As illustrated in work papers to Schedule 10 and 16, during the period January 2016 through December 2017, SCE forecasts:

- $440 million in ISO-related non-incentive network transmission expenditures (Including $339 million in ISO Blanket expenditures),
- $429 million FERC incentive rate qualified CWIP expenditures, and
- $309 million of FERC direct capital expenditures projected to go into rate base during the upcoming Rate Year (in the period January 2017 through December 2017)

In addition to the numerous but relatively small transmission projects, there are twelve (12) significant transmission projects (each $5 million or greater in ISO-related costs) that are projected to go into rate base during the upcoming Rate Year – seven Blankets (items 1 through 7 below), four non-incentive projects (items 8 through 11), and one incentive project (item 12). Table 1 below provides a summary of forecast FERC-jurisdictional direct capital expenditures for fifteen significant transmission projects that are projected to go into rate base in the period January 2017 through December 2017.

Table 1
FERC Direct Capital Expenditures Projected to Go into Rate Base during Rate Year[1]
($millions)

No.	PIN	Project	FERC CWIP	FERC Non-CWIP	Total
1	3364	Transmission Breakdown Maintenance Planned	0	5.673	5.673
2	3364	Deteriorated Transmission Pole Replacement	0	6.092	6.092
3	4756	Substation Miscellaneous Equipment Additions & Betterment	0	10.982	10.982
4	4211	Bulk Circuit Breaker Replacement Program	0	5.876	5.876
5	5210	Substation Transformer Bank Replacement Program (AA- & A-Bank)	0	15.932	15.932
6	5089	Bulk Power 500kV Line Relay Replacement	0	7.502	7.502
7	7298	Transmission Line Rating Remediation	0	115.846	115.846
8	3138	LADWP DC electrode replacement	0	33.835	33.835
9	6824	La Fresa Substation New MEER Building	0	8.935	8.935
10	7113	El Nido 220/66 kV: Bank on Circuit Breaker Project	0	5.852	5.852
11	7681	Physical Security Enhancement	0	36.953	36.953
12	7650	Whirlwind Substation Expansion	34.782	0	34.782
13	Various	Less than $5m each	0	20.849	20.849
		Total	**34.782**	**274.327**	**309.109**

1. Transmission Breakdown Maintenance Planned (PIN: 3364)

[1] For calculation, see: "WP-Schedule 16-Summary of ISO Capital Expenditures - Non-Incentive Projects" for PINs 3364, 4756, 5210, 5089, 7298, 3138, 6824, 7113, and 7681; also see "WP-Schedule 10-Summary of ISO Capital Expenditures – Incentive Projects" for PIN 7650.

Transmission Breakdown Maintenance Planned Program captures the costs to remove, replace, and retire assets on a programmatic basis. Planned transmission capital maintenance is driven by inspection results. In some instances, field observations lead to specific projects to address emerging issues in a particular grid equipment or structure type. The estimated ISO-related direct capital expenditures for this program that are expected to be operational in the period January through December 2017 are $5.673 million.

2. Deteriorated Pole Replacement (PIN: 3364)

The Deteriorated Pole Replacement Program is an ongoing inspection and maintenance program through which deteriorated wood poles are identified for replacement consistent with CPUC General Orders 95 and 165. GO 95 sets forth the "requirements for overhead line design, construction, and maintenance, the application of which will ensure adequate service and secure safety to persons engaged in the construction, maintenance, operation or use of overhead lines and to the public in general." GO 165 establishes "requirements for electric distribution and transmission facilities… regarding inspections in order to ensure safe and high-quality electrical service." The estimated ISO-related direct capital expenditures for this program that are expected to be operational in the period January through December 2017 are $6.092 million

3. Substation Miscellaneous Equipment Additions & Betterment (PIN: 4756)

Substation Miscellaneous Equipment Additions & Betterment captures the cost to remove, replace, and retire miscellaneous assets on a reactive or programmatic basis. It does not include the costs for preemptive replacement of circuit breakers, substation transformers, substation protection and control systems. Instead, it is predominantly like-for-like replacement of miscellaneous substation equipment with limited engineering. Equipment that is identified as requiring replacement must be replaced in a timely manner because substation equipment failures may lead to prolonged outages, unsafe operating conditions, or more expensive reactive solutions. Example includes the replacement of eight sets of 220 kV disconnects at La Fresa 220/66 kV Substation. The estimated ISO-related direct capital expenditures for this program that are expected to be operational in the period are $10.982 million.

4. Bulk Circuit Breaker Replacement Program (PIN: 4211)

This program is necessary to proactively replace aging 220 kV and 500 kV circuit breakers at substations to enhance transmission system safety and to improve system reliability. This program

also increases the reliability of the ISO transmission grid. The estimated ISO-related capital expenditures for this program that will be operational in 2017 are $5.876 million.

5. Substation Transformer Bank Replacement Program (PIN: 5210)

AA-Bank transformers are located in major substations where they take electricity at the 500 kV transmission level and transform it down to 220 kV. The Substation Infrastructure Replacement ("SIR") program identifies and replaces AA-Bank transformers that are approaching the end of their service lives, that contain parts which are known to be seriously problematic or are no longer available, or that can no longer be cost effectively maintained. The costs of AA-Bank transformer replacement are all under FERC jurisdiction.

A-Bank transformers are located in major substations where they take electricity at the 220 kV transmission level and transform it down to a subtransmission voltage, either 115 kV or 66 kV. The SIR program identifies and replaces A-Bank transformers those are approaching the end of their service lives, that contain parts which are known to be seriously problematic or are no longer available, or that can no longer be cost-effectively maintained.

The consequences of an in-service failure of an A-Bank transformer are highly undesirable. A-Bank transformers typically supply power to large portions of SCE's distribution system servicing hundreds of thousands of customers. While redundancy is built into the A-Bank system, an in-service failure would place the system into an "N-1" condition, wherein a second failure or system disturbance could result in a massive blackout affecting significantly large areas. So severe are the consequences of such a blackout that SCE believes that every reasonable precaution must be taken to prevent it.

Although infrequent, in-service failures of A-Bank transformers can be violent. These transformers are oil-filled and catastrophic failures and ensuing fires can endanger the safety of SCE employees and the operability of nearby equipment. Inspections are extremely helpful in identifying many incipient failures. However, because of the speed at which failure mechanisms can arise and progress, inspections cannot prevent all failures. Therefore, planned preemptive replacements under controlled conditions of transformers clearly approaching the end of their service lives are a prudent and responsible action to minimize the risk of in-service failures.

In summary, the replacement of AA- and A-Bank transformers is managed by the Substation Infrastructure Replacement program which combines engineering analysis and expert judgment to

ensure that the appropriate number of AA- and A-Bank transformers is replaced each year and that those which are replaced are the most risk-significant.

The estimated ISO-related direct capital expenditures for this program that are expected to be operational in the period January through December 2017 are $15.932 million.

6. Bulk Power 500kV Line Relay Replacement (PIN: 5089)

Relays are devices that monitor the currents and voltages for each piece of equipment in substations and actuate circuit breakers should these parameters exceed acceptable limits. Relays in 500 kV and 220 kV substations fall under FERC jurisdiction. The estimated ISO-related direct capital expenditures for this program that are expected to be operational in the period January through December 2017 are $7.502 million.

7. Transmission Line Rating Remediation (PIN: 7298)

SCE has been performing the Transmission Line Rating Study, and has developed a remediation plan to comply with the CPUC General Order No. 95 (G.O. 95) that establishes the rules that overhead electric utility lines and equipment are governed by, effective 1942.

To identify transmission spans that are potentially in violation of G.O. 95 requirements, SCE follows a two-step process:

- First, SCE identifies potential transmission line clearance issues using Light Detection and Ranging (LiDAR) to aerially survey the transmission system; and
- Second, SCE performs site visits to validate that the violation condition still exists and develop remediation plans.

SCE has completed the first step; SCE has performed a LiDAR survey of all of SCE's CAISO-controlled transmission lines for lines built before 2005. Based on the results of the survey, SCE has prioritized the spans that may need line clearance remediation. The prioritization criteria includes line sag when operating at or below 130 degrees Fahrenheit, and potential risk to public safety and system reliability based on location of span, terrain, encroachment type, and extent of deviation from standard.

Currently, SCE has initiated remediation of the inspected line spans that did not meet G.O. 95 requirements. Transmission Line Rating Remediation (TLRR) work includes replacing towers and poles, clearing brush, replacing insulators, removing slack from lines, and other efforts to remediate line clearance issues.

The forecast of TLRR capital expenditures is based on a specific, project-based forecast. The forecast includes the costs for remediation activities, engineering and design work, and materials, by year and by priority level of the work. Most of these costs are FERC jurisdictional. The estimated ISO-related direct capital expenditures for this program that are expected to be operational in the period January through December 2017 are $115.846 million.

8. LADWP DC electrode replacement (Ocean segment) (PIN: 3138)

The purpose of this project is to improve the availability and reliability of the newly upgraded Sylmar Converter Station East, the ground return cables need to be replaced and encased in a separate conduit bank along a new circuit route to the ocean electrodes. The project scope includes replacing the existing underground cables with higher-rated, insulated cables that eliminates oil pressure build-up and rupturing of the external lead sheath. The existing cables carry ground return current to ocean electrodes for the Sylmar High Voltage Direct Current (HVDC) transmission system and they were installed in 1969 when the Pacific DC Intertie ("PDCI") was originally energized at +/- 400 kV, 1800 Amps, and 1440 MW. After several upgrades to the PDCI, there have been no upgrades to the electrode and numerous failures have been sustained. Current operations are at a higher rating of +/- 500 kV, 3100 Amps, and 3100 MW. To replace the underground portion of the PDCI ground return system, project scope includes 7-8 miles of underground line from Kenter Terminal Tower and installation of up to 8 new miles of concrete encased conduit bank and 120,000 feet of new cable. The proposed operating date is November 2017 with estimated ISO-related direct capital expenditures of $33.835 million, which represents SCE's 50% share of the project.

9. La Fresa Substation New MEER Building (PIN: 6824)

This project involves the installation of a new Mechanical Electrical Equipment Room ("MEER") building in addition to the current MEER building, and cutting over the existing protection. The new MEER is the second phase of a prior bank-on-bus to double breaker reconfiguration and 220/66kV transformer upgrade at La Fresa. The new MEER building is necessary to address the aged control building, house the existing substation controls and protection, as well as to accommodate current standard SCE substation automation. The proposed operating date is December 2017 with estimated ISO-related direct capital expenditures of $8.935 million expected to be operational in the period January through December 2017.

10. El Nido 220/66 kV: Bank on Circuit Breaker Project (PIN: 7113)

This project involves conversion of the current bank-on-bus configuration to a double breaker configuration for 220/66 kV transformer banks. Equipping the banks in circuit breakers configuration would ensure compliance with present SCE Line and Bus Criteria. The new double breaker configuration provides greater operational flexibility, simplifies future additions, and minimizes the loss of station capacity during planned outages. The proposed operating date is December 2017 with estimated ISO-related direct capital expenditures of $5.852 million.

11. Physical Security Enhancement (PIN: 7681)

Physical security enhancements for critical substations, including enhanced perimeter and asset protection: block walls, limited ballistic protection, and lighting. The proposed operating date for the specific project is December 2017, with total ISO related direct capital expenditures of $36.953 million.

12. Whirlwind Substation Expansion (PINs: 7650 & 7695)

The transmission facilities that SCE proposed to build as part of the Whirlwind Substation Expansion would provide capacity for an additional 2,000 MW of new generation resources at Whirlwind and include the following: 1) expansion of the Whirlwind 220 kV Switchrack; 2) installation of two additional 500/220 kV AA transformer banks (No.'s 3&4); (3) equipping of 500 kV and 220 kV positions to terminate the two new transformer banks; 4) equipping multiple 220 kV positions to support interconnection of new generation; and 5) use of an SPS.

Installation of the second AA-bank and AA Bank N-1 SPS was completed in 2014. The second AA-bank was labelled No.3 AA bank. During the Rate Year, installation of the third AA bank is scheduled to be completed. The third AA bank will be labeled No.4 AA bank. The addition of the third AA bank will trigger the need to modify the Whirlwind AA Bank N-1 SPS. It will also trigger the need to install two GE N-60 Relays for bank monitoring for the participation in the Whirlwind AA Bank RAS and add the third bank as part of the SPS. The proposed operating date for the third AA bank is February 2017 with estimated ISO-related direct capital expenditures of $34.782 million.

For further details, please see the following work papers: "WP-Schedule 10-Summary of ISO Capital Expenditures - Incentive Projects", "WP-Schedule 16-Summary of ISO Capital Expenditures - Non-Incentive Projects", and "WP-Schedule 10 & 16."