

**CITY OF BOULDER
CITY COUNCIL AGENDA ITEM**

MEETING DATE: March 18, 2008

AGENDA TITLE: Update on Boulder Municipalization Feasibility Study and *Smart Grid* and Consideration of a Motion to Support the City Manager's Recommendations on Next Steps

PRESENTERS: Frank Bruno, City Manager
Jerry Gordon, Acting City Attorney
Stephanie Grainger, Deputy City Manager
Kara Mertz, Assistant to the City Manager
Jonathan Koehn, Environmental Affairs Manager

EXECUTIVE SUMMARY:

In an effort to address community goals, as part of its 2004 retreat and the budget processes of 2005 and 2006, City Council directed staff to simultaneously pursue two pathways:

1. Conduct municipalization feasibility studies to determine the costs associated with acquiring the electric distribution system from Xcel Energy.
2. Pursue franchise negotiations with Xcel Energy prior to August 2010, when the current franchise expires.

The city has received preliminary results from its Phase II municipalization study from RW Beck, the city's municipalization consultant. These results indicate that customer rates for electricity under a municipal electric utility have the potential over time to be lower, but may be significantly higher than Xcel Energy's projected rates. This range of results represents variations in several parameters, primarily the cost of supplying power to Boulder residents and businesses under a municipal utility scenario. The study results are very preliminary and staff has had only limited time to conduct follow-up analyses. The RW Beck study addresses the feasibility once a municipal utility had been created. The city should also consider that it would encounter significant legal and public relations challenges over the five to ten year period that would precede creation of a municipal utility. This period could represent several million dollars of risk, as the outcome of a legal challenge to a city municipalization effort is unknown.

As a city, we now face an "exit ramp" as was referenced in prior communications with council on the subject of municipalization. The risk represented by the range of feasibility study results is information that should be used by council to assess whether to continue along the pathway toward municipalization. If council chooses to direct staff to continue this investigation, resources will need to be dedicated to refining the results and beginning to craft potential ballot measures to seek permission to issue municipal bonds

to fund both ongoing planning and legal support as well as authorization and funding for the municipal utility itself.

At the same time, Boulder has been selected by Xcel Energy as their demonstration *Smart Grid City* to deploy and test proprietary enhancements to the electric power grid that allow increased efficiency through digital communication and control. The benefits of a successful *Smart Grid* demonstration could include significant greenhouse gas reductions and power system reliability enhancements. A white paper describing Xcel Energy's *Smart Grid* project is included as **Attachment A**.

Implementation of the *Smart Grid City* project will require significant staff attention and will be conducted in consort with ongoing franchise negotiations. The city manager will report to council periodically throughout 2008 with updates on both the *Smart Grid City* project and the status of franchise negotiations.

STAFF RECOMMENDATION:

Staff is recommending suspension of the municipalization studies in light of the results of the RW Beck study coupled with the risks inherent in a acquisition process that would necessarily involve condemnation proceedings and associated financial impacts. Suspension of the municipalization pathway will also allow staff resources to focus on the *Smart Grid City* implementation and ongoing franchise negotiations with Xcel Energy.

Being named Xcel Energy's *Smart Grid City* is an exciting opportunity that has the potential to more quickly move Boulder toward achieving its community goals and objectives with respect to reliability, renewable energy, greenhouse gas emissions reductions and economic vitality. Significant planning work needs to be launched in partnership with Xcel to begin to implement the *Smart Grid* project.

Staff has begun to compile a list of issues and next steps that will need to be addressed with Xcel as part of the *Smart Grid* implementation. A *Smart Grid* implementation team will be formed comprised of city staff, Xcel Energy and other key partners in the *Smart Grid City* project to address these issues and manage communication with the public.

COMMUNITY SUSTAINABILITY ASSESSMENTS AND IMPACTS:

- **Economic:** Although the preliminary municipalization study results indicate that customer rates for electricity under a municipal utility could be lower than Xcel's projected rates, significant risk exists in the range of possible outcomes. In addition, the path that would be traveled prior to creation of a municipal electric utility could have negative economic impacts on the community, as it would likely involve a five to ten year legal and public relations challenge to the city's attempts at municipalization with a multi-million dollar price tag.

Pursuit of Xcel's *Smart Grid City* vision is expected to have positive impacts on Boulder's business community with regard to increased reliability. In addition,

individual businesses should have the ability to control costs through new demand management technologies that the system will provide.

Although many questions still exist for Xcel with respect to the costs and rate recovery mechanisms for system-wide implementation, increased rates will not pay for this pilot project; rather the city is gaining access to approximately \$100 million of private investment to test out the *Smart Grid City* concept. Throughout the testing period, it will be beneficial for Boulder to be an integral part of the team as Xcel Energy works through the rate recovery issues with legislators and the Colorado Public Utilities Commission (PUC).

- **Environmental:** Participation with Xcel as a *Smart Grid City* is expected to have significant impacts on the city's ability to reach its CAP goals in a timely manner. The benefits of *Smart Grid* as they relate to lowered residential peak demand and energy consumption and improved distribution losses are estimated to reduce Boulder's current electricity use by two to ten percent, representing a CO₂ emissions reduction of 16,000 to 80,000 tons annually or between five and twenty-five percent of the current Climate Action Plan (CAP) emission reduction goals. Implementation of the *Smart Grid* will also dramatically enhance the existing electric system efficiency and conservation capabilities. Studies on *Smart Grid* elements have shown that when additional energy efficiency measures and increases in renewable energy capacity are factored into the mix, these emissions reductions could be significantly magnified.

By suspending the municipalization studies, staff resources and Xcel Energy resources can be dedicated to maximizing the *Smart Grid* opportunities and negotiating renewable energy features that only *Smart Grid* technology can support. This will have the effect of positively impacting the city's CAP goals in the near and long term.

Conversely, if the city proceeds with municipalization efforts, it could delay increases in renewable energy options by at least three years, until the municipal utility was able to secure new power generating capacity. In this interim period, the city would be limited to implementing only what Xcel Energy was willing to provide within the constraints of the existing franchise agreement.

- **Social:** Some "public purpose" programs that Boulder could have achieved with a municipal electric utility may be given up by suspension of the municipalization efforts. To ameliorate this, staff recommends that part of the franchise negotiations with Xcel include increased programs to assist low and moderate income residents as well as to provide affordable housing energy efficiency upgrades. As with the economic sustainability impacts touched on above, Boulder's participation in determining how to rate-base a full scale implementation of a *Smart Grid* system will need to address any additional burdens on low income residents.

The City's and Xcel Energy's demand side management (DSM) programs consist of planning, implementing, and monitoring programs that are designed to encourage consumers to modify their level and pattern of electricity usage. The *Smart Grid* will

allow an emphasis on customer service upgrades that can focus on lower income populations. Furthermore, electric system reliability enhancements that come with *Smart Grid* could help seniors and special needs populations in Boulder who may rely on uninterrupted power supplies for their medical support.

OTHER IMPACTS:

Fiscal: Further pursuit of the city's municipalization efforts would require up to \$500,000 annually for five to ten years for legal fees and staff time to defend legal and public relations challenges that would likely accompany it. The costs associated with formation of a municipal utility are identified in the "analysis" section.

To the extent that implementing the *Smart Grid City* project and continuing with franchise negotiations require any unbudgeted expenses such as outside legal counsel, staff will return to council to discuss funding options. However, these items are expected to total under \$50,000 and may be able to be funded through the city manager's contingency, budget from the city attorney's office or from the water utility fund to the extent any outside research relates to the issues associated with hydroelectric power generation. Any fiscal impacts will be brought to council as part of the regular budget process.

Staff time: Staff time will be allocated to this project for 2008 as part of the City Manager's Office, Environmental Affairs, City Attorney's Office and Public Works Department work programs.

BOARD AND COMMISSION FEEDBACK: At the March 5 Environmental Advisory Board meeting, staff provided general *Smart Grid City* information including how it might enhance Boulder's environmental sustainability. While no formal action or recommendation was made, the board agreed that implementation of the *Smart Grid* could achieve city goals with respect to energy efficiency, conservation, renewable energy and reliability, which were some of the original objectives identified in the municipalization effort.

PUBLIC FEEDBACK: The Municipalization Task Force is a city manager appointed group comprised of approximately twenty-five members that was tasked with guiding staff in designing the municipalization study and reviewing the study results. The task force met on March 5 on the *Smart Grid* proposal and is scheduled to meet on March 13 to review preliminary results from the RW Beck municipalization analysis. With respect to the *Smart Grid*, the task force was supportive and excited about the proposal. The task force did have some suggestions regarding ways to support the community values that were paramount in the municipalization discussion. These suggestions have been incorporated into the analysis section of this memo.

Staff will report to council on March 18 regarding the March 13 task force discussion on the municipalization study results.

ANALYSIS:

Background on the two-track analysis

Originally, council's interest in forming a municipal utility grew out of its desire to create meaningful conservation and alternative energy programs for Boulder. Acknowledging that the desire for "green power" and energy efficiency was not enough to garner full community support and shoulder the significant investment necessary to municipalize an investor-owned utility, in 2004 council broadened the objectives to include reliability and economic vitality as well.

In 2005, the city embarked on a two-pronged investigation to test the viability of creating a municipal electric utility and to simultaneously prepare for the negotiations with Xcel. At this time, the objectives identified for both the municipalization efforts and the franchise negotiations included:

- Renewable energy,
- Reliability,
- Conservation,
- Energy efficiency, and
- Rate stabilization and economic vitality.

Within each of these broad objectives, staff has identified, with prior input from council and the municipalization task force, priority program areas to focus on when moving through the municipalization analysis and the franchise negotiations. Some of these priority programs still need to be vetted by outside legal counsel.

Municipalization track

In 1970 and 1990, the city considered municipalizing its electric utility but in both of those years, the city chose to negotiate franchise agreements instead. In 2005, the city embarked on a two-track investigation to test the viability of creating a public power utility while also maintaining council's flexibility to choose whichever alternative was deemed to be in the city's best interests: direct municipal control through city ownership, or indirect city influence through agreements with Xcel Energy. Council requested "exit ramps," opportunities along the road to municipalization, if it determined it wanted to stop the process to maximize council's ability to make real choices independent of any momentum that might exist, since continuation could have long-term political and economic implications for the community.

During the 2005 budget process, council appropriated \$100,000 to conduct a Phase I feasibility study designed to begin a high level analysis, identifying any significant obstacles that would preclude the city from moving forward with its investigation into creating a municipal utility. This study concluded, "There is a reasonable expectation that the city could acquire the Xcel distribution system" without any rate increases. This result was based on a "top-down" cash flow analysis that modeled the projected utility revenues, operation and maintenance expenses, capital requirements and reserve levels. The model calculated any remaining cash available after these obligations had been met to determine whether the city could afford the debt service that would be associated with system acquisition. This remaining available cash was compared to an educated guess of the range of values that may be attributed to Xcel's distribution system. This model was

utilized because the city and its consultants did not have access to any real data on the distribution system inventory (i.e., the number, age and condition of the poles, wires, and low-side of substations that would be acquired through the municipalization).

As part of the 2006 budget, Council approved use of an additional \$150,000 to fund a Phase II feasibility study that included legal, financial, engineering and administrative study components. The Phase II work was based on more precise data from Xcel regarding the inventory of assets that would need to be acquired if a municipal utility were formed; therefore, the analysis was a “bottom-up” approach that began by simply surveying the assets and determining a range of valuation for them. In addition, RW Beck refined its estimate of the cost to sever Boulder’s distribution system from the rest of Xcel Energy’s distribution system, as well as its estimates of costs to purchase power on the open market and/or to build new power generating capacity.

RW Beck’s preliminary results indicate a large range of costs for creation of a municipal utility in Boulder. Significant additional research would be required to critique and refine these results. The range represents variation in possible costs associated with:

1. Wholesale power supply (determined by projected spot power supply market prices, availability and/or the costs for Boulder to build its own power generating resources);
2. Valuation of assets (determined by a condemnation judge); and
3. Stranded costs (determined by a Federal Energy Regulatory Commission judge).

Best-case and worst-case scenarios are presented here, representing a range of economic risks and benefits for the city for fifteen years under a municipal utility scenario.

Assumed municipal utility start-up in 2011. All numbers are in thousands.

	Best case- 2011	Best case- 2025	Worst case- 2011	Worst case- 2025
Operation and Maintenance	\$18,092	\$27,669	\$18,092 (no change)	\$27,669 (no change)
Power Supply	\$80,444	\$146,940	\$119,680	\$182,830
Annual debt service on acquisition	\$9,520	\$9,520	\$14,160	\$14,160
Annual debt service on stranded costs	\$0	\$0	\$4,778	\$4,778
Total operating costs	\$108,056	\$184,129	\$156,710	\$229,437
Average city revenue requirement (average rate)	\$91.20/MWh	\$152.78/MWh	\$132.27/MWh	\$190.38/MWh
Xcel projected average rate	\$95.64/MWh	\$186.74/MWh	\$95.64/MWh (no change)	\$186.74/MWh (no change)

The previous chart shows that, according to RW Beck, the average electricity rate a Boulder municipal utility would need to charge in 2011 to cover all its operating costs would be \$91.20 per megawatt-hour in a best-case scenario. When the assumptions regarding power supply costs, acquisition costs and stranded investment costs¹ are changed, the worst-case scenario could result in Boulder electric utility rates in 2011 needing to be as high as \$132.27 per megawatt-hour. These rates can be compared to Xcel Energy's projected average rate of \$95.64 per megawatt-hour in 2011.

Franchise track

The city has met with Xcel Energy to begin to frame the franchise negotiation discussion. Typically, the negotiations involve discussions relating to renewal of a franchise agreement as well as creation of side agreements that can address issues not able to be addressed in a franchise such as: street lighting, public purpose programs for low and moderate income residents, economic vitality programs, renewable energy programs and any demand side management programs that may be outside of the purview of Xcel's Least Cost Resource Plan that is filed with the PUC.

City staff has begun to analyze Denver's franchise agreement to determine if the city will have any significant changes to this franchise model for Boulder. From the city's perspective, there are several city interests to negotiate as compared to Denver's franchise, but staff feels confident these mostly technical issues will be able to be settled. The largest issues that are not addressed in Denver's franchise and side agreements relate to renewable energy and significant energy conservation programs. Implementation of the *Smart Grid City* project will provide opportunities to create new renewable energy projects, increase distributed generation options and enhanced energy conservation programs.

Smart Grid City

The vision of a *Smart Grid*, is an electric system that integrates the power supply, transmission and distribution infrastructure with consumer use information so that energy can be generated, distributed, and consumed more efficiently and cost effectively; thereby achieving a more resilient, secure and reliable energy system. Emerging energy and information technologies have the potential to radically improve the efficient use of Boulders energy system.

¹ Stranded costs: Under a municipal acquisition, the city could be required to compensate Xcel Energy for the reduced value of any remaining (or stranded) Xcel assets that result from the acquisition. FERC has defined the costs associated with stranded investment as the difference between the revenue that a utility could have expected to recover, less the market value of the energy released by the departing customer, all times the length of time the utility could have reasonably expected to continue to serve the customer. Ultimately, a final determination of the costs associated with stranded investment would be made by a FERC judge. If the FERC judge determined that the length of time that Xcel Energy could have expected to serve Boulder's customers is zero years after 2010, then the determination could result in an assessment of zero stranded investment. The worst case scenario approximates a 15 year stranded investment term.

Attachment A includes a white paper that Xcel provided that describes its vision of *Smart Grid*, a fully network-connected system that creates an automated “neural network” that can manage all of the variables involved in delivering energy to the consumer.

Through a digital decision-making system that will be overlaid onto Boulder’s existing electrical grid, consumers will be able to make decisions regarding when, where and how to consume energy. At the same time, Xcel Energy will be able to regulate when, where and how power is fed on to the grid, minimizing distribution losses inherent in the current analog system, and allowing for increased capacity for inherently variable renewable energy sources. In a *Smart Grid City*, all aspects of the power grid are integrated and both supply and demand decisions are communicated back and forth to maximize efficiency.

A significant benefit of this type of automated system is precise identification of power outage locations as well as advance warnings of system vulnerabilities, which both have the effect of decreasing the incidence of power outages and improving response times if there is a power outage.

Page eleven of the white paper included in **Attachment A** describes the components that will be deployed to Boulder as Xcel’s *Smart Grid City* pilot. Among other things, conversion of existing meters to two-way technology integrated with electrical outage management systems, 10,000 in-home control devices and the necessary infrastructure to fully automate in-home energy use, and 1,000 distributed generation technologies including plug-in hybrid electric vehicles, battery systems, vertical wind turbines and solar panels. Taken together, these distributed generation and storage points will help to mitigate the effects of the variable nature of renewable energy sources.

Ability to reach the city’s goals

Municipalization

- **Renewable Energy:**

One of the primary purposes behind efforts to municipalize the city’s electric utility has been to give the city the ability to determine the makeup of its power portfolio. For example, if the city wanted to supply more renewable energy to its businesses and residents, the board of directors of the municipal electric utility could set policies to do so. The governing board would take into consideration the rate impacts of choices of this type. RW Beck’s analysis projected the rate impacts of both 15 percent renewable energy and 25 percent renewable energy.

The rates resulting from these scenarios range from a low of \$90.88/MWh, representing a five percent savings as compared with Xcel Energy’s projected rates, to a high of \$124.32/MWh, or a thirty percent increase over Xcel Energy’s projected rates.

- **Reliability:**

If the city were to create its own municipal utility, it would carry forward the vulnerabilities of Xcel Energy’s transmission system, which it would still rely on as well as the current distribution system. RW Beck’s analysis does not include any investments for a *Smart Grid*. The city would have to wait until *Smart Grid* technologies are available

to everyone, which could be five to ten years from now. At any point, the city municipal utility could invest in its own *Smart Grid* technology.

- Conservation and energy efficiency:

If the city operated its own utility, revenues not spent on power purchases could be channeled into conservation programs. Avoided costs could be realized and re-invested. However, in order to achieve energy efficiency levels commensurate with current programs, the city would need to make investments to replicate the demand side management (DSM) programs the city currently accesses through Xcel Energy. In 2007, \$206,000 of Xcel Energy rebates were utilized by Boulder businesses for commercial DSM programs.

- Rate stabilization and economic vitality:

Staff has met with representatives from some of Boulder's large industrial electric customers who felt they could benefit from city-sponsored programs that helped them invest in back-up power and on-site co-generation facilities. If the city operated its own electric utility, these sorts of economic vitality programs could be created and funded through energy performance contracts.

With respect to rate stabilization, to the extent that a municipal electric utility would enter into long-term power purchase contracts, its rates would be predictable over time. In addition, a municipal utility would be a non-profit public utility with an elected governing board, so it would be subject to rate review and public scrutiny, tending to keep the rates relatively stable.

Also, to the extent that the utility could enter into advantageous long-term contracts and ownership agreements with renewable energy vendors, the rates would be inherently more stable than with coal or gas, as the initial capital investment has a steady amortization schedule over time and the fuel costs are zero.

Franchise negotiation and *Smart Grid*

- Renewable Energy:

In order to achieve the emission reduction goals outlined in the Climate Action Plan, part of the solution involves replacing coal, oil and gas-fired power plants with cleaner, renewable technologies. However, to move towards future energy independence, there is great value in adding in small, local generation (often referred to as micro-generation) to the mix, from wind micro-power, micro-hydro and rooftop solar panels to more advanced technologies like plug-in hybrids, vehicle to grid technology and potential future developments like photovoltaic "curtains." These types of diverse, widespread sources of power generation are typically called "distributed energy," and they have some advantages over the current, largely centralized infrastructure. Distributed power allows greater resource flexibility: the more varied the resources used to generate electricity, the less likely that disruptions will result from the limited availability of one source. Additional power from on-site and remote renewable sources such as solar and wind farms are often erratic and unpredictable in their generation capacity. The success of renewable energy including distributed generation is ultimately dependent upon the availability of computer-enabled power networks provided by systems like the *Smart*

Grid. As more renewable energy production is connected to the general power grid, the more systems will be needed that are able to manage the result.

- Reliability:

It is anticipated that the *Smart Grid* will allow transmission components to operate efficiently by minimizing stresses on the system. Detailed, real-time information from sensors on the *Smart Grid* will prevent blackouts whenever possible, and help to keep them as short as possible when they do occur. In pilot tests, *Smart Grid* components have shown a greater ability to predict and prevent power outages by getting accurate information about equipment load and potential failure points. Xcel Energy representatives have noted the *Smart Grid* ability to re-route power around compromised or damaged equipment, further improving power reliability.

- Conservation and energy efficiency:

Staff research anticipates that a significant element of the *Smart Grid City* pilot is development and availability of dynamic pricing for demand reduction. “Smart meters” will be installed that will enable Boulder residents and businesses to make decisions about their electricity use as well as the prices they pay for electricity. Dynamic pricing refers to electricity rates that can vary by the time of day or season of the year. When customers are provided with time-differentiated rates, they can be used to help incentivize them to modify their electricity usage in ways that benefit them as customers as well helping to mitigate strains on the electric system. On average, consumers who have participated in “smart metering” pilot projects have been shown to save approximately ten percent on their electricity bills.

Smart Grid will provide a platform to deploy new DSM programs such as in-home control devices to fully automate home energy use. Residents and businesses in Boulder’s *Smart Grid City* will be able to have their home electricity use be left as it is now, but they will also have the ability to modify their personal settings via computer or a display provided by Xcel Energy to reflect their own preferences. For example, a resident will be able to set her dishwasher to turn on when the price is lowest during the day or if she chooses, when the grid is carrying the highest proportion of wind energy. Staff will work closely with Xcel Energy to implement the *Smart Grid* and to evaluate and recommend the most beneficial DSM programs, focusing attention to educate Boulder residents and businesses on how to monitor and modify their behaviors.

Finally, it has been estimated that distribution losses (the current grid loses a significant amount of its power as it is transferred across the distribution network), could be reduced by thirty percent by a *Smart Grid*.

- Rate stabilization and economic vitality:

Electricity is the only form of energy capable of running computers and telecommunications systems, the very lifeblood of the 21st century “information age.” These systems require significantly more power, higher quality and more reliable power. As a result, the stress on the grid is increasing. There have been five massive blackouts in the United States over the past 40 years; three have occurred in the past nine years. The economic impact of these interruptions is significant:

- It is estimated that failures within the grid such as blackouts and power interruptions, cost the American economy in excess of \$100 billion per year.
- The August 14, 2003, blackout that affected the area from New York City to Detroit impacted the lives of 50 million people and cost an estimated six billion dollars.
- Power interruptions at Sun Microsystems' various campuses are estimated to cost the company one million dollars per minute.

A successful *Smart Grid* will drive Boulder's economy with digital grade, reliable power. As Boulder's economic vitality is reliant on high-tech and service-oriented businesses, it is increasingly important to be able to provide consistent, high-quality power. The *Smart Grid City* may give Boulder the ability to retain and recruit businesses, especially those in Boulder's targeted industries.

Additional economic vitality programs including the ability to assist commercial and industrial customers with back-up power and on-site co-generation facilities should be woven into the *Smart Grid* city implementation discussions as well as the franchise negotiations.

Benefits, costs and risks

Municipalization

Although the best case scenario modeled by RW Beck seems to indicate that Boulder's ratepayers could see savings on their electric bill of \$4.44 per MWh, the worst case scenario reveals the potential for a \$36.63/MWh increase as compared with projected Xcel Energy rates. The variability in this range of costs is due in a large part to factors outside of the city's control (i.e., power supply market prices, power supply availability and somewhat unprecedented legal rulings). This renders the risk somewhat unquantifiable; therefore, at this time, the city must assume the worst case scenario in its analysis.

In addition, it must be noted that these scenarios represent the economic case once a municipal utility is established. However, it is critical to also look at the costs and risks that would be incurred in the period leading up to formation of a municipal utility. The city could expect a protracted legal and public relations challenge prior to a vote on whether to establish a municipal utility. Other communities that have undertaken this include the Sacramento Municipal Utility District that purchased distribution territory from Pacific Gas and Electric Company in California; the acquisition process took eight years. The town of Las Cruces, New Mexico and El Paso Electric battled for more than 12 years and Las Cruces spent six million dollars before agreeing to a settlement and ultimately opting not to municipalize. These costs may be able to be recouped through the final issuance of bonds; however, if the city were to decide not to municipalize in the end, or if the vote to municipalize did not pass, these bonds could not be paid back by utility revenues.

Perhaps the largest risk in continuing down the municipalization path is the opportunity costs that will be incurred in the next five to ten years where city resources will be focused on planning for formation of a utility and responding to challenges mounted against the effort rather than being focused on achieving our CAP goals and forming

partnerships to create more renewable energy as well as maximizing energy conservation and efficiency programs.

Franchise negotiations and *Smart Grid*

As mentioned previously, there is a strong nexus between the proposed enhancements created by the *Smart Grid* and established city goals in the CAP. Boulder will benefit from the significant peak demand reductions possible with *Smart Grid* and resultant greenhouse gas emissions reductions; the ability to increase distributed generation in Boulder in the form of plug-in hybrid vehicles and on-site solar systems as well as neighborhood-scale solar arrays; and increased demand-side management conservation options.

Staff has been preparing a list of city objectives and priority programs to be included in the franchise discussions with Xcel Energy and many of the elements to be requested may be uniquely obtainable via the *Smart Grid City* project. However, the promise of *Smart Grid* lies in its ability to field test unproven technologies. There is no consensus on precisely which technologies will work and which will need to be modified after deployment. Early business cases at several utilities show a range of partial and full *Smart Grid* concepts using different standards and – most interestingly – anticipating different results. That makes comparing these business cases difficult. An October 2006 study by The Energy Policy Initiative Center in San Diego modeled a *Smart Grid* implementation in San Diego. This study shows that an initial \$490 million investment would generate \$1.4 billion in utility system benefits and nearly \$1.4 billion in societal benefits over 20 years. However, the results for Boulder's *Smart Grid City* are dependent on the actual technologies delivered by Xcel Energy and their effectiveness in reducing greenhouse gas emissions. The actual impacts of a *Smart Grid* could be more or less, based upon dozens of different future variables such as consumer behavior, energy prices and national carbon tax legislation.

With respect to the costs to continue with franchise negotiations and implement the *Smart Grid City*, any unbudgeted expenses such as outside legal counsel will be brought to council as part of the regular budget process. These expenses are expected to total under \$50,000 and should be able to be funded through the city manager's contingency, budget from the city attorney's office or from the water utility fund to the extent any outside research relates to the issues associated with hydroelectric power generation.

Ways to maximize benefits and mitigate risks

In order to maximize the benefits and minimize the risks associated with suspending the municipalization efforts and focusing staff resources on the franchise negotiations and implementation of the *Smart Grid* project, the city should enter into agreements in principle with Xcel Energy that will address the following as part of the *Smart Grid City* project:

- specific demand side management programs for Boulder
- increased or ongoing access to rebate funds for small scale renewable energy and distributed generation projects

- increased or ongoing access to assistance programs and rebate funds for appliance and lighting change-out programs to decrease total electric demand
- Creating new renewable energy projects to test the ability of the *Smart Grid* to boost utilization
- Work together to ensure the rate-based options being explored with the PUC are fair and support the city's social and economic sustainability goals.

CONCLUSIONS:

Based on the direction received from council, the city manager will direct staff to work with Xcel Energy and its partners to address implementation issues relating to *Smart Grid*. Staff will report back to council periodically on the progress of franchise negotiations and the *Smart Grid City* project.

Approved By:

A handwritten signature in cursive script, appearing to read "Allan D. Lewis, for". The signature is written in black ink and is positioned above the printed name of the signatory.

Frank W. Bruno,
City Manager

Attachment A: **Utility Innovations: Xcel Energy Smart Grid, A White Paper** © 2008
Xcel Energy Inc.