11 – Rate setting

MISSISSIPPI
Water and Pollution Control
Operators Association

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Objectives

- Effectiveness in full cost recovery of expenses
- Revenue stability and predictability
- Rate stability and predictability (customer perspective)
- Promotion of efficient resource use
- Fairness in dividing costs among user classes
- Avoidance of undue discrimination among users
- Ability to respond to changing economic patterns
- Rates are easily interpreted by customers
- Ability to be easily administered
- Legal and defendable

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Types of rate structures

- Primary Structure Rate Structure Types
  - Flat Rate
  - Uniform Block Rate
  - Decreasing Block Rate
  - Increasing Block Rate
- Other Rate Structure Types
  - Seasonal Rates
  - Water Budget Rates
  - Fire Protection Service Rates
  - Wholesale Rates
  - Standby Rates
  - Drought and Surcharge Rates
  - Low-Income Affordability Rates

Source: AWWA – Principles of Water Rates, Fees, and Charges (M1)

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Flat rate structure

- The customer pays a fixed amount regardless of the amount of water used
- Example - $45.00 per month
- Examples
  - Systems without working meters
  - Trailer parks (water charges are included in lot rent)
  - Subdivisions (water charges are included in HOA fees)
  - Systems that have grown from community wells

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Flat rate structure

- Pros
  - Easy to understand
  - Provides the most stable revenue flow
  - Provides some measure of cost recovery
- Cons
  - Fairness – low usage customer pay higher rates
  - Conservation – no incentive to conserve water
  - Equity – same as fairness
  - Cost of Service – does not reflect the true cost of water
  - Defendable – difficult to rationalize cost differentials among different types of users
  - Feasibility – doesn't promote system sustainability

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Uniform block rate structure

- The customer pays a fixed amount for a minimum water usage and then a set amount for each consumption block over the minimum usage
- Example - $45.00 for up to 2,000 gallons of consumption; $5.00 per each additional 1,000 gallons of consumption
- Most common type of rate structure used in MS
- Examples
  - Residential rates
  - Commercial rates

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Uniform block rate structure

- Pros
  - Understandability – easy to understand
  - Revenue Flow – provides a relatively stable revenue flow
  - Cost Recovery – Can adjust to achieve cost recovery
  - Fairness – all customers pay the same flow rate (low usage customers pay a higher base minimum rate)
  - Conservation – some incentive to conserve water
  - Defendable – easily defendable to all stakeholders
  - Cost of Service – can reflect the true cost of supplying water
  - Feasibility – can support system sustainability
- Cons
  - Perhaps the best of all rate structure types

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Increasing block rate structure

- The customer pays a fixed amount for a minimum water usage and then increasing amounts for each consumption block over the minimum usage
- Example - $45.00 for up to 2,000 gallons of consumption; $5.00 per 1,000 for the next 5,000 gallons of consumption, $6.50 per 1,000 for the next 10,000 gallons of consumption, etc.
- Consumption blocks do not have to be equal
- Typically touted as a conservation measure, but can be used to dramatically enhance revenue if a system has a number of large users in a consumption class

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Increasing block rate structure

- Pros
  - Revenue Flow – provides a relatively stable revenue flow in normal usage months, but revenue will vary more than the uniform block rate structure
  - Cost Recovery – Can adjust to achieve cost recovery
  - Conservation – highest incentive to conserve water
  - Defendable – easily defendable to all stakeholders
  - Cost of Service – can reflect the true cost of supplying water
  - Feasibility – can strengthen system sustainability
- Cons
  - Understandability – can be difficult for residential customers to understand
  - Fairness – larger users pay higher rates than small usage customers

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Decreasing block rate structure

- The customer pays a fixed amount for a minimum water usage and then decreasing amounts for each consumption block over the minimum usage
- Example - $45.00 for up to 2,000 gallons of consumption; $5.00 per 1,000 for the next 5,000 gallons of consumption, $4.00 per 1,000 for the next 10,000 gallons of consumption, etc.
- Consumption blocks do not have to be equal
- Typically used for large commercial or industrial customers that use very large amounts of water.
- Not typically used for residential or small commercial customers

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Decreasing block rate structure

- Pros
  - Revenue Flow – provides a relatively stable revenue flow in normal usage months, but revenue will vary more than the uniform block rate structure
  - Cost Recovery – Can adjust to achieve cost recovery, but higher usages may only capture variable costs
  - Conservation – no incentive to conserve water
  - Cost of Service – can reflect the true cost of supplying water
  - Feasibility – can strengthen system sustainability
- Cons
  - Understandability – can be difficult for residential customers to understand, but industrial customers will understand
  - Defendable – may not be easily defendable to all stakeholders
  - Fairness – larger users pay lower rates than small usage customers

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Other rate structures

- These structures are not typically used in Mississippi
  - Seasonal Rates
  - Water Budget Rates
  - Fire Protection Service Rates
  - Wholesale Rates
  - Standby Rates
  - Drought and Surcharge Rates
  - Low-Income Affordability Rates
- Any of the primary rate structures can be used in these settings

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Seasonal rate structure

- Rate varies by time period
- Typically implemented in times of highest demand
- In Mississippi, that is usually June through October
- Reflects a higher cost of providing water during these periods
- Encourages conservation during high usage months
- Two strategies are used
  - High demand/low demand – specific rates are set for each season
  - Excess use – a higher rate is charged for customer consumption above a set threshold – similar to the increasing block rate structure

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Water budget rate structure

- Form of increasing block rate structure
- Lowest consumption block is based on the estimated and efficient needs of the customer
- Problem – this structure is typically customer-specific; you may need a different block structure for each customer
- Would be very difficult to implement for small systems, particularly given the types of billing software used across the state

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Fire protection rate structure

- Involves standby water for fire protection
- Charge for the system maintaining fire protection equipment (e.g., fire hydrants) and maintaining an adequate flow and pressure to combat fires
- Requires a cost-of-service study to determine this cost
  - Typically a fixed cost
  - This cost could be incorporated into the base minimum amount of a block rate structure or incorporated into property tax rates

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Wholesale rate structure

- Involves serving "non-owner" entities
  - Examples – other water systems as emergency backup, manufacturing facilities
- Two strategies (and a hybrid of the two strategies) are typically used
  - System-wide Cash-needs Approach – treat the outside entity as if it is a "system-owned" entity – i.e., as if it is an entity that exists within the system boundaries – and treat it as any other customer
  - Utility-Basis Approach – takes into account additional infrastructure needs and upgrades and the costs of expanding system capacity (particularly for entities that experience wide usage variations)

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Standby rate structure

- Can be similar to the wholesale rate situation, but usage may vary widely
- Often used to serve other water utilities and entities with their own water supplies (hospitals and industrial firms)
- Typically consists of a fixed standby rate assessed each billing period plus a flow rate for consumption
- Infrastructure costs and increased capacity/maintenance costs should be included in the standby rate
- Cost calculations should ideally be transparent, especially for other utilities

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Surcharge rate structure

- Surcharges are an additional rate structure added onto customers' bills
- Typically done for the following reasons
  - Disaster response
  - Drought - often implemented as a means to encourage conservation
  - Rate stabilization reserves
  - Elevation surcharges for additional required pumping
  - Capital financing – reserve account established to purchase capital equipment
- The timing of surcharges may adversely affect customers – be transparent before surcharges are implemented

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Low income affordability rate structure

- Intended to mitigate impacts of high water bills on poorer households
- Impact goes beyond economic consequences
- Must define “low income” and “affordability”
- Does not encourage conservation
- Systems are already implementing these measures
  - Arrearage forgiveness or customized payments
  - High usage (leak, swimming pool, etc.) forgiveness
  - Fixture repairs
  - Leak detection assistance
  - Crisis vouchers (usually in connection with social service entities)
  - Budget billing

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Other factors to consider

- There are other things just as important as having a good rate structure
  - Accurate meters
  - Enforceable and effective collection policies
  - Board support for rate structure goals
- Understand the importance of the appropriate rate structure and level for the organization
- Identify what information is important to obtain from the study
  - Impact on individual users
  - Changing dynamics of individual customer revenue (minimum users, high users)
  - Variation in revenue based on historical usage

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Rate structure objectives
System specific objectives

- Fairness in the treatment of different customer demographics
  - Low fixed-income customers vs high-usage customers
  - Residential vs commercial vs industrial
  - Water vs wastewater
- Beliefs in costs that should be recovered (many board members don't believe customers should be charged for depreciation costs)
- Beliefs that grant funding will subsidize costs to customers
- Beliefs regarding the amount of revenues over expenses accrued by a non-profit entity
- Relationship between the board and customers (neighbors, typically close neighbors)

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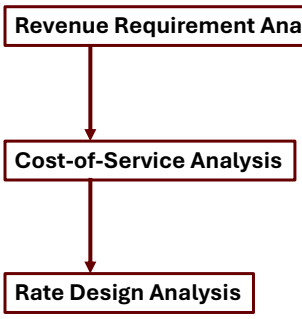
Rate structure process

The general process for determining an efficient and effective rate structure



Compares the revenues of the utilities and capital costs to determine the adequacy of the existing rates to recover the utility's costs

Allocates the revenue requirements to the various customer classes of service in a fair and equitable manner

Considers both the level and structure of the rate design to collect the distributed revenue requirements from each class of service

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Case study 1

- Small (≈ 250 billed customers each month) Class D system
- Organized as an association
- 307 connections
- 118,053 feet (22.36) miles of distribution line
  - 2” line – 24,944 feet
  - 2.5” line – 18,975 feet
  - 3” line – 7,025 feet
  - 4” line – 40,495 feet
  - 6” line – 26,614 feet
- One rate class – residential
  - Very few customers that would classify as commercial
  - Standby sales to neighboring system

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Basis of the rate study

- The basis of the rate study is the billing software
  - Understand the capabilities of your software
- Develop a three year (at least) monthly usage matrix that contains both billing and usage information
  - Key element is to examine enough history to level out the usages and to gain a sense of variation by month over the yearly time span

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Things to remember

- This is a model; it represents real life, but doesn't replicate real life
- The information that you get out is only as good as the data that you put in
  - Meter readings have to be accurate – doesn't usually seem to be the case
- The key is the quality of the information that goes into the model
  - You need to be able to look at the raw data in order to insure its accuracy

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Study components

- Ability to include other utilities (wastewater & garbage in particular)
- Incorporate usage variation for (mainly) weather
- Multiple Flow Rates – account for flat, uniform, increasing, decreasing block rates
- Multiple Rate Structures for different customer types (some systems will have 10 or more)
- 5 year projection of both revenues and expenses
- Capability of including future developments
- Different reports addressing different needs

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Procedure

- "Download" the billing/user information
  - Either use option from the software menu ***or***
  - Examine data storage files from program menu
    - Many (especially older) programs use dBase or Access database formats for data storage
- Create monthly user matrix by year
  - Include total bill and usage information
- Most important – Clean up data
  - Look for overrides, mistaken entries, calculate backwards

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Goals

- Define what you want to gain from the study
- Don't look for short-term solutions to long term problems
- Keep the psychology of rate changes in mind
- Incorporate your asset management and long-range financials into your rate study
- Make sure your study gives you what you need to make good, informed decisions (***reports***)
- Fund accumulation to fund capital projects
- Identification of potential operational problems
- Determine the impact of rate changes on specific customer types

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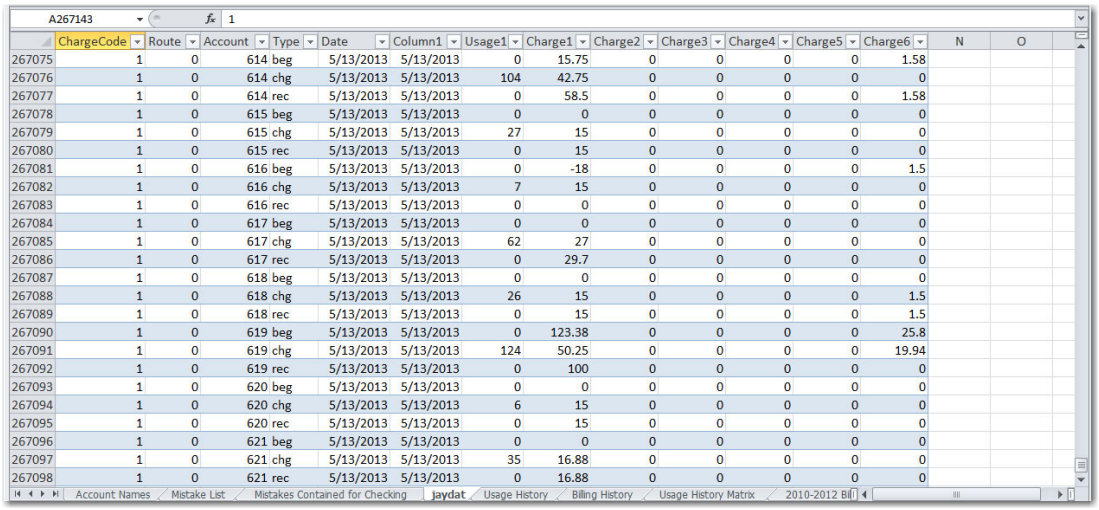
Analysis steps

- Step 1 – get the raw ***usage*** data from the billing program



	ChargeCode	Route	Account	Type	Date	Column1	Usage1	Charge1	Charge2	Charge3	Charge4	Charge5	Charge6
267075	1	0	614	beg	5/13/2013	5/13/2013	0	15.75	0	0	0	0	1.58
267076	1	0	614	chg	5/13/2013	5/13/2013	104	42.75	0	0	0	0	0
267077	1	0	614	rec	5/13/2013	5/13/2013	0	58.5	0	0	0	0	1.58
267078	1	0	615	beg	5/13/2013	5/13/2013	0	0	0	0	0	0	0
267079	1	0	615	chg	5/13/2013	5/13/2013	27	15	0	0	0	0	0
267080	1	0	615	rec	5/13/2013	5/13/2013	0	15	0	0	0	0	0
267081	1	0	616	beg	5/13/2013	5/13/2013	0	-18	0	0	0	0	1.5
267082	1	0	616	chg	5/13/2013	5/13/2013	7	15	0	0	0	0	0
267083	1	0	616	rec	5/13/2013	5/13/2013	0	0	0	0	0	0	0
267084	1	0	617	beg	5/13/2013	5/13/2013	0	0	0	0	0	0	0
267085	1	0	617	chg	5/13/2013	5/13/2013	62	27	0	0	0	0	0
267086	1	0	617	rec	5/13/2013	5/13/2013	0	29.7	0	0	0	0	0
267087	1	0	618	beg	5/13/2013	5/13/2013	0	0	0	0	0	0	0
267088	1	0	618	chg	5/13/2013	5/13/2013	26	15	0	0	0	0	1.5
267089	1	0	618	rec	5/13/2013	5/13/2013	0	15	0	0	0	0	1.5
267090	1	0	619	beg	5/13/2013	5/13/2013	0	123.38	0	0	0	0	25.8
267091	1	0	619	chg	5/13/2013	5/13/2013	124	50.25	0	0	0	0	19.94
267092	1	0	619	rec	5/13/2013	5/13/2013	0	100	0	0	0	0	0
267093	1	0	620	beg	5/13/2013	5/13/2013	0	0	0	0	0	0	0
267094	1	0	620	chg	5/13/2013	5/13/2013	6	15	0	0	0	0	0
267095	1	0	620	rec	5/13/2013	5/13/2013	0	15	0	0	0	0	0
267096	1	0	621	beg	5/13/2013	5/13/2013	0	0	0	0	0	0	0
267097	1	0	621	chg	5/13/2013	5/13/2013	35	16.88	0	0	0	0	0
267098	1	0	621	rec	5/13/2013	5/13/2013	0	16.88	0	0	0	0	0

Account Names | Mistake List | Mistakes Contained for Checking | jaydat | Usage History | Billing History | Usage History Matrix | 2010-2012 Bil

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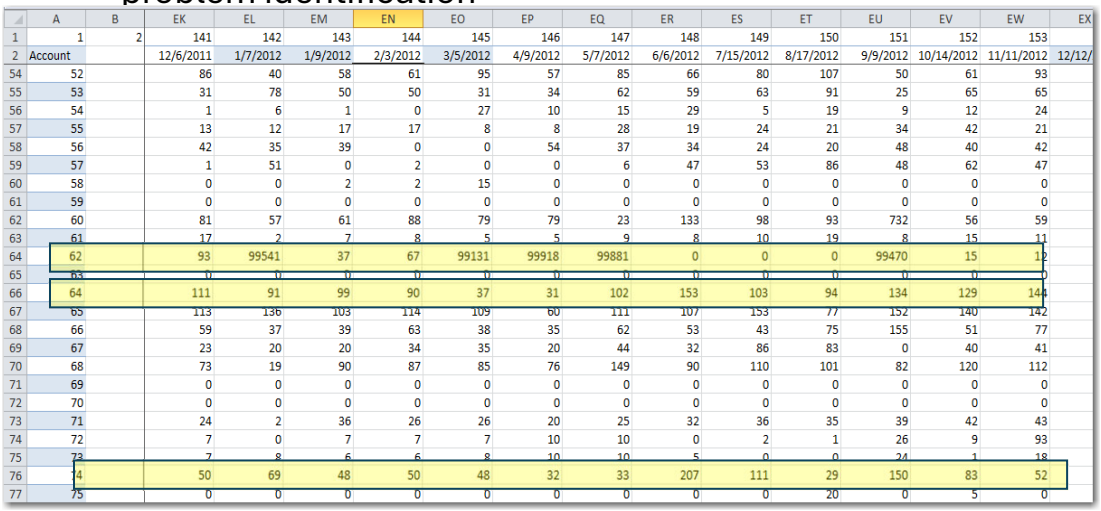
Analysis steps

- Convert usages into a date/account number matrix – this allows problem identification



	A	B	EK	EL	EM	EN	EO	EP	EQ	ER	ES	ET	EU	EV	EW	EX
1	1	2	141	142	143	144	145	146	147	148	149	150	151	152	153	
2	Account		12/6/2011	1/7/2012	1/9/2012	2/3/2012	3/5/2012	4/9/2012	5/7/2012	6/6/2012	7/15/2012	8/17/2012	9/9/2012	10/14/2012	11/11/2012	12/12/
54	52		86	40	58	61	95	57	85	66	80	107	50	61	93	
55	53		31	78	50	50	31	34	62	59	63	91	25	65	65	
56	54		1	6	1	0	27	10	15	29	5	19	9	12	24	
57	55		13	12	17	17	8	8	28	19	24	21	34	42	21	
58	56		42	35	39	0	0	54	37	34	24	20	48	40	42	
59	57		1	51	0	2	0	0	6	47	53	86	48	62	47	
60	58		0	0	2	2	15	0	0	0	0	0	0	0	0	
61	59		0	0	0	0	0	0	0	0	0	0	0	0	0	
62	60		81	57	61	88	79	79	23	133	98	93	732	56	59	
63	61		17	2	7	8	5	5	9	8	10	19	8	15	11	
64	62		93	99541	37	67	99131	99918	99881	0	0	0	99470	15	12	
65	63		0	0	0	0	0	0	0	0	0	0	0	0	0	
66	64		111	91	99	90	37	31	102	153	103	94	134	129	144	
67	65		113	136	103	114	109	60	111	107	153	77	152	140	142	
68	66		59	37	39	63	38	35	62	53	43	75	155	51	77	
69	67		23	20	20	34	35	20	44	32	86	83	0	40	41	
70	68		73	19	90	87	85	76	149	90	110	101	82	120	112	
71	69		0	0	0	0	0	0	0	0	0	0	0	0	0	
72	70		0	0	0	0	0	0	0	0	0	0	0	0	0	
73	71		24	2	36	26	26	20	25	32	36	35	39	42	43	
74	72		7	0	7	7	7	10	10	0	2	1	26	9	93	
75	73		7	8	6	6	8	10	10	5	0	0	24	1	18	
76	74		50	69	48	50	48	32	33	207	111	29	150	83	52	
77	75		0	0	0	0	0	0	0	0	0	20	0	5	0	

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Analysis steps

- If problems exist with no explanation, incorporate billings into the matrix and calculate billed usage – base revenue budget on what you paid for

DT91 =IF(AE91="NA",0,VLOOKUP(CONCATENATE($A91," - ",AE$1),'Usage History'!$D$2:$E$25955,2,FALSE))

	A	B	DK	DL	DM	DN	DO	DP	DQ	DR	DS	DT	DU	DV	DW
1	Account		2/3/2012			3/5/2012			4/9/2012			5/7/2012			6/6/2012
2			Usage - Rep	Bill ($)	Usage - Calc	Usage - Rep	Bill ($)	Usage - Calc	Usage - Rep	Bill ($)	Usage - Calc	Usage - Rep	Bill ($)	Usage - Calc	Usage - Rep
3															
61	58		2	15	2	15	16.5	34	0	16.5	34	0	16.5	34	0
62	59		0	0	0	0	0	0	0	0	0	0	0	0	0
63	60		88	36.75	88	79	33.38	79	79	33.38	79	23	15	23	133
64	61		8	13	8	3	13	3	3	13	3	3	13	3	8
65	62		67	31.77	75	99131	15	15	99918	15	15	99881	15	15	0
66	63		0	0	0	0	0	0	0	0	0	0	0	0	0
67	64		90	50.28	124	37	33.45	79	31	29.32	68	102	61.53	154	153
68	65		114	46.5	114	109	44.63	109	60	28.88	67	111	45.38	111	107
69	66		63	27.38	63	38	18	38	35	16.88	35	62	27	62	53
70	67		34	16.5	34	35	16.88	35	20	15	20	44	20.25	44	32
71	68		87	36.38	87	85	35.63	85	76	32.25	76	149	59.63	149	90
72	69		0	0	0	0	0	0	0	0	0	0	0	0	0
73	70		0	0	0	0	0	0	0	0	0	0	0	0	0
74	71		26	16.5	34	26	18.15	38	20	19.97	43	25	21.96	49	32
75	72		7	15	7	7	15	7	10	15	10	10	15	10	0
76	73		6	15	6	8	15	8	10	15	10	10	15	10	5
77	74		50	24.75	56	48	26.4	60	32	17.33	36	33	19.48	42	207
78	75		0	15	15	0	16.5	34	0	15	15	0	15	15	0
79	76		28	16.99	35	26	18.68	40	23	20.55	45	22	17.31	36	12
80	77		59	26.59	61	40	21.41	47	41	23.97	54	35	23.89	54	29
81	78		0	0	0	0	0	0	0	0	0	0	0	0	0
82	79		10	15	10	6	15	6	5	15	5	12	15	12	7
83	80		0	15	15	0	15	15	0	15	15	21	15	21	10

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Analysis steps

- Calculate averages and standard deviations of three year time frame by month

AN88 =ROUND(AVERAGE(C88,O88,AA88),0)

	A	B	AN	AO	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY
1			Average Usages											
2	Account		January	February	March	April	May	June	July	August	September	October	November	December
62	59													
63	60		93	111	113	85	62	124	103	106	88	84	142	100
64	61		27	25	27	24	19	14	25	12	16	23	27	19
65	62		27	33	29	29	20	42	40	30	28	17	23	58
66	63		46	30	35	37	28	31	28	36	21	28	30	17
67	64		138	144	99	112	111	157	108	125	106	115	135	113
68	65		143	144	135	119	97	148	139	114	169	149	132	113
69	66		44	55	47	40	52	50	51	58	101	38	46	39
70	67		20	35	34	31	36	38	54	52	34	41	57	19
71	68		93	109	118	95	96	106	91	87	77	113	99	67

BC88 =ROUND(STDEV.P(E88,Q88,AC88),0)

	A	B	BA	BB	BC	BD	BE	BF	BG	BH	BI	BJ	BK	BL
1			Standard Deviation											
2	Account		January	February	March	April	May	June	July	August	September	October	November	December
62	59													
63	60		27	34	27	5	29	26	9	20	20	20	112	42
64	61		28	24	29	25	8	14	13	5	12	10	17	11
65	62		9	30	10	10	8	32	32	15	9	10	22	25
66	63		6	2	1	7	5	4	8	2	9	13	15	2
67	64		32	47	30	42	31	51	43	17	14	40	46	24
68	65		31	24	22	46	11	21	10	26	23	15	28	3
69	66		1	9	9	5	10	4	8	17	55	17	25	18
70	67		16	3	2	13	7	6	23	22	15	2	24	3
71	68		9	24	36	14	39	21	15	18	13	8	9	31

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Why these statistics

- The **average** gives you a basis from which to form the actual rate study
- The **standard deviation** gives you a measure of usage variability
  - Use population standard deviation
  - Make sure that you cut off the low usage at zero – you can't have negative water usage
  - ***Probably also need to incorporate user-defined variations such as 5% high and 10% low***
- Be sure to adjust your study for new and departing customers

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Model features

- Spreadsheet based input screen makes it simple for systems to run their own scenarios
- Models are built for specific systems; "one size fits all" models don't provide great accuracy

	A	B	C	D	E	F	G
1	**Water Rates**						
2	*Manual Variations*						
3		*Baseline Tuning*	***100.00%***		*First Analysis Year*	***2025***	
4		*Billing Block Size (gallons)*	***1,000***		*Year 1 Net Income*	**$1,550**	
5		*Inflation Rate*	***4.0%***		*Year 2 Net Income*	**($5,345)**	
6		*Savings Rate*	***0.0%***		*Year 3 Net Income*	**($12,515)**	
7		*Annual Base Rate Increase*	***0.0%***		*Year 4 Net Income*	**($19,971)**	
8		*Annual Flow Rate Increase*	***0.0%***		*Year 5 Net Income*	**($27,726)**	
9							
10	**Water Rates - FY2025**		**2025**	**2026**	**2027**	**2028**	**2029**
11		*Effective Meter Charge*	***$30.00***	***$30.00***	***$30.00***	***$30.00***	***$30.00***
12		*Minimum Gallons*	***0***	***0***	***0***	***0***	***0***
13		*Block 1 Gallons*	***1,000***	***1,000***	***1,000***	***1,000***	***1,000***
14		*Block 1 Price*	***$8.00***	***$8.00***	***$8.00***	***$8.00***	***$8.00***
15		*Block 2 Gallons*	***1,000***	***1,000***	***1,000***	***1,000***	***1,000***
16		*Block 2 Price*	***$8.00***	***$8.00***	***$8.00***	***$8.00***	***$8.00***
17		*Block 3 Gallons*	***1,000***	***1,000***	***1,000***	***1,000***	***1,000***
18		*Block 3 Price*	***$8.00***	***$8.00***	***$8.00***	***$8.00***	***$8.00***
19		*Block 4 Gallons*	***1,000***	***1,000***	***1,000***	***1,000***	***1,000***
20		*Block 4 Price*	***$8.00***	***$8.00***	***$8.00***	***$8.00***	***$8.00***
21		*Block 5 Price*	***$8.00***	***$8.00***	***$8.00***	***$8.00***	***$8.00***

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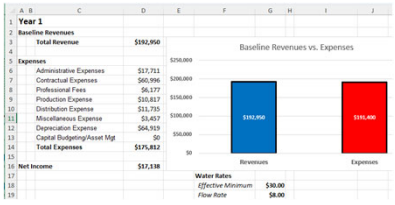
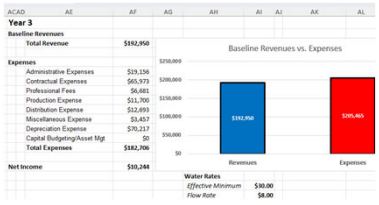
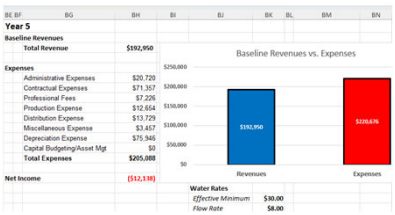
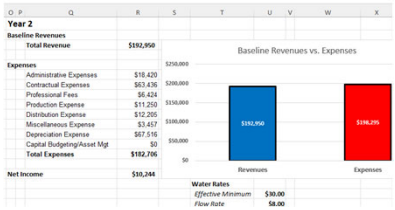
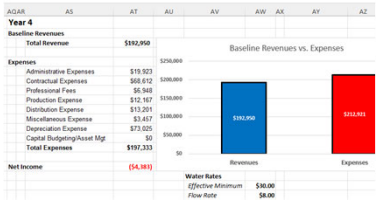
Develop model complete w/ income statement and block usages











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Provide monthly revenue data

- Monthly cash flow projections are very important, especially for financially troubled systems
- Of particular importance to board members is the effect on minimum bill customers

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1		Year 1												
2		January	February	March	April	May	June	July	August	September	October	November	December	Total
3	**Residential Water Customers Billed**	251	252	255	251	249	251	256	255	256	253	255	253	253
4	**Gallons of Water Sold**	1,199,320	912,760	810,090	885,590	1,321,490	1,140,970	1,160,390	1,213,360	1,107,530	1,085,920	978,110	914,470	12,730,000
5	**Residential Water Revenue**	$17,125	$14,862	$14,131	$14,615	$18,042	$16,658	$16,963	$17,357	$16,540	$16,277	$15,475	$14,906	**$192,950**
6														
7	Number of Res Min Bill Customers	207	209	206	208	208	208	203	202	200	202	200	208	***205***
8														
9	Residential Revenue from Water Base Minimum	$7,530	$7,560	$7,650	$7,530	$7,470	$7,530	$7,680	$7,650	$7,680	$7,590	$7,650	$7,590	***$91,110***
10	Residential Revenue from Water Flow Rate	$9,595	$7,302	$6,481	$7,085	$10,572	$9,128	$9,283	$9,707	$8,860	$8,687	$7,825	$7,316	***$101,840***

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Annual revenue data provide readable summaries

	Year 1	Year 2	Year 3	Year 4	Year 5
Baseline Average					
Residential Water Customers Billed	253	253	253	253	253
Gallons of Water Sold	12,730,000	12,730,000	12,730,000	12,730,000	12,730,000
Residential Water Revenue	**$192,950**	**$192,950**	**$192,950**	**$192,950**	**$192,950**
No. of Class 10 Res Minimum Bill Customers	205	205	205	205	205
Class 10 Res Revenue from Water Base Mini	$91,110	$91,110	$91,110	$91,110	$91,110
Class 10 Res Revenue from Water Flow Rate	$101,840	$101,840	$101,840	$101,840	$101,840
Expenses					
Wages	$17,711	$18,420	$19,156	$19,923	$20,720
Repairs/Maintenance/Supplies	$60,996	$63,436	$65,973	$68,612	$71,357
Bank Fees	$6,177	$6,424	$6,681	$6,948	$7,226
Utilities	$10,817	$11,250	$11,700	$12,167	$12,654
Debt Service	$11,735	$12,205	$12,693	$13,201	$13,729
Administrative Costs	$3,457	$3,457	$3,457	$3,457	$3,457
Capital Outlay	$0	$0	$0	$0	$0
Total Expenses	***$191,400***	***$198,295***	***$205,465***	***$212,921***	***$220,676***
Net Income	***$1,550***	***($5,345)***	***($12,515)***	***($19,971)***	***($27,726)***

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Sensitivity analysis

- User-defined sensitivity analysis demonstrates the impact of the rate change on particular groups of customers

Sensitivity Analysis		**Old Rates**		**New Rates**
	Code	*Residential*		*Residential*
	Minimum Price	***$30.00***		**$30.00**
	Minimum Gallons	***0***		**0**
	Block 1 Gallons	***1,000***		**1,000**
	Block 1 Price	***$6.20***		**$8.00**
	Block 2 Gallons	***1,000***		**1,000**
	Block 2 Price	***$6.20***		**$8.00**
	Block 3 Gallons	***1,000***		**1,000**
	Block 3 Price	***$6.20***		**$8.00**
	Block 4 Gallons	***1,000***		**1,000**
	Block 4 Price	***$6.20***		**$8.00**
	Block 5 Price	***$6.20***		**$8.00**
	Group Interval	***500***	*gallons*	
Usage				
Usage Block	*Old Rates*	*New Rates*		*Pct Change*
0 gallons	$30.00	$30.00	$0.00	0.0%
500 gallons	$33.10	$34.00	$0.90	2.7%
1,000 gallons	$36.20	$38.00	$1.80	5.0%
1,500 gallons	$39.30	$42.00	$2.70	6.9%
2,000 gallons	$42.40	$46.00	$3.60	8.5%
2,500 gallons	$45.50	$50.00	$4.50	9.9%
3,000 gallons	$48.60	$54.00	$5.40	11.1%
3,500 gallons	$51.70	$58.00	$6.30	12.2%
4,000 gallons	$54.80	$62.00	$7.20	13.1%
4,500 gallons	$57.90	$66.00	$8.10	14.0%

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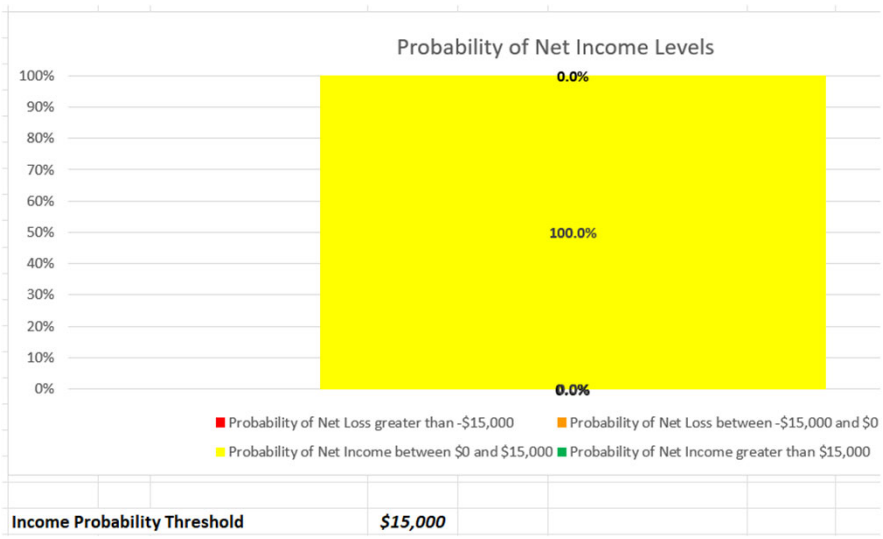
Simulation

- What is the probability that your net income is going to be at a certain level based on customer-level historical usages?



Income Probability Threshold	*$15,000*

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Additional information

- There are many types of usage-based information contained in the billing software that can be useful

	A	B	C	D	M	N	O	P
1	Residential Customer Numbers by Usage Block (Baseline Usages)							
2							Pct of Average	Cumulative Customer
3		Jan	Feb	Mar	Dec	Average	Customers	Percentage
5	0 thru 1,000 gallons	35	48	47	50	41	16.33%	16.33%
6	1,000 thru 2,000 gallons	32	33	51	41	38	15.14%	31.47%
7	2,000 thru 3,000 gallons	33	53	49	53	44	17.53%	49.00%
8	3,000 thru 4,000 gallons	42	41	41	34	39	15.54%	64.54%
9	4,000 thru 5,000 gallons	25	16	21	29	24	9.56%	74.10%
10	5,000 thru 6,000 gallons	21	23	17	10	18	7.17%	81.27%
11	6,000 thru 7,000 gallons	15	11	8	6	12	4.78%	86.06%
12	7,000 thru 8,000 gallons	16	9	6	7	9	3.59%	89.64%
13	8,000 thru 9,000 gallons	3	7	3	4	5	1.99%	91.63%
14	9,000 thru 10,000 gallons	7	2	4	3	5	1.99%	93.63%
15	10,000 thru 11,000 gallons	4	1	2	5	5	1.99%	95.62%
16	11,000 thru 12,000 gallons	2	3	1	0	3	1.20%	96.81%
17	12,000 thru 13,000 gallons	2	0	1	2	2	0.80%	97.61%
18	13,000 thru 14,000 gallons	2	0	1	2	1	0.40%	98.01%

	A	B	C	D	M	N	O	P	Q	R	S
1	Residential Customer Charges by Usage Block (Baseline Usages)										Water
2	Year 1 Water/Wastewater Rates					Annual	Pct of Total	Cumulative Revenue			
3		Jan	Feb	Mar	Dec	Total	Revenue	Percentage			Threshold
5	0 thru 1,000 gallons	$1,113	$1,568	$1,498	$1,608	$15,620	8.10%	8.10%		1,000	$38.00
6	1,000 thru 2,000 gallons	$1,374	$1,372	$2,166	$1,719	$19,132	9.92%	18.01%		2,000	$46.00
7	2,000 thru 3,000 gallons	$1,659	$2,661	$2,442	$2,653	$26,525	13.75%	31.76%		3,000	$54.00
8	3,000 thru 4,000 gallons	$2,430	$2,350	$2,367	$1,936	$26,630	13.80%	45.56%		4,000	$62.00
9	4,000 thru 5,000 gallons	$1,664	$1,046	$1,367	$1,912	$19,056	9.88%	55.44%		5,000	$70.00
10	5,000 thru 6,000 gallons	$1,570	$1,672	$1,267	$745	$15,734	8.15%	63.59%		6,000	$78.00
11	6,000 thru 7,000 gallons	$1,225	$897	$659	$480	$12,053	6.25%	69.84%		7,000	$86.00
12	7,000 thru 8,000 gallons	$1,436	$808	$540	$628	$10,038	5.20%	75.04%		8,000	$94.00
13	8,000 thru 9,000 gallons	$290	$680	$299	$390	$6,265	3.25%	78.29%		9,000	$102.00
14	9,000 thru 10,000 gallons	$742	$215	$422	$317	$6,464	3.35%	81.64%		10,000	$110.00
15	10,000 thru 11,000 gallons	$452	$110	$225	$575	$6,256	3.24%	84.88%		11,000	$118.00
16	11,000 thru 12,000 gallons	$243	$367	$124	$0	$3,909	2.03%	86.90%		12,000	$126.00
17	12,000 thru 13,000 gallons	$257	$0	$130	$263	$2,728	1.41%	88.32%		13,000	$134.00
18	13,000 thru 14,000 gallons	$276	$0	$135	$276	$2,068	1.07%	89.39%		14,000	$142.00
19	14,000 thru 15,000 gallons	$285	$0	$0	$146	$2,187	1.13%	90.52%		15,000	$150.00

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Additional information

- User-defined sensitivity analysis demonstrates the impact of the rate change on particular groups of customers

	A	B	C	D	E	F
1	**Sensitivity Analysis**			**Old Rates**		**New Rates**
2		*Code*		*Residential*		*Residential*
3		*Minimum Price*		***$30.00***		**$30.00**
4		*Minimum Gallons*		***0***		**0**
5		*Block 1 Gallons*		***1,000***		**1,000**
6		*Block 1 Price*		***$6.20***		**$8.00**
7		*Block 2 Gallons*		***1,000***		**1,000**
8		*Block 2 Price*		***$6.20***		**$8.00**
9		*Block 3 Gallons*		***1,000***		**1,000**
10		*Block 3 Price*		***$6.20***		**$8.00**
11		*Block 4 Gallons*		***1,000***		**1,000**
12		*Block 4 Price*		***$6.20***		**$8.00**
13		*Block 5 Price*		***$6.20***		**$8.00**
14						
15		*Group Interval*		***500***	*gallons*	
16						
17	***Usage***					
18	Usage Block	*Old Rates*		*New Rates*		*Pct Change*
20	**0 gallons**	$30.00		$30.00	$0.00	0.0%
21	**500 gallons**	$33.10		$34.00	$0.90	2.7%
22	**1,000 gallons**	$36.20		$38.00	$1.80	5.0%
23	**1,500 gallons**	$39.30		$42.00	$2.70	6.9%
24	**2,000 gallons**	$42.40		$46.00	$3.60	8.5%
25	**2,500 gallons**	$45.50		$50.00	$4.50	9.9%
26	**3,000 gallons**	$48.60		$54.00	$5.40	11.1%
27	**3,500 gallons**	$51.70		$58.00	$6.30	12.2%
28	**4,000 gallons**	$54.80		$62.00	$7.20	13.1%
29	**4,500 gallons**	$57.90		$66.00	$8.10	14.0%

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Rate study results – System 1

- Without asset management but including $62,422 in depreciation, this is the “break-even” scenario

Year	Base Rate	Base Minimum Amount	Flow Rate (per 1,000 gal)	Net Income
2026	$30.00	0 gallons	$8.00	$4,046
2027	$30.00	0 gallons	$9.00	$2,430
2028	$30.00	0 gallons	$9.80	$105
2029	$30.00	0 gallons	$11.50	$16
2030	$30.00	0 gallons	$13.50	$544

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Rate study results – System 1

- Using these same rates, including asset management expenditures, and not including depreciation (depreciation should be used to partially fund the asset management plan)
- The asset management team ***must*** be judicious in determining what assets to fund and how they will be funded

Year	Base Rate	Base Minimum Amount	Flow Rate (per 1,000 gal)	Net Income
2026	$30.00	0 gallons	$8.00	($236,833)
2027	$30.00	0 gallons	$9.00	($238,350)
2028	$30.00	0 gallons	$9.80	($240,674)
2029	$30.00	0 gallons	$11.50	($240,764)
2030	$30.00	0 gallons	$13.50	($240,236)

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Rate study results – System 1

- What if the customer base was doubled with customers like the ones that the system now has?

Year	Base Rate	Base Minimum Amount	Flow Rate (per 1,000 gal)	Net Income
2026	$30.00	0 gallons	$8.00	($43,883)
2027	$30.00	0 gallons	$9.00	($42,719)
2028	$30.00	0 gallons	$9.80	($42,898)
2029	$30.00	0 gallons	$11.50	($38,430)
2030	$30.00	0 gallons	$13.50	($32,540)

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Rate study results – System 1

- There has been substantial interest in expanding the system west with relatively high-income homes on 5+ acre lots. Given that a substantial number of these homes are expected to have swimming pools and that specific interest has been shown for 120 homes, these are the results of these 120 homes used 4,000 gallons per month

Year	Base Rate	Base Minimum Amount	Flow Rate (per 1,000 gal)	Net Income
2026	$30.00	0 gallons	$8.00	($13,055)
2027	$30.00	0 gallons	$9.00	($11,318)
2028	$30.00	0 gallons	$9.80	($11,040)
2029	$30.00	0 gallons	$11.50	($5,598)
2030	$30.00	0 gallons	$13.50	**$1,437**

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Rate study results – System 1

- The results of this rate study show that very small and small systems will have a difficult time in sustaining their system
- The economics aren't there to replace/refurbish/maintain these systems over the long term without population expansion, either through new construction or perhaps consolidation

Year	Base Rate	Base Minimum Amount	Flow Rate (per 1,000 gal)	Net Income
2026	$30.00	0 gallons	$8.00	($13,055)
2027	$30.00	0 gallons	$9.00	($11,318)
2028	$30.00	0 gallons	$9.80	($11,040)
2029	$30.00	0 gallons	$11.50	($5,598)
2030	$30.00	0 gallons	$13.50	**$1,437**

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