Comments of the California Energy Commission Staff on the "Report on Unaccounted-For Energy and Upstream Metering" Submitted on November 20, 1998, by Pacific Gas and Electric Company, San Diego Gas and Electric Company, and Southern California Edison Company

In accordance with Decision 97-10-086, Ordering Paragraph 9, the Staff of the California Energy Commission (Staff) offer these Comments to the California Public Utilities Commission (CPUC) on the "Report on Unaccounted-For Energy [UFE] and Upstream Metering" (the Report) submitted by Pacific Gas and Electric Company, San Diego Gas and Electric Company, and Southern California Edison Company (the UDCs). In these Comments Staff provide a discussion of the financial impacts of UFE and our recommendations to the CPUC for moving forward on UFE issues, based upon the analysis and conclusions presented in the Report.

A. Financial Impacts of UFE

UFE results when the sum of the loads within a given UDC service territory does not equal the total energy supplied to that territory, after adjusting for imports, exports, and physical line losses in the distribution and transmission systems. Various types of errors (in metering, loss estimation, load profiling, accounting, data processing and various estimated energy flows) can result in positive or negative UFE for any given hour. Energy theft, through either physical bypass of the meter or manipulation of the data, would only cause positive UFE (i.e., where total load is less than total supply), as it would involve some combination of under-reporting of load and over-reporting of supplied generation.

In the restructured electricity market, metered load data is processed and exchanged by several independent firms between the end-use meter and the ISO. This creates opportunities for parties to under-report the load they are responsible for, thereby avoiding a share of their rightful energy charges.[1] Charges thus avoided are passed on

[1] This potential exists for an ESP reporting load to a scheduling coordinator (SC), a UDC reporting its bundled-service load to the PX, or a SC reporting load to the ISO. There is actually a double benefit

to the rest of the market through the ISO's UFE charges. At present it is not possible to tell whether, or to what extent, this form of energy theft is occurring, nor to assess the contributions to UFE of the other factors mentioned in the Report.

Overall, UFE represents a significant amount of money -- nearly $70 million over the period from May 12 through August 16 -- which is ultimately charged back to electricity consumers.[2] The daily average value of UFE for this period was about $722,400, although on some days it was in the millions of dollars and, on July 16, the value of UFE hit a peak of nearly $6.4 million. In energy terms, over the same period UFE averaged 3.9 percent of the total load on the ISO system accounted for by the three UDCs, which translates into an average cost of about $1.12 per MWh of accounted-for load. On July 16, UFE was 11.2 percent of load, translating to a cost of $8.52 per MWh of accounted-for load.[3]

The totals and averages quoted above do not tell the whole story, however, since the ISO calculates UFE quantities and assesses charges independently for each UDC service territory. In PG&E's service territory, for the same time period, UFE totaled $49 million, or $1.78 per MWh of load, to be passed on to customers. In SCE's territory UFE was $20 million or $0.70 per MWh, while in SDG&E's territory it was $274,000 or $0.05 per MWh. On July 16, the peak-cost day noted above, UFE was 15.8 percent for PG&E's territory, 8.9 percent in SCE's territory, and 1.9 percent in SDG&E's territory. Besides concealing differences among the UDCs, the system-wide UFE figures also under-represent the true magnitude of UFE, for two reasons. First, they incorporate many negative UFE values. For any hour when a particular UDC showed negative UFE, the positive UFE value for another UDC had to be large enough to offset the negative

---

to a party who avoids some share of its energy charges in this manner. The ISO allocates UFE charges to SCs in proportion to each SC's reported or "deemed delivered" (i.e., ***ex ante*** scheduled) load, which means that a party who under-reports load also pays less than its rightful share of UFE charges.

2 The figures reported here, which represent ***ISO-calculated UFE***, do not fully account for all the UFE that actually occurs. As discussed below, some portion of UFE is accounted for in the distribution loss factors of SCE and SDG&E and in a theft factor which PG&E applies to its bundled-service load. Although this portion is not included in ***ISO-calculated UFE***, it is still a type of unaccounted-for energy and does have a cost impact on customers.

3 The figures presented here are derived from the ISO's daily totals of hourly UFE in MWh, by UDC service area, which are then valued at the ISO's average daily ***ex post***, locational, imbalance-energy prices.

amount in the system-wide average. For such hours, the financial impact on customers in the positive UFE service territories was much greater than the system-wide averages reveal.

This effect is well illustrated by the September UFE figures which the ISO recently released. For the system as a whole, UFE was only 0.55 percent of total load, for a total value of $8.6 million. But when the total is disaggregated by UDC, UFE was 4.94 percent for PG&E (for a total value of $19.6 million), -3.09 percent for SCE (-$8.4 million), and -4.67 percent for SDG&E (-$2.5 million). In fact, on a daily basis UFE was consistently positive for PG&E and consistently negative for SCE and SDG&E.

Second, both SCE and SDG&E build into their distribution loss factors (DLFs) a factor to cover that portion of UFE which they estimate to be due to distribution-level causes. PG&E does not adjust its DLFs for UFE, but Staff understands that they do add a theft factor to the load they report to the PX for their bundled-service customers.[4] For all three UDCs, then, the result is that their *ISO-calculated UFE* is lower than their *actual UFE*. The Report deals only with *ISO-calculated UFE*, yet it is *actual UFE* which ultimately impacts consumers and should therefore be the focus of analysis and mitigation efforts.

Staff note that the ISO and the UDCs have discovered a number of accounting and data processing errors which explain a portion of UFE, and they have corrected these errors and several other market start-up problems. The Report therefore anticipates that UFE and its cost will ultimately be substantially reduced through these kinds of corrections. Staff agree that focusing on data processing and accounting problems has been the appropriate course of action up to now, and that it is necessary to fix these problems before a meaningful analysis of the other causal factors can be conducted. We note, however, that specific causes have not yet been identified for the negative UFE values for SCE and SDG&E in September.

[4] A key difference is that PG&E's theft factor does not apply to direct-access load, whereas SCE's and SDG&E's DLFs apply to direct-access as well as bundled-service load.

B. Recommendations

Staff recommend that the CPUC:

1. Order a thorough analysis of the impact and causes of UFE and an evaluation of the options for reducing it, including installation of additional metering.

As the Report points out, the large effects of data processing and accounting problems have made it impossible to date to assess the steady-state magnitude or the causes of UFE. Once these problems are fixed, however, UFE data will become more reflective of the inherent causal factors identified in the Report. At the same time, new monitoring mechanisms being developed will track the performance of the data processing steps and data exchanges upon which ISO settlements and UFE calculations depend.[5] Once these improvements are actually implemented, it will be feasible to conduct a more thorough analysis of UFE.

At the same time, because of the market-wide distribution of UFE charges, individual market participants may have weak incentives to care about UFE, and certainly would not be able to evaluate the market-wide and distributional effects of UFE. Moreover, the other parties and groups which the Report identifies as working on UFE-related issues will not close all the gaps. For example, some of the monitoring mechanisms which the Data Quality and Integrity Working Group (DQIWG) will propose, such as independent audits of MDMA and MSP activities, will probably remain on hold until they are ordered by the CPUC. Other monitoring mechanisms are very limited in scope. For example, the MDMA Performance Monitoring Reports (PMRs) are already being implemented by the UDCs, but will only cover performance standards, i.e., timeliness of usage data posted to the MDMA server and the amount of that data which is estimated and not actually metered. The PMRs will not reveal whether MDMAs have performed the validation, editing and estimation (VEE) procedures correctly, which may be crucial for UFE. There appears to be no way to monitor correct performance of

[5] Of particular relevance are the Usage Data Reconciliation (UDR) procedure and the MDMA Performance Monitoring Reports (PMRs), which SCE initiated and the other UDCs are developing, and the Estimation Logs which the ISO requires of all SCs. These mechanisms will be discussed in more detail in the Final Report of the Data Quality and Integrity Working Group to be filed with the CPUC shortly. An important point regarding UFE is that the UDR procedure is the only mechanism, existing or contemplated, capable of detecting inadvertent or deliberate under-reporting of load. It therefore merits close attention by the CPUC.

VEE, short of having an independent audit of MDMAs which examines their VEE procedures and recalculates a sample of their validated data. In summary, then, the safeguards and detection mechanisms now being developed are far from complete and fully effective. Thus there is clearly a need for the CPUC to direct in-depth analysis of UFE and evaluation of other mitigation options.

Regarding upstream metering, the Report's argument that it would be ineffective is seriously flawed. First, by focusing exclusively on three options for extensive upstream metering, the Report fails to examine a broader range of metering strategies which might offer improvements in UFE in a cost-effective manner. Second, by emphasizing the assertion that upstream metering cannot differentiate among the components of UFE, the Report neglects the value of upstream metering in: (1) precisely separating distribution-level UFE, which is a CPUC-jurisdictional concern, from transmission-level UFE, which is FERC-jurisdictional and hence an ISO concern; and (2) allocating UFE accurately to transmission-distribution interface points or ISO take-out points, which helps to allocate UFE to the responsible parties.[6]

The importance of item (1) becomes apparent when one notes that distribution-level UFE is a retail market problem, and as such is of little concern to the FERC or the ISO. The Report places heavy emphasis on the ISO's audit authority over SCs and, through SCs, indirectly over ESPs, MDMAs, MSPs and customers. While this authority does exist in the ISO tariff and metering protocols, much of its practical interpretation and implementation remain to be worked out. The CPUC should, in developing its own course of action with regard to UFE, avoid assuming that ISO authority will effectively control distribution-level UFE.[7] Likewise, the CPUC should not assume that SCs will delve deeply into retail-side activities in order to fulfill ISO requirements regarding settlement data accuracy. The CPUC's authority over the UDCs and, through the UDCs over ESPs, MDMAs and MSPs, must be the driving force in monitoring and reducing

[6] In support of this point, the ISO reports that certain municipal utilities which are embedded in UDC service territories and receive power from the ISO grid actually have zero ISO-calculated UFE because upstream meters provide precise measurements of their loads. The only UFE these municipals have to deal with is at distribution level, which is completely internal to their operations and under their jurisdiction municipals have to deal with is at distribution level, which is completely internal to their operations and under their jurisdiction.

[7] In a presentation on UFE on September 8, the ISO explicitly mentioned DLFs and load profiling error as "IOU" concerns and excluded these items from its own continuing UFE agenda.

distribution-level UFE. Additional strategically-placed metering could be a powerful tool in this effort.

Regarding item (2), allocation of UFE to ISO take-out points, the Report argues that upstream metering data cannot be used for UFE allocation because of the routine switching of customers to different distribution circuits for reliability reasons. But based on the Report's description of the three upstream metering options, this argument applies only to option 1, metering at the primary distribution circuit. Options 2 and 3 would move the meters further upstream to points where circuit switching would no longer prevent accurate UFE allocation.

The Report's other argument against upstream metering, based on non-coincidental meter read dates, is irrelevant. Upstream meters would provide hourly data to be used in conjunction with an hourly UFE calculation by the ISO. At present, data from cumulative meters is load profiled to create hourly values in time to meet the ISO's settlement timetable, regardless of when during the month these meters are read. Upstream metering would provide valuable hourly control totals against which to reconcile hourly usage totals from the end-use meters.

Finally, we note that the UDCs' cost estimates do not provide any breakdowns or work sheets to show how they derived the total costs, so it is not possible to critique these estimates. Staff believe it would be prudent, for a future assessment of additional metering for UFE reduction, to obtain independent cost estimates of any promising metering scenarios.

In summary, Staff believe there is a serious need for a thorough analysis of the causes of UFE and an examination of a broader range of mitigation options than the Report has provided. Our concern is that unless the CPUC takes a strong lead in following up on the subject of UFE, the distribution-level factors affecting UFE will not get adequate attention in the foreseeable future.

2. Develop and implement procedures for regulatory oversight of the bundled-service usage data reported by the UDCs to the PX.

The usage data for UDC bundled-service customers represents roughly 80 percent of the total load on the ISO system. This data is no less susceptible to the various causes of UFE than direct-access data is, but thus far the UDC procedures for processing this data and submitting it to the PX have not been investigated as a possible source of UFE. The Usage Data Reconciliation (UDR) procedure referred to earlier can detect mis-reported usage data for direct-access customers, but the same procedure is not feasible for reconciling UDC bundled-service load because it relies on an independent analysis by the UDC to be a check on what the ESP and SC submit to the ISO. Thus at present there is no comparable mechanism envisioned for verifying bundled-service load reported to the PX. The CPUC should therefore initiate an inquiry into this as soon as possible.

3. Direct future analyses of UFE to be based on actual UFE *rather than* ISO-calculated UFE.

As noted above, the problem with *ISO-calculated UFE* is that it omits the shares of UFE which are accounted for in SCE's and SDG&E's DLFs and PG&E's theft factor. These shares are still a cost impact on the market, however, so a proper analysis of UFE should include them and focus on *actual UFE*. For the longer term, Staff would urge the CPUC to take this a step further and direct the UDCs to develop DLFs which measure physical distribution system losses only. This would make *actual UFE* fully transparent, to allow monitoring of its total impacts on customers on an ongoing basis.

C. Conclusion

The financial impacts of UFE, the extremely limited current level of knowledge about the causal factors of UFE, and the incompleteness of existing and planned mitigation measures imply that a thorough analysis of UFE and an evaluation of mitigation options are still needed. Staff believe that it is clearly within the CPUC's regulatory scope to pursue these issues in order to reduce the impacts of UFE on consumers and to eliminate as far as possible the opportunities to shift costs unfairly by gaming the data. As the CPUC moves forward with this effort, we suggest that it rely less on market participants to do the needed analysis, and consider alternatives such as contracting

with an independent consultant or initiating a collaborative effort between, perhaps, the Energy Division and the ISO. The CEC would also be interested in collaborating in such an effort.

Date: December 11, 1998

Respectfully submitted,

CARYN J. HOUGH
Attorney for the
California Energy Commission
1516 Ninth Street, MS-14
Sacramento, CA 95814
Telephone: (916) 654-4178
Fax: (916) 654-3843