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Liberty Utilities

(U 933-E)

2019 General Rate Case

Before the California Public Utilities Commission

Chapter 2: Capital

Tahoe Vista, California
November 30, 2018

Liberty CalPeco-02: Capital

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I.

CAPITAL

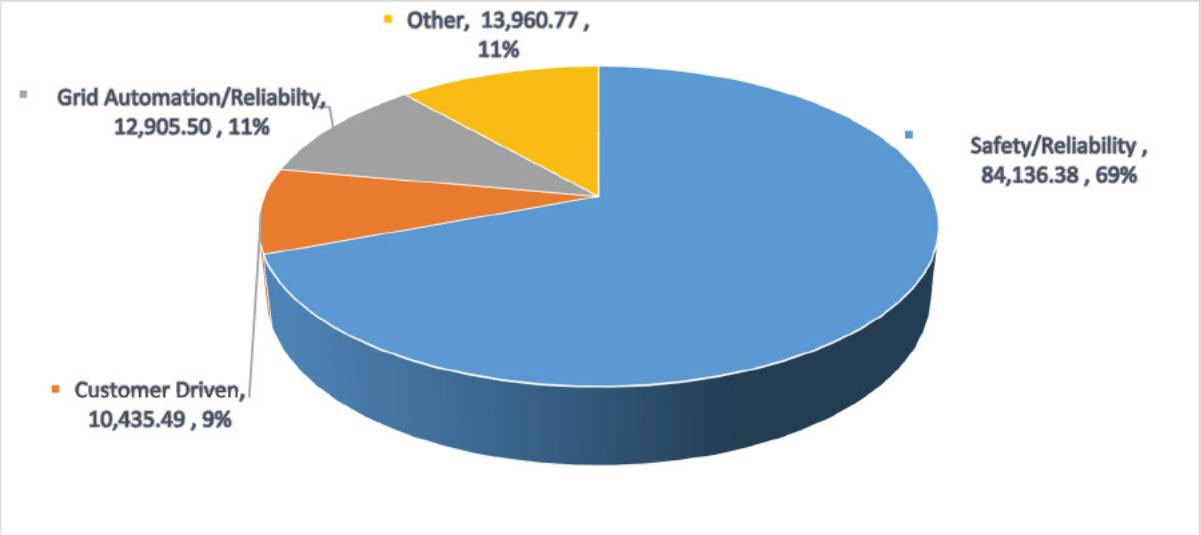
A. Capital Expenditure Overview

Liberty Utilities (CalPeco Electric) LLC ("Liberty CalPeco") plans capital expenditures for much needed improvements of our aging capital infrastructure supporting safe and reliable service to our customers. As discussed in Mr. Travis Johnson's testimony (Chapter 1- Policy), major capital projects focus on safety and reliability of service, including the replacement of aging and failing distribution lines on the 7300 line and Topaz circuits and the construction of back-up battery energy storage required to meet electricity needs in Alpine County in the event of an outage. Grid modernization projects include the Advanced Metering Infrastructure ("AMI") project and the Supervisory Control and Data Acquisition and Transfer of Authority project ("SCADA"). These projects will improve operational efficiency and customer service by enabling remote monitoring of system assets and faster responses to system outages. Planning and prioritizing work efforts is primarily driven by replacements of equipment failures in-service (an example of which is the 625/650 Transmission Rebuild Project described below) which are identified from routine patrolling/maintenance or outage response and major replacement efforts to proactively install new assets to our system (an example of which is the major reconductoring efforts along the Topaz and 7300 lines described in Figure I-1 below).

Liberty CalPeco presents its capital forecast in five major categories: (1) Safety & Reliability, (2) Customer Driven, (3) Grid Automation, (4) Compliance & Safety, and (5) Other.[1]

[1] *See* workpapers for listing of specific projects by category and annual spend.

Figure I-1
Total Capital Expenditures (September 2018-2022)
($000)



B. Safety and Reliability Projects and Programs

Liberty CalPeco's capital forecast reflects our commitment to the safety and reliability of service for our customers, our employees, and the public. Table I-1 below shows the capital forecast for projects driven by this commitment.

Table I-1
Safety and Reliability Projects
$(000)

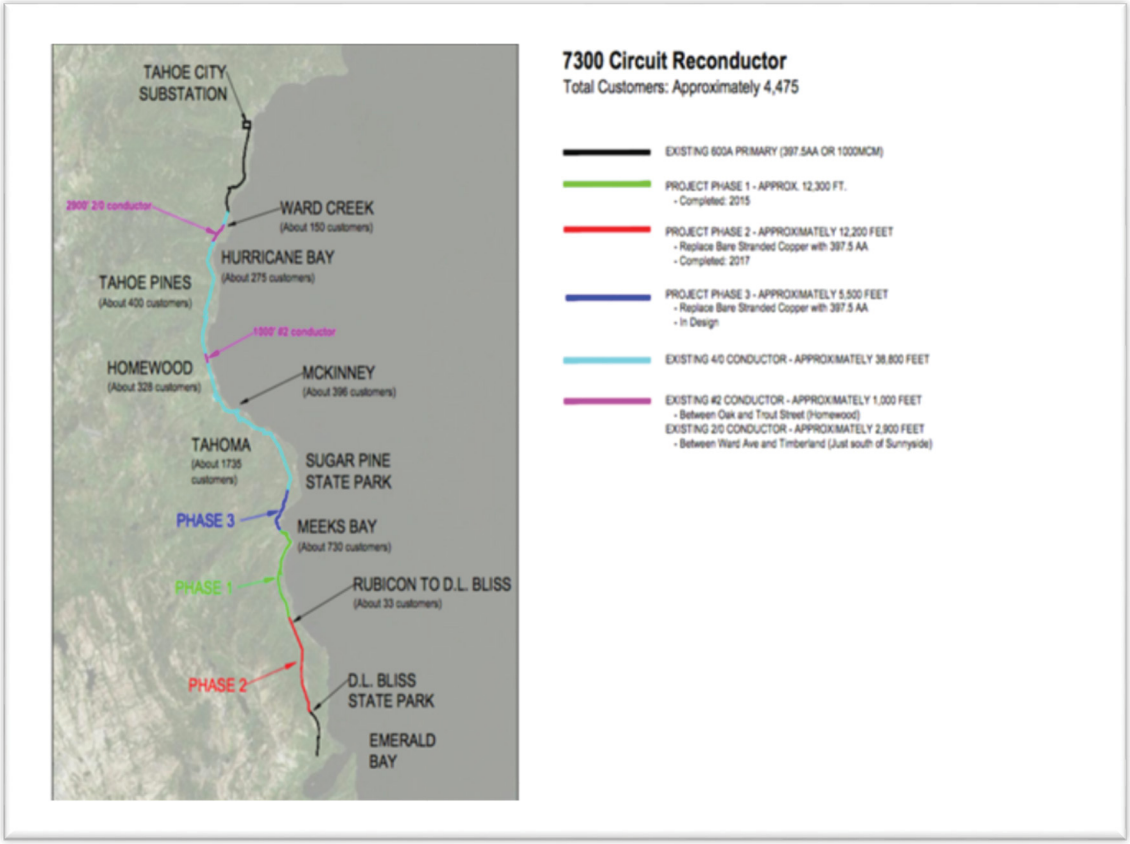
Project #	Project Name	2018	2019	2020	2021
1	7300 Line Reconductor	-	1,700	1,700	1,700
2	Topaz 1261 Reconductor	-	810	810	810
3	625/650	-	-	13,000	-
4	Battery- Alpine	-	8,400	-	-
5	Olympic Microgrid	-	-	18,000	-
6	MHP Conversions	-	854	3,496	1,298
7	Training Center/Back-up Ops	-	-	-	3,300
8	NLT Parking Lot BMP Retrofit	-	1,000	-	-
9	Meyers Sub	1,800	-	-	-
10	Distribution Replacements	50	8,469	8,469	8,469
	Total Safety and Reliability Projects	1,850	21,233	45,475	15,577

1. 7300 Line Rebuild Project

a) Project Overview

The 7300 Line Rebuild project involves reconductoring segments of the 7300 circuit out of Tahoe City Substation from 200A conductor to 600A service. As shown in Figure I-2, the current system route out of Tahoe City Sub runs approximately 15 miles along the west shore of Lake Tahoe and serves approximately 4,500 customers. High winds from extreme storm events caused downed wires and resulted in numerous outages threatening public safety and our customers. The 7300 Line Rebuild project is a long-term replacement effort initiated by NV Energy that replaced the submarine cable across Emerald Bay and reconductored lines to 600A service out of the Meyer's substation to improve system reliability in that region. Liberty CalPeco plans to continue the reconductoring effort northward with construction efforts segmented along the circuit route.

Figure I-2
7300 Circuit Map



b) Project Scope

The 7300 Line Rebuild project includes reconductoring approximately 15,000 feet of overhead lines from Meeks Bay to 600A conductor.[2] This reconductoring will allow for switching customers on the west shore to the 3400 circuit out of Meyers Sub in the event of an outage. Future rate cases will continue reconductoring efforts northward to the North side of Tahoe City. Table I-2 below details the 7300 Line Rebuild project by construction phase.

2 Phase I and Phase 2 of this project were completed in 2015 and 2017, respectively.

Table I-2
7300 Line Rebuild - Deployment Schedule

Construction Phase	Segment Locations	Work	Time-line
Phase 4	Meeks Bay to Tahoma	Construction	Jun-2019 to Oct-2019
Phase 5	Tahoma to Homewood	Permitting	2019
Phase 5	Tahoma to Homewood	Construction	Jun-2020 to Oct-2020
Phase 6	Homewood to Timberland	Permitting	2020
Phase 6	Homewood to Timberland	Construction	Jun-2021 to Oct-2021

c) Project Benefits

The 7300 Line Rebuild project is projected to reduce the outage times (measured by the System Average Interruption Duration Index ("SAIDI")) on the 7300 circuit by gaining the ability to transfer customer load to the 3400 circuit when problems arise. By adding more relay enabled reclosers and modernizing the line with new poles, cross-arms, and hardware, the project allows for improved fault isolation and greater flexibility for power restoration.[3] For our 4,500 customers served by the 7300 circuit, reconductoring lines allows Liberty CalPeco to provide continual service to our customers along this route, even when outages may occur.

d) Capital Cost Forecast

The forecast for the 7300 Line Rebuild project is $1,500,000 per year and includes labor, contract crews, reconductor materials (poles, conductor, insulators), removal, overhead costs, and permitting fees (estimated to be approximately $200,000). Due to the varying terrain, age of poles, permitting

[3] Reconductoring to 397.5 AA wire size, from 4/0 to 2/0, will allow more relay enabled reclosers to be installed on the line. The 7300 circuits currently has a single relay enabled recloser installed due to difficulties of relay coordination between lateral fuses, the single recloser, the substation circuit breaker protection, and substation transformer protection.

constraints, and other challenges unique to each phase, each phase is projected to replace approximately 15,000 feet of conductor.

2. Topaz Line Rebuild Project

a) Project Overview

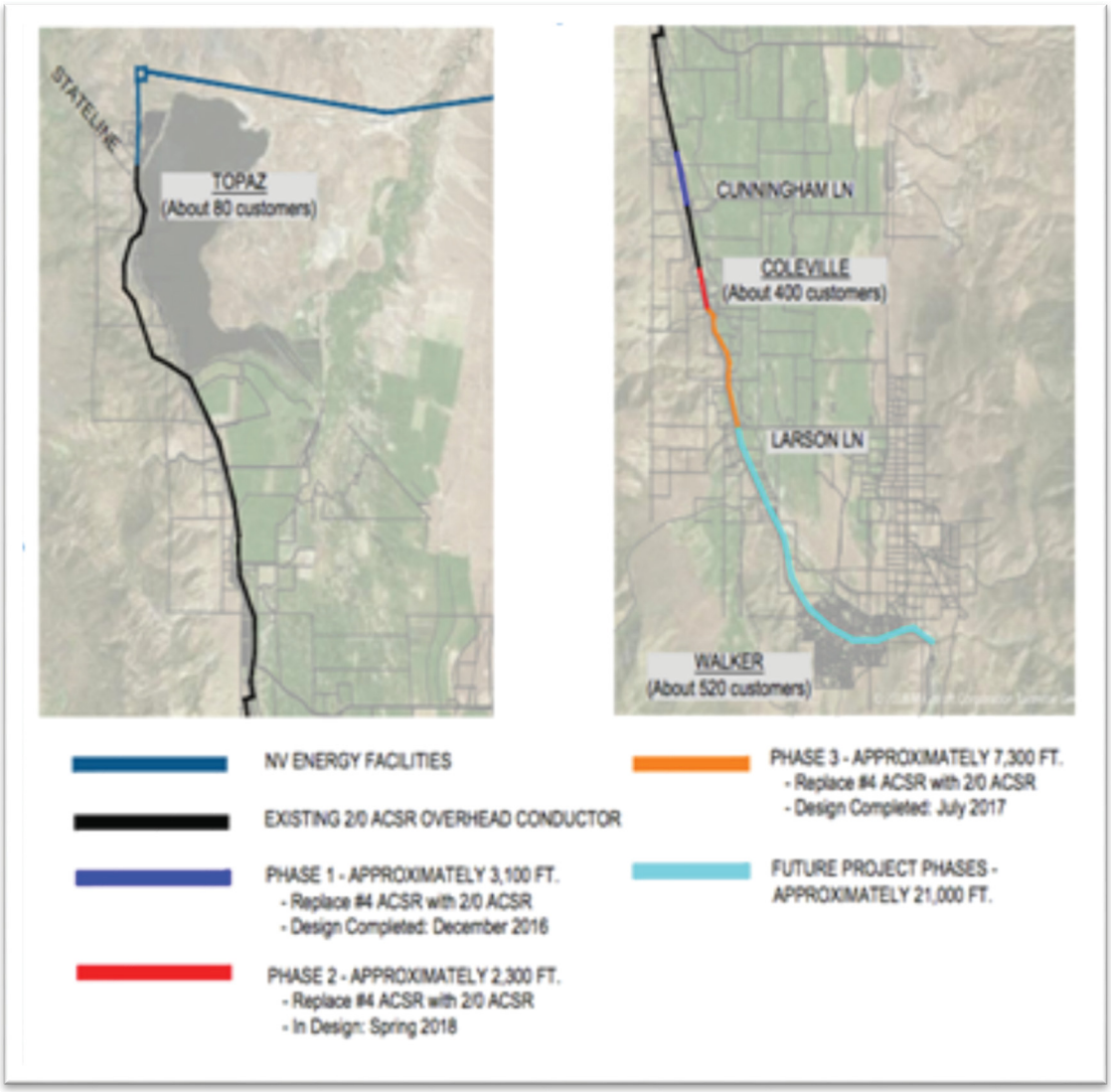
The Topaz Line Rebuild project involves reconductoring segments of the 1261 circuit out of Topaz substation.[4] The 1261 circuit serves load to approximately 480 remote customers in the Antelope Valley communities of Coleville, Walker, and Topaz, including several large cattle ranches.[5] According to the annual reliability reports for 2016 and 2017, the 1261 circuit was the worst performing circuit in Liberty CalPeco's service territory. A thorough modernization effort is needed to improve reliability and capacity as the increase in load has put stress on the circuit with the current configuration of the overhead lines existing #4 Aluminum conductor steel-reinforced ("ACSR") and #6 ACSR conductors. The 1261 circuit is located in an area that frequently experiences high winds and freezing temperatures. Combined with the age of overhead lines, these conditions have caused significant damage to the conductors. Portions of the circuit consisting of #4 ACSR conductor tend to break under the strain of ice and wind and exacerbate the deficiency of proper wire sag between poles causing the lines to be repeatedly spliced back together.

This project is segmented into phases to address the long stretches of the remote terrain. Figure I-3 below shows an aerial map of construction work slated for 2019-2021 (Phases 1-3) and future phases to reconductor the remaining portions of the circuit.

[4] The Topaz circuit was acquired by Liberty CalPeco in 2011 from NV Energy utility company.

[5] Due to the ongoing drought in California, load serving this area has increased with the addition of larger pumps for wells than previously installed on cattle ranches.

Figure I-3
Topaz Circuit Map



b) Project Scope

The Topaz Line Rebuild project involves reconductoring overhead lines from the existing #4 ACSR conductor to our company's standard #2 ACSR conductor. The #2 ACSR conductor is stronger and more reliable and allows for an increase in load serving the area. In addition to reconductoring the lines, the project also installs distribution poles along the circuit route in accordance with General Order

("GO") 95 pole loading standards for "Heavy" and "Grade A" loading areas.[6] The capital expenditures from 2019 to 2021 cover replacement of approximately 7,500 feet of overhead conductors and installation of distribution poles on the Topaz circuit. The deployment schedule for the Topaz Line Rebuild is shown below in Table I-3.

Table I-3
Topaz Line Rebuild - Deployment Schedule

Construction Phase	Segment Locations	Work	Time-line
Phase 3	Coleville to Walker	Construction	2019
Phase 4	Town of Walker	Permitting	2019
Phase 4	Town of Walker	Construction	2020
Phase 5	Larson Ln. and Eastside Ln.	Permitting	2020
Phase 5	Larson Ln. and Eastside Ln.	Construction	2021

c) Project Benefits

This project will increase the reliability of the system serving remote communities in the Antelope Valley (namely, Coleville, Walker, and Topaz), including several large cattle ranches, that have experienced multiple area outages over the years. Reconductoring the 1261 circuit will have a significant impact by modernizing the line with new poles, crossarms, and hardware where necessary and, in turn, reducing SAIDI and System Average Interruption Frequency Index ("SAIFI") metrics. Since the 1261 circuit consists of large sections of smaller size conductor and old poles, rebuilding the line with larger size conductor will strengthen the circuit by improving span lengths and hardening the circuit against the severe winds and extreme cold experienced in the area.

[6] *See* workpapers for company standards and excerpt of GO 95 pole loading standards.

This project will also mitigate the risk of fires sparked from downed wires on the circuit.[7] Current configuration and increased stress on the system has resulted in overhead conductors breaking in mid-span and falling to the ground. Such events have resulted in multiple outages (and at least one fire event) and present a potential hazard to public safety.

d) Capital Cost Forecast

The forecast for the Topaz Line Rebuild project is $750,000 per year for this rate case cycle and includes labor, contractors, reconductor materials (poles, conductor, insulators), removal, overhead costs, and estimated permitting costs (approximately $60,000). As with the 7300 Line Rebuild project, the Topaz Line Rebuild project will proceed in phases over multiple years. Due to the varying terrain, age of poles, permitting constraints, and other challenges that differ between phases, each phase is expected to cover approximately 7,500 feet of line reconductor.

3. 625/650 Line Upgrade Project

a) Project Overview

In A. 10-08-024, Liberty CalPeco requested the California Public Utilities Commission ("CPUC") grant a permit to construct upgrades and improvement to its transmission system in the North Lake Tahoe area (the "625/ 650 Line Upgrade Project"). In D.15-03-020, the CPUC issued a permit to construct Phase 1 of the Project.[8] Liberty CalPeco was also granted permission to construct Phase II subject to verification that the peak load growth on the North Lake Tahoe Transmission System approached 89 megawatts. Liberty CalPeco verified the peak load criteria in Advice Letter 64-E filed in October 17, 2016, including submission of a detailed study conducted by Ascension Power Engineering.[9] At that time, Phase II of the Project was expected to include the upgrade of the three 650 Line substations (North Truckee, Northstar, and Kings Beach) and the decommissioning of the Brockway substation and the re-routing 14.4 kV distribution feeders to the Kings Beach substation.

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[7] The Slinkard Fire was 8,925 acres and originated in Slinkard Valley, just west of Coleville. The cause was a lightning strike on Aug. 29, 2017.

[8] Phase 1 of the Project was completed in 20xx and placed in service.

[9] On October 14, 2016, Liberty CalPeco submitted Advice Letter 64-E providing "verification of [the] load triggers and the attainment of the 89 MW trigger" and requesting the authority to complete the construction of Phase 2 of the Transmission Upgrade Project before the 2017/2018 winter peak load period.

In January 2017, the #2 regulator unit at Brockway Substation suffered a catastrophic failure causing a number of its major components to be inoperable during severe storm activity concurrently with peak loading conditions for the Liberty CalPeco electric system. Liberty CalPeco has remediated the equipment failures sufficient to maintain service out of the Brockway Substation on a temporary basis. However, the Brockway Substation continues to experience reliability issues heightening the risk of longer and more frequent and expansive, outages. As a result, Liberty CalPeco has revised the project scope of Phase II of the 625/650 Line Upgrade Project as described below.

b) Project Scope

The revised project scope of Phase II of the Project includes the expansion of the King's Beach Substation to add (i) two line terminals for the Northstar and Tahoe City transmission lines, (ii) two new substation transformers with regulating provisions, (iii) associated circuit breakers, switches, support structures, foundations, grounding and conduit systems. and (iv) one enclosed switchgear unit serving four distribution feeders and integrating the plant output from the neighboring Kings Beach generation facility.

c) Project Benefits

Phase II of the 625/650 Line Upgrade Project serves a number of key objectives, namely, establishing reliable transformer capacity in the Kings Beach area and allowing for the timely decommissioning of the Brockway Substation. Phrase II will also provide improved switching capability, additional transformer and feeder capacity, and enhanced operational flexibility for the facilities serving Liberty CalPeco's customers in the Kings Beach area. Completion of Phase II will also establish reliable transformer capacity in the Kings Beach area and allow for the timely decommissioning of the Brockway Substation.

a) Capital Cost Forecast

The capital costs for Phase II of the 625/650 Transmission Upgrade project are estimated at $13 million. [10]

[10] *See* workpapers.

4. Alpine Battery Storage

a) Project Overview

Liberty CalPeco plans to install a 2.6 megawatt ("MW")/15 megawatt-hour ("MWh") battery energy storage system ("BESS") in the Alpine County town of Markleeville. Installing a BESS in Alpine County will significantly improve system reliability and safety for our customers served in this region. Liberty CalPeco's Alpine County customers experience longer and more frequent power outages than the average Liberty CalPeco customer because of the rough topography of the Sierra Nevada mountain range and the only source for electric supply for Alpine County is one radial distribution line. With many Alpine County customers at elevations of 5,500 feet or higher sustained outages pose a substantial life safety issue, particularly during cold winter months when electricity for heating is critical. Liberty CalPeco supplies electricity to Alpine County via the 1296 Circuit, a radial distribution line that originates at the Muller substation in NV Energy's service territory. As this is the only line providing power into Alpine County, there is no alternate feed into Alpine County when an outage occurs on this line. Consequently, rather than the typical scenario a Liberty CalPeco customer confronts when the outage persists for only as long as needed to isolate the problem and switch the system around it, the outage time for Alpine County customers will last until repairs are completed. The rough geography of the region and winter snow also significantly impedes Liberty CalPeco's repair efforts, further contributing to extended outage times. The proposed BESS Project addresses this by allowing for restoration of power to Alpine County residents in a more reasonable time frame.

b) Project Scope

Installation of the BESS in Alpine County will provide back-up power to customers for several hours in the event of an outage on the 1296 Circuit. In addition to reducing outage times, the BESS will provide additional benefits, including tariff optimization, system peak shaving, energy shifting, voltage regulation, and demand response.

c) Project Benefits

From 2013 to 2016, Alpine County experienced 32 outages resulting in 4.1 million customer minutes of interruption ("CMI"). Had the BESS been in place during this period, the number of outages would have been significantly reduced from 32 to 6 outages and the corresponding CMI reduction would

have been 1.6 million CMI rather than 4.1 million CMI. During the December 2014 storm event alone, a reduction of 1.2 million CMI would have been achieved had the BEES been in place to avoid the 29-hour outage that occurred during the storm.

Liberty CalPeco's customers on the 1296 Circuit have experienced the fragility of the existing electrical grid over recent winters, with multiple power outages occurring over the course of each winter season. As compared to a fossil fuel based system (*e.g.* diesel generators) to provide back-up for the 1296 Circuit, the proposed BESS Project is less capital intensive, provides a more timely solution, uses more advanced and cleaner technology, and is a more efficient way to fortifying the existing grid When overall demand on the 1296 Circuit is low, surplus grid energy can be fed to the BESS via existing Liberty CalPeco infrastructure. Conversely, when demand is high or the upstream energy source (Muller substation) is interrupted, the BESS can provide essential power to the grid via the 1296 Circuit, thereby reducing grid outages and the negative impacts on Liberty CalPeco customers.

d) Alternatives

Alternatives include building a second transmission line estimated at $8 million to $16 million. However, the prospects of obtaining the necessary permits and authorizations in a timely manner, if at all, is unlikely. Another alternative would be to install diesel generators with costs projected at north of $3 million. While this cost is less than the BESS installation, such generators employ traditional fossil fuel technology and the permitting challenges in the region due to greenhouse gas emissions present a time-consuming, costly and potentially insurmountable obstacle.

e) Capital Cost Forecast

The forecast for the Alpine County BESS is $8.4 million. This includes the battery vendor costs, the cost of work to be performed by Liberty CalPeco personnel to connect the battery to its system, and land lease costs for the BESS site.[11]

[11] *See* workpapers.

5. Olympic Valley Microgrid

a) Project Overview

Liberty CalPeco is planning the installation of a microgrid in Olympic Valley, including an 8MW/32 MWh BESS within a village in nearby Placer County. In the event of a system outage on the 8200 and 8300 lines, this BESS will automatically activate and provide vital back-up power to all Liberty CalPeco customers reliant on those circuits for power. The BESS will provide up to 8 MW of electricity for four hours. In addition to back-up power, this BESS will increase system reliability in the region, provide for the integration of additional renewable energy resources, and allow for system peak shaving, energy shifting, voltage regulation, and demand response.

b) Project Scope

The Project entails the installation of an 8MW/32 MWh BESS comprised of 72 Tesla Powerpack systems (each of which has 210 kWh of energy storage capacity), and 4 Tesla bi-directional inverters. The systems and inverters will be housed in a metal prefab structure and installed on a concrete pad. The structure will mitigate against unauthorized access to, interference with and damage to the battery storage facility. The devices will be electrically connected as a single system before being stepped up to 12.47 kV distribution voltage for interconnection to the Liberty CalPeco grid. The single system will be dispatched and controlled by Liberty CalPeco via a remote controller that will send control commands to the onsite controller.

The electrical system in the village will also be upgraded to interface with the BESS and configured for automatic transfers from the two utility circuits sourcing the village (8200 and 8300 lines) and the batteries located at the top of the mountain. The implementation of smart grid technology via installation of automatic transfer switches (ATS) in the village will improve system reliability for the entire Olympic Valley. The use of ATSs allows the transfers from circuit to circuit or circuit to battery to occur without causing an extended outage or requiring the dispatch of Liberty personnel to perform the transfer.

c) Project Benefits

The Olympic Valley Microgrid project will provide the following benefits to Liberty CalPeco customers:

1. The BESS location site and integration of the microgrid solution will improve service reliability to the residential and business customers in Olympic Valley;
2. The microgrid will provide backup power to Olympic Valley and reliability support assistance, such as voltage support and resiliency during periods, in the event of a service disruptions;
3. The microgrid connection to the transmission domain will allow for storage of excess renewable generation during the day that can be discharged at night during the peak period when solar generation sources are unavailable and grid energy prices escalate;
4. The BESS will reduce CO2 emissions by supporting peak load in place of the diesel generation facility at Kings Beach Station;
5. It will allow for deferral of Phase 3 of the 625/650 Line Upgrade Project;
6. A local business customer, Squaw Valley Alpine Meadows , has agreed to contribute $100,000 annually, to cover future operating expenses and mitigate against the rate impact of the project cost.

d) Alternatives

Liberty Utilities evaluated bringing a third feeder into the Olympic Valley area as an alternative. During an N-1 contingency when either the 8200 or 8300 is lost, the ampacity of the intact circuit will be maxed out during peak loading conditions and cause customers in Olympic Valley to experience an outage. A third feeder into the Olympic Valley would alleviate this contingency and provide increased reliability and capacity to the area. Cost estimate of $3.4 million assumes a spare 6" conduit exists along the path between the substation and the Squaw Valley village on the 8300 circuit.

Another alternative considered was to install a new conduit along the 8300 circuit and new trenching and vaults near the village in order to tie into the existing conduit system going up the mountain. The estimated costs for alternative #2 is $3.4 million.

e) Capital Cost Forecast

The forecast to install the Olympic Valley Microgrid is $16.4 million. This estimate includes the battery vendor costs, Liberty CalPeco work to connect the battery to its system, and the cost to lease the battery site. Table I-4 below breaks down the cost by category.

Table I-4
Olympic Valley Microgrid
($000)

Category	**Cost**
Battery Vendor Costs	$14,400
Liberty CalPeco Scope of Work	$3,530
Land Lease with Squaw Valley Resort (20 yrs)	$20
Total Olympic Valley Microgrid Cost	**$17,950**

f) Battery Vendor Costs

The battery vendor costs of $14.4 million includes the battery itself, full turn-key installation, and a 15-year operation and maintenance agreement for the entire battery system.

g) Liberty CalPeco Scope of Work

The Liberty CalPeco scope of work includes system upgrades, system automation via automatic transfer switches, and line construction. Liberty CalPeco will require system upgrades on the 8200 and 8300 circuits to automate the operation of the battery bank for service restoration during power outage scenarios, voltage regulation, and peak shaving operations. System automation will utilize overhead distribution reclosers/breakers connected through a communications line to a system processor located at the battery bank location. An additional communication link will be established with the system operator control center. The line construction to connect the battery bank to the 12.47 kV distribution system will be made via underground and overhead lines. Expenditures for equipment, engineering, design, permitting, project management and construction are also included.

h) Land

The land lease agreement between Squaw Valley Alpine Meadows and Liberty CalPeco will run twenty years. In February 2018, Squaw Valley Alpine Meadows announced its intention to be powered by 100% renewable energy and has been a proponent of this Olympic Valley Microgrid project from its inception. Squaw Valley Alpine Meadows is (1) offering preferential land lease terms at $1,000 per year for the full 20-year lease term and is (2) providing $242,000 worth of contribution in aid of construction

(i.e. excavation, grading, and installing conduit and water lines to the battery facility, and paying $100,000 per year as a contribution-in-aid of construction for the battery facility).

6. Mobilehome Park Conversions

a) Project Overview

Liberty CalPeco plans to continue its voluntary conversion of electric and gas master-metered service at mobile home parks and manufactured housing communities (collectively, "MHPs") to direct service pursuant to D.14-03-021. These conversions promote service, reliability, and overall safety at the MHPs. Table I-5 shows the MHP conversions planned from 2019 to 2021.

Table I-5
Mobilehome Park - Deployment Schedule

Location	No. of Spaces	Work	Time-line
Heavenly Estates	61	To the Meter & Beyond the Meter	2019
Tahoe Verde	270	To the Meter Work	2019
Tahoe Verde	270	Beyond the Meter Work	2020
Cedar Pines	16	To the Meter & Beyond the Meter	2020
Trails West	52	To the Meter & Beyond the Meter	2021
Truckee Cottages	30	To the Meter & Beyond the Meter	2021

Construction work is classified by "to the meter" and "beyond the meter" work required for each MHP configuration. As with any mobile home park or community conversion, the MHP projects will be coordinated with Southwest Gas and the project schedule can be impacted by factors such as coordination of construction schedules, MHP applications, and availability of contractors.

"To the meter" work includes utility and contracted labor efforts (contractor to install underground conduit, Liberty CalPeco to install cables), purchased services, materials, trenching and paving. Utility labor work includes engineering/design, distribution facility installation, meter setting, service connection, master meter removal and procurement and warehousing of materials.

"Beyond the meter" work includes construction work related to the connection of new service from the meter to the mobile home. This work will be performed by contractors selected by the MHP owner and approved by Liberty CalPeco.

b) Capital Cost Forecast

Liberty CalPeco's forecast is based on the number of spaces at each MHP to convert at the average "to the meter" cost and "beyond the meter" conversion cost. The forecast also includes program management costs (including program outreach and coordination with customers before, during and after construction activities) and related overhead. Table I-6 below shows the estimated MHP conversion costs.

Table I-6
MHP Conversions
$(000)

Project #	MHP Conversions	2019	2020	2021
1	Tahoe Verde	-	3,240	-
2	Cedar Pines	-	256	-
3	Heavenly Estates	854	-	-
4	Trails West	-	-	728
5	Truckee Cottages	-	-	570
		854	**3,496**	**1,298**

Liberty Utilities applied the costs of the two previous MHPs that were converted through the MHP pilot program to come up with an average cost per space. The costs are estimated to range from $12,000 to $19,000 per space.[12] The average costs were determined from a small sample of 56 converted spaces during the pilot project.[13]

[12] *See* workpapers for cost estimate for each MHP conversion.

[13] Coordination with Southwest Gas could also impact construction schedules leading to increases in project costs.

7. Lineman Training Facility/Backup Ops Center

a) Project Overview

Liberty CalPeco plans to locate, develop and build a Lineman Training Center within our service territory. Currently, employees meet with outside vendors or send linemen teams to external training facilities to receive required training related to their fields. This building will provide a full-time training facility for linemen, the substation technical team, and other Liberty CalPeco employees with on-site training that will eliminate the need to additional travel expenses.

This facility will also serve as a back-up emergency operations center, enabling better use of existing facilities that are temporarily seconded during emergency operations activation causing disruption to the employees and work that is handled at those locations.

a) Capital Cost Forecast

Liberty CalPeco forecasts $3.3 million for the Linemen Training Facility and Back-up Operations Center. This estimate includes acquisition of land, building, and purchase and installation of appropriate training support materials and related construction.

8. Distribution Capital Maintenance and Replacements

a) Project Overview

Liberty CalPeco forecasts capital expenditures related to routine replacements based on field inspections and equipment failures and to proactive replacement of distribution assets based on age. The forecast of annual capital expenditures is based on historic average spend. The table below presents our request for distribution asset replacements.

b) Capital Cost Forecast

The capital forecast for distribution capital maintenance and replacements are shown below in Table I-7 for 2019-2021. The forecast is based on an average of recorded costs for these budget line items for expected maintenance and replacements.

Table I-7
Distribution Capital Maintenance & Replacements
($000)

Project #	Project	Annual Forecast (TY's 2019-2021)
1	Pole Replacement per Testing	1,040
2	U/G Failures	553
3	O/H Failures	808
4	Substation Equipment Replacement	924
5	O/H Services	1,525
6	U/G Services	1,358
7	Distribution Rebuilds	2,000
8	Submersible Transformer Replacements	3
9	A-1 Meter Replacements	37
10	Street & Hwy Improvement	221
		8,469

C. Customer Driven

1. Rule 20A Projects

a) Tahoe Vista (Placer County)

(1) Project Overview

The Placer County Board of Supervisors previously issued a resolution that created a Utility Undergrounding District along North Lake Blvd. to underground overhead lines within the District boundaries.[14] In accordance therewith, Liberty CalPeco plans to underground overhead lines along North Lake Blvd (Hwy 28) and National Avenue in North Lake Tahoe using Rule 20A funds allocated to Placer County.

(2) Project Scope

Phase 1 of the project in 2019 includes obtaining necessary permits for the installation of conduit and vault substructures within Caltrans right-of-ways to allow for undergrounding conductors. In 2020, Phase 2 will consist of installation of transformers and underground cables and the modification of private panels from overhead to underground source and associated substructure work. In 2021, the final phase

[14] On January 28, 1992, Placer County established the creation of the Tahoe Vista/Kings Beach Underground Utility Conversion District, Area No. 10 and Area No. 11, Placer County Board of Supervisors Resolution No. 92-32 and 92-33.

of work includes completing installation of private substructure and panel work and removal of overhead facilities. The project forecast for 2021 includes the costs related to the design and permitting for the Tahoe City Rule 20 project in Placer County.

(3) Project Benefits

Rule 20A allocated funds will offset Liberty CalPeco's capital expenditures upon project completion and will serve to benefit the community served by eliminating a high concentration of overhead lines in the area. In addition, this project will be a joint utility project with the phone and cable utilities. Liberty CalPeco is the lead utility for the substructure installation and will be reimbursed by the other utilities for design and permitting costs.

(4) Capital Cost Forecast

As shown in Table I-8 the capital costs for Placer County Rule 20A project is forecast at $6.1 million, of which $3.6 million is for 2019, $2.0 million is for 2020, and $0.5 million is for 2021. The 2019 forecast includes contract labor, purchased services, materials, and trenching and paving costs. The 2020-2021 forecast is based on the price per foot for cable installation and procurement and transformer sets, including utility and contracted labor costs (with the contractor to install conduit and Liberty CalPeco to install cable and transformers), purchased services, materials, trenching and paving. Utility labor costs include engineering/design, distribution facility installation, inspection of substructure, service connections, removal of existing overhead facilities, and the procurement and warehousing of materials.[15]

[15] As this Tahoe Vista Rule 20 project is being coordinated with Southwest Gas there are numerous factors that can impact the program schedule such as coordination of construction schedules, permitting applications, availability of contractors, etc., which can cause costs to rise.

Table I-8
Rule 20A Projects – Placer County
($000)

2019	**Rule 20 - Tahoe Vista**	**$3,600**
	Area 10 & 11 Caltrans Substructure Contractor - *Budget based on Contractor Bid)*	3,300
	Area 10 & 11 Caltrans and LU Inspection Labor – *Estimated labor hours for LU Employee plus night work expenses*	200
	Area 10 & 11 Project Management, Design, Right-of Way - *Estimate of required labor hours*	100
2020	**Rule 20 - Tahoe Vista**	**2,000**
	Area 10 & 11 Caltrans Cabling and Transformers *Price per foot to procure and install cabling and transformers*	1,000
	Area 10 Private Substructure & Panel upgrades *Estimate of required excavation and panel work*	700
	Area 10 Private Cabling - *Estimate of required cable procurement and installation*	170
	Removal - *Estimate of required labor and vehicle hours*	135
2021	**Rule 20 - Tahoe Vista**	**$500**
	Area 11 Private Substructure & Panel upgrades - *Estimate of required excavation and panel work*	350
	Area 11 Private Cabling - *Estimate of required cable procurement and installation*	80
	Removal - *Estimate of required labor and vehicle hours*	70
2021	**Rule 20 - Tahoe City**	**150**
	Design and Permitting - *High level estimate of required labor hour*	150

b) Apache Avenue (El Dorado County)

(1) Project Overview and Scope

On April 3, 2018, El Dorado County established the creation of the Apache Avenue Underground Utility District.[16] The Rule 20A Apache Avenue project will take approximately three years to complete,

[16] El Dorado County Board of Supervisors Resolution No. 042-2018.

with construction work scheduled to begin in 2019 with the installation of substructures within County right-of-ways. In 2020, work continues with the installation of transformers, underground cable, private substructures and panel work, and removal of overhead facilities. In addition to completing work on Apache Avenue, the work in 2021 also includes the preliminary design and permitting of the next Rule 20 project.

(2) Capital Cost Forecast

The forecast for the Rule 20A Apache Avenue project is $1.7 million. The forecast is based on preliminary estimates for substructure installation of a recent Rule 20 project completed in El Dorado county (Pioneer Trail and Sierra Blvd). In 2019, the majority of the work consists of contract labor, purchased services, materials, trenching and paving totaling $750,000. The forecast for 2020 and 2021 of $925,000 covers the installation of transformers and cables including utility and contract labor costs (with contractor to install conduit and Liberty CalPeco install cable and transformers), purchased services, materials, trenching and paving. Utility labor costs include engineering and design, distribution facility installation, inspection of substructure, service connections, removal of existing overhead facilities as well as the procurement and warehousing of materials. Various factors that can impact the program schedule, such as coordination of construction schedules, permitting applications, availability of contractors, may result in actual costs that vary from our forecast.

2. New Service & Claims

a) Project Overview

Liberty CalPeco forecasts new service installations for residential and commercial customers. Claims are for customer-related damages to Liberty CalPeco's assets that need replacement. Our estimated annual capital expenditures are based on historic average spend for new customer services and Claims are presented in Table I-9 below.

Table I-9
New Service & Claims

Project #	Budget Item	Annual Forecast (TY's 2019-2021)
1	Meters New Business	210,110
2	Customer New Business	526,936
3	Claims	141,450
		878,496

D. Grid Automation

1. Supervisory Control and Data Acquisition (SCADA) and Transfer of Authority (TOA) project

a) Project Overview

Liberty CalPeco plans to acquire SCADA and TOA systems for monitoring, dispatch, and control services that are currently provided by NV Energy under a service agreement expiring at the end of 2018.. SCADA gathers and analyzes real time data from remote plant assets where terrain and distance are challenging with human oversight. SCADA allows for system operators to analyze and act on system incidents as reported in real-time. TOA supports our operations logging, outage/work scheduling, field request, coordination, switching, event analysis and reporting.

b) Project Scope

The project scope is to migrate from NV Energy's SCADA solution to a system owned and operating by Liberty CalPeco. Phase I includes assessing our equipment, and developing migration time-lines and the roadmap for delivery. Phase II includes delivery of a working SCADA system with full integration, user training and support for system controls and dispatching independent of NV Energy.

c) Project Benefits

SCADA software provides services necessary to properly having flexibility and exercising control over our distribution lines. The TOA software provides unique numbering system, traceability, approval protocols, and integration with GIS. As it stands, when one of our lines goes out, Liberty CalPeco must deal with delays arising from working through NV Energy's control room operators as those operators are

overseeing other lines and services other than our own. This project will expedite the ability of our field crews to dispatch to customer locales and to identify power outage conditions and communicate results quickly and accurately, especially in storm conditions. In addition, switching power lines, which is dangerous for our field workers, will be standardized and communicated remotely using the industry best practices to enhance worker safety. As described in greater detail below, Liberty CalPeco's acquisition of SCADA and TOA systems will result in lower operations and maintenance ("O&M") costs.

d) Capital Cost Forecast

Based on historic SCADA and TOA implementation costs for affiliated utilities in New Hampshire, Georgia, and other states, and the results of the assessments in Phase One, Phase Two expenditures are forecast at $4,347,000. This will cover labor costs for internal and outside resources to perform all field upgrades and programming and SCADA system integration.

2. Advanced Metering Infrastructure ("AMI") Implementation Phase-in Plan

a) Project Overview

Liberty CalPeco plans to implement AMI in our service territory to better serve our 47,000 customers (41,740 residential and 5,260 commercial). Our request for AMI is consistent with Commission precedent supporting Advanced Metering initiatives for California's major Investor Owned Utilities (IOU's) to increase accuracy of meter reads, provide real-time outage data, and allow for greater control of resource usage.

b) Project Scope

Phase I of the implementation includes the initial design and plans for the installation of the 47,000 meters in our service territory. The remainder of the implementation work will be covered in future GRC Applications and will also address our plan to recover stranded costs of our current undepreciated meter assets.

c) Project Benefits

Benefits of AMI project includes the following:

- Mitigating safety risks to our meter-reading workforce who will no longer have deal with harsh weather conditions and travel to remote areas to access meters.
- AMI allow for faster outage detection and restoration of service.

- We will no longer need to rely on estimated meter reads when weather conditions become severe (including those experienced in January 2017).
- AMI will allow for remote disconnection and reconnection of seasonal customers which will reduce labor costs presently incurred to manually connect or disconnect meters.

d) Capital Cost Forecast

Liberty CalPeco forecasts $9 million for the AMI project. Costs include meters and the installation of communication equipment (routers and antennas) and the installation of back office equipment.

E. Compliance and Safety-Related Capital

1. Tahoe Vista Office Parking Lot Redesign and BMP Retrofit

a) Project Overview

Liberty CalPeco plans to redesign the current parking lot configuration at the Tahoe Vista Office to add parking spaces and storage yard space. The project also includes installing storm water retention devices and landscaping that is required in the Tahoe basin.

b) Project Scope

Phase I of the project includes design and permitting for the parking lot and Best Management Practices retrofit. This will include property surveys, hydrological studies, and impervious coverage calculations. Phase II includes grading and asphalt of the parking and related elements needed to meet regulatory requirements (including those mandated by the Americans with Disabilities Act ("ADA")) and the installation of stormwater retention devices and landscaping.

c) Project Benefits

The existing layout of the parking lot does not facilitate parking for every employee on-site in properly designated areas raising safety concerns. As currently configured, the parking lost is not in compliance with mandates by the Tahoe Regional Planning Agency.

d) Capital Cost Forecast

The capital cost forecast for the Tahoe Vista Office Parking Lot and BMP Retrofit project is provided in Table I-10 below.

Table I-10
Tahoe Vista Parking Lot and BMP Retrofit ($000)
$(000)

Category	Cost
Design and Permitting	$200
Grading and Asphalt	$400
ADA Compliance	$100
Installation of Stormwater Devices	$400
Landscaping	$100
Total	$1,000

F. Other Capital Projects

1. Lake Tahoe Office Building Remodels

a) Project Overview

Liberty CalPeco's regional operating division serving the North Lake Tahoe area has dedicated staff sharing the main office building located at 701 National Avenue, Tahoe Vista. The building, originally constructed in 1965, is a single story reinforced brick building with an attached warehouse housing the local operating division's construction equipment and materials. The South Lake Tahoe Office Building, located at 933 Eloise Ave, South Lake Tahoe, was also constructed in 1965 and consists of a reinforced brick single story building used as warehouse space with attached offices and single story brick buildings constructed for use as a vehicle maintenance building and storage facility. Since the original construction of the North and South Lake Tahoe Office buildings, the offices have undergone modifications to comply with statutory changes and to adapt to the growth in the staff at both locations.

(1) Remodeling at North Lake Tahoe:

The last major remodel occurred in 1993 to build out the warehouse space to accommodate materials necessary to support operations. Between 1993 and 2018, there were minor refurbishments to create office space and cubicle workstations. In 2018, a minor upgrade was performed in certain parts of the building to comply with ADA standards, including the modification of a restroom for accessibility, and to install ballistic glass and walls in the Customer Service area to meet company safety and security guidelines.

(2) Remodeling at South Lake Tahoe:

The last major remodel occurred in 1992 converting old warehouse space into office space for the administrative staff who housed there. Between 1992 and 2018, small changes have been made to create more office space. During 2018, a minor upgrade was performed in certain parts of the building to comply with ADA standards, including the upgrading of the male and female restrooms for accessibility and to install ballistic glass and walls in the Customer Service area to meet company safety and security guidelines. Some minor changes are being made in 2018 to create more working space due to an increase in staffing at the South Lake Tahoe office.

Liberty CalPeco has encountered various challenges related to the original building infrastructure, including heating-ventilation-air conditioning ("HVAC"), cabling, structural, and electrical. As past work was performed in isolated areas of the buildings, Liberty CalPeco could only replace items within its confines, leaving old infrastructure connected to new infrastructure connecting back to old. While this helped mitigate disruption to the rest of the staff and daily operations, this non-traditional method required extra modifications so that the completed area functioned properly, but created issues (specifically, HVAC and plumbing) in other parts of the building.

In 2017, Liberty CalPeco engaged the services of an architectural firm, Ward & Young, to review the building functionality and to provide designs for the 2018 remodel and longer-term plans for a full-scale remodel to accommodate the changing needs of the organization and the staff deployed at the North Lake Tahoe office in addition to the South Lake Tahoe office. Ward & Young provided the following plans for the building remodel.

b) Project Scope at North Lake Tahoe Office Building

- Remodel of the internal layout of the building to better accommodate the personnel based at the office
- Flexible office space to accommodate personnel supporting operations and activities on both sides of Lake Tahoe.
- Redesign of the HVAC system to meet the building's needs
- Installation of shower facilities at the building, and replacement of aging restroom facilities

- Improvements to the aged building exterior to address issues created by pests and weather.

c) Project Scope at South Lake Tahoe Office Building

- Remodel of the internal layout of the building to better accommodate the staff based at the office
- Flexible office space to accommodate personnel supporting operations and activities on both sides of Lake Tahoe.
- Redesign of the HVAC system to meet the building's needs
- Replacement of the aging restroom facilities in the warehouse portion of the building.
- Improvements to the office space in the warehouse portion of the building (enhanced lighting and heating). and
- Improvements to the building exterior to address issues created by pests and weather.

d) Project Benefits

The project will allow the building to meet standards for efficient heating, water and lighting systems and reduce environmental impact. The remodel will also allow Liberty CalPeco to accommodate changes in personnel demands that continue to develop as operations continue to evolve.

e) Capital Cost Forecast

Liberty CalPeco's forecast includes $3.3 million for the North Lake Tahoe Office Building remodel project and $3.3 million for the South Lake Tahoe Office Building remodel project. The forecast is based on Ward & Young architect's original estimate for each building.

2. Fleet

a) Project Overview

Liberty CalPeco maintains a fleet of 128 vehicles and equipment out of its Tahoe Vista, South Lake Tahoe and Portola locations. The fleet is comprised of a mix of vehicles including small SUVs, light to heavy duty trucks, specialized Line trucks, and a wide range of specialized equipment (such as wire/cable reel trailers, snow mobiles, ATVs, Snow Cats, and Back Hoes). The fleet support the construction and maintenance of our electrical system. Based on current fleet replacement criteria, there

are a number of vehicles within the fleet that need to be replaced.[17] The workpapers include information identifying the vehicles needing replacements and the equivalent make and model of the replacement vehicle.[18]

b) Project Benefits

Vehicle replacements in accordance with our criteria, delivers a number of benefits, including:

1) Reduced maintenance cost and reliability;
2) Investments in vehicles with renewable fuel technology (hybrids and renewable diesel) to replace fossil fuel powered vehicles helps meet both the company's and California's drive to shift towards more sustainable fuels;
3) Investments in newer vehicles with greater fuel efficiency due to technological advances in engine design and performance;
4) As part of Liberty Utilities, we are able to take advantage of the national pricing agreements to reduce acquisition costs, obtain improved warranty terms and reduce the overall costs of fleet maintenance and replacement;

c) Capital Cost Forecast

See Table I-11 below for our annual fleet replacement forecast. All costs include sales tax, registration and wrap fee based on the estimated purchase costs.

Table I-11
Fleet Replacements
($000)

Cost Category:	2018	2019	2020	2021
Estimated Replacement Cost	954	1,873	1,276	1,068
Sales Tax	74	145	99	83
Registration Fees	13	18	10	16
Wrap	31	23	20	30
Total	**1,073**	**2,059**	**1,405**	**1,197**

[17] *See* workpapers for fleet retirement conditions.

[18] *See* workpapers for current list of fleet vehicles and equipment and the annual proposed fleet purchase plan for 2018-2021 by vehicle.

3. EV Charge – Transportation Electrification

a) Project Overview

The CPUC approved $2.418 million in transportation electrification capital projects for Liberty CalPeco on September 27, 2018 in D.18-09-034. The projects include installation of DC fast chargers in Liberty CalPeco's service territory and installation of EV bus infrastructure. Liberty CalPeco is including these authorized capital expenditures in its revenue requirement forecast in 2019.

4. Meyers Sub

a) Project Overview

Liberty CalPeco plans to replace the Meyers Sub Control Building due to safety hazards created by the existing substation battery bank and to replace the aging oil circuit breakers inside Meyers Substation. The improvements will create a safe working environment for substation personnel and will improve system reliability by replacing ageing infrastructure. Current working conditions are unsafe. Workers need to reach over the top of an energized substation battery bank in order to perform routine maintenance on the substation relays. All the DC load centers are located on the wall directly behind battery bank, which has a battery rack that protrudes out into the work space approximately 6 feet. In order to operate the breakers in the control panel safely, substation personnel need to currently use an extended stick to manually flip the breakers on and off during routine relay maintenance. The control building does not have adequate ventilation for the lead acid batteries that make up the substations battery bank. Without proper ventilation, hydrogen gas could escape from the batteries and collect on the ceiling where it poses a potential threat of an explosion. There is no barrier between the battery bank and the control panels within the building, if an explosion were to occur, to could cause severe injury to substation personnel as well as equipment. In addition, the oil circuit breakers that feed the following circuits are over 50 years old and need to be replaced:

1. -3100 OCB 2,042 customers
2. -3200 OCB 3,548 customers
3. -3300 OCB 3,587 customers

4. -3400 OCB 3,042 customers

5. -3500 OCB 2,042 customers

Combined these OCB protect approximately 15,853 customers, replacing these OCB's would provide greater reliability for these customers.

b) Capital Cost Forecast

Liberty CalPeco estimates $1.9 million for the Meyers Substation project. See Table I-12 below.

Table I-12
Meyers Sub
$(000)

Category	**Cost**
Labor	$82
Hardware	$1,885
Building Storage	$56
Total	$1,911

Appendix A

Witness Qualifications

LIBERTY UTILITIES (CALPECO ELECTRIC) LLC

QUALIFICATIONS AND PREPARED TESTIMONY

OF JEFF MATTHEWS

Q. Please state your name and business address for the record.

A. My name is Jeff Matthews and my business address is 933 Eloise Avenue, South Lake Tahoe, California 96150.

Q. Briefly describe your present responsibilities at Liberty Utilities (CalPeco Electric) LLC.

A. I am currently the Manager of Engineering and Planning Departments for Liberty Utilities (CalPeco Electric) LLC, ("Liberty CalPeco") and am responsible for overseeing the electric meter operations and substation departments.

Q. Briefly describe your educational and professional background.

A. I have been in the utility industry for over thirty years and held various positions in warehousing, engineering, and planning departments. I have been employed at Liberty CalPeco for eight years.

Q. What is the purpose of your testimony in this proceeding?

A. The purpose of my testimony in this proceeding is to sponsor Chapter 2 – Capital.

Q. Was this material prepared by you or under your supervision?

A. Yes, it was.

Q. Insofar as this material is factual in nature, do you believe it to be correct?

A. Yes, I do.

Q. Insofar as this material is in the nature of opinion or judgement, does it represent your best judgement?

A. Yes, it does.

Q. Does this conclude your qualifications and prepared testimony?

A. Yes, it does.

LIBERTY UTILITIES (CALPECO ELECTRIC) LLC

QUALIFICATIONS AND PREPARED TESTIMONY

OF STUART TIMSON

Q. Please state your name and business address for the record.

A. My name is Stuart Timson and my business address is 701 National Avenue, Tahoe Vista, California 96148.

Q. Briefly describe your present responsibilities at Liberty Utilities (CalPeco Electric) LLC.

A. I am currently the Director, Procurement – West Region which includes Liberty Utilities (CalPeco Electric) LLC, ("Liberty CalPeco") and I am responsible for supporting Liberty CalPeco's procurement, warehouse, fleet and facilities operations.

Q. Briefly describe your educational and professional background.

A. I graduated from the University of Central England, Birmingham (United Kingdom) in 1994 with a Bachelor of Science Degree in Industrial Information Technology. I have held a variety of positions in the Utility Industry at Southern California Edison, Southern California Gas and Liberty, including Category Manager, Supply Chain Manager, Portfolio Manager and Manager of Category Management which encompassed all of Sempra's regulated California Utility procurement requirements, in addition I've worked within Procurement and Supply Chain roles in different industries for over 20 years.

Q. What is the purpose of your testimony in this proceeding?

A. The purpose of my testimony in this proceeding is to sponsor Chapter 2 – Capital.

Q. Was this material prepared by you or under your supervision?

A. Yes, it was.

Q. Insofar as this material is factual in nature, do you believe it to be correct?

A. Yes, I do.

Q. Insofar as this material is in the nature of opinion or judgement, does it represent your best judgement?

A. Yes, it does.

Q. Does this conclude your qualifications and prepared testimony?

A. Yes, it does.