BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

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Order Instituting Rulemaking to Integrate and Refine Procurement Policies and Consider Long-Term Procurement Plans.	R. 10-05-006 (Filed May 6, 2010)

TRACK 1 OPENING BRIEF OF CALPINE CORPORATION

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TRACK 1 OPENING BRIEF OF CALPINE CORPORATION

Pursuant to the procedural schedule set during the evidentiary hearings,[1] Calpine Corporation ("Calpine") submits this opening brief in support of the adoption of an interim procurement requirement for uncontracted existing resources.[2] As discussed herein, the record demonstrates an immediate need for the California Public Utilities Commission ("Commission") to take steps to ensure the continued availability of uncontracted existing resources while uncertainty regarding long-term renewable integration requirements is resolved. Absent such steps, resources assumed to be available in the renewable integration modeling performed in this proceeding are at risk for economic retirement. Should such resources shut down, substantial amounts of new replacement resources may be necessary to satisfy reliability and renewable integration needs during the planning period at a potentially huge financial cost to ratepayers. Given the consequences, the Commission cannot afford to take a "wait and see" approach.

I. INTRODUCTION

The renewable integration modeling performed to date by the California Independent System Operator Corporation ("CAISO")[3] and jointly by Pacific Gas and Electric Company ("PG&E"), Southern California Edison ("SCE") and San Diego Gas & Electric Company

[1] *See* ALJ Allen, Tr. at 892.

[2] "Uncontracted existing resources" refers to existing resources that are not under contracts to, or owned by, load serving entities ("LSEs").

[3] *See* CAISO/Rothleder, Exh. 2400.

(collectively, the "IOUs")[4] has not conclusively shown that there is a need to add *new* resource capacity to satisfy renewable integration needs through 2020.[5] Specifically, the results of the modeling show a range of need between 0 - 8,200 MW depending on the scenario modeled.[6]

While some uncertainty exists with respect to the need for *new* resources, the record demonstrates the need for *existing* resources to remain available to satisfy flexibility and capacity-related reliability requirements during the planning period. As discussed below, sensitivity studies show that substantial amounts of new replacement resources will be needed to satisfy reliability and renewable integration needs at a potential cost of billions of dollars if existing uncontracted resources shut down. This is the case even in a scenario that does not otherwise show a need for new resources to meet renewable integration requirements.[7]

In the face of this evidence, some parties would have the Commission sit on its hands and defer acting until the CAISO undertakes additional modeling. These parties note that the modeling to date is "inconclusive"[8] and that it would be "premature" for the Commission to act while the CAISO tries to define and develop products and markets for flexible resources needed to integrate renewable generation.[9] These parties, however, miss the point. Ensuring existing resources remain available to satisfy flexibility and capacity-related reliability requirements is necessary precisely because future needs have not yet been conclusively determined.

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[4] *See* Exh. 106, Southern California Edison Company, Pacific Gas and Electric Company, and San Diego Gas & Electric Company System Resource Plan ("Joint IOU Supporting Testimony").

[5] Motion of Settling Parties for Expedited Suspension of Track 1 Schedule, and for Approval of Settlement Agreement, R.10-05-006. Settlement Agreement at 5 (August 30, 2011). Calpine is a party to the Settlement Agreement.

[6] CAISO/Rothleder, Exh. 2400 at 43-44; Joint IOU Supporting Testimony, Exh. 106 at 3-3 (Table 3-1).

[7] Calpine/Barmack, Exh. 601 at 12.

[8] PG&E/Alvarez, Exh. 108 at 3.

[9] SCE/Stern, Exh. 215 at 36-37.

The Utility Reform Network ("TURN") and the CAISO each acknowledge that if existing resources shut down, replacement capacity may be needed during the planning period.[10] TURN and PG&E further admit that neither knows the amount of existing resources needed to support renewable integration at a 33 percent RPS.[11] Failing to ensure the continued availability of existing resources under these circumstances jeopardizes California's ability to meet renewable integration needs.

Current and expected wholesale market conditions do not provide uncontracted existing generation resources with reasonable opportunities to secure sufficient and stable revenue streams to recover going forward costs, including maintenance necessary to ensure availability in the future. As a result, if a procurement mechanism is not adopted in the near term to address this situation, economic retirements should be expected. To avoid such economic retirements, the Commission should direct the IOUs to procure additional flexible resources through intermediate term (3-5 years) solicitations to ensure that existing resources remain available until uncertainty about future need and market rules are resolved.

II. STEPS MUST BE TAKEN TO ENSURE THAT EXISTING RESOURCES REMAIN AVAILABLE UNTIL UNCERTAINTY ABOUT FUTURE NEED IS RESOLVED

A. Uncontracted Existing Resources are at Risk for Economic Retirement

The fundamental economic decision facing uncontracted existing generation resources is not novel or difficult to grasp - if the compensation from the markets available to such generation is not sufficient and stable enough to recover going forward and major maintenance costs, the generation will shut down. As the record shows, current market opportunities provide

[10] *See* TURN/Woodruff, Tr. at 460-461; CAISO/Rothleder, Tr. at 405-406.

[11] TURN/Woodruff, Tr. at 458; PG&E/Strauss, Tr. at 796.

insufficient and unstable compensation to support the continued availability of existing uncontracted generation.

As an initial matter, it is important to understand that there are relatively new, efficient generation resources that are at risk for economic retirement because they do not receive sufficient and stable compensation from the market. These resources were developed in response to electric restructuring beginning in the late 1990's but before the development of the current "hybrid" market. As a result of regulatory changes, existing resources are penalized by current procurement policy and market design which mandates procurement of new resources (both conventional and renewable) outside of the markets available to existing resources.[12]

Specifically, existing generation resources are precluded from participating in long-term resource solicitations. As a result, market opportunities for resources without contracts (or with expiring contracts) are limited to the short-term bilateral market for resource adequacy ("RA") capacity; energy and Ancillary Services ("AS") markets operated by the CAISO; and bilateral contracting opportunities associated primarily with the intermediate-term solicitations for energy, RA, and bundled products.[13] While some generation resources may be able to cobble together an adequate revenue stream from some combination of these mechanisms, there is no certainty that a specific resource can obtain adequate compensation through any of these market mechanisms.

No party has disputed in this proceeding that the compensation available in the RA, energy and AS markets is low and trending downward. The short-term bilateral market for RA capacity generally yields low compensation and RA compensation is expected to drop even lower as the RA market continues to be oversupplied at both the system and local level by an

[12] Calpine/Barmack, Tr at 877-878.

[13] Calpine/Barmack, Exh. 601 at 6.

influx of new resources being developed in response to RPS requirements and the Commission's long-term procurement policies.[14]

The results of the CAISO's Department of Market Monitoring ("DMM") most recent analysis also show that estimates of net revenues for combined cycle gas turbine ("CCGT") units have been declining in recent years. For 2010, net revenues are estimated to be less than one-half of the five year average:[15]

Results of DMM Analysis[16]

Table 2.8 Financial Analysis of new combined cycle unit (2006–2010)

Components	2006		2007		2008		2009		2010	
	NP15	SP15	NP15	SP15	NP15	SP15	NP15	SP15	NP15	SP15
Capacity Factor	63%	75%	69%	76%	74%	81%	57%	57%	67%	74%
DA Energy Revenue ($/kW - yr)	$319.65	$355.32	$369.59	$389.41	$489.17	$505.42	$172.67	$169.61	$137.95	$142.65
RT Energy Revenue ($/kW - yr)	$34.37	$50.02	$36.20	$41.98	$47.41	$51.98	$21.27	$15.50	$34.89	$37.31
A/S Revenue ($/kW – yr)	$1.01	$1.06	$0.37	$0.42	$0.41	$0.42	$0.76	$0.85	$1.01	$1.25
Operating Cost ($/kW - yr)	$279.50	$321.59	$321.86	$337.82	$425.16	$428.39	$154.57	$147.48	$143.25	$145.69
Net Revenue ($/kW – yr)	$75.53	$84.82	$84.30	$95.23	$111.82	$128.25	$40.14	$38.48	$30.60	$35.52
5-yr Average ($/kW – yr)	*$68.48*	*$76.46*								

Going forward, the CAISO projects that net revenues for conventional generation resources could decline even further as additional renewable resources come on-line:

> The combination of increased production of wind and solar energy will lead to displacement of energy from thermal (gas-fired) generation in both the daily off-peak and on-peak hours. Due to this displacement and to simultaneous reduction in market clearing prices, there may be significant reductions in energy market revenues to thermal generation across the operating day in all seasons.[17]

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[14] Calpine/Barmack, Exh. 601 at 6-8.

[15] Calpine/Barmack, Exh. 601 at 9 (*citing* CAISO *Market Issues and Performance Annual Report 2010* at 53.

[16] *See CAISO Market Issues and Performance Annual Report 2010* at 53.

[17] Calpine/Barmack, Exh. 601 at 9 (*quoting* CAISO *Integration of Renewable Resources; Operational Requirements and Generation Fleet Capability at 20% RPS* ("*CAISO 20% RPS Integration Study*") at v (August 31, 2010).

Specifically, the *CAISO 20% RPS Integration Study* found that revenues for a generic CCGT would decline by 16% under a 20% RPS relative to a baseline in which current levels of renewable generation are maintained but not expanded.[18]

While net revenues for conventional resources are expected to drop, reliance on these resources for integrating renewable resources is expected to increase. The CAISO study found that generic CCGTs would be expected to start 35% more frequently compared to the baseline.[19] Increased starts typically result in additional maintenance costs for conventional generation. Thus, the CAISO found that revenues for CCGTs will be declining as cycling and associated costs are increasing.

TURN acknowledges the adverse impact that market design issues have on existing uncontracted generation resources[20] but asks the Commission to ignore these issues and either assume generation owners will continue to operate resources at a loss or, once the economics become insurmountable, sell the resources to the IOUs.[21] TURN's proposed solution is no solution but rather an attempt to leverage a flawed market design to force the "fire sale" of existing generation resources to the IOUs and return California to the days of vertically integrated utilities. If the Commission wants existing uncontracted generation resources to remain available, the Commission should be concerned over the inability of such resources to recover going forward costs from the current markets and take action to address the problem. The Commission should not countenance TURN's belief that a return to vertical integration is a successful outcome.

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[18] Calpine/Barmack, Exh. 601 at 10 (*citing* CAISO 20% RPS Integration Study at 87 (Table 5.4)).

[19] Calpine/Barmack, Exh. 601 at 10 (*citing* CAISO 20% RPS Integration Study at 87 (Table 5.4)).

[20] *See* Woodruff/TURN, Tr. at 466-470.

[21] TURN/Woodruff, Exh. 1505 at 2.

B. If Existing Resources Assumed to be Available in the CAISO and IOU Modeling Shut Down, Substantial Amounts of New Replacement Resources May be Necessary to Satisfy Reliability and Renewable Integration Needs During the Planning Period

The renewable integration modeling performed in this proceeding shows that the flexibility requirements required to integrate renewable generation under a 33% RPS range from 8,200 MW of additional new resources to no need for new resources.[22] Although uncertainty exists with respect to the need for additional *new* resources, the record demonstrates that, under multiple scenarios, new "replacement" resources will be needed should *existing* resources assumed to be available in the CAISO and IOU modeling shut down.

Specifically, sensitivity studies performed by Calpine demonstrate that if existing resources assumed to be available in the CAISO and IOU modeling shut down, substantial amounts of new replacement resources will be necessary to satisfy reliability and renewable integration needs during the planning period. For these sensitivity studies, Calpine removed 3,200 MW of CCGT capacity from two of the renewable integration scenarios modeled by the CAISO. The CCGT units were selected to represent a broader set of existing resources at risk of economic retirement.[23] The CAISO's Trajectory High Load case was used as the baseline case for one of the sensitivities because it reflects a reasonable middle ground in the 0 – 8,200 MW range of "need" identified in the various modeling scenarios. The Trajectory case was used as the baseline case for the second sensitivity because it reflected a scenario where no new resources would be needed.

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[22] *See supra* note 6.

[23] The CCGTs used in the sensitivity studies were selected because some of the units do not currently have contracts and none of the units have contracts that extend beyond 2013 (*i.e.*, they will be exposed to short-term markets in the near future). The units were also selected because they are generally similar to other units (both Calpine and non-Calpine) that were built in the past 10 years and are not under long-term contracts. *See* Calpine/Barmack, Exh. 601 at 5.

Depending on the scenario, the results of the sensitivity studies show that the removal of 3,200 MW of CCGT capacity results in the need for between 1,400 – 2,600 MW of replacement resources at an estimated cost of between $1.68 - $5.52 billion:

Scenario	Existing Uncontracted Resources Assumed Retired	Replacement Resources Needed to Integrate Renewable Generation	Cost of Replacement Resources[24]
Trajectory High Load	3,200 MW	2,600 MW[25]	$3.12 – 5.52 billion
Trajectory	3,200 MW	1,400 MW	$1.68 - 2.97 billion

While the sensitivity studies do not identify the precise quantity of uncontracted existing resources necessary to reliably integrate renewable generation under all scenarios, it does demonstrate that, even in cases that show no need for new resources, existing resources cannot be lost without substantial consequences.

C. Additional Consequences Associated with the Economic Retirement of Existing Resources

In addition to cost issues, it is unclear whether replacement resources could be timely developed and built should existing uncontracted generation shut down. Recent experience in California suggests that it is very difficult to permit and build new power plants.[26] Thus, notwithstanding the costs, it may not be possible to replace large amounts of existing conventional capacity if many large units are retired.

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[24] The range in the cost of replacement capacity was calculated using publicly available estimates of the cost of new capacity from the California Energy Commission and other public sources. *See* Calpine/Barmack, Exh. 601 at 13.

[25] The amount of replacement resources is less than 1-for-1 because on the day of the simulation in which the greatest amounts of new generic resources are needed to serve load and satisfy flexibility requirements, 600 MW of the resources that were modeled as retired in the sensitivity analysis are forced out. Because the 600 MW are forced out, removing them as part of the sensitivity analysis does not increase need. *See* Calpine/Barmack, Exh. 601 at 12, note 18.

[26] Calpine/Barmack, Exh. 601 at 14.

In addition, the potential exists to increase the operating flexibility of existing generation resources through modest additional investment.[27] As a result, if future renewable integration modeling identifies a need for additional flexible resources, upgrades to existing resources could be a cost-effective option for meeting integration and reliability needs. The option to add increased operational flexibility to existing resources through modest additional investment, however, would be lost if existing resources shut down.

D. Intermediate Term Resource Solicitations should be used to Procure Flexible Capacity from Existing Uncontracted Resources

The continued availability of existing uncontracted resources can be better assured by adopting procurement mechanisms that will provide sufficient revenues to recover going forward costs and support investment in maintenance necessary to maintain availability in the future. Specifically, the Commission should direct the IOUs to hold intermediate term (3-5 years) resource solicitations to procure flexible capacity from existing uncontracted resources.[28] Directing the IOUs to undertake intermediate term resource solicitations represents a "least regrets" approach for preserving the *status quo* of resource "flexibility" until uncertainty about future need is resolved.

The amount of procurement from existing uncontracted resources should be set to maintain the aggregate resource flexibility assumed available from the existing fleet in the CAISO and IOU renewable integration modeling. To meet this obligation, the Commission should direct the IOUs to procure additional capacity so that, in the aggregate, the amount of

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[27] *See* Calpine/Barmack, Exh. 601 at 14-15.

[28] To the extent that such procurement is viewed as satisfying system rather than bundled needs, cost allocation mechanisms that already exist can be employed to ensure that all load serving entities share in the cost of additional procurement.

resource flexibility owned by, or under contract to, the IOUs, results in the same estimates of need for new capacity as currently represented in the CAISO and IOU modeling.

For example, using the CAISO's High Load Trajectory case as a starting point, a base case would be simulated that reflects the capabilities of the resources that the IOUs currently have under contract or own. The IOUs would then be directed to procure additional resources so that the combination of these additional resources with the resources the IOUs already have under contract and own yields the same result (the need for 4,600 MW of additional flexible resources) as the CAISO's High Load Trajectory case simulation.

The IOUs could procure the necessary amount of flexible resources by purchasing additional amounts of currently authorized products, such as tolling and/or capacity-only contracts that would either provide the IOUs with broad dispatch rights or obligate suppliers to submit offers into CAISO markets in a manner that reflects the flexibility that the IOUs secure through the contracts. Contracts that would commit suppliers to provide the procured amount of capacity in some future year (*e.g.*, 2015) could also be used.[29]

III. CONCLUSION

The record demonstrates that existing uncontracted resources are at risk for economic retirement and that, should such resources shut down, substantial amounts of new replacement resources with a potential cost to ratepayers in the billions of dollars may be necessary to satisfy

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[29] These contracts would not obligate suppliers to provide capacity or other products in intervening years.

reliability and renewable integration needs during the planning period at issue. In light of the potential consequences, the Commission should direct the IOUs to procure additional flexible resources through intermediate term solicitations to ensure that existing resources remain available until uncertainty about future renewable integration needs is resolved.

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