SILICON VALLEY POWER
CITY OF SANTA CLARA

Fiscal Year 2021/2022

Residential Connection & Commercial Load Development Fee Analysis

Prepared By:
Silicon Valley Power
Fiscal Year 2021/2022

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Introduction

This report provides an analysis of the recommendation for an update to Silicon Valley Power's (SVP's) Connection and Load Development Fees. There are two distinct installation methods under residential connection fees (underground and overhead installations). Only underground connection fees were studied for this analysis. Overhead connection fees are expected to be reviewed in a future study. The distribution and transmission system serve as the backbone to SVP's Bulk Electric System (BES) that transforms and delivers power to customers.

Connection and Load Development Fees are intended to recover costs associated with customers connecting to SVP's distribution and transmission system based on average or typical time and material cost to connect a customer to the BES as well as the impact customers have on SVP's future expansion costs based on the customer's estimated peak demand. The purpose of these fees is to prevent existing customers from experiencing increased electric rates due to capital expenditures directly related to the addition of infrastructure associated with new load increases.

Current Residential Connection and Commercial Load Development Fees

Two fee groups are used when customers connect to SVP's BES.

- Residential Connection Fees are adopted and adjusted annually by an annual cost index identified by the City typically as part of the annual budget process. These fees are charged when connecting to SVP's distribution system for dwelling units and per unit in mobile home parks defined within Section 18.06.010. The fee is based on the type of connection (overhead or underground) and then the type of residential (single family residential versus multiple residential units). The current fees are listed below:

  Residential Connection Fees Effective 07/01/2021

Connection Types	Fee	Unit
Overhead Lines - New Single Family/Residential	$ 1,197.16	Per Lot
Overhead Lines - New Multiple Units	$ 736.24	Per Unit
Underground - New Single Family/Residential	$ 1,764.70	Per Lot
Underground - New Multiple Units/Residential	$ 1,573.68	Per Unit

- For commercial units, a two tier fee was adopted beginning in FY 2018/19. The Commercial Load Development Fee is adjusted annually by an annual cost index identified by the City. This fee is based on the amount of kVA requested from commercial and industrial class customers connecting to SVP's BES. The Current kVA Fee is listed below:

  Commercial Load Development Fees Effective 07/01/2021

kVA Tiers	kVA Fee	Unit
Tier 1: Up to 4,500 kVA	$ 141.63	Per kVA
Tier 2: Greater than 4,500 kVA	$ 240.03	Per kVA

Fee Analysis

In order to increase system capacity, several types of capital projects are required including (1) improvements to the existing system such as transformer upgrades and power line upgrades

(reconductoring), (2) receiving station replacements, and (3) new substations. To determine the costs associated with these improvements, the following were evaluated:

A. Projected Capital Expansions by System Impact Category
B. Projected System Growth
C. Average Costs per kVA (System Impact Category)

A. Projected Capital Expansions by System Impact Category

Costs associated with new load development and connection expenses include Capital Improvement Projects (CIP) necessary to cover distribution and transmission expenses where assets are built, upgraded or replaced to account for growth over the projected life of the asset. In 2021, SVP completed a three-year growth plan strategy that identifies transmission projects needed to expand/enhance capital infrastructure to meet anticipated growth expected by 2031. This analysis includes projects planned from 2021 to 2031 based on that growth plan strategy. These costs are grouped by four system impact categories including:

1. Transmission Projects >=60kV

Transmission Projects >=60kV are designed to increase the available transmission capacity and therefore increase the Load Service Ability (LSA). LSA (measured in Megawatts [MW]) depicts the maximum peak load that SVP's system can provide to its customers. SVP's 2021/2022 Transmission Planning Process (TPP) identified the current LSA at 720MW. The LSA is expected to grow by 370MW for a total of 1,090MW by 2031 after the projects listed in Table 1 are completed. As new development requests are received and evaluated, additional projects may be added and planned projects may be removed within table 1 based on the customer's connection point to SVP's system. These additional projects may be required to serve customers although it may not impact the overall LSA.

In addition to the projects required to increase system capacity, some of the projects identified in the Three-Year Plan are required to replace end of life assets. Therefore, for the projects listed below, a percentage of the cost was allocated to new development based on the additional capacity gained. The amount not applied to new development is recovered from existing customers through customer electric rates or through existing substation agreements.

Table 1: Transmission Projects >=60kV (in 000's)

Transmission >= 60kV Projects*	Total CIP	% Allocated to New Dev	$ Allocated to New Dev
Agnew-FCJ 60kV Line Re-conductor	$ 1,050	44%	$ 464
Fiberglass Substation Upgrades	10,000	17%	1,667
FCJ-NAJ 60kV Line Re-conductor	3,250	44%	1,436
Kifer Receiving Station (KRS) Rebuild	57,700	38%	21,926
KRS/SRS Breaker Replacements	6,000	25%	1,500
NRS 230kV T2 Spare Transformer	17,000	0%	0
NRS 392 Breaker Upgrade	4,250	0%	0
NRS to KRS 115kV Transmission Line	27,100	100%	27,100
NRS Transformer Upgrades	15,000	38%	5,700
NRS-Agnew 60kV Line Re-conductor	2,100	44%	928
NRS-Mission 60kV Line Re-conductor	2,150	49%	1,049

Transmission >= 60kV Projects*	Total CIP	% Allocated to New Dev	$ Allocated to New Dev
Reconfigure Northwest and Center Loops	18,000	100%	18,000
Scott Receiving Station (SRS) Rebuild	63,250	38%	24,035
SRS-Central 60kV Line Re-conductor	2,600	44%	1,149
SRS-Homestead 60kV Line Re-conductor	8,050	44%	3,558
SVP Battery Energy Storage System	3,100	0%	0
Transmission System Reinforcements	32,000	61%	19,400
Walsh-Uranium 60kV Line Re-conductor	2,750	44%	1,215
Total >= 60kV Projects	**$ 275,350**	**47%**	**$ 129,127**

*FCJ = Freedom Circle Junction, NAJ = Norman Avenue Junction, KRS = Kifer Receiving Station, SRS = Scott Receiving Station

2. General Substation Projects

Substations transform power by decreasing voltage from the transmission system to a level appropriate to enter SVP's distribution system. These substation projects have been added to increase the distribution system capacity to allow for new development. Development requests primarily consist of new commercial facilities, mixed use, and residential dwellings. CIP costs include both design, engineering, and construction labor and materials. When all projects are considered, the distribution system capacity is expected to increase by 203.0 MVA with 90.0 MVA to support new development.

Table 2: General Substation Projects (in 000's)

Substation Projects	MVA Increase	Total CIP	% Allocated to New Dev	$ Allocated to New Dev
Fairview 3rd Transformer	31.5	$ 6,000	43%	$ 2,571
Serra 2nd Transformer	63.00	15,500	14%	2,214
Central Bushing Replacement	14.0	200	0%	0
Homestead Rebuild	0.0	17,000	0%	0
Esperanca Substation	94.5	24,000	71%	17,143
Total Substation Projects	**203.0**	**$ 62,700**	**35%**	**$ 21,928**

3. Distribution: 12kV Projects

12kV projects are improvements in SVP's primary distribution system. These improvements include 600amp equipment such as cable, splices, switches, elbows, and capacitor banks. Cost estimates include material and labor to install and connect each customer. Current planned improvements consist of 94.15 MVA in new load. This new load will also flow through to the system category of <12kV projects or the low voltage system. The MVA identified is a combination of customer types including commercial, residential, and mixed use embedded within the New Business Work CIP.

Table 3: Distribution: 12kV Projects (in 000's)

Distribution 12kV Projects	MVA Request	Total CIP	% Allocated to New Dev	$ Allocated to New Dev
New Business Work	94.15	$ 13,881	100%	$ 13,881
Distribution Crossing	0.00	4,000	100%	4,000

Distribution 12kV Projects	MVA Request	Total CIP	% Allocated to New Dev	$ Allocated to New Dev
Rondonovan Reach	0.00	3,500	100%	3,500
Fairview CIP (Substructure)	0.00	1,250	100%	1,250
Patrick Henry (Substructure)	0.00	600	100%	600
Serra Distribution Feeders	0.00	483	50%	242
Mission Feeder Ext – Tasman Dr.	0.00	433	100%	433
3700 El Camino - Gateway Village	0.00	392	100%	392
Fairview Distribution Feeders	0.00	372	100%	372
Palm Sub Feeder – Tasman E	0.00	308	100%	308
Total 12kV Projects	**94.15**	**$ 25,219**	**99%**	**$ 24,978**

4. Distribution: Low Voltage Projects <12kV

The Low Voltage <12kV projects (also referred to as the secondary system) includes infrastructure associated with the 200amp system such as cable and meters and associated parts and materials needed to connect from the primary distribution system to the customer's meter. In addition to material, cost estimates also include the labor to install and connect each customer. Based on estimated new customer requests, an additional 94.15 MVA is expected to be required within the low voltage system. The MVA requested is a combination of customer types including commercial, residential, and mixed use embedded within the New Business Work CIP.

Table 4: Distribution: Low Voltage Projects <12kV (in 000's)

Distribution: Low Voltage Projects < 12kV	MVA Request	Total CIP	% Allocated to New Dev	$ Allocated to New Dev
New Business Work	94.15	$ 9,410	100%	$ 9,410
Distribution Crossing	0.00	0	100%	0
Rondonovan Reach	0.00	0	100%	0
Fairview CIP (Substructure)	0.00	0	100%	0
Patrick Henry (Substructure)	0.00	0	100%	0
Serra Distribution Feeders	0.00	0	50%	0
Mission Feeder Ext – Tasman Dr.	0.00	0	100%	0
3700 El Camino - Gateway Village	0.00	0	100%	0
Fairview Distribution Feeders	0.00	0	100%	0
Palm Sub Feeder – Tasman E	0.00	17	100%	17
Total <12kV Projects	**94.15**	**$ 9,427**	**100%**	**$ 9,427**

B. Projected System Growth

SVP estimated system growth projections are based on projects approved through the City of Santa Clara's Project Clearance Committee (PCC) and negotiations of special facilities agreements or substation agreements with large customers. Table 5 outlines projected residential growth and Commercial/Industrial growth by category and by kVA that is submitted as part of SVP's Transmission Planning Process (TPP) with the California Independent System Operator (CAISO) and California Energy Commission (CEC). This includes projects needed to utilize capacity that is currently available in the system and new growth resulting from projects in the

capital improvement plans depicted in Tables 1 through 4. Table 5 depicts projected residential growth per dwelling unit or household to result in the estimated growth by customer class. The projected residential kVA is estimated based on average residential peak kVA. Due to variation in size of customer connections, kVA demand for Commercial and Industrial facilities are projected based on the installed service panel rating at the customer's location, substation agreement, or load ramp provided by the customer to SVP during the annual load forecast process.

Table 5: Projected Growth by kVA

Fee Type	Units	Demand	kVA
Underground – New Single-Family/Residential	0	4.0	0
Underground – New Multiple Units/Residential (ADU/Apartments/Condos/Townhomes/Mobile)	11,936	3.4	40,582
Commercial Facilities <12kV & 12kV	N/A	1.0	53,568
Commercial Facilities Customer Dedicated 12kV & 60kV	N/A	1.0	370,000
Total	**11,936**		**464,150**

C. Average Costs per kVA (System Impact Category)

SVP has identified four categories of projects to support 'new' customer load requests including upgrades to existing assets. Each category was assigned a kVA level that serves as a measurement for the additional load expected within the distribution system, substation capacity, or LSA increase for transmission projects. Table 6 depicts the average cost per kVA by dividing the assigned CIP costs for new development by the assigned kVA units needed to meet new growth per category. These costs are not embedded in the fees under any existing substation or special facility agreements and all of these costs are expected to be recovered from fees associated with new customer load requests. Where costs of CIP work is included in a customer agreement and anticipated to be recovered from the affected customer directly, that project was eliminated from this analysis. As such, only costs supporting new development that cannot be recovered through an alternate agreement were included in this analysis and in the recommended fees.

Table 6: System Category Average Costs per kVA

System Category	New Dev. Capital Costs	kVA Assigned	Avg. Cost per kVA
1. Transmission Projects >=60kV	$ 129,127,000	370,000	$ 348.99
2. General Substation Projects	21,928,000	90,000	243.64
3. Distribution: 12kV Projects	24,978,000	94,150	265.30
4. Distribution: Low Voltage Projects <12kV	9,427,000	94,150	100.13
Total	**$185,460,000**		

Proposed Fee Structure

Below is a summary of the 'New' proposed Residential Connections and Commercial Load Development Fees. This structure incorporates both existing fee groups listed above in the Current Residential Connection and Commercial Load Development Fees section:

Residential Connection Fees

Residential Connection Fees are applied to dwellings including single-family, accessory units, duplexes, groups, multiple family, and mobile homes [apartments, condos, duplexes, single family homes, townhomes, and mobile homes] as defined within Section 18.06 of the City Code. These fees are intended to recover the typical or average costs of material and labor required by SVP to install and connect to SVP's system. Residential Connection Fees are broken down between connection type such as overhead or underground and further defined as 'Residential Connection/New Single-Family' and 'Residential Connection/New Multiple Units' described below:

1. Overhead Lines – Residential Connection/New Single-Family (Dwellings include: Single-family): The current and proposed fee uses a "per lot" fee structure. The fee is calculated based on average number of kVA units required per dwelling then multiplied by the determined cost per kVA.
2. Overhead Lines – Residential Connection/New Multiple Units (Dwellings include: Accessory Unit, Duplex, Groups, Multiple Family Units [Apartments, Condominiums & Townhouses] and Mobile Home Park): The current and proposed fee uses a "per unit" fee structure and is based on average number of kVA units required per dwelling then multiplied by the determined cost per kVA.
3. Underground – Residential Connection/New Single-Family (Dwellings include: Single-family): The current and proposed fee uses a "per lot" fee structure and is based on average number of kVA units required per dwelling then multiplied by the determined cost per kVA.
4. Underground – Residential Connection/New Multiple Units (Dwellings include: Accessory Unit, Duplex, Groups, Multiple Family Units [Apartments, Condominiums & Townhouses] and Mobile Home Park): The current and proposed fee uses a "per unit" fee structure and is based on average number of kVA units required per dwelling then multiplied by the determined cost per kVA.

Commercial Load Development Fees

Commercial Load Development Fees are applied to commercial and industrial customers. The fees are calculated based on a predetermined amount of kVA requested within certain levels further defined in the following section titled Collection of Fees. These fees are categorized into four different groups that allow for the system average costs within Table 7 to be apportioned according to the type of commercial facility:

1. Commercial Facilities <12kV – For commercial facilities <12kV, the customer takes service at the secondary level and SVP provides the load transformation from the 12kV system to meet customer voltage requirements. The proposed fee is based on the demand established on the installed service panel rating at the customer's location. The customer's fee is determined by taking the calculated kVA value from the customer's service panel and multiplying it by the determined cost per kVA specified in Table 7.
2. Commercial Facilities 12kV – For commercial facilities 12KV, the customer takes service at the primary level and provides their own load transformation directly from the 12kV system. The proposed fee is based on the demand established on the installed service panel rating at the customer's location. The customer's fee is determined by taking the calculated kVA value and multiplying it by the determined cost per kVA specified in Table 7.
3. Commercial Facilities Dedicated 12kV – Commercial Facilities Dedicated 12kV customers have a dedicated substation built to service the customer's facility. The customer executes a Substation agreement with the City and pays all costs of substation construction including design and engineering. Once the substation is constructed, SVP owns and operates the power transformation at the 12kV levelEach special facilities agreement or substation agreement includes a representation of how the customer plans to consume capacity from the system including timing for increases in peak load. The customer's fee is determined by taking the calculated kVA value and multiplying it by the determined cost per kVA as specified in Table 7.

4. Commercial Facilities Dedicated 60kV – Commercial Facilities Dedicated 60kV customers have a dedicated substation built to service the customer's facility. The customer executes a Substation agreement with the City and pays all costs of substation construction including design and engineering. Once the substation is constructed, SVP owns and operates the system to the 60kV level prior to the power transformation. The customer's fee is determined by taking the calculated kVA value and multiplying it by the determined cost per kVA specified in Table 7.

Proposed Fees

Table 7 summarizes all proposed new and updated fees by category. Fees are based on the amounts and calculations described in Table 6 - System Category Average Costs per kVA. This method of calculating the Residential Connection Fee and Load Development Fee allows for an average cost to be applied to residential connection and commercial load development fees based on the costs of the necessary capital infrastructure improvements needed to support increased customer load. System category average costs per kVA from Table 6 were layered in Table 7 below based on the overall system impact. For example, residential fees do not include transmission costs as they have a minimal impact on the overall system. The transmission system has existing capacity that can accommodate 'New' Commercial load at or below 12kV and residential customers. The transmission system is primarily impacted by large customers.

Table 7 – Proposed Fees

Customer Fee	System Category*	kVA per customer	kVA Fee per Unit	Fee**
OH – Res Conn/New Single Fam	N/A	N/A	N/A	$ 1,197.16
OH – Res Conn/New Multiple Fam	N/A	N/A	N/A	$ 736.24
UG – Res Conn/New Single Fam	(2), (3), (4)	4.0	$ 609.07	$ 2,436.28
UG – Res Conn/New Multiple Fam	(2), (3), (4)	3.4	$ 609.07	$ 2,070,84
Com Facilities <12kV	(2), (3), (4)	1.0	$ 609.07	$ 609.07
Com Facilities 12kV	(2), (3)	1.0	$ 508.94	$ 508.94
Com Facilities – Dedicated 12kV***	(1)	1.0	$ 391.85	$ 391.85
Com Facilities – Dedicated 60kV	(1)	1.0	$ 348.99	$ 348.99

*This column references system categories of fees from Table 6 that are applied to each Customer Fee and used to calculate the kVA fee per unit.

**OH/UG Residential Connection fees are Per Lot/Unit while the Commercial Fees are charged per KVA.

*** For this Customer Fee, the cost of one (1) transformer in the amount of $42.86 has been added to the kVA fee per unit. This recovers the cost of the dedicated transformer that the Electric Utility maintains for this customer class.

Summary – Fee Comparison

The following table represent a summary of the proposed fees vs. current fees.

Table 8: Fee Comparison

Customer Type	Proposed Fee	Unit	Current kVA fee	Percent Change

Overhead Lines – Res Conn/New Single Fam	$ 1,197.16	Per Lot	$ 1,197.16	0.00%
Overhead Lines – Res Conn/New Multiple Fam	$ 736.24	Per Unit	$ 736.24	0.00%
Underground – Res Conn/New Single Fam	$ 2,436.28	Per Lot	$ 1,764.70	38.06%
Underground – Res Conn/New Multiple Fam	$ 2,070.84	Per Unit	$ 1,573.68	31.59%
Commercial Facilities <12kV	$ 609.07	Per kVA	$ 141.63	330.04%
Commercial Facilities 12kV	$ 508.94	Per kVA	$ 141.63	259.34%
Commercial Facilities Customer Dedicated 12kV	$ 391.85	Per kVA	$ 240.03	63.25%
Commercial Facilities Customer Dedicated 60kV	$ 348.99	Per kVA	$ 240.03	45.39%

Table 9: Current Load Development Fees – Phased Out

Customer Type	Proposed Fee	Unit	Current kVA fee*	Percent Change
Load Development Fees – Tier 1*	$ 348.99	Per kVA	$ 141.63	146.41%
Load Development Fees – Tier 2*	$ 697.98	Per kVA	$ 240.03	190.79%

*Tier 1 and Tier 2 fees are only used when they are referenced in an executed substation agreement and will be phased out. All other substation agreements will reference the applicable Load Development Fee in Table 8.