

City of Columbia Rate Design and Line Extension Policy

Larry Feltner

Eric Blake

The Prime Group, LLC





Rate Design

Rate Design Principles

- Rates should be fair and equitable for all customers
- Customers should pay the costs that they impose on the system
- Recover fixed costs through fixed charges
- Recover variable costs through variable charges

Cost Recovery

- The goal is to recover fixed and variable costs as fairly as possible from both large and smaller usage customers
 - Fixed cost of the minimum gas system/grid access should be recovered through a fixed monthly charge (customer charge)
 - Fixed costs related to the level of capacity installed should be recovered through a demand charge which varies with usage or through an energy or commodity charge

Two Part

- Customer charge and energy charge
- Most common rate design due to low-cost meters
- Pros
 - Easy to understand
 - Easy to bill
- Cons
 - Not very equitable because it does not adapt to load factor and coincidence factor differences between customers
 - Poor price signal since all hours are priced the same

Declining Block

- Customer charge and blocked energy charge that declines with each block
- First block is generally designed to recover customer costs not included in the customer charge
- Pros
 - Encourages energy consumption for utilities looking for increased sales
- Cons
 - Not reflective of cost
 - Not very equitable because it does not adapt to load factor and coincidence factor differences between customers
 - Poor price signal since costs don't decline with additional usage

Inclining Block

- Customer charge and blocked energy charge that increases with each block
- Generally used to encourage conservation
- Pros
 - Encourages conservation for utilities looking to limit sales growth
- Cons
 - Not reflective of cost
 - Not very equitable because it does not adapt to load factor and coincidence factor differences between customers
 - Poor price signal since costs do not increase as customers use more energy

Time of Use Energy

- Customer charge and time differentiated energy charge
- Generally used to encourage conservation during peak time periods
- Pros
 - Encourages customers to use power during off-peak times when costs are less expensive
 - Sends better price signal than two-part rates
- Cons
 - Not reflective of cost
 - Not very equitable because it does not adapt to load factor and coincidence factor differences between customers

Three Part

- Customer charge, energy charge, and demand charge
- Requires metering that can record highest demand in the month
- Pros
 - More reflective of costs than two-part rates
 - Is more equitable than two-part rates because it adapts to load factor differences between customers
- Cons
 - Cannot adapt to coincidence factor differences between customers
 - May require education for customers who are not familiar with the concept of demand
 - Requires more expensive metering

Hours Use of the Demand

- Customer charge, energy charge, and blocked demand charge based on Kwh/kW or hours use
- Requires metering that can record highest demand in the month
- Pros
 - More reflective of costs than two-part rates
 - Is more equitable than two-part rates because it adapts to load factor differences between customers
- Cons
 - Cannot adapt to coincidence factor differences between customers
 - Very complicated for customers to understand and will require education for customers
 - Requires more expensive metering

Four Part

- Customer charge, energy charge, distribution demand charge, and purchased power demand charge
- Pros
 - Most fair and equitable rate design
 - Adapts to both load factor and coincidence factor for each customer better than most any rate design
 - Sends very accurate price signals
- Cons
 - More complicated to for customers to understand
 - More complicated to bill
 - Requires more advanced and expensive metering



Line Extension Policy

Why Have a Line Extension Policy?

- Marginal costs exceed marginal revenue
- Rates are averages and they recover the carrying costs associated with the average plant investment that applies to a particular customer class
- Without line extension policy, growth can cause the need for rate increases
- Fairness and Equity

Why Have a Line Extension Policy?

- Rates should include some “standard” level of service facilities that are built into base rates, but should include not non-standard facilities
- Rate stability

What is the Purpose of Line Extension Policy?

- The purpose of a line extension policy is to make new customers look “average” for rate purposes
- Line extension policies that do not achieve this goal will result in a utility’s financial position degrading as new customers are added to the system or that customers don’t receive adequate facilities without a Contribution In Aid of Construction (CIAC)
- Helps ensure equitable treatment of all customers on the utilities system
- Equity can be interpreted in different ways

Determination of Line Extension Amount

- Revenue requirement calculation based on cost of service study information to determine the amount of investment that can be supported by existing rates
- The amount of investment is calculated as a multiple of net revenue
- Net revenue is total revenue less purchased power revenue

Amount of Investment That Can Be Supported By Rates

Assumptions:			
Investment		\$ 1,000,000	
Book Life		30	
Tax Life		20	
Composite Tax Rate		0.00%	
Property Tax Rate		2.53%	
Levelized Revenue Requirement Years		30	
O&M as Percent of Investment		5.26%	
Escalation Rate for O&M		3.00%	
Results:			
Present Value Revenue Requirement		\$ 2,516,141	
Levelized Revenue Requirement		\$145,509	
Levelized Carrying Charge Rate		14.55%	
Level of Investment that can be Supported by Revenue		6.87	Times Net Revenue

Amount of Line Extension Per Class Supported By Rates

	Residential Service Gas Heat	Residential Service Electric Heat	Residential Service Heat Pump	Residential Service Combined
Test Year Base Rate Revenue	\$ 29,812,309.24	\$ 16,776,248.37	\$ 4,134,766.58	\$ 50,723,324.19
Less: Purchase Power Cost	\$ 15,812,521.03	\$ 10,146,940.35	\$ 2,558,080.57	\$ 28,517,541.95
Net Revenue	\$ 13,999,788.21	\$ 6,629,308.02	\$ 1,576,686.01	\$ 22,205,782.24
Average Number of Customers	28,117	13,211	2,573	43,900
Average Non-Fuel Revenue Per Customer	\$ 497.91	\$ 501.82	\$ 612.88	\$ 505.83
Less: Average Annual Meter Reading and Billing Cost	\$ 114.94	\$ 114.94	\$ 114.94	\$ 114.94
Carrying Cost on Meter, Service, & Transformer	\$ 103.60	\$ 137.26	\$ 149.20	\$ 116.40
Average Net Revenue Per Customer	\$ 279.37	\$ 249.62	\$ 348.74	\$ 274.48
Amount Times Net Revenue Rate will Support	6.87	6.87	6.87	6.87
Amount Times Net Revenue Selected to Ensure Contribution to Fixed Cost	3.00	3.00	3.00	3.00
Cost of Line Extension Provided With No Contribution	\$ 838.12	\$ 748.86	\$ 1,046.23	\$ 823.45

Amount of Line Extension Per Class Supported By Rates

	Small General Service Gas Heat	Small General Service Electric Heat	Small Commercial Heat Pump	Small General Service / Comm. Combined
Test Year Base Rate Revenue	\$ 9,250,571.08	\$ 3,108,042.56	\$ 63,762.64	\$ 12,422,376.28
Less: Purchase Power Cost	\$ 4,573,498.41	\$ 1,666,006.06	\$ 35,334.34	\$ 6,274,838.81
Net Revenue	\$ 4,677,072.67	\$ 1,442,036.50	\$ 28,428.30	\$ 6,147,537.47
Average Number of Customers	4,362	1,216	29	5,607
Average Non-Fuel Revenue Per Customer	\$ 1,072.23	\$ 1,185.89	\$ 980.29	\$ 1,096.40
Less: Average Annual Meter Reading and Billing Cost	\$ 114.94	\$ 114.94	\$ 114.94	\$ 114.94
Carrying Cost on Meter, Service, & Transformer	\$ 135.59	\$ 159.05	\$ 144.35	\$ 140.73
Average Net Revenue Per Customer	\$ 821.70	\$ 911.90	\$ 721.00	\$ 840.74
Amount Times Net Revenue Rate will Support	6.87	6.87	6.87	6.87
Amount Times Net Revenue Selected to Ensure Contribution to Fixed Cost	3.00	3.00	3.00	3.00
Cost of Line Extension Provided With No Contribution	\$ 2,465.10	\$ 2,735.69	\$ 2,162.99	\$ 2,522.22

Potential Line Extension Policy

- Customers would receive the meter, transformer, and service drop as a part of standard service
- Extensions of primary would be covered under the line extension policy
- There could be variations of the policy for developers, mobile homes, etc.
- The calculation indicated that Columbia could invest \$6.87 for every dollar of net revenue (revenue less purchased power and fuel cost) it receives from a customer

Potential Line Extension Policy

- Providing the full \$6.87 of investment could mean that some customers would not contribute anything toward Columbia's fixed costs (all revenue would pay for line extension)
- We recommend using some percentage (for example 50%) of the \$6.87 on which to base the policy. This ensures that every customer contributes some amount to the utilities fixed cost

Residential Line Extension Policy Example

- Residential customers would receive \$825 worth of extension free of charge
- Extensions with a cost over \$825 would require the customer to make a contribution for the amount over \$825

Non-Residential Line Extension Policy Example

- Non-Residential customers would receive an extension free of charge up to 3 times their annual net revenue
- 3 times net revenue is equivalent to how the dollar credit for the residential class was determined
- Net revenue is revenue less purchased power and fuel expenses
- Extensions costing more than 3 times a customer's annual net revenue would require a contribution from the customer

Non-Residential Line Extension Policy Example

- Since contributions would be based on revenue estimates, the contribution could be true-up to actual after 3 years

Developers Line Extension Policy Example

- Could require developers to install certain facilities so that the line extension costs per lot is held to \$825 or below
- Could require developers to pay the line extension costs up front and then refund the payment back as each house is occupied
- Could require a letter of credit for the up-front costs

Mobile Homes Line Extension Policy Example

- Many require mobile homes to pay for any extensions up-front and remain at a location for a certain amount of time before some, or all, of the contribution can be refunded

Attachment to Extended Lines

- Many policies will refund a portion, or all, of a customer's contribution when other customers attach to a line where a customer paid a contribution to have it constructed
- Customers can get a refund only during a specified period of time, for example the first 5 or 10 years
- Some policies don't include refund provisions