SDG&E's Comments
on the December 19, 2012 Workshop Concerning
Proposed Renewable Resource Portfolios for the 2013-14 Transmission Planning Process

Results from the 12-12-2012 version of the RPS Calculator model demonstrate that the amount of renewable resources in the Discounted Core meet virtually all the renewable net short in year 2022. Most of the decision-making within the model can be traced back to input assumptions concerning the Cost Score, Environmental Score, and Permitting Score for projects in the Discounted Core. (All projects in the Discounted Core have the best possible Commercial Viability Score because these resources have Power Purchase Agreements (PPAs) with Load Serving Entities (LSEs).) Potential renewable resources that are not in the Discounted Core, including out-of-state renewable resources, are never in contention for supplying the renewable net short in year 2022 because these resources do not have PPAs.

SDG&E generally agrees with this approach, however, as everyone knows, the existence of a PPA does not guarantee project success. It is likely that some amount of potential renewable resources that are not currently in the Discounted Core will be needed by year 2022 to meet the existing 33% RPS requirement. In addition, while a change in the existing 33% RPS requirement is not contemplated by the instant model results, future changes to the RPS requirement are possible. If the RPS requirement were increased from 33% to, say 40%, potential renewable resources that are not currently in the Discounted Core will be needed to supply the larger renewable net short.

SDG&E recommends that the RPS Calculator model be updated with recent information concerning long-term capital costs (that account for technology improvement) and with recent data concerning expected annual capacity factors for out-of-state wind. Additionally, SDG&E recommends the model revise the Commercial Interest scores for distributed solar to better reflect the historical success rates for these particular projects.

<u>Distributed Solar in the Discounted Core</u>
According to the RPS calculator, distributed solar receives a perfect Commercial Interest score – zero out of a hundred, with zero being the best possible outcome. SDG&E believes this score may yield higher than realistic assumptions for distributed solar in the San Diego CREZ, and could potentially undermine the accuracy of the Discounted Core. While the model appears to value Commercial Interest based on whether the resource has a signed PPA, SDG&E's experience is that this factor alone has not been dispositive in the case of small scale solar PV. While it is generally acknowledged that there is a substantial failure rate in renewable project development, the failure rate is particularly acute in the small distributed solar arena where developers might possess less commercial experience. Indeed, in SDG&E's experience there is an approximately 40% failure rate for small ground mounted solar in the San Diego area projects with signed PPAs.

Thus, the assumption of a 100% success rate for *all* projects with signed PPAs included in the model does not represent a reasonable base case planning assumption given historical performance of small ground mounted solar in the San Diego area. SDG&E suggests the model revise the Commercial Interest scores for distributed solar to better reflect the historical success

rate of approximately 60%. Finally, overstating assumptions regarding distributed generation in the San Diego CREZ can materially skew assumptions about local capacity need and associated transmission planning in constrained load pockets like the San Diego area. In light of this fact, SDG&E at a minimum requests that the CAISO perform a sensitivity study modeling lower distributed solar estimates.

Capital Cost Assumptions

Based on recent capital cost estimates approved by the WECC Transmission Expansion Planning Policy Committee (TEPPC) in October, 2012, the RPS Calculator model results are based on understated rooftop solar photovoltaic capital costs and overstated wind capital costs, especially out-of-state wind capital costs. The effect of these assumptions in the RPS Calculator model may be to bias results in favor of rooftop solar PV relative to other renewable resources.

For example the RPS Calculator model uses a $3,500/kW (DC) installed cost for Small Solar PV (large rooftop) in California.[1] In comparison, the WECC Transmission Expansion Planning Policy Committee (TEPPC) approved an installed capital cost estimate of $4,963/kW (AC) by year 2022.[2]

The RPS Calculator model uses a $2,399/kW installed cost for 2,282 MW of Tehachapi wind.[3] In comparison, TEPPC approved an installed capital cost estimate of $1,981/kW for California wind by year 2022.[4]

The RPS Calculator model uses a $2,207/kW installed cost for 6,033 MW of Wyoming wind.[5] In comparison, TEPPC approved an installed capital cost estimate of $1,793/kW for Wyoming wind by year 2022.[6]

---

[1] See cells AB17 through AE17 in the "a – ProForma" worksheet. It is not immediately clear what DC to AC conversion factor is used in the RPS Calculator model.

[2] Energy+Environmental Economics (E3)'s October 23, 2012 "*Cost and Performance Review of Generation Technologies, Recommendations for WECC 10- and 20- Year Study Process*": U.S. Residential Rooftop PV year 2012 installed cost of $6,250/kW (AC). (see Table 26) This cost is projected to decline to $4,625/kW by year 2022. ($6,250/kW x 74% = $4,625/kW) (see Figure 7.) Adding the California construction multiplier yields a year 2022 installed cost of $4,963/kW. ($4,625/kW x 1.073 = $4,963/kW) (see Table 40).

[3] See cell T17 in the "a – ProForma" worksheet ($2,399/kW). See cells M182 through M185, M233 through M234, M236 through M239, M244, M1045, M1199 through M1208, M1210, M1223, M1226 and M1280 in the "j – GenericProjData" worksheet (2,282 MW).

[4] Energy+Environmental Economics (E3)'s October 23, 2012 "*Cost and Performance Review of Generation Technologies, Recommendations for WECC 10- and 20- Year Study Process*": U.S. On-shore Wind: year 2012 installed cost of $2,000/kW. (see Table 30) This cost is projected to decline to $1,860/kW by year 2022. ($2,000/kW x 93% = $1,860/kW) (see Figure 12.) Adding the California construction multiplier yields a year 2022 installed cost of $1,981/kW. ($1,860/kW x 1.065 = $1,981/kW) (see Table 40).

[5] See cell T17 in the "a – ProForma" worksheet ($2,399/kW). This is cost is adjusted by a factor of 0.92 to account for Wyoming construction costs. (see cell S259 in the "j – GenericProjData" worksheet: $2,399/kW x 0.92 = $2,207/kW.) See cell O259 in the "j – GenericProjData" worksheet (6,033 MW).

[6] Energy+Environmental Economics (E3)'s October 23, 2012 "*Cost and Performance Review of Generation Technologies, Recommendations for WECC 10- and 20- Year Study Process*": U.S. On-shore Wind: year 2012 installed cost of $2,000/kW. (see Table 30) This cost is projected to decline to $1,860/kW by year 2022. ($2,000/kW x 93% = $1,860/kW) (see Figure 12.) Adding the Wyoming construction multiplier yields a year 2022 installed cost of $1,793/kW. ($1,860/kW x 0.964 = $1,793/kW) (see Table 40).

SDG&E recommends that the RPS Calculator model be repopulated with capital cost data that is consistent with the data approved by the TEPPC in October, 2012.

Assumptions for Out-of-State Wind Production Capability May Be Too Low

SDG&E suggests that the CPUC staff contact developers of out-of-state wind projects to determine whether reliable data is available to support an increase in the annual capacity factors used for the most attractive out-of-state wind resource development areas, and the quantity of developable installed capacity in those areas. SDG&E believes that the best wind development sites in Wyoming will yield annual capacity factors well above the maximum 42% currently embedded in the RPS Calculator model.[7] The best wind development sites in New Mexico should allow the development of considerably more than the RPS Calculator model's 204 MW of installed capacity with an annual capacity factor of 42%.[8]

The RPS Calculator Model Should Reflect Better Permitting Score for Certain Out-of-State Renewable Resource Development Areas

The 12-12-2012 version of the RPS Calculator model contains the worst possible Permitting Score for all of the Wyoming wind resource development areas. This score needs to be reviewed because at least 1000 MW of wind development potential in south-central Wyoming has received a favorable Record of Decision from the U.S. Department of Interior.[9]

The Environmental Score for Out of State Renewable Resources is Arbitrary

The RPS Calculator model assigns a mid-point Environmental Score for all out-of-state renewable resources. This is an entirely arbitrary assignment and was done because environmental information for out-of-state renewable resource development potential is, ostensibly, unavailable. The effect of this assumption is to diminish the attractiveness of out-of-state renewable resource development potential that involves abandoned agricultural lands, active military bases, abandoned military bases, closed or active mines, degraded/disturbed lands, salt-contaminated soils, remote brownfields, landfills, remediated sites, existing substations/electric facilities, Superfund sites, quarries and industrial plants.

SDG&E notes that the Western Renewable Energy Zones (WREZ) data—which is used to populate some of the out-of-state data assumptions in the RPS Calculator model—already reflects environmental exclusion areas. In addition, the WREZ data was developed from detailed geographic information. This suggests that approximate latitude and longitudes should be available upon which an environmental scoring methodology similar to that used for California can be applied.[10]

---

[7] Check with proponents of the Wyoming-Colorado Intertie project.

[8] Check with proponents of the SunZia Southwest transmission project.

[9] *http://wyia.org/newsworthy/salazar-approves-massive-wyoming-wind-farm-project/*

[10] See the WREZ report at *www.nrel.gov/docs/fy10osti/46877.pdf*.