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2011 CTPG Work Plan

Phase 1, Study Process and Assumptions

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1 Executive Summary

1.1 Background

The California Transmission Planning Group (CTPG) is a forum for conducting joint transmission planning studies consistent with Federal Energy Regulatory Commission (FERC) Order 890 principles, and for coordinating CTPG members' transmission planning activities. The CTPG members include both transmission owners and transmission operators and are subject to North American Electric Reliability Corporation (NERC)/Western Electricity Coordinating Council (WECC) transmission planning standards.

In 2010, the CTPG with the assistance of stakeholders developed a statewide transmission plan for consideration by the state Balancing Authority Areas (BAA)'s and other decision makers. The purpose of the 2010 CTPG Study was to develop a state-wide transmission plan that identified the transmission infrastructure needed to reliably and efficiently meet by year 2020, the state's 33% RPS goal. In 2011, the CTPG will continue the study of the state's 2020 transmission infrastructure needs by building upon the work completed in 2010. The CTPG has developed this 2011 Work Plan to engage stakeholders prior to beginning this year's study. The Work Plan is divided into three phases as described below.

1.1.1 Phase 1, Study Process and Assumptions

Phase 1 will consist of developing more detailed study processes and more developed basis for the assumptions used in the transmission planning studies for determining future transmission needs. During the 2010 CTPG process, stakeholders requested that the study processes and assumptions be reviewed and documented prior to conducting further studies. With input from stakeholders, the CTPG has decided to focus on the following study processes and assumptions:

- Determine the 2011 Base Case Approach
- Update the forecasted 2020 renewable energy "Net Short"
- Verify the Modeling of Existing Renewables
- Incorporate Once Through Cooling (OTC) Assumptions
- Review Path Flow Assumptions
- Review Re-dispatch Methodology
- Review Dynamic Stability Study Approach
- Coordinate with the Western Electricity Coordinating Council (WECC) Transmission Expansion Planning Policy Committee (TEPPC)

1.1.2 Phase II, Transmission Planning Studies

In Phase 2, the CTPG will perform transmission planning studies which will reflect the results of CTPG's effort to verify the modeling of existing and under construction renewable generation projects, include renewable resource development portfolios sufficient to meet the state's 33% Renewable Portfolio Standard (RPS) for year 2020, and model scenarios defined by specific sets of system conditions. The study results will be used to refine the determination of the "high

potential" and "medium potential" transmission upgrades as well as identifying upgrades within the previously-identified high potential transmission corridors. Phase 2 will begin on May 19th, 2011 with a CTPG stakeholder meeting. The CTPG will provide stakeholders with a draft work plan for comment prior to beginning Phase 2.

1.1.3 Phase III, 2011 Statewide Transmission Plan

In Phase 3, the CTPG will develop a 2011 Statewide Transmission Plan which will include the 2011 updates of the respective BAA transmission planning processes, lessons learned in 2011, and a proposed CTPG Work Plan for 2012. It is expected Phase 3 will begin in September of this year. A draft work plan will be provided to stakeholders for comment prior to beginning Phase 3.

1.1.4 2011 CTPG Stakeholder Process

As in 2010, the CTPG will continue to conduct a robust stakeholder process throughout its 2011 activities. To that end, the CTPG has implemented two new process improvements. The first process improvement includes receiving input from the CTPG stakeholders prior to the development of any work plan or study plan. The second process improvement includes the opening of the CTPG Executive Committee meetings to interested parties, including public comment to the Executive Committee. The CTPG looks forward to the continued participation of stakeholders.

2 Phase I, Study Processes and Assumptions

2.1 Update Net Short

The state of California Renewable Portfolio Standard (RPS) goal for the year 2020 is 33% of retail electricity sales[1]. The amount of energy from renewable resources that will be needed to meet the state's goal after taking into account existing and under-construction renewable energy generation, and the expected incremental impact of programs to reduce retail load (energy efficiency, demand response, on-site generation) is called the renewable "net short".

In 2010, due to strong input from stakeholders, the CTPG utilized the net short calculated by the Renewable Energy Transmission Initiative (RETI) for the CTPG studies in Phases 2 through 4. The results of these studies ultimately resulted in the CTPG's selection of the "high potential" and "medium potential" transmission upgrades and the "high potential" corridors that will support attainment of California's 33% RPS goal in year 2020. While RETI's methodology was strongly supported, stakeholders have requested that the CTPG update the calculation by incorporating revised assumptions for the forecast reduction in retail loads based on the expected impact of demand reduction programs and self-generation applications (e.g, expected reductions from state programs such as Combined Heating and Power projects, expected

[1] Since retail sales are the basis for establishing goals, personal consumption that is met by on-site generation (self generation) is not subject to the requirements. In addition, certain pumping loads are excluded from the requirements.

behind-the-load- meter distributed generation additions[2] and other potential demand reduction programs).

Based upon current information RETI is expected to be inactive in 2011. However, the California Energy Commission (CEC) is currently considering the states "net short" needs in its 2011 Integrated Energy Policy Report (2011 IEPR). Although the CEC is not expected to complete their 2011 IEPR process until late 2011, the CTPG believes through collaboration with the CEC staff and stakeholders, that an updated renewable "net-short" calculation may be completed for use in the CTPG 2011 study assumptions.

2.1.1 Objective

To engage and collaborate with the appropriate state regulatory agencies and stakeholders for the purpose of obtaining input in the update and/or development of a statewide "net-short" calculation.

2.1.2 Approach

The CTPG will meet with CEC staff to discuss their development of an equation for the calculation of a "net short" or range of "net short" and to obtain expected values for each of the equation variables.

2.2 Verify the Modeling of Existing Renewables

In 2010, the CTPG was encouraged by stakeholders to utilize the net short calculated by RETI for determining how much new renewable energy would be required by 2020 to meet the state's RPS goal after taking into account both existing renewable energy resources and other renewable energy resources. Therefore, an important factor in the calculation of the state's net short and in identifying the system impacts caused by the addition of new renewable resources are the amounts of existing renewables that are assumed to be in commercial operation by the end of 2011, the amounts of distributed generation that will be connected to the distribution system by the end of 2011 (both in-front-of and behind load meters), and whether or not these resources have been accurately reflected in CTPG's adjustments to the WECC 2020 seed case. If these resources operating at their expected simultaneous output for the hour and day of the year being studied are under-or over-represented in the base cases being used in the CTPG transmission studies, the results of CTPG's transmission studies could be called into question.

2.2.1 Objective

The objectives of this effort are to:

- Determine what if any adjustments should be made to the WECC 2020 seed case to accurately reflect the type, amounts, and locations of existing and under-construction renewable energy resources as well as the expected amounts of generation resources connected at the distribution level that are planned to be in-service by the end of 2011, and
- Make specific recommendations regarding the adjustments required to the CTPG base cases to more accurately model such resources.

[2] It is necessary to distinguish between behind-the-load-meter distributed generation additions and in-front-of-the-load meter distributed generation additions since the former additions which use renewable technologies do not count towards California's 33% RPS goals while the latter do.

2.2.2 Approach

The CTPG will review existing databases, such as the CEC Quarterly Fuels and Energy Report (QFER) and CEC staff working papers for the 2012 Integrated Energy Policy Report (IEPR) process, to determine what existing renewable resource facilities have reported in commercial operation for the state up to the end of 2009. CTPG will also review the CEC Renewable Contracts Database to identify those facilities that were completed in 2010 and that are planned to be in-service by the end of 2011. CTPG will also consider available information concerning distribution level generation that is planned to be on-line by the end of 2011, and determine an appropriate way of adjusting the WECC 2020 seed case to include these resources (e.g., reducing forecast loads across some or all of California's load buses). The CTPG will then review the 2020 WECC seed case to determine the extent to which this seed case includes the expected simultaneous energy output from these resources and make recommendations on how the seed case should be adjusted to more accurately depict these energy resources.

2.3 Incorporate Once-Through-Cooling Assumptions

On October 1st, 2010, the State Water Resources Control Board's (SWRCB) "Policy on the Use of Coastal and Estuarine Waters for Power Plant Cooling" (a.k.a. Once-Through Cooling or "OTC") became effective. The policy set a specific compliance date for fossil-fueled OTC plants of December 31, 2020. Nuclear fueled power plants have compliance dates which coincide with the expiration of their respective Nuclear Regulatory Commission licenses.

California has sixteen coastal power plants, excluding Diablo Canyon and San Onofre nuclear power plants that use OTC technology. These plants have a combined capacity of 16,714 MW which includes six plants in northern California (total 5,499 MW), seven plants in southern California (total 8,516 MW), and three plants in the LADWP area (total 2,699 MW). Recent studies by the California ISO and LADWP indicate that, at least for the foreseeable future, much of the OTC capacity in the Los Angeles Basin is likely to be required to maintain local reliability.

Plant owners/operators were required to submit implementation plans on April 1, 2011 to the Statewide Advisory Committee on Cooling Water Intake Structures (SACCWIS). The SACCWIS will review the implementation plans and schedules to ensure deadlines are met, schedules I the above-mentioned policy are realistic, and the policy will not cause disruption to the State's electrical power supply.[3]

The SACCWIS held its first public meeting on April 8, 2011 summarizing the reported intentions of each of the plants. To date, Potrero and South Bay have shut down operation. The remaining 14 plants have submitted implementation plans following one of two tracks for compliance. These 14 plants represent 49 generating units in total. Four of the 49 will shut down without being replaced, 31 are reported to follow Track 1 to re-power, and the final 14 units will follow Track 2.[4]

[3] Statewide Advisory Committee on Cooling Water Intake Structures website: http://www.swrcb.ca.gov/water_issues/programs/ocean/cwa316/saccwis/

[4] http://www.swrcb.ca.gov/water_issues/programs/ocean/cwa316/saccwis/docs/sa_sb_pres040811.pdf

Details of the implementation plans by plant owners and operators have not yet been released by the State Water Control Board. Depending on when a summary of the implementation plans is publicly available, the CTPG hopes to incorporate the implementation plans into the 2011 base case assumptions.

2.3.1 Objective

Determine assumptions to be used in regard to the status of the OTC plants for the 2011 CTPG studies. This will enhance the studies from previous years, by incorporating assumptions regarding OTC units that reflect the recently approved SWRCB policy.

2.3.2 Approach

Most OTC power plants are located in "load pockets" and, as discussed above, much of this capacity is likely to be needed for local reliability purposes. Due to urban development in these areas, it may be difficult to build new transmission facilities to replace the OTC plants to meet reliability requirements for certain local areas. Furthermore, many of the OTC plants have the operating flexibility necessary to integrate intermittent renewable resources onto the system.

The CTPG will review publicly available information on the need for generation within local areas in order to meet applicable local area reliability requirements. This information will include the CAISO's December 30, 2010 report entitled "*2013-2015 Local Capacity Technical Analysis, Report and Study Results*" and similar studies made available by other Balancing Authorities (BAs).

For the CAISO BA, the CTPG will assume that the Local Capacity Requirement (LCR) amounts projected by the CAISO for year 2015 in each of the identified LCR areas, will apply in year 2020. Other BA operators with local reliability requirements will be requested to provide the CTPG with similar assumptions for year 2020.

The CTPG will assume that any OTC generation that is needed to be available[5] to meet local reliability requirements, will be repowered with efficient combined cycle technology. Note that depending on the system condition being simulated (e.g., a summer adverse peak load level versus off-peak load levels) the amount of OTC generation that is actually dispatched in the power flow case may be less than the amount of installed OTC generating capacity that is needed to be available. However, since CTPG will assume that this OTC generating capacity is being repowered with efficient combined cycle technology, it is likely that these units will be simulated at or near maximum output levels in CTPG's pre-renewable power flow bases cases.

The CTPG's starting point pre-renewable power flow base case will model repowered OTC units within each local area, such that the combined dependable installed capacity of all generators within each local area is at least equal to the BAs' projected LCR amounts for those local areas. The simulated output of these repowered OTC units should reflect the system condition being studied and be consistent with the output level of other generators of comparable efficiency.

[5] To be "available," a unit must be capable of being started up and operated at a minimum output level. This does not mean that the unit must actually be running in the power flow case, or that it be running at full capacity in the case; that determination depends on the system condition that is being simulated.

If power flow analysis indicates that the simulated amount of local generation is not adequate to meet local reliability requirements, the output of the repowered OTC units will be increased (not to exceed the existing amount of installed OTC generating capacity) until the local reliability requirements are met. Uncommitted transmission expansion projects will not be included in the starting point base case power flow data base.

When renewables are added to the pre-renewable base cases, fossil-fired generation – including repowered OTC units – will be decremented in economic merit-order subject to any applicable local reliability constraint that would prevent the repowered OTC units from being turned off.

This approach sets a starting point assumption from which the CTPG may choose to conduct sensitivities. As more information becomes available in future years – such as decisions by generation owners to retire existing OTC units without repowering, or to replace the retired OTC capacity on-site with new gas turbines – the CTPG will update its assumptions accordingly.

The CTPG will work with other parties and apply the following approach to existing OTC generation:

1. Diablo Canyon and San Onofre nuclear power plants will be modeled as base-load units and dispatched at rated capacity.

2. A baseline set of transmission expansion assumptions may be necessary in the unlikely event power flow solutions cannot be obtained using the approach described above.[6]

3. The repowered OTC plants will be modeled using publicly available information for recently-constructed combined cycle plants.

2.4 Review Path Flow Assumptions

In 2010, the CTPG included scenarios in Phases 1 through 4 in which the pattern of existing generation within the WECC was dispatched prior to the addition of renewable resources so that selected WECC paths would be loaded near or at their existing WECC path ratings[7] while incurring no reliability violations. The system conditions assumed for the power flow cases *prior to* the addition of new renewable resources may influence which transmission infrastructure additions will prove effective in mitigating reliability criteria violations that may arise after renewable resources are added and corresponding fossil-fired generation decrements made.

Because it is important to recognize the potentially significant reliability impacts from the addition of renewable resources, particularly during times when the level of grid power flows are approaching previously established limits, it is useful for the CTPG to identify transmission infrastructure additions which mitigate those violations. These transmission upgrades represent options that BAA's will consider when deciding how best to accommodate the output of renewable resources while ensuring that load is reliably served under various operating

[6] Power flow solution problems are not anticipated because the studies that estimate the LCR amounts for each local area are generally based on contingency analysis under stressed system conditions.
[7] This practice is known as "stressing" the path.

conditions. The North American Electric Reliability Corporation (NERC) Standards require that system performance must meet requirements over "all demand levels,"[8] and prohibit operating at levels which have not been studied.

Stakeholders have requested that the CTPG determine if the 2010 path flow assumptions that were modeled prior to the addition of new renewable resources are still appropriate for 2011 studies and which existing area generators should be used in stressing each path.

2.4.1 Objective

To establish a CTPG agreed upon approach for path flow assumptions that will be used in the development of CTPG base cases that is both a reasonable approach for providing information to affected BAAs and decision makers and also meets NERC requirements.

2.4.2 Approach

The CTPG will establish criteria for identifying reasonable high stressed simultaneous flow scenario across existing WECC paths prior to the dispatch of identified renewable resources.

The CTPG will contact other WECC BAs, the WECC Transmission Expansion Planning Policy Committee (TEPPC), and other groups knowledgeable about operational constraints in the WECC that require specific generators to be on-line at a minimum output level for certain system conditions. The CTPG will document the results of the outreach effort, in addition to information gathered from CTPG members, for use in (i) adjusting the pre-renewable generation dispatch in the 2020 WECC seed case as described above, and (ii) establishing which generators are eligible for re-dispatch as renewable resources

2.5 Review Re-Dispatch Methodology

In 2010 the CTPG's initial study work, power flow analysis was used to identify reliability criteria violations for a number of different study scenarios. Transmission infrastructure additions that mitigated these violations were then identified.

The CTPG found that it was helpful to use an incremental study approach that began with a power flow case containing existing and under-construction renewables; but not the additional uncommitted renewable resources necessary to meet California's 33% Renewable Portfolio Standard (RPS). Uncommitted renewable resources were added to this pre-renewable power flow case, a corresponding amount of fossil-fired generation decremented ("redispatched"), and the power flow case run to determine whether the changed pattern of generation created any

[8] In practice, transmission planners run cases for those representative demand levels where the most severe problems are expected to occur and use engineering judgment for the rest of the demand levels. The intent is that the system will be reliable under all foreseeable conditions. This practice complies with NERC Standards and Measurements, wherein the Standard states that system performance must be met under "all demand levels" and the Measurement by which this Standard is met shall include "System performance assessments based on simulation testing …. for selected demand levels over the range of forecast system demands." FERC Order 693 requires that "critical system conditions and study years be determined by conducting sensitivity studies with due consideration of the range of factors …"

reliability criteria violations. Transmission infrastructure upgrades that mitigated these new violations were then identified.

To determine which fossil-fired generators to decrement, and the amount of decrement for each of these generators, the CTPG followed an economic merit-order decrementing approach subject to the constraint—in most of the scenarios—that at least 70% of the decrements had to be on generators located within the state of California.[9] In some scenarios, the CTPG also attempted to observe must-run requirements for certain generators that CTPG members designated as critical for maintaining reliability in transmission-constrained load pockets; i.e., these generators were not decremented off-line even though strict application of economic merit-order decrements would indicate that they should be shut-down as renewable resources are added to the grid.[10] The CTPG has also not—to date—attempted to confirm that there will be enough dispatchable generation on-line to supply the integration services necessary to accommodate larger quantities of intermittent generation.

Because the 70% in-state decrementing constraint is arbitrary, recognizing the need for local generation to meet specific local reliability requirements, and considering that the system will require an increasing amount of dispatchable generation over time, stakeholders have asked that the CTPG develop a more objective approach for deciding which generators to decrement and the amount of decrements for those generators.

2.5.1 Objective

T o establish a CTPG agreed upon approach for decrementing ("redispatch") fossil-fired generation when uncommitted renewable resources are dispatched in the CTPG power flow cases.

2.5.2 Approach

To accommodate the output of new renewable resources in the post-renewable power flow cases, the CTPG will use an economic merit-order decrementing approach for dispatchable generators subject to the constraint that enough generation will be available and/or operating in local areas to satisfy applicable local reliability requirements. Generation decrements will be made without regard to the in-state or out-of-state location of the dispatchable generators.

2.6 Determine Base Case Approach

In 201o, the CTPG developed base cases utilizing the Western Electricity Coordinating Council's (WECC) 2019 Heavy Summer (HS) case. A WECC full-loop representation was used that included the Western United States, Western Canada and the system of Comisión Federal de Electricidad (CFE) of Baja California, Mexico. The CTPG modified the WECC 2019 seed case to include certain planned transmission projects that were well along in the project approval

[9] Several scenarios were run without the 70% in-state decrementing constraint.

[10] CTPG has not documented the conditions under which local generators are required to be on line in order to preserve reliability within a local area. Nor has CTPG established a consistent approach for identifying which generators are required to remain on-line and at what level. Finally, CTPG has not confirmed that local reliability requirements are being consistently identified and enforced across the state.

process and removed transmission projects that had been cancelled. In addition, the CTPG updated the California load demand to reflect forecast loads for year 2020.

2.6.1 Objective

To develop base cases that will be a dependable assessment tool for evaluating the potential impact of the renewable resources on California's transmission system in year 2020, the CTPG technical study team will:

- Develop working base cases that accurately represent the system configuration and demand expected in 2020 and the system conditions defined by the selected study scenarios (e.g. season, time of day), and
- Utilize consistent contingency files among the cases to determine any pre-renewable dispatch reliability criteria violations. This will provide a clear starting point for the post-renewable power flow cases.

2.6.2 Approach

In 2011, the CTPG proposes to utilize the 2020 WECC Heavy Summer seed case to represent a 2020 heavy summer condition. The following steps will be used to develop the CTPG foundation case that will be named $CTPG_O$.

1. Ensure that the WECC seed case does not contain thermal overloads that cannot be attributed to local load growth.
2. Ensure that the WECC seed case has the correct 2020 load forecast. If not, the load forecast will be corrected as necessary.
3. Review bulk power voltages to ensure they remain within acceptable operating ranges.
4. Develop consistent contingency files that can be used across any of the base cases developed from the WECC seed case.
5. Review "Summary of Significant System Changes" provided by WECC in the 2020 seed case for transmission projects that have BAA approval. Transmission that does not have that have BA approval will be removed.
6. Identify the transmission projects that have BAA approval but are not in the WECC 2020 seed case. Generally, projects over 100-kVthat have BAA approval will be added to the seed case.
7. Ensure all WECC path flows do not exceed their maximum ratings.

After completion of Phase I, the WECC seed case will be modified to include any identified corrections to the existing renewable generation within the foundation case and the agreed upon approach for modeling the OTC generation. After completing the modification described above, the modified WECC 2020 seed case will be known as the $CTPG_O$ foundation case. All study cases developed as part of the 2011 CTPG Study will be constructed from the $CTPG_O$ foundation case.

2.7 Review Dynamic Stability Study Approach

Dynamic stability analysis is an important part of any transmission plan. By performing dynamic stability studies, it can be ensured that the transmission system remains in operating equilibrium, as well as operating in a coordinated fashion through abnormal operating conditions. In addition to ensuring the overall system stability, dynamic stability analysis determines if any criteria violations are expected to occur, such as unacceptable transient voltage deviations or low frequency. Such analysis may also show if any undamped oscillations may occur on the system, or if any generation units are expected to be tripped either for out-of-step conditions, over or under-excitation, or for abnormal voltage or frequency. Dynamic stability analysis also evaluates expected performance of the system load. The study results will show if all the loads remain connected to the system through disturbances, or if any portions of the load may be tripped due to under-voltage or under-frequency. The studies may also show if any loads that are represented by induction motors may cause sustained low voltages due to stalling of the motors. Another aspect of dynamic stability analysis is validation of the equipment modeling, and if there are any errors in the equipment models, they can be revealed and corrected during the studies.

In 2010, the CTPG performed limited dynamic stability studies primarily due to the large number of study cases that were developed and the time constraints of the schedule. In addition, the CTPG experienced some technical challenges in modeling certain renewable generators within existing industry software. Stakeholders have requested that CTPG complete dynamic stability studies in 2011.

2.7.1 Objective

To develop an agreed upon criteria for CTPG to select which power flow study cases will also have dynamic stability studies completed. To also develop or obtain technical solutions for modeling renewable generation within existing industry dynamic stability study software.

2.7.2 Approach

The CTPG Technical Steering Team will review the proposed study cases planned for Phase II, Transmission Studies and determine which study cases provide results that will most influence the CTPG statewide transmission plan. These studies will also be analyzed by CTPG for dynamic stability.

The CTPG will also ask for input from other WECC planning entities and dynamic stability study software companies on technical solutions for modeling renewable generators.

2.8 Coordinate With the WECC Transmission Expansion Planning Policy Committee (TEPPC)

The WECC Transmission Expansion Planning Policy Committee (TEPPC) and its subcommittees were formed by WECC to provide transmission expansion planning coordination and leadership across the Western Interconnection. TEPPC works closely with subregional planning groups, transmission operators, energy agencies and others to facilitate the economic transmission expansion planning across the Western Interconnection. The TEPPC states the

functions performed by the TEPPC complement, but do not replace the responsibilities of the WECC members and stakeholders regarding the planning and development of specific projects.

Each year, the TEPPC develops a study plan with the help of its members and stakeholders, on what transmission system expansion studies they will perform. The program is based on study requests received during the TEPPC's open season request window (November 1st – January 31st). Studies performed by the TEPPC focus on proposed projects that have interconnection-wide implications including high-level assessment of transmission congestion and operational impacts. TEPPC's studies are intended to provide useful insight into transmission expansion needs within the Western Interconnection.

In early 2011, the CTPG was approved by the WECC Board of Directors as a subregional planning group member of TEPPC.

2.8.1 Objective

To obtain information on the planned expansion of the Western Interconnection outside of California to determine its impact on the state transmission system and to provide the TEPPC with a California statewide transmission system plan.

2.8.2 Approach

The CTPG will participate in the TEPPC and its subcommittees (Subregional Coordination Group, Scenario Planning Steering Group) and provide regular input to the TEPPC during its open season window.

3 Other Processes and Assumptions Considered For Study

In addition to the study processes and assumptions described above, the CTPG received requests from stakeholders for the CTPG to consider adding the following process or assumption to the Phase I Work Plan:

- Developing an approach for the consideration of energy storage
- Developing an approach for including benefit cost analysis
- Develop and approach for the phasing of proposed transmission upgrades
- Provide environmental scoring of transmission upgrades

3.1 Energy Storage

At California's 33% Renewable Portfolio Standard (RPS) level, there will be an increased penetration of intermittent generation resources in California which may result in a need for more facilities, such as energy storage facilities, that can provide additional regulation and load following services In addition, energy storage facilities can be used to store energy produced during off-peak hours when market clearing prices for energy are low, and return this energy to the grid (less cycle losses) during on-peak hours when the market clearing prices for energy are higher. The ability to charge energy storage facilities may be particularly useful during periods when Balancing Authority Area (BAA) operators would otherwise run out of generation that can be decremented in order to maintain a load-resource balance ("over-generation" conditions).

Energy storage facilities can also act as alternatives to transmission infrastructure additions in areas where (i) there is more renewable generation capacity than existing transmission capacity (renewable output in excess of the existing transmission capacity can be stored and then discharged during hours when the output of the renewable resources is lower than the existing transmission capacity), and (ii) there is more demand than can be served by existing transmission and existing local generation (energy can be stored during low demand hours and then discharged when demand is at a level that exceeds the combined capability of the existing transmission and existing local generation sources).

There are extensive development activities around the world for various types of energy storage technologies. These development activities are expected to improve the availability and cost-effectiveness of a diverse array of energy storage facilities for electric utility applications.

In 2010, the California State Legislature passed AB 2514 that may mandate California utility companies to use energy storage technologies. The bill requires the California Public Utilities Commission (CPUC), by March 1, 2012, to open a proceeding to consider establishing investor owned utility procurement targets for viable and cost-effective energy storage systems to be achieved by December 31, 2015, and an additional target to be achieved by December 31, 2020. Publicly owned utilities would have comparable requirements, and would be required to develop plans to maximize shifting of electricity use for air-conditioning and refrigeration from peak demand periods to off peak periods.

After review the status of the development of an energy storage plans within the state, the CTPG has decided to defer the development of an energy storage approach until the CPUC, POU's and other responsible entities provide specific plans for complying with the requirements of AB2514.

3.2 Benefit Cost Analysis of Transmission Alternatives

In 2011, stakeholders requested that the CTPG include a benefit cost analysis be included in the CTPG statewide transmission plan. The proposed analysis would compare alternative solutions to identified needs utilizing benefit cost analysis.

After careful review, the CTPG has decided to defer the development of a benefit cost analysis approach to future years and continue to rely on member BAA's to conduct their own analysis utilizing their specific cost data and other criteria.

3.3 Phasing of Proposed Transmission Upgrades

In 2011, stakeholders requested that the CTPG provide a recommended phasing of proposed transmission upgrades in its statewide transmission plan. Some stakeholders believe that it would be of value to recommend which transmission upgrades should have the highest priority for implementation.

The CTPG has maintained that the CTPG statewide transmission plan is a list of transmission system needs rather than specific transmission projects. Furthermore, the transmission upgrades are based upon an assumed renewable resource development plan. The CTPG continues to believe the selection, approval, and prioritization of specific transmission projects should remain with the BAA's.

3.4 Proposed Transmission Upgrades Environmental Scoring

In 2010, at the request of the CTPG, RETI facilitated an environmental review of each transmission upgrades identified by the CTPG. The review was similar to that performed by RETI for the proposed transmission line segments in their Phase 2B Report.

The RETI environmental scoring process was intended to identify the level of potential conflict with known environmental resources along the length of the proposed line segment and the expected complexity of mitigating those conflicts. The methodology also incorporated factors that distinguish between proposed line segments that will utilize existing transmission facilities and/or existing transmission line right-of-way and designated corridors from proposed line segments that will require new right-of-way and/or would not use designated corridors. The higher the environmental score the more perceived environmental conflict and complexity of mitigation. The environmental scoring methodology was not intended to and would not replace a CEQA or NEPA environmental analysis, or suggest whether or not a particular line segment should be constructed.

The CTPG has decided to defer the decision to provide some form of environmental scoring for each of the proposed transmission upgrades until Phase II.

4 Phase I Work Plan Schedule

The CTPG proposes the following schedule for Phase 1, Study Process and Assumptions. The milestones and dates listed below are approximate and are subject to change. The CTPG will send out notices to provide stakeholders with updates. Interested stakeholders are encouraged to join the CTPG mailing list by going to the CTPG website at www.CTPG.us and select the Stakeholders Meeting tab and click on the **Join the CTPG Mailing List** at the top of the page.

Phase I Work Plan Schedule	
Milestone	**Date**
Phase I Stakeholder Meeting	2/28/2011
Executive Meeting to Approve Phase I Scope	4/7/2011
Begin Phase I Work	4/7/2011
Stakeholder Meeting	5/19/2011
Post Phase I Report	6/2/2011
Stakeholder Meeting To Receive Input on Phase I Report	6/14/2011
Receive Stakeholder Comments	6/27/2011
Post Report Final Report	7/11/2011