**Comments on Dr. Rohy's Report Entitled**
**"Long Term Planning in the SDG&E Service Area"**
**12/19/2007**
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I appreciate and would like to acknowledge Dr. Rohy's contribution to the important public policy debate concerning long-term energy planning strategy. Informed, open debate is one of the necessary ingredients for healthy policy making. Only through the clash of opinions can the sparks of truth be seen.

Dr.Rohy has indicated that he welcomes comments on his paper. I have provided below some general and specific comments regarding Dr. Rohy's report. Although many of the points brought up in Dr. Rohy's report[1] (the "Rohy report") touch on important topics, the discussion is generally presented at a fairly high level and in a simplified manner which means some crucial details are missing. This could lead readers to reach wrong conclusions.

I want to caution against over simplifying complex issues such as the pursuit of a "balanced approach" to energy planning. As an example, over-simplification was one cause of the California Independent System Operator's (CAISO's) market failure in early 2000. Originally California had the national lead in implementing a sound and detailed approach to managing/operating and pricing electricity through Location Marginal Pricing (LMP) where energy and ancillary service capacity are priced depending on where and when these commodities are produced (injected) and where and when they are consumed (withdrawn). Interestingly enough, SDG&E was at the forefront of that debate and promoted the use of LMP to manage electricity production and consumption in the western United States. However, other stakeholders thought LMP was too complicated and came up with the "simplified" and failed "zonal" approach where energy is priced across very broad areas instead of at hundreds of individual nodes[2]. The zonal approach actually increases complexity because the CAISO has to create work-arounds to address all of the physical grid limitations which exist at the nodal level but are not reflected in prices. Meanwhile, much of the rest of the country PJM (Pennsylvania, New Jersey, Maryland), New York, New England, the Midwest and now Texas have successfully implemented the approach which was first suggested for California over ten years ago. The CAISO is now in the process of implementing an LMP-based approach, ten years late and at a tremendous start-up cost to consumers.

My purpose here is not to critique the Rohy report but to point out some of the more important details and inaccuracies to assure we engage in a more "balanced debate", particularly as it relates to distributed generation and its impact on, and value to, the system and to all consumers. I agree with the Rohy report's recommendation (page 3) that the economic and reliability impacts of distributed generation (DG) on the system and on other customers needs to be evaluated and become part of the public record. My

[1] Long Term Electricity Planning in SDG&E Service Area, David A. Rohy
[2] The CAISO currently prices electricity within three zones: Southern California (SP15), Central California (ZP26) and Northern California (NP15).

preliminary evaluation of those impacts shows however, that there is a significant net benefit to the system (non-DG owners) that can be achieved from the increased penetration of DG. Some of the benefits of firm DG (firmness to be achieved in aggregation and in accordance with utility reliability standards[3]) are listed below:

1. Reduces the need for utility purchases of electricity and reduces market clearing prices for energy.
2. Improves grid reliability and security.
3. Reduces the utility's need to procure Resource Adequacy (RA) capacity and to pay for ancillary services.
4. Reduces the market clearing prices for RA capacity and for ancillary services.
5. Reduces the utility's need to procure capacity in transmission-constrained load pockets (Local Capacity Requirements (LCR)).
6. Reduces the need for utility infrastructure (distribution and transmission facilities).
7. Reduces the GHG, if the generation is by renewable or efficient CHP resources.

Assuming that the analysis mentioned above shows that significant system economic savings can be achieved by expanding DG, there are two ways to achieve this expansion:

1. Providing incentives to existing and prospective DG owners to develop more DG.
2. Allowing and encouraging utilities to invest in DG and earn a return (shareholder profits) on that investment. Alternatively, a PBR (Performance Based Rate) can be set up that is tied to the quantity of utility DG additions. A portion of the estimated system savings associated with the increased DG penetration can be provided to utility shareholders as a profit incentive.[4]

Two General Comments:

A. In general, the report is unclear about the relative price of electricity. On page 2 it states that the price of electricity in our state is already high enough but later on page 7 it states that under the current system our electricity is "reliable, safe, and affordable." Which one is it, expensive or affordable? Later it says that "even with high natural gas prices generators using natural gas can provide electricity at lower costs than any commercialized solar energy technology." This is only true if we do not include the cost to the environment to transport and burn fossil fuels, and the cost to secure its availability across the globe.

[3] The aggregation of, and establishing the firmness for, different types of DG technologies requires detailed analysis that is beyond the scope of these comments. In addition, it will be necessary to engage the utilities in order to obtain their concurrence and support, and the CAISO in order to confirm conformance with applicable grid reliability criteria.

[4] There are many other ways that incentives can be provided to the utilities to assure that DG is one of the options considered in utilities' long tem planning.

B. The role of the utilities and the CAISO seem to be confused. Since 1998, the CAISO has been in charge of controlling the day-to-day and moment-to-moment operation of the transmission system, and is responsible for the balancing of loads and resources. The large investor owned utilities in California no longer perform these functions.

Several Specific Comments:

1. The Rohy report expresses concern with state policies that support renewable resources including solar photovoltaic via "net metering". In particular, the report argues that "net metering" shifts costs to customers who do not have on-site generation because the net metering customer does not pay for utility infrastructure necessary to support the net metering customer's load and surplus generation. (page 3)

    a. In the first instance, net metering is limited; i.e., the net metering customer cannot bank any surplus on-site generation beyond a 12 month period.
    b. More importantly, additional on-site generation can avoid utility infrastructure additions because the distributed nature of the on-site generation (throughout the utility's distribution system) allows the utility to plan for a lower level of peak distribution-level loads and, as a result, a lower level of peak transmission-level powerflows. These infrastructure savings are significant. Therefore people who install distributed generation do not shift costs to others and actually save money for the people who do not have DG. This can be shown by the economic analysis I have proposed earlier.

2. The report later states that if a neighborhood does not need the surplus generation from distributed generation (DG) then the utility has to transport that power at lower voltages and that creates higher losses (page 11).

    It is highly unlikely that DG will produce so much surplus power that the power cannot be absorbed by other loads in the neighborhood. Even if it cannot, the loss savings due to the reduction in the need for the utility to generate power—and the attendant losses thru (a) the step-up transformer to get the energy to the transmission system at the generator location, (b) transmission lines, (c) the step-down to the distribution level voltage, and finally (d) the step-down to the end-use load level voltage—will offset any increase in losses that may be associated with the transmittal of surplus DG energy. The losses related to the transmittal of power generated by central station powerplants will nearly always be higher that the losses associated with generating the power at the end-use load level, even including the possibility that some surplus DG energy could be stepped-up to the distribution level.

3. The report is recommending that "the CPUC must examine the effect of special pricing for the net metering of solar energy, on the price signal to customers and alternate suppliers." (page 4) Wide spread use of any measure that reduces peak demand will impact price signals applicable to energy efficiency (EE), demand response (DR), and time of use metering programs. But it obviously would not make sense to forego the demand reduction associated with on-site solar energy generation using the logic that lower demand would dull the price signals for EE, DR, or time of use metering.

4. The report argues that we "don't know how to store significant quantities of electricity." (page 7) This is inaccurate. The hydroelectric resources of the Pacific Northwest (including Canada) and the California Sierra Nevada's have enormous energy storage capabilities. In addition there are very large pumped/storage/generation facilities that exist and currently operate at comparatively low annual capacity factors (e.g., on the order of 10%). Further, at least one new 500 MW pumped storage facility has been proposed for Southern California. There exist considerable opportunities to store energy but, to date, it has not been economical to use all of this storage capability at its maximum physical potential.

5. The report says distributed generation is "not designed to work hand-in-glove with the grid in a supply mode." (page 7) This is inaccurate. Currently there are thousands of distributed generation applications in operation and they work perfectly well. Some supply a portion of on-site load and the utility supplies the balance. Others generate surplus energy and the utility uses this surplus to satisfy other loads. Utilities have many years of successful experience with delivering power to end-use customers as well as receiving and using surplus power from end-use customers.

6. The report suggests that the possible increase in electric vehicle use will increase off-peak loads and therefore undermines the usefulness of solar photovoltaic development which only supplies power on-peak. (page 9) The reality is that the operator of most of the California electric grid, the California Independent System Operator (CAISO), is concerned that there will be too much supply, and not enough load, during off-peak hours. This is because the CAISO anticipates large increases in wind generation, much of which occurs during off-peak hours. Therefore there is nothing about the increased use of electrical vehicles that compromises the value of solar photovoltaic.

7. The report implies that because solar photovoltaic prices are increasing, the technology is likely to be uneconomic. (page 10) But this reflects a very short term focus. In the long-run, if the demand for solar photovoltaic remains high, prices will inevitably fall as technology improves and economies of scale in production take over.

8. The report indicates that "control software" is needed to accept and deploy electricity from distributed generation applications. (page 11) It is unclear what additional "control" is needed beyond what already exists. The CAISO operates the grid in real-

time using a variety of operating reserves, carefully selected so that supply and load will always remain in balance, even under unusual system conditions and during contingencies.

9. The report spends considerable ink worrying about the deficiencies of battery storage technologies as if battery storage is a necessary complement to solar photovoltaic applications. (page 11) But the facts indicate otherwise. There is no reason to link the expansion of solar photovoltaic technology to improvements in battery storage technology because, although better batteries may be useful, it is not necessary to store energy generated by solar photovoltaic systems in batteries. Photovoltaic energy can be used to supply the state's on-peak electric needs and other technologies, such as storage hydro facilities, wind and conventional fossil-fueled generators can supply whatever energy is needed during off-peak periods. California is very long way from ever reaching the point where there would be more on-peak solar photovoltaic generation than load.

10. The report seems to suggest that consolidation of smaller utilities into larger ones results in lower prices (page 12). California has some of the largest investor owned utilities (IOUs) in the United States (PG&E is the largest IOU) but, with respect to the IOUs' bundled customers, has some of highest rates.