Borough of Madison:
Report of the
Strategic Planning Committee on the Utilities

January 12, 2015

Table of Contents

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Executive Summary

Background and Methodology

The Strategic Planning Committee on the Utilities ("UPC") was formed to analyze Madison's electric and water utilities and to advise the Council on the UPC's findings.

The UPC began with a discussion of the missions for the utilities, essentially looking for an answer to this question: why should Madison own a utility. The missions capture three points for justifying the costs of owning, operating, and maintaining a utility: the highest level of reliability attainable, and in no event, less than the reliability of any of the alternative utility service suppliers available; rates that are comparable with the other suppliers; and the generation of a surplus to be used in municipal operations, where the residents realize a net benefit from a surplus. In short, the key words guiding the UPC work were reliability, rates and surplus.

From here, it was necessary to identify the information and determine the decision-making tools necessary to assess the utilities in relation to the mission. The UPC began with the assembling of capital asset schedules for each utility. This was more than an inventory of the physical assets of the plant. For each of the major physical assets, the installation date, useful life, estimated replacement date, and estimated replacement cost was assembled. This information will be useful in the development of capital budgeting, as a floor for capital investment to maintain the current level of reliability.

Next, it was necessary to determine a way in which the reliability of the utilities could be measured. Again, the starting point was information – in this case, on the outage history in Madison. The UPC focused on the electric utility, because of the availability of information to analyze. The UPC categorized the outage history into causes (e.g., infrastructure, weather, external), determined average length of outage by cause, and calculated overall impact (in outage time) to Madison. With this information in hand, the UPC proceeded to identify a benchmark against which Madison's reliability could be assessed. The UPC investigated different benchmarks utilized in the electric utility industry, and ultimately decided upon the System Average Interruption Duration Index ("SAIDI"). The SAIDI index is relatively easily to calculate, and provided a good benchmark to assess Madison's reliability.

Rates were the next area of investigation. A survey was conducted of other electric and water suppliers, and various approaches to comparing rates were generated.

Finally, a surplus analysis was conducted. Utilizing the projected capital investments and different scenarios for rates, pro forma income statements for each utility were generated. These statements show a projection of surplus for the years 2015-2017 under the different scenarios. (Given that the costs to purchase power were relatively certain for no more than three years, and given that over time the estimates for capital investment would be less reliable, a three year period was considered appropriate.)

Recommendations

Generally, the UPC's work was more about preparing what was needed for planning, and less about actual planning. Without information and without decision-making structures, the UPC needed to build a foundation upon which planning could take place. The recommendations below are aimed towards institutionalizing this foundation.

The UPC recommends that the Council adopt ordinances on each of the following:

1. Mission Statements for the Utilities;
2. Schedule of Assets, as prepared by the UPC, and requiring the regular maintenance of these schedules;
3. Outage Database and Analysis approach described herein, including the categorization of the information;
4. Utilization of SAIDI; and
5. Rate Analysis approach described herein.

The UPC further recommends that the Council take the following actions for the years 2015-2017, with the intention to monitor the value and success of same, and to adjust as necessary for the years after 2017:

1. Use the Schedules of Assets in annual capital budgeting and capital investment decisions;
2. Annually, review the SAIDI results and determine appropriate action to improve reliability if warranted; and
3. Annually, conduct the rate analysis, utilizing the methodology described herein.

Finally, in the interests of transparency, improved communications with the residents, and improved consistency of decision making, all of the above should be made available on Rosenet.

Findings

In addition, the UPC reached some findings on reliability and rates. The findings are relative to the mission statements. Specifically:

- Madison's reliability is significantly better than the reliability demonstrated by any of the major utility service suppliers
- Electric rates are comparable with other comparable suppliers
- Water rates are considerably less than the rates for other comparable suppliers.

The findings on rates are not an opinion about the rates relative to considerations beyond the mission statements. As rates and surplus are interrelated with the municipal finances (including municipal capital investments), it is important that rates, surplus, and municipal finances be considered together, as a change in one will lead to an impact in another.

Next steps

There are areas in which more work can be done, and in which work has yet to be done. The UPC recommends that the Council continue to support the planning effort. A few ideas are as follows:

1. Reliability Improvement
    a. Continue the investigation into causes, in order to identify ways in which reliability can be increased through investment (e.g., infrastructure investment, weather preventive measures, reduction in response time; AMR);
    b. Continue the investigation into per circuit causes, in order to identify and address individual circuit anomalies.
2. Surplus Analysis – development of a systematic approach for evaluating the relationship between surplus and taxes, with the goal of developing a process that can be included in the annual budgeting process;
3. Power Procurement Guidelines – preparation and adoption of a process for making wholesale electric power decisions, so as to avoid the experience of 2007-2008; and
4. Alternate Power Sources – investigate the possibility of using alternate sources of power (e.g., solar local generation).

Mission Statements for the Utilities

Introduction

The UPC started its work with a discussion of the mission for the electric utility. To be valuable, the mission required key guiding principles for all other decisions to be made by the Council regarding the utility. The fundamental question to be addressed by these guiding principles is this: why should Madison be involved in the provision of electric power.

The electric utility does not possess a document on its history, the issues it has faced over its history, and how those issues have been resolved. However, in 1984, the Madison Eagle prepared a detailed history of the utility (the "Utility History"), which provided a rich source of information. (See Appendix 1 for the Utility History.) The UPC analyzed the Utility History, in the process of creating the mission. (See Appendix 2.) The following themes and/or reoccurring issues were identified in the Utility History:

- Independence
- Rates and the utility's purposes and costs
- Rates as compared with neighbors
- Generating a surplus
- Surplus in municipal operations
- Rates versus taxes

Electric Utility Mission

Presented below is a proposed mission for the electric utility. It should be kept in mind that the proposed mission guided the UPC in its work. As will be seen, three key words appear to capture the essence of the goals of the utility: Reliability, Rates, and Surplus.

> The Borough of Madison, acting in and for the best interest of its residents, determined in 1890 that the citizens would benefit by the ownership of its own generation of electric power. In the 1920s, it was determined that it was in the best interests to discontinue generation of electric power, but to maintain its own distribution system for electric power that was generated by third parties. This distribution system is referred to as the Electric Utility of Madison. Building on this historical decision, the mission for the Electric Utility is as follows:
>
> To provide the residents of Madison with the highest level of reliability in electric power attainable, and in no event, less than the reliability available from any of the major providers of electric power in the State of New Jersey; it being expressly understood that service is a critical component of achieving such a level of reliability.
>
> To maintain rates that are comparable to those that would be payable to other providers of electric power in the State of New Jersey.

> Where the circumstances are such that the resident taxpayers are benefited thereby, to generate surplus funds (through the charging of rates that exceed the costs of operation of the Electric Utility), which are to be used in the municipal operations of Madison.

It is recommended that the Council pass an ordinance, adopting this mission statement, and that it be guided by the mission statement in its management of the Electric Utility.

Water Utility Mission

Madison maintains its own water storage and distribution system, utilizing its own natural wells. No similar history of the Water Utility was located. However, the UPC determined that the mission should be quite similar to the Electric Utility mission. Presented below is a proposed mission for the Water Utility:

> To provide the residents of Madison with the highest level of water quality and the highest level of reliability in the distribution of water attainable, and in no event, less than the quality and reliability available from any of the major suppliers of water in the State of New Jersey; it being expressly understood that service is a critical component of achieving such a level of reliability.
>
> To provide this level of quality and reliability at comparable rates to those that would be payable to other suppliers of water in the State of New Jersey.
>
> Where the circumstances are such that the resident taxpayers are benefited thereby, to generate surplus funds (through the charging of rates that exceed the costs of operation of the Water Utility) that are to be used in the municipal operations of Madison.

It is recommended that the Council pass an ordinance, adopting this mission statement, and that it be guided by the mission in its management of the Water Utility.

Reliability: Assets

Introduction

Fundamental to the reliability of the Utilities is the condition and management of its physical assets. The UPC undertook a methodical investigation into the physical assets of the utilities, looking to not only develop an inventory/database of the assets, but to gather critical information that would be used in the planned replacement of the assets, e.g., installation date, useful life, and planned replacement date. The UPC ultimately prepared a Schedule of Assets ("SOA") for each utility, which contains this information. (See Appendices 3 and 4.)

Replacement of physical assets today tends toward a mix of proactive and reactive replacement. Any increase in proactive replacement, utilizing the SOA, reasonably should be expected to increase reliability. Conversely, leaving more to reactive replacement would be expected to lead towards decreased reliability.

It should be noted that to date, physical assets have been paid for with either operating funds or with capital funds. It is not certain as to the reason for the categorization (e.g., see the electric field and water field). However, the UPC did not explore this or take any position on this bifurcated approach. The UPC notes that there may be impacts from this categorization, such that further investigation is warranted. For this report, the UPC followed the current categorization.

In calculating an annual spending level, two general approaches were taken to planned replacement date. One is a simple straight-line approach. This approach assumes all assets are replaced at the end of their expected useful life. It shows the expected annual amount to go into current year spending and escrowing for future spending. The second used the remaining useful life ("RUL"), in order to give an idea of how behind Madison may be in preparation for upcoming replacement dates, i.e., what it would need to set aside starting in 2015 in order to "catch up". Under the RUL approach, as physical assets are replaced, the annual amount would decline, and eventually, when "catch up" is completed, the straight-line amount would be reached. Catchup would be completed when once it replaced all assets that have installation dates before 2015 have been replaced. The projected year of catchup is indicated below. Regardless of which approach is followed, a systematic process of annual set aside or reservation for major physical asset replacement is recommended.

Findings and Recommendations

Here is a summary of the annual appending levels under the different approaches:

	Annual Average Total Spend on Physical Assets – Straight-Line Approach	Annual Average Total Spend on Physical Assets – Remaining Useful Life Approach	Expected Year to Complete CatchUp
Electric Utility	$410,517	$1,601,295	2056
Water Utility	$325,119	$3,201,095	2050

It does not appear likely that full catchup could be implemented without either significant adjustment in rates (in order to maintain surplus) or impact in surplus. However, continued spending at just the straight-line level is inconsistent with seeking to maintain reliability. The Council should explore at what level it could commit to escrowing for future spending.

The UPC recommends that the Council adopt ordinances on the SOA, including the methods to calculating useful life. Further, it its recommended that the ordinance indicate that although it is for guidance and planning purposes only, Council should be careful to consider the impacts of modifying the SOAs to accomplish other municipal needs, as doing so would be inconsistent with maintaining reliability, and if done, could result in a negative impact on revenues, leading to reduced surplus.

Reliability: Outages

Introduction

In order to determine whether the reliability of Madison's utilities is acceptable or not, a measure of reliability is needed. The UPC determined that the measure of outages would be a valuable approach to measuring reliability. In order to do so, it would be necessary to develop two things: the experience data on outages and a way in which to measure that experience against that of other suppliers of electric. (Note: Although this effort was limited to electric, it may be worth exploring for water as well.)

The UPC undertook a methodical investigation into the outage experience of Madison. The Electric utility has been keeping information on outages for approximately ten years. The UPC analyzed this data, categorizing it into different types of outage, determined the average length of an outage, the total impact to Madison of outages, and looked into whether areas of Madison were more vulnerable to outages or to types of outages. Schedules on this information were prepared. (See Appendices 5 and 6.) Some significant findings were identified, which should enable improved planning going forward, e.g., proactive spending decisions on physical asset replacement.

In order to measure Madison's experience against other providers, the UPC investigated different indices on measuring reliability.

Outage Analysis

A summary of outage history was compiled by the Electric Utility Superintendent for all the utility outage work orders between July 2003 and March 2014. Approximately 230 work orders representing various types of electric outages were compiled into an excel spreadsheet for data analysis. The original field work order recorded the following information: date; outage start time; customer restore time; location; reason; circuit; fuse and weather.

This data was grouped into major categories of cause, in order to analyze and understand issues with reliability. The UPC optimized the excel database outages and broke them down into seven categories of outages: Infrastructure Failure; External (i.e., responsibility lies with JCP&L, in its capacity as supplier to Madison); Animals; Accidents; General Weather; Major Storms; Unknown or Miscellaneous.

Five outage algorithms were developed:

1. Number of outages per category;
2. Sum total of outage hours per category;
3. Average outage hours per category; calculated the delta start/restore time per outage then the sum total of outage hours divided by number outages in that category;
4. Approximate customers affected in each category was complied from the utility Superintendent and added to the database groups;

5. Total hours without power in a category equals the sum of outage hours multiplied by the number of customers.

The following table shows a summary of the outage analysis.

Summary Outage History Rev2.2 - Seven Category Folders

Outage Type	Nunber Outages	Total Outage Hours	Calculated Average Hours	Approx. # Customers	Sum Customers Outage Hrs
Infrastructure Failure	51	129	2.3	561	1192
External & Blackouts	7	37	2.2	45500	107055
Animals	90	120	1.3	967	1203
Accidents	7	60	6.6	120	906
Weather	64	262	3.8	649	2184
Major Storms	2				
Unknown & Misc	7	14	1.7	76	166
Total	228	621	2.5	47873	112705

The following table shows a per-circuit analysis and a look at selected outage causes per circuit.

Data Source Folder "Outages 7-2003 to 3-2014"

Top 8 Circuits		1	2	3	4	5	6	7	8	Remaining Circuits with Outages Hrs.
	8 Circuits Total	Prospect	Greenwood	Madison Ave	Ridgedale Ave	South	Park Ave	Woodland Ave	East	
No. Outages	201	48	34	26	27	20	19	15	12	28
Total Hrs. X Customers	105657	71262	581	440	482	413	31808	282	389	7111
Average Hrs.	2.4	3.4	1.6	2.4	1.6	2.0	3.5	2.1	2.1	2.5
Approx. Customers	28104	19943.0	309.0	244.0	332.0	235.0	6751.0	160.0	130.0	19769
Squirrels	84	20	15	13	13	8	6	6	3	
Lightning	21	6	0	5	3	2	3	2	0	
Trees & Branches	32	6	5	4	4	3	3	4	3	

The following observations and findings are noted:

- Categories of Outages have different lengths of outage. For example, accidents and general weather tend to have the longest outage times with the smallest number of customers affected. Also, externally-caused outages tend to have the shortest outage times, but with the largest number of customers affected.
- Frequency analysis on a comprehensive database such as occurrence and time frequency can be applied to measure operation success or failure. For example, and illustrating a positive effect, animal outages occurred frequently in the early

years of record keeping and dramatically decreased as electric utility infrastructure was upgraded.

- Reliable information comes from a well organized database collection system. Today's technologies such as tablet PCs and smart phones can ease and efficiently streamline utility operations in the collection process and valuable outage information can be collected for utility operations and reliability.
- The items within our control are infrastructure failure, preventable general weather-related outages, which warrant further investigation into causes and possible ways to prevent.
- A preliminary analysis by circuit indicates that further investigation into preventative measures by circuit would be valuable

Standardized Outage Indices

There are two significant benefits to establishing a standardized reliability index. First is the ability to compare Madison's reliability to other utilities. Second is the ability for Madison to compare reliability from one year to the next.

The Institute for Electrical and Electronics Engineers ("IEEE") has created standard "Electric Power Distribution Reliability Indices". These indices are detailed in an annual report prepared by the IEEE. Various indices are detailed in the report, which focus on:

- How often the average customer experiences a sustained interruption
- Duration of an interruption for the average customers
- Average time to report service

After reviewing the report and input from Sussex Rural and Vineland Electric, the UPC selected the SAIDI index. SAIDI is commonly measured in minutes or hours of interruption and is measured over a predefined period of time (monthly or yearly). Mathematically, it is calculated as:

$$\frac{\text{Total sum of customer minutes of interruption}}{\text{Total number of customers served}}$$

A simple example may help. Assume there are 100 customers in the utility and the following outages:

Event	# Customers	Outage Minutes	Customer Minutes
May 15 Outage	50	120	6,000
July 27 Outage	10	60	600
Oct 2 Outage	100	40	4,000

Total customer minutes of interruption = 10,600

SAIDI = 10.600/100 = 106 Minutes

This SAIDI score of 106 minutes can be compared to other utilities that use the SAIDI index as well as industry averages. Sussex Rural currently uses this SAIDI and they provided Madison with SAIDI information for their utility in 2013 as well as the average SAIDI score for the 696 rural cooperatives in their association.

Calculation of SAIDI for Madison

The UPC analyzed Madison's historical outage data from July 2002 to January 2014 and determined that over that 11.5 year period, there were 6,762,297 total customer minutes of interruption, or 588,026 total customer minutes of interruption per year. The Madison utility has 6,435 customers, so the annual SAIDI calculates to 588,026 / 6435 or 91.4 minutes.

SAIDI Comparative Analysis

The below chart summarizes the various historical SAIDI scores that the UPC was able to collect.

Utility	SAIDI Score
Sussex Rural 2013 Score	184.5 minutes (their goal is 120 minutes)
IEEE Median value for Small (i.e., <= 100,000 customers) North American Utilities (2013)	179
IEEE Median value for Large (i.e., over 1 million customers) North American Utilities (2013)	209
Madison July 2002 – January 2014	91.4

As can be seen, Madison's SAIDI compares favorably with other service suppliers. However, the index alone cannot be used to conclude whether Madison is performing at the highest level of reliability attainable.

Recommendations

The UPC recommends as follows:

- Adopt SAIDI as the index for evaluating Madison's utility reliability
- Adopt conventions on recording and labeling data, so as to achieve a high level of data integrity (e.g. consistent naming conventions and nomenclature), and deeper analysis of the data in order to better understand the outage history and to better set the requirements for collecting and categorizing data.
- Improve on tracking reliability
    - Work with Sussex Rural and other utilities to confirm date integrity, i.e., that the data is being collected uniformly, and is consistent with standardized categories.
    - Set operational goals for the Madison Electric Utility using SAIDI.
    - Annually assess reliability, by comparing the reliability year over year, and comparing Madison's reliability against other utilities.

- Investigate proactive efforts to improve reliability
    - Analyze outages by circuit to determine if there are certain areas of town that are more vulnerable. If this is true, then address the vulnerabilities in those areas.
    - Analyze outages by cause to determine if there are opportunities for improved reliability. For example, infrastructure failure has average outage of 2.3 hours. How can this amount of time be reduced? Earlier alert of outage? Pre-warning of equipment failure? Replacement pursuant to the SOA, rather than at failure. Concerning lightning, what does PSE&G and JCP&L do to limit the impact? In connection with this effort, the cost and benefit of proactive protective measures need to be determined.
    - Consider implementing AMR. Automated meters will allow for a faster response time, faster diagnosis time and faster repair time, all resulting in greater reliability.

Rate Analysis

Introduction

In analyzing Madison's electric rates for comparability with other utilities, residential electric rate schedules were collected from the nine other Municipal Owned Utilities ("MOU") in New Jersey, including Sussex Rural Electric Co-op (a co-operatively owned utility that covers rural areas in multiple municipalities in Northwestern NJ) and from the four major Investor Owned Utilities ("IOU") - PSEG, JCPL, Atlantic City Electric and Rockland County Electric.

The next step taken was to determine the average annual consumption of a Madison resident. This consumption level was then priced utilizing the different rate schedules for the selected utilities.

Electric Rate Comparison

The average monthly residential electric consumption in Madison is 855kWh. This amount was used to calculate the monthly bill using each of the survey utility rate schedules. The rate analysis assumes the same consumption of 855kWh per month for all twelve months of the year. This was done to simplify the calculations. It is likely that the average residential customer uses more electricity in the summer and less the rest of the year. Lavallette, Pemberton, Vineland, PSEG, JCPL, Atlantic City Electric and Rockland all have higher summer rates. *As such the annual bill for these utilities would be higher than represented in this study.*

JCP&L raised an additional issue. The JCP&L rate was quite at variance with all other suppliers. However, there was a question of comparable reliability. Recently, the BPU has negatively commented on JCP&L reliability. Therefore, two approaches were taken with regard to the inclusion of JCP&L in the IOU blended rate.

Importantly, the approach to generation of surplus (i.e., revenue over cost) and the use of the surplus is not uniform across the MOUs. Certain municipalities (i.e., Pemberton, South River, and Milltown) have taken a similar approach to Madison, in setting rates so as to generate a surplus for use in the municipal budget. Other MOUs (i.e., Vineland, Butler, Lavallette, Park Ridge, Sussex Rural) set rates without the purpose of generating surplus for use in the municipal budget. (These MOUs may still charge above cost, to provide for the needs of the utility.)

The individual utility rate calculations were prepared. (See Appendices 7 and 8.) A summary of the analysis appears in the following table.

Electric Rate Comparison

Supplier	Average Annual Cost	Madison to Index (%)*
Madison	$2,071.13	N/A
Index 1: Average of All 14 Suppliers	$1,755.66	18.0%
Index 2: Average of All, without Madison	$1,731.40	19.6%
Index 3: Average of MOUs (without Madison)	$1,702.95	21.6%
Index 4: Average of MOUs that transfer surplus	$2,110.02	-1.8%
Index 5: Average of MOUs that do not transfer surplus	$1,414.49	46.4%
Index 6: Average of IOUs	$1,795.39	15.4%
Index 7: Average of IOUs without JCP&L	$1,902.71	8.9%

*Madison to Index = (Madison Average Annual Cost – Index Average Annual Cost) / Index Average Annual Cost. Thus, the value indicates the percentage by which the Madison Average Annual Cost exceeds/is less than the Index Average Annual Cost.

Electric Rate Findings/Conclusions

The most comparable Madison to Index calculation is with Index 4, which indicates that Madison is comparable with comparable suppliers. The next most comparable Madison to Index calculation would be with Index 7. Although Madison's rates are less comparable with Index 7, a change to such level would need to consider the resulting impacts on reliability and/or on surplus.

Water Rate Comparison

A survey was conducted and residential water rates were collected from various neighboring communities and from NJ American Water, the largest Investor Owned Water Utility in NJ, which serves approximately 2.5 million customers in 183 NJ communities. Although we had information on surplus transfers and rate setting for the municipal electric utilities, we did not have the same information for municipal water utilities.

Madison's average residential customer uses 13,429 cubic feet (or 100,455 gallons) of water in a year.

Although the UPC analysis assumed the current Madison water rate schedule, it is important to note that a rate change is scheduled to start in 2016. Per Ordinance 1-2011, water utility rates were increased to cover costs of significant water main replacements

and to save for an automatic meter reading system. The rate increase is scheduled to sunset January 31, 2016.

Water Rate Comparison

Supplier	Annual Average Cost	Madison to Index (%)*
Madison	$426.29	N/A
Index 1: Average of All	$682.29	-37.6%
Index 2: Average of All without Madison	$711.18	-40.1%
Index 3: Average of MOUs (without Madison)	$939.62	-54.6%
Index 4: Average of IOUs	$528.42	-19.3%

*Madison to Index = (Madison Average Annual Cost – Index Average Annual Cost) / Index Average Annual Cost. Thus, the value indicates the percentage by which the Madison Average Annual Cost exceeds/is less than the Index Average Annual Cost.

Water Rate Findings/Conclusions

The most comparable Madison to Index calculation is with Index 3, which indicates that Madison is substantially under comparable suppliers. The next most comparable Madison to Index calculation would be with Index 4, which also indicates that Madison is substantially under comparable suppliers.

Rates and Reliability

Introduction

Considering rates without considering reliability, or vice versa, would be inconsistent with the mission. These are interdependent principles that should be considered together. Thus, it is recommended that annually the Council use SAIDI and the rate analysis in order to determine whether the combination of mission principles 1 and 2 are acceptable, and whether any changes are warranted. This would be a regular area of monitoring.

Findings

The UPC finds as follows:

- Electric Utility – with a favorable SAIDI and comparable rates with comparable suppliers, the combination appears consistent with the Mission
- Water Utility – with no history of significant service interruption, but with rates that are substantially below market, the combination may be inconsistent with the Mission

Surplus Funds: Pro Forma Statements for 2015-2017

Introduction

Given the importance of the surplus to Municipal Finances, the UPC developed pro forma income statements for each utility for the three year period of 2015-2017. With this information, the Municipal Budget Committee could verify its projections of need for surplus for the same period.

Different pro forma statements were prepared, assuming different scenarios. The Base Scenario pro forma assumed current rate schedules, no change in consumption, operating costs based upon historical spending, and the straight-line capital funding approach. The next other scenarios assumed the changes to the Base scenario, as described in the table. Each of these statements appear in the annex. (See Appendices 9 and 10.) A summary of the findings follows.

Summary of Surplus Projections

Electric Utility Surplus
($000)

Scenario Number	Scenario Description	Projected 2015 Surplus	Projected 2016 Surplus	Projected 2017 Surplus
1	Base*	$7,039	$6,932	$7,005
2	Base, but adjusted to use the Remaining Useful Life approach to capital spending	$5,849	$5,742	$5,815
3	Base, but using the Index 1 Rates (see section on Electric Rates)	$3,642	$3,535	$3,619
4	Base, but using the Index 3 Rates	$3,070	$2,963	$3,036
5	Base, but using the Index 6 Rates	$4,069	$3,962	$4,035
6	Base, but using the Index 7 Rate	$5,226	$5,119	$5,192

*Base was calculated by using the current rates schedules, and assumed (1) no change in consumption from 2014, (2) operating costs based upon historical spending, and (3) the straight-line approach to capital funding.

Note that pro forma statements were not prepared for Index rates that did not appear valuable in the analysis. Index 2 rates were too general, missing the wide differences between types of suppliers. Index 4 rates were nearly exactly that of Madison. Index 5 rates were significantly dissimilar to Madison, as the concept of surplus was not involved in the rate setting.

Water Utility Surplus
($000)

Scenario Number	Scenario Description	Projected 2015 Surplus	Projected 2016 Surplus	Projected 2017 Surplus
1	Base*	$295	$434	$371
2	Base, but adjusted to use the Remaining Useful Life approach to capital spending	$2,581	$2,442	$2,505
3	Base, but using the Index 1 Rates (see section on Water Rates)	$1,775	$1,914	$1,851
4	Base, but using the Index 2 Rates	$1952	$2,091	$2,028
5	Base, but using the Index 3 Rates	$3,281	$3,420	$3,357
6	Base, but using the Index 4 Rates	$889	$1,028	$965

*Base was calculated by using the current rates schedules, and assumed (1) no change in consumption from 2014, (2) operating costs based upon historical spending, and (3) the straight-line approach to capital funding.

Findings/Conclusions

The projected surpluses can only be understood and evaluated in light of the need for surplus in municipal finances. In its presentation at the December 8, 2014 Council Meeting, the Municipal Budget Committee MBC stated that "annual transfers to the municipal budget will be required to support 17-20% of total municipal appropriations" (see page 40). The MBC presentation includes the 2014 Utility transfer amount of $6,246,000 but did not present pro formas for 2015-2017, and so its surplus need calculations are unknown. Thus, it is not possible to determine whether the projected surplus amounts in this report would be sufficient to meet the municipal's utility transfer needs for 2015-2017.

However, "what-if" scenarios can be performed. For example, assuming that the 2014 need is constant for the period 2015-2017, it can be said that the projected surpluses under Scenarios 1 above for both Electric and Water would be sufficient to meet the utility transfer need. Additionally, a combination of Scenario 2 for electric and Scenario 1 for water would be very close to the utility transfer need. However, other scenarios for the Electric utility would result in an insufficient amount of utility transfer.

It is recommended that the MBC prepare pro forma needs for 2015-2017 and that the surplus projects contained herein be evaluated in light of the MBC pro formas.

Next Phase Work

In addition to items noted herein, there are a number of topics that would be worthy of further investigation. The following are some recommended topics.

Surplus – Generation

- Develop methodology for determining the net benefit of a generating a surplus (over less tax relief)
- Develop a standard approach to evaluating rate changes in light of the impact on municipal finances

Surplus – Use in Municipal Operations

- Adopt a target amount of surplus to be generated for municipal operational expenses purpose only (i.e., excluding capital spending). Having such a target would:
    - Enable rational, structured utility rate setting
    - Establish a control on municipal spending and tax rate setting
    - For the 2015-2017 period, a target of 10% is recommended. An analysis of municipal budgets for 1999-2014 indicates that the annual municipal revenue short fall to fund municipal operational expenses was less than 10%.
- Adopt an ordinance that requires the remaining surplus be prioritized for capital (either for pay as go spending or for debt service)
- Develop and approach to determine the amount of surplus that can be transferred safely from utility operations, without negatively impacting working capital needs of utilities, but maximizes the amount that can be transferred

Schedule of Assets

- Determine what steps should be taken to close the gap between SL and RUL capital funding levels

Procurement

- Complete and adopt power procurement guidelines.

Appendix

1. Electric Utility History (Madison Eagle Article, May 1984)
2. Electric Utility History Summary and Analysis
3. Electric Utility Schedule of Assets
4. Water Utility Schedule of Assets
5. Electric Utility Outage History (by cause)
6. Electric Utility Outage Analysis
7. Electric Rate Analysis
8. Water Rate Analysis
9. Pro Forma Income Statements for Electric
10. Pro Forma Income Statements for Water
11. Buried no Longer (by American Water Works Association)
12. Water System Critical Component Analysis
13. Current Procurement Model