

Decisions, Decisions

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We all make decisions every day. Most are small and fairly inconsequential. A few are really big deals.

Some people seem to have a knack for making great decisions. How do they do that? They use a great decision-making process. This article will show you such a process for making decisions that require an investment. And, it will show you a tool that will make your evaluation work easy.

Not Urgent but Critical	Urgent and Critical
Not Urgent and not Critical	Urgent but not Critical

You are probably familiar with the four quadrant issues matrix like the one here. Classifying issues like this works well for clearing your desk, in basket or to-do list. You knock out the Urgent *and* Critical issues real fast, hopefully. Completing that, if you ever do, you should spend most of your time on the Not Urgent *but* Critical issues and little time on the Not Critical issues. Unfortunately, this matrix does not very well fit decisions that are investment-based.

Utility managers and decision-makers make their share of “in basket” decisions. More importantly, they make investment decisions on behalf of their ratepayers. That creates a large burden on decision-makers to *show* ratepayers the merits of those decisions.

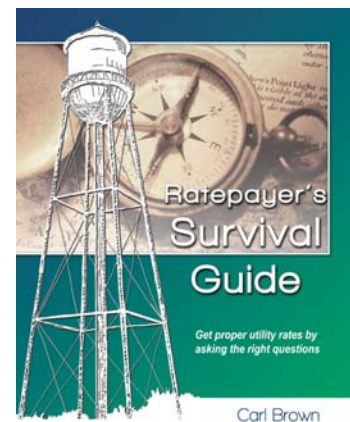
Ratepayers and tax payers care about debt, rate and spending questions because it's *their* money that will be spent. Their default response to such questions is “no.” Thus, your job as the leader of this pack is to make a sound decision, prove up the correctness of the decision and convince them to say “yes,” or at least go along.

Investment decision-making involves two phases: gathering and evaluating pertinent information, then making and carrying out the decision. Most poor decisions happen because, in our impatience, we short change the first phase.

Investment decisions involve these criteria:

1. Investment required,
2. Return expected,
3. Probability of getting that return,
4. Risk of getting something else,
5. Consequence of getting something else, and
6. Your aversion to getting something else.

Good decision-making requires some math. Now, don't get worked up about that. Simple multiplication and percentages will be the most difficult calculations you need to do for most decisions.



Don't like math? The tables in this article were adapted from a spreadsheet called DecisionMaker5[®]. It is available for free download at <http://gettinggreatrates.com/>. The free Ratepayer's Survival Guide and other decision tools can also be downloaded there.

From the list above criteria 1, 2 and 3 are the “upside” criteria – what you expect or hope for. Criteria 4, 5 and 6 are the “downside” criteria – what you hope will not happen, but might.

Criterion 6 makes every decision personal. Just remember, when you are making a decision for others you need to use *their* values as much as possible so the decision will match their values. Now, if your ratepayers’ *values* need adjusting, meaning they need to stop clinging to inadequate rates, the “Ratepayer’s Survival Guide” will help them make that decision.

Think of your ratepayers in this baseball metaphor. There are singles and there are homeruns. Extreme risk takers go for homeruns a lot but they strike out a lot, too. Risk-averse people like nice, safe, consistent singles. While some of your utility customers are risk takers in their personal lives, they are risk-averse when it comes to utility service. They don’t want you to strike out with their service or their money.

Risk-aversion: The degree to which one rejects or dislikes a risk.

Let’s first consider the risk of downsides in personal decisions.

Each decision places us at risk for various bad consequences. Most are survivable. But some could cost you your life, liberty or ability to live and function well in the future. For example, most people would rate death as an extremely high-consequence decision outcome – they are very death-averse. For them the potential gain from an activity with a 50 percent chance of death would need to be extremely high to overcome that downside. Most just won’t knowingly take such risks.

High-consequence activities include things like committing serious crimes, cliff diving and free rock climbing. The last two are a partial double count in that free rock climbing occasionally turns into (involuntary) cliff diving. A small group of people even like to combine free rock climbing, cliff diving and parachuting. One risk is just not enough for them. Of course, one can do research and train for these activities to reduce the risks and consequences. Some risk-takers do just that, notably the old ones.

The death example is extreme but many people make decisions that carry other severe downside risks. Let’s consider extra-marital affairs as shown in Table 1. The return on investment of an extra-marital affair will remain un-described here. But on the negative side the potential consequences are big: loss of the partner, loss of family, upheaval for children, loss of net worth, income, reputation and more. Some serious consequences ride on maintaining secrecy.

Someone who is really good at keeping such a secret may be able to achieve a probability of secrecy for one day of 99.9 percent. That is near certainty that they will not be found out for one day. For two days the probability of secrecy will then be 99.9 percent times 99.9 percent which equals 99.8 percent, still a very high probability of secrecy. However, one year in the probability drops to 69.4 percent.

Day	Running Secrecy Probability	Running Secrecy Probability	Running Secrecy Probability	Running Secrecy Probability
1	99.9%	99.0%	95.0%	90.0%
2	99.8%	98.0%	90.3%	81.0%
22	97.8%	80.2%	32.4%	9.8%
45	95.6%	63.6%	9.9%	0.9%
94	91.0%	38.9%	0.8%	0.0%
194	82.4%	14.2%	0.0%	0.0%
230	79.4%	9.9%	0.0%	0.0%
365	69.4%	2.6%	0.0%	0.0%

Table 1

Now, if this person over estimated by just 0.8 percent, making the real probability of secrecy an even 99 percent, their probability drops dramatically. If a person is relatively lackadaisical on the secrecy front at a 95 percent rate, by day 45 they have less than a 10 percent chance of maintaining secrecy. And if they are a secrecy buffoon with a 90 percent rate, by day 22 they have less than a 10 percent chance of maintaining secrecy. One should weigh the probability of serious loss against the potential gains of an affair before proceeding. Mysteriously, running the numbers is not on our minds when we take up such activity.

Now that your attention is fully engaged, you are ready to move on to utility decision-making.

Return on investment: The earnings produced by an investment over a specified time period.

Payback period: The time needed for an investment or venture to return in total earnings the original amount invested.

All decisions that lead to making an investment produce a return on investment and a payback period. These, and the potential downsides, are the primary decision criteria you need to focus on.

Consider this common water system situation. You manage a water distribution system. It springs a leak. You need to figure out if you should fix the leak at all, how you should do it and how quickly you should do it. You need to calculate the payback period and return on investment for your decision options and adjust these criteria for your aversion to risk.

In tables 2 and 3 decision options are called “scenarios.” The formula for each calculation is shown in the center of Table 2.

This is how you should proceed to make such a decision. Measure or estimate how rapidly you are losing water. Calculate or estimate your cost to produce water. Estimate the cost to fix the leak, including the cost of the water you will lose until it is fixed, using the various options available to you. There are many possibilities but just consider the four in the tables for now. Once you have all your options laid out side by side, compare the payback period, return on investment and downsides of each option. Based on your aversion to risk, your best option may now be quite clear and the decision easy.

Consider the cheap water situation in Table 2. It assumes that your water only costs \$2.00 per 1,000 gallons to produce. Under this and the other criteria assumptions the do-it-yourself scenario will yield the quickest payback period, the highest return on investment and the lowest risk of things going wrong – which is the “Bad Consequence Adjustment.” Payback and return on investment for the “Don’t Fix” scenario cannot be calculated because no investment will be made to fix the leak. However, in only one year’s time \$18,000 worth of water will have run out of the pipe so this is an expensive option.

Some investments enjoy a quick payback but yield a low return. That is because the dollars invested are low and the earnings or savings generated are also low. These options aim too low. Another investment may yield a slower payback but higher return. That is usually the better investment option.

For utility decisions you should use a high percentage for the item in tables 2 and 3 that is called “Aversion to Getting Bad Consequence.” That will give more weight to the downsides part of the equation to match your ratepayers’ high aversion to sustaining losses.

Line Leak Fix, Cheap Water Situation														
Scenarios	Loss or I&I/Day in Gallons	Cost/1,000 Gallons	Cost/Day	Days to Fix	Total Cost of Lost Water or I&I	Cost to Fix Leak	Cost to Fix + Lost Water	Probability of Suffering Bad Consequence	Bad Consequence	Aversion to Getting Bad Consequence	Bad Consequence Adjustment	Aversion-adjusted Cost to Fix + Lost Water or I&I	Aversion-adjusted Payback in Days	One Year Aversion-adjusted Return on Investment
Formulas:	A	B	A / 1,000 * B	D	C * D = E	F	E + F = G	H	I	J	H * I * J = K	G + K = L	L / C = M	C * 365 / L = N
Fix it with city staff	25,000	\$2.00	\$50	90	\$4,500	\$2,000	\$6,500	10%	\$1,000	75%	\$75	\$6,575	132	278%
Fix with bid contract	25,000	\$2.00	\$50	60	\$3,000	\$4,000	\$7,000	20%	\$2,000	75%	\$300	\$7,300	146	250%
Fix with negotiated contract	25,000	\$2.00	\$50	15	\$750	\$5,500	\$6,250	20%	\$2,750	75%	\$413	\$6,663	133	274%
Don't fix	25,000	\$2.00	\$50	365	\$18,250	\$0	\$18,250	0%	\$0	0%	\$0	\$18,250	N.A.	N.A.

Table 2

Some would say, as Table 2 suggests, “Well of course it’s cheaper to do it ourselves so that’s always the best way to go.” Wrong. Consider the situation in Table 3 where water is more expensive to produce.

Line Leak Fix, Expensive Water Situation														
Scenarios	Loss or I&I/Day in Gallons	Cost/1,000 Gallons	Cost/Day	Days to Fix	Total Cost of Lost Water or I&I	Cost to Fix Leak	Cost to Fix + Lost Water	Probability of Suffering Bad Consequence	Bad Consequence	Aversion to Getting Bad Consequence	Bad Consequence Adjustment	Aversion-adjusted Cost to Fix + Lost Water or I&I	Aversion-adjusted Payback in Days	One Year Aversion-adjusted Return on Investment
Fix it with city staff	25,000	\$5.00	\$125	90	\$11,250	\$2,000	\$13,250	10%	\$1,000	75%	\$75	\$13,325	107	342%
Fix with bid contract	25,000	\$5.00	\$125	60	\$7,500	\$4,000	\$11,500	20%	\$2,000	75%	\$300	\$11,800	94	387%
Fix with negotiated contract	25,000	\$5.00	\$125	15	\$1,875	\$5,500	\$7,375	20%	\$2,750	75%	\$413	\$7,788	62	586%
Don't fix	25,000	\$5.00	\$125	365	\$45,625	\$0	\$45,625	0%	\$0	0%	\$0	\$45,625	N.A.	N.A.

Table 3

In this case the cost of lost water mounts up quickly. Therefore, getting the fix done quickly with a negotiated contract is the better option, even though the cost of that contract is higher than the other options. At this cost to produce level the return from a bid project lags that of the negotiated contract and the do-it-yourself option lags even more. It boils down to this. If the value of time is very great at all, you can’t afford to waste it with long bidding cycles or “getting around to it” cycles.

Think about how you normally handle line leaks and other cost saving opportunities. You probably have a consistent way of doing it – such as always do-it-yourself or always bid it out. The above demonstration should bring home this point – it is your decision-making process that should be consistent. Then, your actions should execute each decision accordingly.

The math is dependable but what goes into the equation is not:

- You might know *for certain* that the water loss rate is 25,000 gallons per day. Then again, you might not.
- You *should* know, pretty closely, what your cost to produce is, but you may not.
- You are probably just guessing the number of days it will take to do each fix.
- You are definitely guessing about the cost to fix using each option, at least early on.

In utility management many things are uncertain. But you still have to make a decision – water is running out of the pipe. What to do?

Run scenarios. Run each of the “givens” up and down in the range that you think is reasonable. Your best option will be the one that gives you a good return and payback with an acceptable level of downside risk through a wide range of given criteria. That means that even if you are off by a lot on one or more criteria, that option is still likely to serve you well.

But what if you need to fix some leaky lines, fix some pumps, replace some meters, build a water tower and build a new clarifier? How do you decide where to spend the ratepayers’ money? The beauty of this method is that you can

Some investments, like fixing water leaks, are intended to save money. Others, like the decision to analyze and raise user rates, are intended to make money. A separate worksheet in the DecisionMaker5[®] application calculates the value of decisions that make money.

compare apples, oranges and dump trucks side by side. It doesn’t matter what the decision issue is so long as you can reduce its costs and returns to the same units of measure, such as dollars. Run the numbers until you get a good sense of how each option will perform under stress. Then do the “winning” option first and progress down the list from there. This should sound familiar. This method simply takes the issues matrix and measures with dollars instead of a subjective “criticality” rating.

In truth, such situations are complex to evaluate. Because they affect user rates, the more effective way to evaluate them is to comprehensively analyze user rates and use the effect on

Reduce the risk of paying too much for a rate analysis by downloading the article, “What Should a Rate Study Cost?” at <http://carlbrownconsulting.com/general/RateStudyCost.pdf>.

rates as your guide to making good decisions. Rates have a wonderful way of clarifying things. With that analysis in hand you can also

prove up your case for raising and restructuring rates, getting grants and more.

Finally, the decision-making methodology outlined in this article, with some refinements, can be used to choose between options that will require a long time to show their value. During that time each option will incur various ownership and operating costs so the time value of money and other things will come into play. Situations where this level of analysis is useful include such things as:

- Deciding what type of sewage treatment plant to build, when to build it and how to fund it;
- Deciding if, when and how to adopt advanced asset management strategies; and

- Deciding if, when, and under what terms to enter into a water supply agreement.

Such decisions leave legacies – you can't undo them quickly or cheaply. Again, a comprehensive rate analysis works best but you can use the long investment model in the DecisionMaker5[®] tool, as well.

Having learned this new way of evaluating issues, are you going to use it for all future decisions? No. Like everyone else, you're in too big a hurry. But, when you encounter a big issue or one where you must "prove up your case" to someone, this method will really show its value.

Decisions are about the future. The future carries risks. Many an actor has been offered and turned down a part because they thought it would not advance their careers. Some of those parts made new stars out of nobodies. Such are the risks actors take. However, the *smart* actors who turned down those parts became stars through other vehicles because they thoughtfully considered their moves. They used sound decision-making strategies. Thoughtful decision-making will help *you* beat chance over the long haul, too.

There it is, decision-making from a simple situation to the complex. After reading this article hopefully you are now saying, "Ah ha, I have been doing that all along in my head." That's great. In-your-head evaluation works fine for most decisions.

Unfortunately, in-your-head evaluation doesn't work well for complex investment decisions. In those cases the math is hard to do in your head. That will encourage you to gloss over the math and get overly influenced by feelings – yours or your ratepayers'. Don't let that happen.

Follow through with good research and calculations. Your ratepayers will be well-served and feel confident in the investment decisions you make for them. They will come to think of you as a person who has the "knack" for making great decisions. And, they will be right.

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