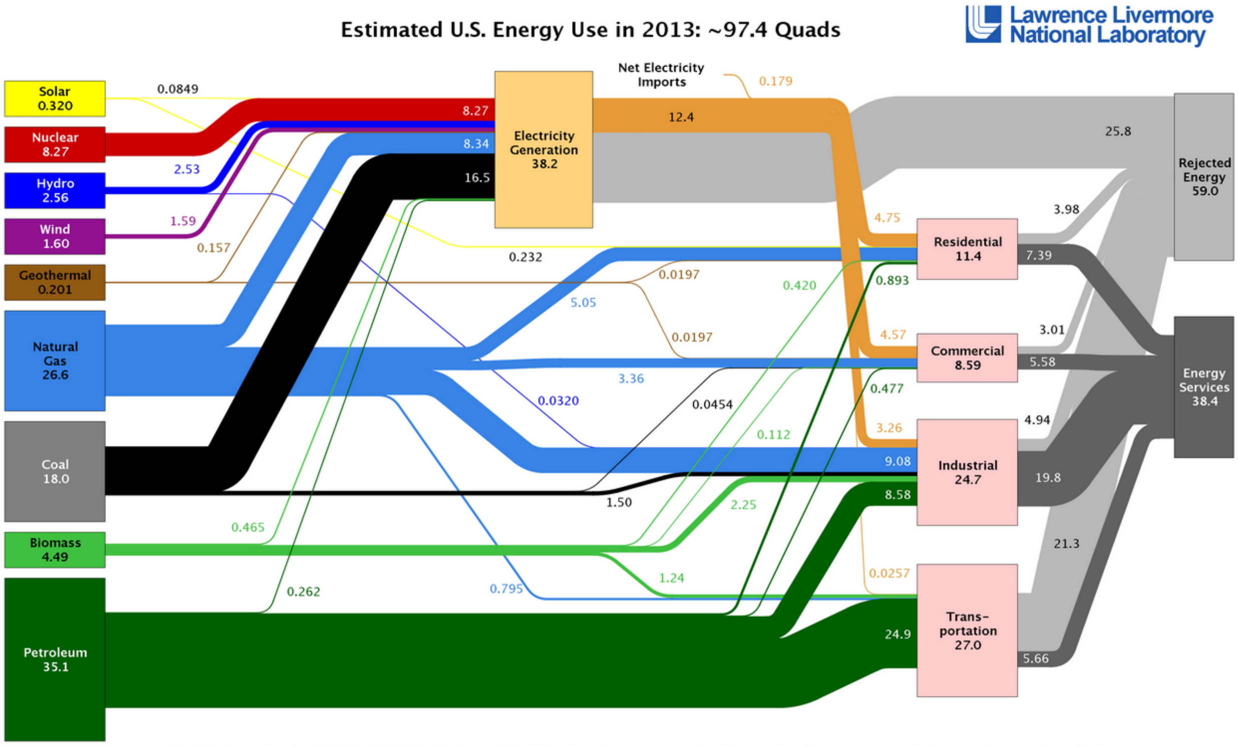

Figure 1: 67% of all electrical energy generated in the U.S. is lost, or "rejected", throughout the system before it reaches the consumer.

This critical issue of greater system-wide energy efficiency is gaining attention in many jurisdictions. Yet, no state in the country has yet advanced a comprehensive solution. Over the last three years, through a two phase process convened by the Citizens League, a diverse group of citizen and expert stakeholders worked to develop the following recommendations to get Minnesota on track toward a solution.

Phase 1: Defining an ideal electrical energy system

In 2010, former employees of the Minnesota Department of Commerce Office of Energy Security, now the Division of Energy Resources, as well as other Citizens League members proposed a stakeholder process to explore the future of Minnesota's energy system. During Phase 1 of the Citizens League's project, a broad, cross-sector base of 200 individuals engaged in a deliberative process to lay out a vision for Minnesota's electrical system, including the outcomes that an ideal system would achieve. These six attributes and outcomes were affordability and competitive pricing; efficiency; sustainability; self-reliance; reliability and high-quality of power; safety and security.

Phase 1: Ideal Outcomes of Minnesota's Electric System:

Affordability
Sustainability
Reliability / Quality
Safety and Security
Efficiency
Self-Reliance

Figure 2

Phase 1 participants and subsequent community workshops and meetings identified energy efficiency as an agreed upon priority for Minnesota since energy efficiency helps address both affordability and sustainability - two of the most frequently cited priorities for the future of the electrical system. When efficiency is maximized across the electrical energy system, fewer units of energy are required to accomplish any particular end, resulting in smaller utility bills, reduced environmental and health impacts, and potentially increased overall grid reliability.

Phase 2: Long-term, system-wide policy changes to promote electrical efficiency

Contemplating a system-wide change to achieve greater efficiency is a complex task. Beginning in November 2012, Phase 2 began with an overview of Minnesota's current energy efficiency policies, and related policies encouraging more renewable electricity generation and reduced emissions. Thanks to several efforts, Minnesota has made significant progress in recent years toward reducing electrical demand and increasing the overall sustainability of our electrical energy system.

Participants also engaged in a deeper investigation of energy efficiency across the electrical system in Minnesota. During this year-long stakeholder process, it was agreed that "energy policy" should be defined broadly, and proposed solutions should include not only governmental actions but also actions by large customers, energy service providers, non-profit institutions and individual citizens. Utility-focused policies alone cannot produce a complete solution; instead, energy efficiency is maximized when energy systems are integrated.

Likewise, we distinguished broader energy efficiency from customer-focused energy conservation. Instead, we focused on the broader challenges and opportunities to achieving deeper energy efficiency across the broader electrical energy system, including the opportunity for much deeper energy savings at the individual customer level, beyond the current scope of state-mandated conservation activities.

To gauge strategies and concepts, participants expanded upon Phase 1's ideal (Figure 2), and defined a set of eleven evaluative principles. In achieving efficiency, the group agreed that changes should achieve the following outcomes (Figure 3).

Participants identified strategies either in use by other states or proposed by leading national energy policy advocates, ranging from the American Council on an Energy Efficient Economy (ACEEE) to the Edison Electric Institute (EEI). Many of these potential policy options which could work within the current policy framework fell short on our evaluative principles. Consequently, the group found that despite Minnesota's efforts having delivered three decades of cost-effective conservation activities, the current regulatory framework is unable to adequately incent investor-owned utilities to capture system-wide energy efficiency benefits. Therefore, Phase 2 stakeholders narrowed in on developing a framework that would enable service providers to continuously optimize the efficiency of the energy system while delivering services to their customers. Because cooperative (except Dakota Electric) and municipally owned utilities are largely self-regulated, the group soon focused on investor-owned utilities.

Evaluative Principles

Figure 3

<u>Goals</u>: In achieving efficiency, policy should achieve the following outcomes:

1. **<u>Conservation</u>:** Minimize losses to maximize the outcome per raw energy input.
2. **<u>Cost</u>:** Protect and strengthen affordability, considering not just the price of electricity, but also the larger societal costs and benefits.
   a. Policy should allow electricity to be affordable for citizens and businesses.
   b. The price of the service that electricity provides should also be stable, not fluctuating drastically or unpredictably.
3. **<u>Sustainability</u>:** Protect and strengthen sustainability, environmentally, economically, and socially. A truly sustainable system meets today's needs without compromising the ability of future generations to meet their needs.
   a. Negative environmental impact should be minimized.
   b. To the degree that electricity must depend on limited resources, policy should account and plan for those limitations.
   c. A sustainable system must be economically viable in the short and long term.
   d. A sustainable system must be socially equitable, considering who receives the benefits of the system and who bears the negative impacts.
4. **<u>Reliability and quality</u>:** Electricity of consistent quality should be available without interruption.
5. **<u>Safety and public health</u>:** Injury or harm should not be caused to workers, consumers, or other citizens.
6. **<u>Security</u>:** Access to electricity at the user level should be protected from all hazards, natural and man-made, and able to continue to deliver electricity even if there is a disturbance.
7. **<u>Economic development</u>:** Energy – including electricity – is integral to Minnesota's economy, and electrical energy policy should not negatively impact the state's economic health.
   a. Policy should allow Minnesota business to be competitive.
   b. Policy should strive to capture the employment and economic growth opportunities associated with greater energy efficiency realization.

Effective policy on energy efficiency will include *<u>processes</u>* that:

1. **<u>Focus on outcomes while facilitating continual improvement.</u>** Allow for flexibility in the means to achieve these ends. We cannot predict the opportunities created as new technologies are developed, nor what practices or entities will prove to be effective.
2. **<u>Take a whole-systems approach</u>**, considering all of the inputs and outputs, the systems that connect them, and the sequences and processes from beginning to end.
3. **<u>Include a complete economic assessment.</u>**
   a. Effective policies take externalities and societal costs into consideration, though all costs do not necessarily need to be incorporated into electrical prices.
   b. Pricing questions should focus on overall costs (bills) rather than on the rate per kWh.
4. **<u>Align incentives and market signals at all levels towards efficiency.</u>** Actions that achieve cost-effective efficiency should be rewarded through the market.

Our dialogue is a timely one, and is part of what is becoming an industry-wide dialogue on the future of electrical utility regulation. In the two years since the Citizens League released the Phase 1 report, the need to modernize electric utility business models has gained national attention from Forbes magazine[2] and Bloomberg BusinessWeek[3] to the electric industry trade group, Edison Electric Institute (EEI), which in 2013 published a guide for its investor-owned utility members entitled, "Disruptive Challenges: Financial Implications and Strategic Responses to a Changing Retail Electric Business."

Because electrical energy policy impacts the environment, businesses, public health, quality of life and even tax policy, discussions of different concept solutions often result in significant debates. The committed participants in both Phase 1 and Phase 2 of the Citizens League Energy Policy Project demonstrate the value of this nonpartisan process to build long-term policy solutions, and the diverse interest in energy efficiency as one potential consensus solution to Minnesota's energy policy framework.

[2] "Distributed Generation Poses an Existential Threat to Utilities," Forbes, Aug. 26, 2013.
[3] "Why the U.S. Power Grid's Days Are Numbered" Bloomberg BusinessWeek, Aug. 22, 2013.

II. Findings and Conclusions

Finding 1: Minnesota's Conservation Improvement Program is a Strong Foundation for Delivering Cost-Effective Energy Conservation

For more than 30 years, Minnesota has advanced electrical energy efficiency through utility-centered conservation mandates. In 1983, the Conservation Improvement Program (CIP) was initiated to implement mandatory spending requirements by utilities on conservation activities for the state's largest investor-owned utilities. Six years later, it was expanded to apply to all investor-owned electric utilities, and by 1991, all electric investor-owned utilities were required to spend at least 1.5% of their annual retail sales on cost-effective conservation activities.

Since its inception, CIP has become the primary means of driving energy efficiency investment for consumers, with great impact. A 2005 Minnesota Legislative Auditor's report on CIP found that the program's benefits are greater than its costs, and that the program has the potential to provide cost-effective energy conservation in the future. CIP continues to apply four cost-effectiveness tests to ensure benefits exceed costs from four distinct perspectives: 1) Societal; 2) Utility; 3) Program Participant, and 4) Ratepayers.[4]

In 2007, Governor Pawlenty proposed, and the Legislature passed several substantial reforms to CIP; ultimately, these reforms were enacted as the cornerstone of the landmark Next Generation Energy Act. The two most significant changes in the 2007 CIP reforms were: 1) to add an energy savings requirement to the existing spending requirement, and 2) to expand CIP oversight and energy savings targets to apply to municipal utilities and rural electric cooperative utilities, in addition to investor-owned utilities.[5]

The 2007 reforms also required that the Public Utilities Commission revise and expand the incentives which investor-owned utilities can earn from meeting and exceeding their annual CIP energy savings target; an update in 2009 empowered the Commission to adopt any such mechanism "such that implementation of cost-effective conservation is a preferred resource choice for the public utility considering the impact of conservation on the earnings of the public utility." In 2010, the Commission approved a new suite of incentives for investor-owned utilities that meet or exceed their CIP annual savings targets.

Under CIP, energy efficiency continues to be the lowest cost resource for Minnesota ratepayers, as compared to new generation resources. From 2008 to 2012, because of CIP requirements, utilities have spent $719 million on energy efficiency programs, with at least $3.5 billion in resulting energy savings.[6] In 2011, the average cost of these efficiency savings achieved through CIP was 2.14 cents / kilowatt hour, compared to an average cost of 6.17 to 14.43 cents / kWh for electricity generated[7].

[4] MN Office of Legislative Auditor, Evaluation Report: Energy Conservation Improvement Program, Rep. No. 05-04.
[5] Minnesota Laws 2007, Chapter 136.
[6] Energy Savings Platform Presentation on CIP to the Minnesota Legislative Energy Commission, Dec. 19, 2013.
[7] Report to the Legislature: Minnesota Conservation Improvement Program Energy and Carbon Dioxide Savings Report for 2010-2011.

From the Minnesota Chamber of Commerce to environmental advocates, Phase 2 participants agree that CIP should continue to be a core focus of conservation policy, though several participants suggested improvements. This report largely avoids a detailed discussion of detailed changes to CIP; instead we focus on broader opportunities to achieving deeper energy efficiency across the entire electrical energy system.

Finding 2: Progress is Being Made toward a Cleaner Electrical Energy System with Continued Efficiency Gains

Minnesota has made some real and substantive progress toward many of the attributes and outcomes identified in Phase 1 – including gains in customer-side energy efficiency. While demand for electricity increased almost every year from 2000 to 2007, electric demand from all consumers – residential, commercial and industrial – has declined for four of the past five years, from 2008 to 2012 and is expected to continue declining.[8]

Gains in both energy efficiency and integration of renewable electric generation are the results of several policy efforts over the past few decades, including efforts at reducing mercury emissions; increasing customer energy conservation; expanding the use of all renewable electricity, and specifically targeting solar electricity generation.

In 2001, the Minnesota Legislature created the Metropolitan Emissions Reduction Program (MERP). Several coal-fired turbines were retired and replaced by cleaner natural gas-fired turbines, which resulted in substantially reduced emissions at Twin Cities-area power plants while increasing overall energy output. Due to its success, the Legislature expanded MERP beyond the Twin Cities to multiple power plants across the state in 2006.

The state's utility-run Conservation Improvement Program (CIP) has also long been recognized as a national leader in customer-side energy efficiency programs and by 2011, in aggregate, all electric utilities in the state exceeded the state's aggressive energy savings target of 1.5% of all retail electric sales annually.[9]

Nearly every Minnesota utility is also meeting or exceeding key benchmarks established in the state's Renewable Electricity Standard, resulting in 65,436 GWhs in renewable electricity sold in Minnesota in 2011.[10] In addition, nearly all utilities met their interim benchmark of selling 12% of their total power from renewable resources in 2012, with Xcel Energy exceeding its standard of 18% of total sales from renewable resources.

Further, in 2013, the Legislature enacted the state's first solar electricity standard, and established multiple studies and stakeholder processes to accelerate Minnesota's path toward greater environmental sustainability, ranging from a potential expansion of the Renewable Electricity Standard to 40% by the year 2030 to consideration of a completely fossil-free energy system for the state.[11] As of this report, many elements of the 2013 law have not yet

[8] http://www.eia.gov/todayinenergy/detail.cfm?id=14291
[9] Report to the Legislature: Minnesota Conservation Improvement Program Energy and Carbon Dioxide Savings Report for 2010-2011.
[10] Report to the Legislature: Progress on Compliance by Minnesota Utilities with the Minnesota Renewable Energy Objective and the Renewable Energy Standard, Jan. 14, 2013.
[11] Minnesota Laws 2013 Chapter 85.

been fully implemented, but overall they represent additional regulatory steps toward an electrical energy system with greater diversity.

Finding 3: Energy Efficiency Continues to be Cost-Effective and Reduce Emissions

As Minnesota has advanced policies to increase energy efficiency, increase the use of renewable resources such as wind, solar and biomass, and reduce the emission of harmful pollutants resulting from the generation of electricity, both energy efficiency and renewable electricity has become increasingly cost-effective for customers and for utilities.

In 2005, the Minnesota Office of the Legislative Auditor evaluated the effectiveness of the Conservation Improvement Program.[12] The program evaluation found:

> These [CIP] efforts benefited not only the energy customers who purchased energy- efficient products but also other members of society. Customers who participate in CIP benefit by consuming less energy and having lower energy bills. Other members of society benefit by having utilities avoid the cost of constructing new power plants, transmission lines, natural gas pipelines, and distribution systems. Without conservation, the utilities would need this additional infrastructure to meet their customers' energy needs and would pass the resulting costs onto all their customers.

A 2009 national study of utility sector energy efficiency programs found that Minnesota's electric utility energy efficiency programs cost approximately $0.02 per kilowatt hour saved, just one-third the cost of the most cost-effective new power plant.[13] In deliberations surrounding a proposed coal-fired power plant on the Minnesota – South Dakota border, direct testimony before the Public Utilities Commission cited the cost of an investor-owned utilities' share of power at just less than $0.06 per kilowatt hour generated, while the same utilities' historic cost of CIP conservation activities cost between less than $.01 and $.0275 per kilowatt hour saved.[14] That proposed coal-fired power plant was never built, in part due to the cost effectiveness of energy efficiency. Even as recent as 2014, energy efficiency efforts continues to be far cheaper than investing in additional generation, despite a long history of efficiency efforts pushing up the cost of squeezing out additional savings (Figure 4).[15]

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[12] Minnesota Office of Legislative Auditor, Evaluation Report: Energy Conservation Improvement Program, Rep. No. 05-04.
[13] Am. Council for an Energy Efficient Economy, Saving Energy Cost-Effectively: A National Review of the Cost of Energy Saved through Utility Sector Energy-Efficiency Programs at 5 (Sept. 2009).
[14] Direct Testimony of David A. Schlisse and Anna Sommer, In re Otter Tail Power Co. & Big Stone II, No. EL05-022 (S.D. Pub. Util. Comm'n May 26, 2006).
[15] Maggie Molina. The Best Value for America's Energy Dollar: A National Review of the Cost of Utility Energy Efficiency Programs. March 25, 2014. American Council for Energy Efficient Economy

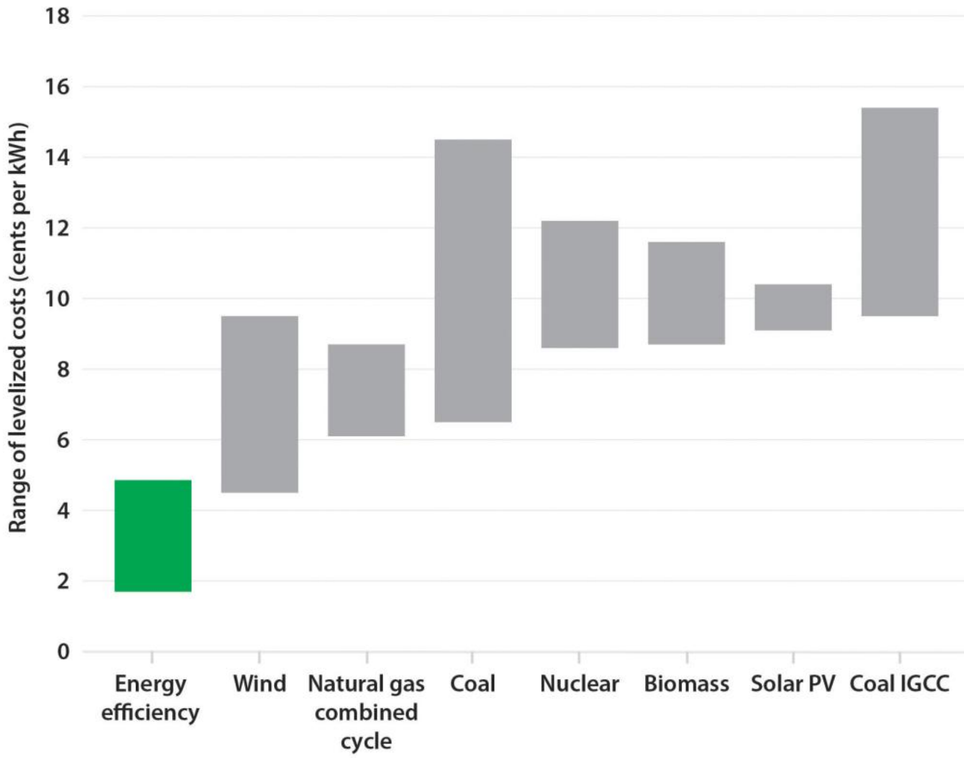

Figure 4: ACEEE shows energy efficiency costs relative to new generation based on data from 20 states (2014).

Finding 4: Current Policy Is Largely Limited To End-User Conservation

Despite the successes of CIP, it has its limitations. Some large customers view CIP as an inefficient program that costs them more than they benefit, and low-income consumer advocates have at times expressed a similar critique. Though utilities are subject to substantial oversight from the Department of Commerce CIP staff and the Public Utilities Commission, they face a difficult task of proving the impact of avoiding the need for new power plants or other more expensive actions; utilities have to essentially “prove a negative,” a challenge in any environment.

Accounting for the cost of a suite of efficiency measures – including customer rebates and other programmatic activity – is much easier than showing what would have otherwise happened without this reduced consumption. Utilities, the MN Department of Commerce, and environmental advocates face skepticism from customers who see a larger charge on their bills without seeing direct benefits from improvements at their facility in any given year.

Further, the Minnesota Chamber of Commerce and others oppose the current level of CIP financial incentive and cite it as an unnecessary reward for an activity in which investor-owned utilities should be already engaged. The MN Chamber of Commerce also points out that Minnesota’s energy efficiency incentive is much larger than any other state’s utility incentive levels for conservation activities.

While multiple incremental improvements to CIP were suggested, we instead chose to focus on the broader limitations of relying largely on end-user conservation efforts to drive efficiency in Minnesota’s electricity sector.

Despite CIP having delivered substantial environmental benefits by avoiding the need to build more power plants, the CIP framework does not account for broader sustainability concerns. First, the CIP mandate can act as an effective limit on a utility's efficiency investments since they only can earn an incentive on conservation up to a limited point. While Minnesota requires all proponents of new power plants to prove the new power generated will be more cost-effective than all other resources, including energy efficiency, the Public Utilities Commission has effectively allowed a utility to prove cost-effectiveness merely by showing they are currently meeting state CIP savings targets. In other words, if a natural gas power plant can generate power at 6 cents / kWh produced, but an energy efficiency program could meet the same resource by saving power at 3 cents / kWh, so long as the proposing utility is meeting or exceeding their total CIP energy savings target, the PUC generally still views this proposal as satisfying the cost-effectiveness requirement. This has the potential to encourage utilities to capture additional revenue by adding to their capital base, rather than making continued investments in conservation beyond the incented threshold.

Next, and perhaps most importantly, CIP is designed to capture customer-level energy savings, also known as "demand-side management" in the industry. Under the CIP regulatory structure, it is difficult for a utility to be incented to achieve energy savings or deeper energy efficiency at the generation, transmission or distribution levels of the electric energy system. In fact, within rate cases today, investor-owned utilities already assume an agreed-upon transmission line loss and general system-wide inefficiencies from generation facilities through transmission lines, substations and distribution lines to end users. Some ratepayer advocates estimate this loss to be around 10%.

Under CIP, an electric utility must generate at least two-thirds of its total CIP savings from kilowatt hours saved by customer. A maximum of one-third of a utility's energy savings target can be credited from energy efficiencies gained through system-wide improvements such as substation upgrades or transmission line improvements, classified in Minnesota Statute 216B.1636 as Electric Utility Infrastructure (EUI). In theory, these EUI investments are eligible for cost recovery, but the statute suggests that these projects would actually compete with other capital investments that are more clearly eligible for earning a return for the utility. Further, the statute is not clear about how the energy savings achieved through EUI investments would be treated, if the capital investment is treated as within the overall rate base. While any given electric utility's most cost-effective improvements might be located on the distribution system, the CIP regime generally requires a focus on energy savings projects on the customers' side of the meter even though they might be more costly. As of 2013, Xcel Energy is currently meeting its annual savings target almost entirely from customer savings, resulting in little if any CIP-driven system-wide energy efficiency activities.

Finding 5: Rate pressures are growing across all electric utilities.

Despite the cost-effectiveness and proven results of CIP, Minnesota continues to face substantial rate pressures, due to many factors, including the move toward a cleaner electricity system. Historically, Minnesota has enjoyed electric rates at or below the national average, in part due to a heavy reliance on lower-cost old coal power and nuclear power. But as the state has added new mandates on electric utilities to help customers save energy (through CIP) or to reduce emissions from power plants – because of public benefit achieved by these requirements – utilities have asked for assistance in recovering the costs of these additional investments.

These forces and others have led to multiple rate increases in the last decade by Xcel Energy, the state's largest investor-owned utility. Most other utilities face similar pressures and have requested or implemented multiple rate increases in the same time period. This trend is expected to continue as infrastructure gets updated, improved and replaced.

Finding 6: 100-Year-Old Utility Regulation Emphasizes Growth over Efficiency

Minnesota's electrical energy policy framework has been designed around the century-old business model of central stations, large wires, and a single deliverer of energy to end-use customers designed during a time of electrical expansion. During the 1890s and early 1900s, electricity was a nascent technology that was quickly gaining adoption. Soon, electric power became a necessity for lighting and for industry, and was classified as a public good. Building out an electric grid required substantial capital investment in central station power generators and in an extensive network of distribution wires.

The rapid growth of the electric power sector sparked intense competition between providers. In some cities, competition for customers was so fierce that some service providers offered service to customers at below the cost of providing that service, with the explicit goal of driving out competitors and creating monopolies for the winning providers; the surviving providers could raise rates to customers without any competition. Consumers faced steep cost increases, just as electricity was viewed by more and more Americans as a necessity.[16]

In 1907, the National Electric Light Association endorsed a regulatory system that was soon adopted by every state, including Minnesota, and persists today.[17] State regulatory commissions, including Minnesota's Public Utilities Commission, grant to utilities an exclusive right to operate in their service territory, in exchange for an agreement to provide affordable and reliable electricity. As part of this compact, commissions regulate the profits of an investor-owned utility. Recognizing that building a large electric grid is so capital-intensive, as their primary metric in determining authorized profits for investor-owned utilities, commissions use the total capital investment as the "rate base," as it is known today.

The Minnesota Public Utilities Commission succinctly articulates the public policy rationale for the capital rate base regulatory model in their 2010 Utility Rates Study report:

> A formal rate case includes a detailed review of all financial factors affecting utility operations. All revenue and cost categories are reviewed: those that increase as well as those that decrease. The goal is to establish rates that are reasonable (i.e., adequate to provide safe and reliable service) and also provide sufficient return to allow utilities to attract capital on reasonable terms to finance capital investments.

This model served Minnesota and the country well for decades, first enabling the electrification of the entire state through the 1930s, and then providing a means to upgrade the grid multiple times throughout the 20th century. Due to capital investment and technological innovation, the overall efficiency of the electricity system improved dramatically, and rates fell along with it. Nationally, the amount of energy required to produce a kilowatt of electricity

[16] Harold Platt, The Electric City: Energy and the Growth of the Chicago Area, 1880-1930, (University of Chicago Press 1991).
[17] National Electric Light Association, Proceedings 642 (1907).

plummeted from 92,000 BTUs in 1902 to 10,500 BTUs in 1970. The cost to produce a kilowatt hour of electricity likewise fell from $0.82 in 1902 to $0.09.[18]

From 1960 onward, the advancement of overall electrical system efficiency plateaued. But the continued economic growth required utilities to pour more money into capital infrastructure. More power plants, transmission lines, and distribution lines were erected, and the total "rate base" expanded with it, as did the total volume of kilowatt hours sold to customers. Investor-owned utilities remained profitable, enabling them to borrow money at low cost, and healthy utilities resulted in relatively stable rates for consumers.[19]

This long-standing regulatory model in Minnesota has rewarded IOUs, like Xcel Energy and Minnesota Power, a maximum authorized rate of return of 10-12% based on the capital investment made in large capital investments like power plants and large transmission lines. However, IOUs are unable to collect a similar return or direct financial reward from other investments in energy efficiency, even if they are substantially more cost-effective, can increase grid reliability, and provide substantial environmental benefits.

As a result of Minnesota's progress to date toward reducing electrical demand and increasing the overall sustainability of our electrical energy system through programs like CIP, electric utilities are faced with declining revenue from electric sales, combined with an ongoing demand for large infrastructure investments to meet our energy needs.

Newly promulgated federal rules are affecting both existing and new fossil-fueled power plants[20], and will continue to impact future electric sourcing in the coal-reliant Midwest, including Minnesota. Additionally, in May 2013, the Minnesota Legislature enacted the state's first solar electric generation standard,[21] including a requirement that a portion of the new solar electric generation facilities be installed as small-system distributed generation; this "behind the meter" electric generation can increase local reliability and resilience, but utilities cannot directly benefit from customer-owned solar systems under the current electric business model. As a result, any deeper energy savings continue to be frustrated by Minnesota's traditional utility business model that provides only marginal incentives to make system-wide efficiency investments, and greater rewards for owning capital.

Finding 7: New Utility Business Models Can Spur Greater System-Wide Energy Efficiency

Phase 2 stakeholders spent several months investigating the current regulatory framework in Minnesota, and in other states. Different market signals, policy signals and other factors affecting energy efficiency potential were deliberated with respect to IOUs, which serve 70% of customers in the state[22], and non-profit municipal and rural electric cooperative utilities. Participants found that the most significant barrier to achieving deep energy savings in

[18] History of the U.S. Power Industry: An Update, U.S. Energy Information Administration (2001), http://www.eia.doe.gov/cneaf/electricity/page/electric_kid/append_a.html.
[19] Ibid.
[20] Federal Clean Air Act (section 110(a)(2)(D)(i)(I)), aka the "Good Neighbor" provision.
[21] Minnesota Laws 2013 Chapter 85.
[22] RES compliance filings in docket 11-852

the electric energy system is the century-old business model and regulatory framework for IOUs. The capital-based regulatory framework creates a market incentive toward continued capital investment in power plants and large power lines, because investor-owned utilities' profits are based on the total capital investment across their system. Though system-wide energy efficiency investments decrease overall costs, they frequently are not included in the capital rate base, thus limiting a utility's profit incentive to make these investments. Further, customer-level efficiency investments, such as those required by CIP, do not qualify at all for inclusion in the rate base.

CIP activities have reduced the need for at least ten (10) 250 megawatt power plants, according to Xcel Energy[23]. However, these energy savings have reduced the opportunity for utilities to add these capital investments to their overall rate base, thus lessening their opportunity to grow profits and further borrow money at low rates. In a growing economy, with increasing demand for electricity, CIP impact on new plant construction was manageable. However, the economic slowdown of the "Great Recession" – combined with continued gains in energy efficiency technologies, financing tools, and program innovation – has resulted in the unprecedented long-term trend of limited growth in electricity demand. As a result, utilities are faced with flat revenue from electric sales, and decreased opportunities for additional capital investment.

These changing economics act as a deterrent in achieving optimal efficiency across the electric system, in two ways. First, as discussed above, energy efficiency can limit utility profit growth by reducing the long-term demand for new capital investment, by reducing the long-term need for more electric energy.

Second, when setting rates, the PUC has to anticipate the total energy needs of consumers within a particular class of customers. Based on this forecast of electrical demand, the PUC authorizes a utility to collect a set amount of revenue from those customers. If those customers consume less energy, the utility collects less revenue than forecasted, and may under collect what is necessary to maintain the same level of infrastructure to serve those customers. As a result, once rates are set, utilities have an inherent financial incentive to sell more electricity to customers, and to resist deep energy efficiency gains that reduce the total amount of electricity sold.

As Minnesota's energy focus has shifted from its original intent of providing more electricity to a higher quality electrical energy system, we must also shift how we incent utilities for new public goals. The recommendations in this report focus largely on the need for new business models and policy frameworks for IOUs because of the disincentives embedded in the capitalization rate structure. Our focus on IOUs is intentional, as they play a significant role overall in the economics of the electricity sector and are directly regulated by the Minnesota Public Utilities Commission.

[23] Xcel Energy's 2012 CIP Status Report (http://www.xcelenergy.com/staticfiles/xe/Regulatory/Regulatory%20PDFs/MN-DSM-CIP-2012-Status-Report.pdf)

III. Recommendations

Phase 2 stakeholders of the Citizens League's Electrical Energy project agreed on three core recommendations for Minnesota to proceed with achieving deeper system-wide energy efficiency while enabling service providers to continue to deliver to their customers. Although our committee focused primarily on IOUs and the existing regulatory model, we recognize the importance of other concurrent efforts by all stakeholders in advancing an electrical energy system that achieves our evaluative principles and drives greater system-wide efficiency.

Recommendation 1: Minnesota should transition to a performance-based electrical regulatory framework that rewards utilities for the efficient delivery of reliable, affordable and clean electricity.

Phase 2 participants, from the MN Chamber of Commerce to multiple environmental organizations, support maintaining and strengthening Minnesota's Conservation Improvement Program as a cost-effective means to deliver customer conservation activities. But to achieve deep system-wide energy efficiency, CIP's success must be paired with a new utility regulatory framework that truly rewards utilities for achieving high levels of energy efficiency at all four levels of the electricity system: generation plants, transmission lines, substations and distribution wires, and the customer.

Though the existing regulatory framework – the capitalization model outlined in Finding 6 – requires that utilities provide reliable and affordable service within their service territory, the two primary metrics on which investor-owned utilities are currently measured for financial reward are 1) the total amount of capital investment allocated within the rate base, and 2) the total amount of kilowatt hours sold to ratepayers.

A performance based regulatory model could provide a more holistic suite of financial rewards for investor-owned utilities based on a weighted balance of metrics, including overall system efficiency; consistent control of rates and costs to consumers; total environmental impact of a utility; customer-level reliability and quality of service; individual customer-level efficiency and reduced overall demand, and more.

Learning from Illinois' 2011 Smart Grid Bill: A Limited Performance Based Regulatory Formula

While no state has made a wholesale transition away from the capitalization model and toward a performance based regulatory framework, Illinois is in the middle of its first experience with a robust pilot.

In 2011, the Illinois legislature enacted the Energy Infrastructure Modernization Act (EIMA), to accelerate investments by ComEd and other utilities in smart grid and other electric infrastructure upgrades. EIMA represents one of the first – if not the first – large effort in the United States to provide a multi-metric financial incentive regime to reward utility performance.[1]

Under EIMA, investor-owned utilities are eligible to receive a 5.80% return on investment for a total of $2.6 billion in electric infrastructure upgrades and smart grid, customer-side investments. These utilities will be measured based on five reliability metrics, four customer metrics, and an additional economic development metric based on opportunities for minority- and women-owned businesses. Failure to meet the targets could result in a loss of return on investment of up to 0.38%.

Crafting a Performance Based Regulatory Framework from Existing Metrics

Most – if not all – of the metrics required to achieve a holistic performance based regulatory model in Minnesota are currently in use today by utilities or regulators. However, these metrics are applied merely as requirements for utilities to continue operating or to achieve simple cost recovery of investments. For instance, the reliability metrics CAIDI (Customer Average Interruption Duration Index) and CAIFI (Customer Average Interruption Frequency Index) are very useful measures of a utility's quality and reliability of service; yet, though the PUC sets targets for an individual utility's performance vis-à-vis CAIDI and CAIFI, a utility receives no financial reward for meeting or exceeding these targets, nor does that utility suffer a financial penalty for falling short.

Dozens of such metrics are already used by the PUC, the Department of Commerce, the Federal Electric Regulatory Commission, the North American Electric Reliability Corporation and other regulatory or industry trade organizations to judge the performance of investor-owned utilities. But none of these metrics are used by the PUC to provide a rate of return or similar financial reward.

In several cases, the legislature has prioritized particular energy investments priorities as public goods and treated them differently – from energy savings to mercury emission reductions to economic development in transit corridors. Because investor-owned utilities facing these required investments must bear the risk that the PUC will not allow these investments to be placed within the capital rate base, the legislature has allowed utilities to automatically recover the these investments from ratepayers. These cost recovery mechanisms are more commonly referred to as "riders."

As the legislature demands more of utilities outside of the conventional rate-setting process, they have granted more riders to utilities in order to spur more investment in these public goods. To date, 19 such riders have been enacted in statute; 5 of them were enacted in just one session, the landmark 2007 legislative session. These 19 riders provide some direction in crafting a performance based regulatory framework, as they have been elevated for special treatment. And in nearly all cases, clear metrics exist for evaluating the success of these riders.

For example, the MERP projects achieved a 96% reduction in sulfur dioxide (SO2) emissions, an 81% reduction in mercury emissions, and a 40% reduction in carbon dioxide (CO2) emissions, according to Xcel Energy.[24] MERP investments are authorized for automatic cost recovery treatment under Minnesota Statutes.

The state's aggressive Renewable Electricity Standard has also resulted in 65,436,274,000 kWh in renewable electricity sold in Minnesota in 2011.[25] Those renewable electricity investments not included within a utility's rate base are eligible for automatic cost recovery treatment under Minnesota Statute.

Under CIP, the primary metric on which utilities are judged is the total kilowatt hours saved by participating customers; utilities can actually achieve not just automatic cost recovery, but also a financial incentive outside of

[24] Oct. 28, 2009 testimony of David Wilks, President of Energy Supply, Xcel Energy, before the Committee on Energy and Natural Resources, U.S. Senate.

[25] Report to the Legislature: Progress on Compliance by Minnesota Utilities with the Minnesota Renewable Energy Objective and the Renewable Energy Standard, Jan. 14, 2013.

the traditional rate-setting process, authorized under Minnesota Statute 216B.16. The CIP incentive is the only cost recovery mechanism in Minnesota law that can result in actual shareholder earnings; but even a fairly robust level of CIP incentives are just a very small part of an investor-owned utility's total shareholder earnings.

<u>Recommendation 2:</u> Minnesota should make this transition methodically and conservatively, with a stepwise approach that minimizes risk to Minnesota's electrical energy system, to ratepayers and to the environment.

Today's most prevalent service providers, investor-owned utilities, rely heavily on capital investments and the financial institutions that fund electrical infrastructure. Minnesota's ratepayers will best be protected by mitigating investor uncertainty that accompanies fundamental regulatory reform, as investor uncertainty frequently results in higher costs of capital which translate into higher electricity rates.

Because electricity policy is so complex – and the need for reliable, affordable and clean electric power so deeply embedded in all aspects of our society – no single individual, advocate, or regulatory body can properly anticipate all of the consequences from such potentially significant reforms alone.

<u>Recommendation 3:</u> Minnesota should transition to Performance-Based Regulation using a transparent process that maximizes public input and stakeholder engagement.

The Citizens League Electric Energy Project has continued to achieve consensus from a broad and diverse group of invested stakeholders and engaged citizens. We recommend that the Citizens Leagues convene a smaller group of industry experts in Phase 3 of this project, to answer two key questions:

1. What metrics should be used to reward an investor-owned electric utility under a holistic performance based regulatory model, and how should those metrics be weighted?
2. What is the best process to formally advance the transition to a performance based regulatory model in Minnesota?

We believe that Phase 3 participants would be wise to begin with an inventory of all existing metrics currently in use by Minnesota utilities, with particular attention paid to those metrics associated with the 19 automatic cost recovery mechanisms identified in the 2010 PUC "rider" study.

As a starting point, we also suggest that Phase 3 begins looking at examples of where performance-based regulation framework has been used in whole or part (Appendix E).

We recommend that the Citizens League convene Phase 3 in 2014, and aim to complete its work in early 2015 to maximize the opportunity for the Legislature to act on any recommendations that may emerge in the next session.

Appendix A:

Phase 2 Charge to Committee for Policy Development

The overarching question is: How can Minnesota more effectively and systematically promote efficiency in energy systems through government, utilities, finance, communities, or other institutions?

Recognizing the need to focus the scope of policy development for this work, the participants of the Citizens League's electrical energy project will focus in this phase on the following question in phase 2: **What policy framework would enable service providers to continuously optimize the efficiency of the energy system while delivering services to their customers?**

In posing this question, we recognize that:

- "Policy" is defined broadly, and solutions may include not only governmental actions but action in all spheres and institutions.
- Efficiency is maximized when systems are integrated. We will approach the question by examining electrical energy systems, but we recognize the efficiency gains through integrating energy systems.
- A utility focus is not the only way to get at efficiency. This work has a utility focus in order to define a scope that is manageable and in which we can be effective – but we do not expect this alone to produce the complete solution.
- We are unlikely to find a one-size-fits-all solution. Investor-owned, cooperative, and municipal utilities are very different, as are electricity load profiles and other considerations. Solutions should be flexible.

Process and timeline: Over the course of this phase of the work:

1. Confirm the definition of "efficiency," starting with the definition produced in Phase 1 of this project.
2. Develop a set of evaluative criteria based on Phase 1 work.
3. Evaluate Minnesota's current structures and their results. Identify key barriers to efficiency.
4. Evaluate a range of possible alternatives. These could be in existence elsewhere or new ideas. We will likely divide into working groups to accomplish this.
5. Determine whether improvements could be made to our current structure, and if so,
6. Develop policy proposals to do so.

At the end of six months, we will evaluate our progress and determine next steps. We may find it is not possible to complete all of the above steps in that time.

Scope: This is subject to change as the project progresses and we learn more, but to start, it will be helpful to consider what is included in the scope of this work:

- Things that are on the table include:
    - Rethinking of the current structure (e.g. business models – how value is created, delivered, and captured)
        - We do not assume that we could suddenly and dramatically change things – but we may need to set up a long-term path to something quite different.
    - Smaller changes that could be added on to current system (e.g. decoupling)
- The following subjects could be considered as they relate to larger topics, but would not be the center of policy development:
    - Financing models.
    - Consumer education.

Roles and expectations: Participants in this phase should expect two-hour meetings every three to four weeks. If you cannot attend in-person meetings, please coordinate with Citizens League staff. We want to be as flexible as possible so that people can participate regardless of their schedule or ability to travel to meetings.

We have a very diverse group in terms of background, and we ask that everyone contribute their experience and knowledge – whether it is as a residential customer, citizen, energy professional, or in other roles. Please acknowledge your self-interest (and that of your employer, if appropriate) and bring it to the table, and ask questions to better understand the self-interests of your fellow participants. We will be able to learn as much from each other in this process as from outside presenters or formal research.

The work produced in this project will be your work. If you have concerns, ideas, questions, raise them at any time – either in committee meetings or separately with CL Staff. You should feel comfortable putting your name on what is produced, and/or acknowledging disagreements.

More in-depth research will be conducted in coordination with this work, overseen by the Minnesota Chamber of Commerce and Eutectics Consulting, in partnership with the Citizens League. The research will be conducted by Common Grounds, a group of graduate students in the University of Minnesota's schools of business, public policy, public health, and law.

This phase will be guided by an Advisory Committee of leaders in this field. They have been tasked with helping to frame the policy question and scope, to make us aware of related efforts, and to give input based on their knowledge and expertise. The Advisory Committee met twice prior to the committee convening and is not expected to meet frequently during the policy development process.

Citizens League will provide the lead staff on this project. The League's primary responsibility is to organize the process and space through which we can develop policy recommendations together, in line with a civic policy making approach. The Citizens League does not have a position on the best direction for policy recommendations – the purpose of this project is to develop this.

Amending this charge: As we continue to learn, the above charge could be revisited. If that happens, it should be done deliberately, and any changes to the scope/charge should be transparent and public.

Appendix B:

Phase II Participants*

Advisory Committee Members
Ellen Anderson, *Senior Advisor to Governor Dayton*
Bill Black, *MN Municipal Utilities Association*
Jessica Burdette, *MN Dept. of Commerce, Division of Energy Resources*
Rick Evans, *Xcel Energy*
Ben Gerber, *MN Chamber of Commerce*
Mike Gregorson, *Great Plains Institute*
Jeremy Kalin, *Eutectics LLC*
Joel Johnson, *MN Rural Electric Association*
Nancy Lange, *MN Public Utilities Commission*
Jerome Malmquist, *University of MN, Energy Management*
Ken Smith, *District Energy St. Paul*

Participants
Robert Armstrong
Larry Baker
Wissam Balshe, *Cummins*
Pat Berger, *Xcel Energy*
Dirk Bierbaum
Deborah Carter McCoy
Steve Dahlke, *Great Plains Institute*
Bright Dornblaser, *University of Minnesota*
Bill Droessler, *Izaak Walton League of America*
Fritz Ebinger *Ebinger Law Office*
John Gasal
Ben Gerber, *MN Chamber of Commerce*
Chris Hammons
Richard Harrington
Ryan Hentges
Holly Hinman
Rep. Melissa Hortman, *MN House of Representatives*
Megan Hoye, *Center for Energy and Environment*
Eric Jensen, *Izaak Walton League of America*
Joel Johnson, *MN Rural Electric*
Frank Jossi
Dave Leveille, *Minnesota Power*
Annie Levenson-Falk, *Legislative Energy Commission*
Matt Lewis
Joshua Low, *Sierra Club*
Jerome Malmquist, *University of Minnesota*
Nick Minderman, *Xcel Energy*
Bruce Nelson, *MN Department of Commerce, Division of Energy Resources*
Will Nissen, *Fresh Energy and MN2020*
Timothy Nolan, *MN Pollution Control Agency*
Jessie Peterson, *Xcel Energy*
Ryan Pulkrabek
Lowell Rasmussen, *University of Minnesota*
Jack Ray, *City of Saint Paul*
Virginia Rutter
Bruce Sayler
Jim Schneider
James Schoettler
Michaeline Sheehy
Laura Silver
James Sjoblom
Benjamin Stafford
Peter Strohmeier, *Rep. Hortman's Office*
Jason Willett

Staff
Adam Arling, *Policy Coordinator*
Annie Levenson-Falk, *Policy Manager*
Arianna Genis, *Policy Assistant*
Jeremy Kalin, *Eutectics LLC*

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District Energy St. Paul, University of Minnesota Energy Management, Xcel Energy and Target.

*Listed affiliations do not necessarily mean endorsement by the organization, but are provided for informational purposes.

Appendix C

Operating Principles:
What are our governing beliefs and practices?

Mission: *What is our fundamental identity?*
The Citizens League builds civic imagination and capacity in Minnesota by:

- Identifying, framing and proposing solutions to public policy problems;
- Developing civic leaders in all generations who govern for the common good; and
- Organizing the individual and institutional relationships necessary to achieve these goals.

Purpose**:** To organize the *means* – the "civic infrastructure" – within the Citizens League and in Minnesota, to achieve this mission. "Civic infrastructure" refers to our ability to govern and solve problems for the common good in and across all institutions.

Values: *What are our core civic beliefs?*

1. We believe in human capacity: the power and potential of all citizens.
2. We believe in democracy and good governance.
3. We believe in civic leadership and active citizenship.
4. We believe in good politics and political competence.
5. We believe in institutional accountability: that all institutions must sustain these ideals from one generation to the next.

Guidelines: *What set of civic standards do we apply to our work to act on values and achieve our mission/purpose?*

1. Defining a problem: People who are impacted by a problem will help define the problem in keeping with our values.
2. Demonstrating transparency and good governance: Leaders will establish transparent processes that expect all participants to engage in decision and policy making.
3. Contributing resources: All participants will help to identify and contribute resources to address the problem.
4. Sustaining solutions: All participants will help to advance and sustain recommended solutions in their institutions.

Disciplines*: The Citizens League uses a set of civic organizing disciplines and skills to support active citizens and civic leaders in meeting these guidelines. These include:*

- Operating Principles (this document) guide all work.
- Life Work Statements align individual purpose with institutional mission, and include self-identity as a civic leader.
- Power Analysis tool is used for diagnosing problems and building workplans.
- Work Plans guide organizational and individual activities.
- Value-Driven Calendar ensures time is spent maximizing workplan goals.
- Public Meetings and Public Evaluation engages members and participants authentically and effectively.
- Civic policy making builds the ability of people/organizations to define and solve problems and set policy.

Civic and Political Skills *are required to practice the disciplines:*

- Critical thinking: to distinguish objective reality (facts) from subjective reality (interpretative)
- Open-ended questions: to engage different perspectives
- Strategic listening: to determine and clarify self-interest as it relates to common goals
- Suspending judgment: to get divergent points of view
- Fostering constructive tension to highlight issues that need to be resolved
- Ability to negotiate and compromise while staying accountable to civic principles
- Holding self and others accountable for follow through on agreement

Appendix D:

Summary of Proposals Considered in Phase 2

Status Quo Plus Working Group
1. Efficiency utility
2. Put efficiency on par with generation as an energy resource
    - 2.1 Energy Efficiency Power Purchase Agreements
    - 2.2 Return on Investment for Energy Efficiency
3. Consider DSM/load shifting under CIP
4. Decoupling

Energy Services Utility Working Group
5. Energy services utility

Performance-based regulation Working Group
6. Performance-based regulation

1. Efficiency utility

Independent, statewide organization runs all efficiency programs and incentives for customers, and could also include renewable energy programs and incentives. Funded by utilities or directly by utility customers.

Evaluative principles:
1. Efficiency/Conservation – yes
    - Evidence from OR suggests that it drives higher conservation
2. Cost – yes, cost-effective
    - OR 2012: 2.7c/kWh. Cost-effective across categories (bldg. types, production)
    - VT 2010: 4.1c/kWh (vs. supply cost of 14.4c/kWh)
3. Sustainability – some
    - Improves environmental impacts
    - Program funding can be vulnerable if it goes through the state
    - Does not help utilities be economically sustainable with declining sales
4. Reliability and quality – N/A
5. Safety and public health – N/A
6. Security – N/A
7. Economic development – yes
    - Should not have negative effect
    - OR claims 2012 added $230M to economy with $154M expenditures. Needs to be compared to the economic development MN gets with current programs.
8. Outcomes focus – yes
    - Neutral on means
    - Are there ways to set it up to allow it to be nimble with new technologies, best practices?
9. Whole systems approach – no
    - Works only on consumer efficiency
10. Complete economic assessment – no
    - No more consideration of externalities in decision making than what we have now
11. Align market signals toward efficiency – no
    - Transfers responsibility for efficiency to an independent organization for whom that is its sole responsibility.
    - But in the process, it creates an incentive for utilities to sell as much power as possible.
    - Utilities will make the required contribution to the efficiency utility; there’s no incentive; it actually disincentivizes utility from working harder for efficiency.

Strengths: If there were single, statewide efficiency utilities with uniform programs, that would simplify things for consumers and contractors and could be more cost-effective than each utility operating its own programs. Cleans up a conflict of interest within utilities currently.

Weaknesses: It does not orient utility business models towards efficiency, and does not provide new revenue associated that could help utilities be sustainable businesses as sales decline.

Conclusion: Does not address the fundamental business model question; not a priority to pursue. It simply reorganizes what already exists.

2. Put efficiency on par with generation as an energy resource

2.1 Energy Efficiency Power Purchase Agreements

Allow customers or third parties to package energy efficiency and sell it to utilities as a power resource on part with new generation or electricity purchase. This could be a potential way to get at large commercial, including CIP opt-outs.

Consider allowing utilities to earn a rate of return on EE PPAs (smaller than the rate earned on capital that they own). EE PPAs would have to be the least-cost resource, including when the rate of return is factored in.

Evaluative Principles:

1. Efficiency/Conservation – yes
    - Puts efficiency on par with generation as a power resource. If financially viable for utility and customer, could drive more efficiency.
2. Cost – yes
    - EE PPAs would only go forward if they were the least-cost resource
3. Sustainability – yes
    - Environmental benefits of efficiency
    - If utilities can earn a rate of return, allows revenue from efficiency to help sustain utility businesses through declining sales.
4. Reliability and quality – N/A
5. Safety and public health – N/A
6. Security – N/A
7. Economic development – yes
    - No negative effect
    - Pursuing efficiency has the potential to drive greater economic development than building new capital (power plants).
8. Outcomes focus – yes
    - Neutral on means to accomplish the efficiency.
    - Allows the customer to use the best means to accomplish the efficiency, and flexible to changing the means as technology/knowledge/circumstances evolve.
9. Whole systems approach – unsure
    - Group unsure if this could focus just on consumer end, or more broadly within electrical system.
10. Complete economic assessment – no
    - Unless there is a change to include externalities in decision making processes. There may be ways to do this in this model.
11. Align market signals toward efficiency – yes
    - Especially if utility is able to earn a return on EE PPAs

Challenges: Could have a high level of complexity in measuring and verifying savings, in circumstances that change frequently and are often very complex for the large users who could achieve large savings. In order to be included in utility resource planning, savings needs to be guaranteed over long periods of time, which could be difficult.

Conclusion: Not a panacea for all efficiency needs, but could be a useful tool if we could overcome the challenges, especially complexity.

2.2 Return on Investment for Energy Efficiency

Allow investor-owned utilities to earn a rate of return on efficiency investments similar to that earned on generation investments. Require the investments to be the least-cost resource and effective to achieve savings that are real, persistent, and would not be done but for the investment.

1. Efficiency/Conservation – yes
2. Cost – yes
3. Sustainability – some
    - Utility rewarded for pursuing efficiency. Is this enough to make up for lost sales due to efficiency?
4. Reliability and quality – N/A
5. Safety and public health – N/A
6. Security – N/A
7. Economic development – yes
    - Does not harm
8. Outcomes focus – yes
9. Whole systems approach – yes
10. Complete economic assessment – no
11. Align market signals toward efficiency – potential

Challenges of rate of return on efficiency on a utility- or program-wide basis are very steep because of the difficulties of measurement and verification.

Conclusions: Do not feel comfortable recommending this option without having some solutions to measurement and verification challenges.

3. DSM/load shifting

Modify consumer demand to put less stress on system during peak times using incentives and education.

Evaluative principles

1. Efficiency/Conservation – No; does not necessarily reduce overall demand.
2. Cost – not significantly
3. Sustainability – not really
4. Reliability and quality – Yes
5. Safety and public health – yes
6. Security – Yes
7. Economic development – not really
8. Outcomes focus – N/A
9. Whole systems approach – No
10. Complete economic assessment – N/A
11. Align market signals towards efficiency – no

Challenges: Consumer privacy issues may be contentious.

Conclusions: DSM can benefit grid reliability and need for additional investments to meet peak demand, but does not improve overall system-wide efficiency or reduce actual energy demand.

4. Decoupling/Revenue Stabilization

Under the existing rate-making process, utilities forecast the expected total energy demand from each individual customer class (residential, small commercial, industrial, etc…). The utility forecasts the cost of providing that total energy demand to that customer class. After deliberation and negotiation on the specific numbers of both total forecasted demand, and the cost of service to that customer class, the Public Utilities Commission establishes a per kilowatt hour rate for that customer class.

Once the rate is established for that group of customers, any substantial reduction in overall demand brings with it a substantial reduction in revenue for the utility. Consequently, utilities resist exceeding the state-mandated CIP energy savings targets because they reduce more revenue than they might produce operational savings through efficiencies. Revenue Stabilization will remove this significant barrier to achieving deeper energy efficiency, by ensuring that the utility is able to capture the total revenue from each customer class, as established by the PUC at the beginning of a rate case.

Evaluative principles

1. Efficiency/Conservation – Does not motivate efficiency, but mitigates identified sales/profit conflict.
2. Cost – Stabilizes rate fluctuations, enables greater efficiency achievement.
3. Sustainability – A helpful bridging policy, but not a long-term solution
4. Reliability and quality – Maintains status quo, includes quality requirements.
5. Safety and public health – yes
6. Security – yes
7. Economic development – enables greater efficiency
8. Outcomes focus – N/A
9. Whole systems approach – N/A
10. Complete economic assessment – Mitigates risk to customer and utilities, does not capture externalities beyond status quo.
11. Align market signals towards efficiency – Could be used as bridge tool, but not a solution in itself.

Challenges: Transparency for customers. Only an accounting tool that can be used for IOUs.

Conclusions: Decoupling is not the “new business model” we’re seeking, but may be useful regulatory tool for getting us beyond the current paradigm. It is being tested by Xcel and others, and merits ongoing consideration.

5. Energy services utility

Rather than selling only kWh, utilities sell some services as well, for example, units of heating or cooling. Customers pay for that output (the service) rather than the input (kWh). It is probably not possible to sell everything as a service, so it would be mixed with kWh sales as well.

In this set-up, the utility should be motivated to deliver the services using as few kWh as possible, so it should drive efficiency throughout the system. The customer would still be motivated to conserve. For example, if customer pays per heating or cooling degree, they will not want to leave the air conditioner on when they leave the house. The customer will no longer have a concern, though, about whether their air conditioner is efficient; that concern is shifted to the utility.

Evaluative principles

1. Efficiency/Conservation – potential
2. Cost – potential
3. Sustainability – potential
    - Environmental benefits of efficiency
    - Economic: new revenue line for utilities, stability while kWh sales decline
4. Reliability and quality – N/A
    - Could be combined with other things to increase reliability, but those effects are not inherent to the business model
        - Sell higher reliability as an additional service to customers
        - Smart meters can pinpoint problems
5. Safety and public health – N/A
6. Security – to watch
    - Business model requires new technologies that introduce new security issues
7. Economic development – yes

- Does not harm
- Potential to grow

8. Outcomes focus – yes
9. Whole systems approach – yes
    - In theory, would incentivize utility to pursue efficiency throughout the system in order to delivery services with as few inputs as possible
    - Would this work in practice?
10. Complete economic assessment – no
11. Align market signals towards efficiency – yes

Conclusion: Worth testing, but needs integrated systems, networked communications (smart grid) and very different regulatory framework for regulated utilities

Next steps: Pilot with willing utilities with different customers, different services.

- If successful, what would facilitate it in different types of utilities, service territories?
- Identify any roadblocks – e.g. does the utility have legal authority to own property in someone's home?
- State may have to put some money up-front for pilots. Could potentially fund through CIP if some requirements made more lenient (e.g. 9-month payback period)
- For IOUs, could be a pilot under CIP
- Coops and municipal utilities may be best place to start a couple pilots

6. Performance-based regulation

Move towards an arrangement in which utilities' revenue is increasingly based on performance metrics rather than cost of service. Transition gradually. Begin with pilot programs, allowing utilities to choose to try new regulatory options or continue with old.

Evaluative principles:

12. Efficiency/Conservation – yes
13. Cost – yes
14. Sustainability – yes
15. Reliability and quality – yes
16. Safety and public health – yes
17. Security – yes
18. Economic development - possibly
19. Outcomes focus – yes, core focus is outcomes.
20. Whole systems approach – yes
21. Complete economic assessment – yes
22. Align market signals towards efficiency – yes

Conclusion: Do model, pilot to explore. Evaluative principles become outcomes we incent in performance regulation.

Appendix E:

Precedents in Performance-Based Regulation

As a starting point for Phase III, the committee recommends looking at the following examples where performance-based regulation framework has been used in whole or part:

Precedent 1: Illinois' 2011 Smart Grid Bill: A Limited Performance Based Regulatory Formula

While no state has made a wholesale transition away from the capitalization model and toward a performance based regulatory framework, Illinois is in the middle of its first experience with a robust pilot.

In 2011, the Illinois legislature enacted the Energy Infrastructure Modernization Act (EIMA), to accelerate investments by ComEd and other utilities in smart grid and other electric infrastructure upgrades. EIMA represents one of the first – if not the first – large effort in the United States to provide a multi-metric financial incentive regime to reward utility performance.[26]

Under EIMA, investor-owned utilities are eligible to receive a 5.80% return on investment for a total of $2.6 billion in electric infrastructure upgrades and smart grid, customer-side investments. These utilities will be measured based on five reliability metrics, four customer metrics, and an additional economic development metric based on opportunities for minority- and women-owned businesses. Failure to meet the targets could result in a loss of return on investment of up to 0.38%.

EIMA is in its early stages of implementation, so results of this limited performance based regulatory regime are not yet available. But the political concerns and uncertainty led to opposition from the state's Attorney General and the Illinois Commerce Commission, and ultimately led to a veto by Gov. Pat Quinn; the legislature overrode that veto to enact EIMA in 2011.[27]

Precedent 2: Great Lakes Energy: A Concise Inventory of State-Mandated Performance Standards

Michigan cooperative electric utility Great Lakes Energy is a member-regulation rural electric association, and is thus not subject to their state's performance standards set by the Michigan Public Service Commission. However, Great Lakes has voluntarily disclosed to their members (electric cooperatives' customers are referred to as members) their performance against 10 clearly articulated metrics.[28] While these metrics are not used as the basis for providing financial incentives (because Great Lakes Energy is neither state-regulated nor a profit-making

[26] "Performance-Based Formula Ratemaking in Illinois," presentation by Ross C. Hemphill, ComEd, at Transmission, Distribution & Metering Conference, Edison Electric Institute, April 29, 2013.
[27] http://www.progressillinois.com/posts/content/2011/11/16/understanding-illinois-smart-grid-and-distributed-generation
[28] http://www.gtlakes.com/vegetation-management/reliability-initiative/state-performance-standards/

utility), the list of State Performance Standards may prove to be a useful means of transparently showing the multiple standards and benchmarks by which a utility's performance will be measured and rewarded.

Precedent 3: RIIO Model (Revenue=Incentives+ Innovation+Outputs) in the United Kingdom.

Over the next decade these companies face an unprecedented challenge of securing significant investment to maintain a reliable and secure network, and dealing with the changes in demand and generation that will occur in a low carbon future.

To ensure that energy is delivered at a fair price for consumers the Office of Gas and Electricity Markets (OFGEM) developed RIIO (Revenue=Incentives+ Innovation+Outputs), a new performance based model for setting the network companies' price controls which will last eight years.

RIIO is designed to encourage network companies to: 1) Put stakeholders at the heart of their decision-making process; 2) Invest efficiently to ensure continued safe and reliable service; 3) Innovate to reduce network costs for current and future consumers; and 3) Play a full role in delivering a low carbon economy and wider environmental objectives.

Appendix F:

Glossary of Key Terms

Energy Efficiency – Using less energy to provide the same service by minimizing losses and delivering reliable, secure and economical energy in a manner that can continue indefinitely.

Energy Conservation – Overall reduction in the amount of energy consumed in a process or system.

Rate Case – A regulatory proceeding to establish customers' rates based on a "snap-shot in time" of all aspects involved in a utility providing service to those retail customers.

Rate Base – The total value of property as used by the utility in providing service.

Riders – Cost recovery mechanisms outside of the rate-setting process for mandated investment activities that address some policy concern (mercury emissions, use of renewables, etc.) To date, 19 riders have been enacted in statute.

Investor-Owned Utility (IOU) – A utility business entity, providing energy to an established customer territory, funded by private investors and managed as private enterprise rather than a government unit or a utility cooperative