Columbia Water & Light Electric Line Extension & Electric Connection Policy

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Line Extension Objectives

- Stabilize effect on line extensions expenditures of CWL (Current method requires CWL to make all investments with no charge to customers)
- Simplify implementation process
- Separately identify the connection fee portion charged to new customers
- Help ensure investments made by CWL will not result in higher rates for existing ratepayers

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Summary of Contribution Margin

- Determine value of customer to other ratepayers:
  - All electric rates include a recovery for fixed costs
- Value is reduced by long term impacts on the backbone infrastructure (transmission and substation facilities, Connection Fees)
- The difference is the maximum investments CWL can contribute toward extension of service to a new customer
- This helps ensure new adding a new customer will not result in higher rates for existing ratepayers.

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Summary of Residential Line Extension Analysis

- Residential customers value is $952.
- Customer long-term impact on backbone system is $182.
- In review of 197 extensions to residential customers the average cost was $1,771
- **To simplify the line extension policy a residential customer will be charged $1,000**
- Currently CWL pay all of the line extension costs

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New Residential Charges (Not in Development)

	Residential Homeowner
Estimated Cost to Extend Service	$ 1,771
Contribution by CWL	
Contribution Margin from Residential Customer	$ 952
Less: Connection Fee (Impacts on Backbone Facilities)	$ 182
Maximum CWL Investment	**$ 771**
Net charge to homeowner	$ 1,000

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Summary of Policy in Subdivisions

- CWL will construct extension up to but not within the subdivision
- Developers will be charged for cost to extend services within the subdivision
  - All costs for extension within the subdivision will be charged to developer (Excluding service drops into the homes)
  - Costs are reduced by CWL's maximum contribution of $569 times the number of lots
  - Difference are charged to developer
- Homeowner will be charged $200 for the service drop into the home

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Residential/Developer Charges

Contribution Margin for homes in Development	$	551
Plus homeowner Charges		200
Total Contribution Margin	**$**	**751**
Less Connection Charges		182
Net Maximum Contribution by CWL	**$**	**569**

- $551 is the contribution margin for home in a subdivision plus $200 charged to homeowner
- The contribution is reduced by a connection fee of $182 for backbone facilities
- Difference between cost and $569 (maximum investment by CWL) is charged to developer of subdivision

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Summary of Policy

- Small General Service (Commercial)
  - Customer will be charged the greater of the cost of the extension less $110 per kVa of installed transformer capacity or the minimum of $50 times the installed transformer capacity
- Large General Service
  - Customer will be charged the greater of the cost of the extension less $50 per kVa of installed transformer capacity or the minimum of $50 times the installed transformer capacity
- Mixed Use
  - Customer will be charged the greater of the cost of the extension less $96 per kVa of installed transformer capacity or the minimum of $50 times the installed transformer capacity

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Small General Service

Determination of Maximum Investment

Contribution Margin per kVa	$	160.00
Less Connection Fee per kVa		50.00
Maximum CWA Investment per kVa		110.00

- Customer will be charged the **greater** of the cost of the extension less $110 per kVa of installed transformer capacity or the minimum of $50 times the installed transformer capacity

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Small GS Example

Example One Extension charge greater than minimum charge

Example Two Extension charge less than minimum

Large General Service Commercial/Industrial
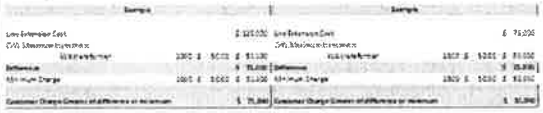
Determination of Maximum Investment

Contribution Margin per kVa	$	100.00
Less Connection Fee per kVa		$0.00
Maximum CWL Investment per kVa		$0.00

- Customer will be charged the greater of the cost of the extension less $50 per kVa of installed transformer capacity or the minimum of $50 times the installed transformer capacity

Large GS Example

Example One **Example Two**



Mixed Use

- Certain extension have anticipated mixed use of residential and general service
- Or a single extension serving multiple residential customers (Apartments)
- For customers with mixed customer charged the greater of:
  - Cost of extension less $96/kVa of installed transformer capacity
  - Or minimum charge of $50/kVa of installed transformer capacity

Mixed Use

Determination of Maximum Investment

Contribution Margin per kVa	$	146.00
Less Connection Fee per kVa		50.00
Maximum CWI Investment per kVa		**96.00**

- Customer will be charged the greater of the cost of the extension less $96 per kVa of installed transformer capacity or the minimum of $50 times the installed transformer capacity

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Mixed Use Example

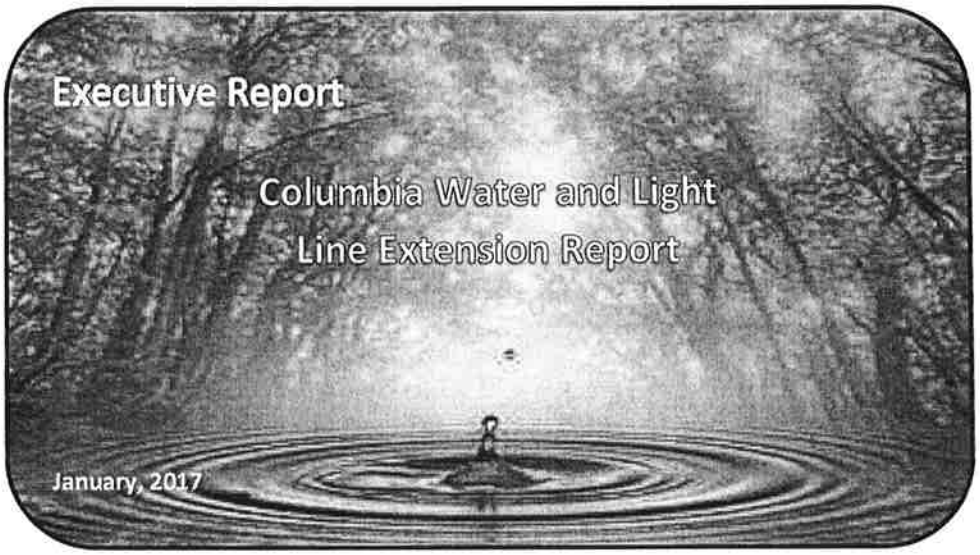
Example One

Gross Extension Cost			$ 25,000
CWI Maximum Investment			
400A 120/240 Meter	200	$ 96.00	$ 19,200
CWI Amount			$ 19,200
Minimum Charge	200	$ 50.00	$ 10,000
Customer Charge Greater of CWI Amount or Minimum			$ 5,800

Example Two

Gross Extension Cost			$ 18,000
CWI Maximum Investment			
400A 120/240 Meter	200	$ 96.00	$ 19,200
CWI Amount			$ 18,000
Minimum Charge	200	$ 50.00	$ 10,000
Customer Charge Greater of CWI Amount or Minimum			$ 8,000

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COLUMBIA WATER AND LIGHT
ELECTRIC LINE EXTENSION POLICY

EXECUTIVE SUMMARY

This report is an update of the analysis of the electric line extension policy for customers of Columbia Water and Light (CWL) completed in 2015. Appendix A provides a copy of the 2015 report. This update summarizes the line extension policy and highlights policies by customer type:

- Residential (not in developments)
- Developers
- Small General Service (Commercial
- Large General Service (commercial/Industrial)
- Mixed Use (Apartments etc.)

The modifications to the 2015 Study was to achieve the following objectives:

1. Simplify the implementation of the 2015 study

2. Separate the allowable contribution from connection fees (impacts on the transmission and substation facilities). All calculations separately identify the allowable contribution and is reduced by the impacts on the backbone facilities

3. Identified the maximum investments CWL can contribute toward extension of service to a new customer to help ensure investments will not result in higher rates for existing ratepayers

4. Consideration of State of Missouri laws on line extensions for new customers

The primary purpose of this report is to help ensure growth benefits all customers, not adversely impacting electric rates and is fair to new customers. To determine the utilities maximum contributions toward the extension of services to new customers the analysis identified the fixed costs recovery received by CWL through rates charged to customers. This contribution is used to identify the maximum contribution, the steps to complete the analysis are detailed in Appendix A. The Appendix details

- Identified fixed cost recovery from customers based on new customers rate class and usage of electricity
- Identify the impact new customers have on future construction costs for transmission and substation facilities (Connection Fees)
- Identified the maximum investments CWL can contribute toward extension of service to a new customer to help ensure investments will not result in higher rates for existing ratepayers.

COLUMBIA WATER AND LIGHT
ELECTRIC LINE EXTENSION POLICY

Summary of Policy:

Residential home owners outside of a subdivision will be charged $1,000 per connection.

		Residential Homeowner
Estimated Cost to Extend Service	$	1,771
Contribution by CWL		
Contribution Margin from Residential Customer	$	952
Less: Connection Fee (Impacts on Backbone Facilities)	$	182
Maximum CWL Investment	$	771
Net charge to homeowner	$	1,000

Residential home owners in a subdivision will be charged $200 per connection. CWL will charge subdivision developer the actual cost of extending service to the subdivision less $569 per lot.

General Service Customers:

The determination of extension costs to charge general service customers is based on transformer capacity. Customers will be charged as follows:

1. The greater of the following:
    a. Installed cost less installed transformer capacity in kVA times the investment policy credit
    b. Backbone charges
2. Charges are limited to the actual cost to extend service as consistent with current interpretation of the laws of the State of Missouri

Credit per kVA varies by class of customer. This variation in kVA credit recognizes the service level the customer is served under and the average load characteristics of each rate class.

Small General Service customers will be charged greater of the cost of the extension less $110 per kVA of installed transformer capacity or the minimum of $50 times the installed transformer capacity. If the actual cost of extending service is less than the calculated charge the customer will be charged actual cost.

The following tables provides examples of the Small General Service (SGS) line extension charge.

Example 1 – Line Extension Cost $5,000 installed transformer capacity 25 kVA

Small General Service Example One (25 kVA Transformer)			
Determinants			
Line Extension Cost	A	$	5,000
CWL Max Investment			
kVA * Investment Policy Credit ($110)	B	$	2,750
Backbone Charge			
kVA * Backbone Policy Charges ($50)	C	$	1,250
Cost Less CWL Max Investment (A-B)	D	**$**	**2,250**
Charge:			
Greater of D or C, Maximum of A		$	2,250

Example 2 – Line Extension Cost $2,000 installed transformer capacity 25 kVA

Small General Service Example Two (25 kVA Transformer)			
Determinants			
Line Extension Cost	A	$	2,000
CWL Max Investment			
kVA * Investment Policy Credit ($)	B	$	2,750
Backbone Charge			
kVA * Backbone Policy Charges ($)	C	**$**	**1,250**
Cost Less CWL Max Investment (A-B)	D	$	(750)
Charge:			
Greater of D or C, Maximum of A		$	1,250

Example 3 – Line Extension Cost $1,000 installed transformer capacity 25 kVA

Small General Service Example Three (25 kVA Transformer)			
Determinants			
Line Extension Cost	A	**$**	**1,000**
CWL Max Investment			
kVA * Investment Policy Credit ($)	B	$	2,750
Backbone Charge			
kVA * Backbone Policy Charges ($)	C	$	1,250
Cost Less CWL Max Investment (A-B)	D	$	(1,750)
Charge:			
Greater of D or C, Maximum of A		$	1,000

Large General Service customers will be charged the greater of the cost of the extension less $50 per kVa of installed transformer capacity or the minimum of $50 times the installed transformer capacity. If the actual cost of extending service is less than the calculated charge the customer will be charged actual cost. The following tables provides examples of the Large General Service (LGS) line extension charge.

Example 1 – Line Extension Cost $125,000 installed transformer capacity 1,000 kVA

Large General Service Example One (1000 kVA Transformer)		
Determinants		
Line Extension Cost	A	$ 125,000
CWL Max Investment		
kVA * Investment Policy Credit ($50)	B	$ 50,000
Backbone Charge		
kVA * Backbone Policy Charges ($50)	C	$ 50,000
Cost Less CWL Max Investment (A-B)	D	**$ 75,000**
Charge:		
Greater of D or C, Maximum of A		$ 75,000

Example 2 – Line Extension Cost $75,000 installed transformer capacity 1,000 kVA

Large General Service Example Two (1000 kVA Transformer)		
Determinants		
Line Extension Cost	A	$ 75,000
CWL Max Investment		
kVA * Investment Policy Credit ($)	B	$ 50,000
Backbone Charge		
kVA * Backbone Policy Charges ($)	C	**$ 50,000**
Cost Less CWL Max Investment (A-B)	D	$ 25,000
Charge:		
Greater of D or C, Maximum of A		$ 50,000

Example 3 – Line Extension Cost $25,000 installed transformer capacity 1,000 kVA

Large General Service Example Three (1000 kVA Transformer)		
Determinants		
Line Extension Cost	A	**$ 25,000**
CWL Max Investment		
kVA * Investment Policy Credit ($)	B	$ 50,000
Backbone Charge		
kVA * Backbone Policy Charges ($)	C	$ 50,000
Cost Less CWL Max Investment (A-B)	D	$ (25,000)
Charge:		
Greater of D or C, Maximum of A		$ 25,000

Mixed Use Service Customer will be charged the greater of the cost of the extension less $96 per kVa of installed transformer capacity or the minimum of $50 times the installed transformer capacity. If the actual cost of extending service is less than the calculated charge the customer will be charged actual cost. The following tables provides examples of the Mixed-Use line extension charge.

Example 1 – Line Extension Cost $25,000 installed transformer capacity 200 kVA

Mixed Use Example One (200 kVA Transformer)			
Determinants			
Line Extension Cost	A	**$**	**25,000**
CWL Max Investment			
kVA * Investment Policy Credit ($96)	B	$	19,200
Backbone Charge			
kVA * Backbone Policy Charges ($50)	C	**$**	**10,000**
Cost Less CWL Max Investment (A-B)	D	$	5,800
Charge:			
Greater of D or C, Maximum of A		$	10,000

Example 2 – Line Extension Cost $15,000 installed transformer capacity 200 kVA

Mixed Use Example Two (200 kVA Transformer)			
Determinants			
Line Extension Cost	A	**$**	**15,000**
CWL Max Investment			
kVA * Investment Policy Credit ($)	B	$	19,200
Backbone Charge			
kVA * Backbone Policy Charges ($)	C	**$**	**10,000**
Cost Less CWL Max Investment (A-B)	D	$	(4,200)
Charge:			
Greater of D or C, Maximum of A		$	10,000

Example 3 – Line Extension Cost $5,000 installed transformer capacity 200 kVA

Mixed Use Example Three (200 kVA Transformer)			
Determinants			
Line Extension Cost	A	**$**	**5,000**
CWL Max Investment			
kVA * Investment Policy Credit ($)	B	$	19,200
Backbone Charge			
kVA * Backbone Policy Charges ($)	C	$	10,000
Cost Less CWL Max Investment (A-B)	D	$	(14,200)
Charge:			
Greater of D or C, Maximum of A		$	5,000

Appendix A – 2015 Line Extension Report

COLUMBIA WATER AND LIGHT
ELECTRIC LINE EXTENSION POLICY

EXECUTIVE SUMMARY

This report is an analysis of the electric line extension policy for customers of Columbia Water and Light (CWL). The analysis identifies the maximum contribution CWL should make to connect a customer to its electric facilities. The analysis identifies the value of the customer to the system and the impact on future costs for transmission and substation facilities.

The primary purpose of this report is to help ensure growth benefits all customers, not adversely impact electric rates and is fair to new customers. To determine the utilities maximum contributions toward the extension of services to new customers the analysis identified the fixed costs recovery received by CWL through rates charged to customers. This contribution is used to identify the maximum contribution, the steps to complete this analysis is listed below.

Steps to Complete Analysis

1) Identify revenues from each class
2) Identify variable cost related to power supply and city contributions
3) Determined contribution margins toward fixed cost recovery from each class
4) Convert contribution margin of each customer class to a per kWh or kW basis
5) Identify the impact new customer have on future construction costs for transmission and substation facilities
6) Recommend adjustments to existing electric line extension amounts

Step One - Variable Cost Analysis

The analysis uses the revenues from each customer class and subtracts variable costs to identify the contribution each customer class makes toward the fixed infrastructure costs of the system. Variable costs are identified in table two and the contribution margin formula in table three.

Table One – Variable Costs

Power Supply Expenses
Meter Reading
Billing
Contribution to City for Franchise Fees

Step Two - Contribution Margin Formula

$$\frac{\text{Revenues from Class Less Variable Costs to Service Class}}{\text{Contribution Margin from Class}}$$

Step Three – Determination of Perceived Risks

CWL has risks associated with serving each type of customer and may result in CWL not recovering its initial investment. Perceived risks consist of factors such as bankruptcy, reduction in anticipated usage, and installation of distributed generation. The perceived risk is quantified in the analysis through the recovery period to recover the initial investment. For example: Residential service has limited risk and a seven year recovery is used to determine the maximum contribution, where a commercial account has greater risk such as going out of business and a 5-Year recovery is used.

Step Four - Contribution Margin per Billing Basis (kWh or kW) by Class

Each class's contribution margin is *present valued* for the specified time period that represents the class' perceived risk. (The greater the perceived risk the shorter the time period to recover the costs) The table below shows the maximum investment by rate class.

Average Contribution by Customer Class

Customer Class	Recovery Period (Years)	Utility Investment	
Residential Service	7	$0.0927	per kWh
Residential Service Space Heating	7	$0.1111	per kWh
Residential Heat Pump	7	$0.1053	per kWh
Small General	5	$0.0800	per kWh
Demand Metered Combined	3	$ 12.21	per kW
Developer Contribution	5	$0.0673	per kWh

EXECUTIVE SUMMARY

Step Five – Maximum Investment before Impacts

The maximum investment before subtractions for customer impacts is listed below:

Electric Services			
Residential & Apt. Service	$	952	per customer connection
Residential & Apt. Service Space Hea	$	1,485	per customer connection
Residential & Apt Heat Pump	$	1,967	per customer connection
Small General Service	$	0.0800	per KWh X total annual kWh's
Demand Metered Combined	$	12.21	per KW X total annual kW's
Developer Contribution	$	675	Per Lot
Customer Extension Portion	$	400	In Development, per lot

Residential – The maximum investment for customers was determined by using the contribution margin on a per kWh basis multiplied by the average annual usage for each residential class as listed below:

Customer Class	Average Annual kWh Usage
Residential Service	10,266
Residential Service Space Heating	13,359
Residential Heat Pump	18,684

Small General Service – Usage for each customer in this class can vary substantially and is determined using the contribution on a per kWh basis multiplied by the customer's projected annual usage.

Demand Metered – Usage for customer is determined using the contribution margin on a per kWh basis multiplied by the customer projected annual demand billings.

Developer – Developer contribution is determined using $675 multiplied by the number of lots. Extension from the loop into the customer home is allotted $400.

Impacts on Transmission and Substations

New customers have an impact on future capital investments in transmission and substations of CWL. The gross investment in transmission plant is $31,426,954 and the peak demands for each class from the cost of services study was used to identify the impact on these facilities. The table below is the cost per KW for each new customer.

COLUMBIA WATER AND LIGHT
ELECTRIC LINE EXTENSION POLICY

EXECUTIVE SUMMARY

	Impacts
Gross Investment in Transmission Plant	$ 31,426,954
Peak NCP Demand of System from COS	338,125
Cost per kW of Demand	**$ 92.94**

Rate recovery for Transmission and Substation infrastructure

Rates charged by customers of CWL include a recovery for existing transmission and substation infrastructure. Projected annual recovery on the transmission and substations is $2,061,345 as determined by the 2011 electric cost of service study. The table below is the recovery for each class of customers.

Year	Residential	Small General Service	Large General Service
Revenue from Transmission and Transmission Substations	$ 2,061,345		
Recovery Period			
1	$ 2,061,345	$ 2,061,345	$ 2,061,345
2	2,061,345	2,061,345	2,061,345
3	2,061,345	2,061,345	2,061,345
4	2,061,345	2,061,345	
5	2,061,345	2,061,345	
6	2,061,345		
7	2,061,345		
NPV	12,994,517	10,306,727	6,184,036
Peak NCP Demand of System from COS	338,125	338,125	338,125
Allowable Credit from Rates	**38.43**	**30.48**	**18.29**

The impact of $92.94KW is reduced by the allowable credit listed in the table above. The revised impact per kW is converted to an impact for each residential customer, KWH usage for small general service and demands for large general service customers.

	Residential	Small General Service	Large General Service
Revenue from Rates	38.43	30.48	18.29
Impact Charge per kW	**$ 54.51**	**$ 62.46**	**$ 74.66**
Average Residential kW NCP from COS	3.33		
Average Commerical KWH per KW of NCP		2,660	
Transmission and Transmission Substation Impact	**$ 181.54**	**0.0235**	**$ 6.22**

The impact on the transmission and substation infrastructure is as follows:
Residential $181.54 per home; small commercial is 2.35 cents/KWH and Large General Service is $6.22 per KW of demand.

COLUMBIA WATER AND LIGHT
ELECTRIC LINE EXTENSION POLICY

SIGNIFICANT ASSUMPTIONS

Certain assumptions were used to identify the maximum investment and the impacts on the transmission and substation infrastructure. The 2011 cost of service study was used to complete this analysis.

1) **Revenues for each class** – Based on 2011 cost of service study

2) **Discount Rate (Rate of Return)** –4.66%

3) **Recovery Period:**
   - Residential Service – 7 year recovery
   - Small General Service – 5 year recovery
   - Large General Service – 3 Year recovery

Allowable construction credits established by this policy are listed in the table below:

Customer Class	Allowable Limits	Less Impact	Net Maximum Contribution
Residential & Apt. Service	$ 952	181	$ 771
Residential & Apt. Service Space Heating	$ 1,485	181	$ 1,304
Residential & Apt Heat Pump	$ 1,967	181	$ 1,786
Residential Combined	$ 1,127	181	$ 946
Small General Service	0.0800	0.02348	0.05650
Demand Metered Combined	$ 12.21	$ 6.22	$ 5.99
Developer Contribution	$ 551	181	$ 370

Allowable Limits – Is the net present value of customer's recovery toward fixed costs of the system
Less Impacts – Is the customer's impact on the transmission and sub transmission system
Net Maximum Contribution – Is the maximum allowable investment established in this policy

COLUMBIA WATER AND LIGHT
ELECTRIC LINE EXTENSION POLICY

Proposed Policy

I. Objectives:

To provide a method for use by the Columbia Water and Light to extend electric lines and facilities to serve Applicants that have made a written application for electric service within the retail service area of the Columbia Water and Light.

II. Policy Content:

A. In the event that upgrading, construction, or extension of facilities is required to provide service to the Applicant, Columbia Water and Light will furnish the facilities required and establish a not to exceed utility cost. Costs greater than the allowable construction credit established for the service classification being applied for should make an in-aid-to-construction contribution.

B. The estimated construction investment shall include the costs of materials, equipment, engineering and labor, including administration overheads, fringe benefits, service transformers and metering equipment, needed to complete the construction for service to the Applicant. The estimated construction investment will include a system impact fee and only the non-betterment costs of the construction required to provide service to the Applicant. A non-betterment cost excludes the costs of replacement or addition of facilities solely for the system benefit and at the election of Columbia Water and Light.

C. Where the estimated construction investment exceeds the established allowable construction credit, the Columbia Water and Light will receive from the Applicant an "In-Aid-To-Construction" contribution. The in-aid-to-construction contribution will be determined as the monetary difference of the non-betterment portion of the estimated construction investment less the allowable construction credit established by this policy.

D. The allowable construction credits established by this policy are as follows:

a) The service furnished to a customer of Columbia Water and Light is subject to the following maximum contributions. Costs in excess of the amounts listed below are subject to an in aid to construction contribution from the Applicant.
   a. Residential and apartment service $771 per customer connection
   b. Residential & Apt. Service Space Heating $1,303 per customer connection
   c. Residential & Apt Heat Pump $1,785 per customer connection
   d. Small General Service $0.056 per KWh X annual total kWh
   e. Demand Metered $5.99 per KW X total annual kW
   f. Developer Contribution $371 Per Lot

g. Customer Extension Portion $400 in development, per lot

b) Customers who make connections under this policy are required to sign a Five year contract with the Columbia Water and Light for service under the proposed rate. Customers are not allowed to change rates during the five year period without prior approval of the Columbia Water and Light. The Columbia Water and Light may assess a charge equal to the difference between the amount of time serviced under the rate and the remaining time on the five year contract:

For Example: If the initial cost of connection was $1,500.00, and customers disconnect after four years, the following charge will be assessed:
1/5 times 1,500.00 = $300.00 charge to the customer.

c) Customers with an existing service who are requesting an upgrade of the facilities to serve additional load, the Columbia Water and Light will contribute the following amounts based on the additional (new) load.
(Amount times the estimated annual usage of new load)

A. Residential & Apt Services $0.0751 per annual kWh's of estimated sales
B. Residential and Apt Service Space Heating $.0934 per annual kWh's of estimated sales
C. Residential and Apt Heat Pump $.0876 per annual kWh's of estimated sales
D. Small General Service $.056 per annual kWh's of estimated sales
E. Demand Metered $5.99 per annual kW of estimated sales

d) The Columbia Water and Light will connect facilities up to the metering point of the customer. Costs beyond the metering point are the responsibility of the customer and not subjected to contribution from the Columbia Water and Light.

E. A development period of five (5) years will apply to all extensions which require an in-aid-to-construction contribution. This five year development period will commence with the date service is first supplied to the Applicant. If, during this five year period one or more additional service applications, or an upgrade in use that includes a residence, are requested to be served from the line extension, the in-aid-to-construction contribution will be recalculated to include the additional Applicants or the upgrade in use to a residence. If the recalculated contribution(s) is determined to be less, the Columbia Water and Light will refund the pro-rata difference.

III. Responsibility

A. Columbia City Council shall be responsible for approval with the annual Water & Light Advisory Board review to determine if the policy continues to meet the policy objectives.

Date Adopted: