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To: Nuclear Regulatory Commission

Comments on notice of intent to prepare an Environmental Impact Statement for the proposed license renewal of Diablo Canyon Nuclear Plant Units 1 and 2, Docket ID NRC-2009-0552

Dear Commissioners,

In 2009, the NRC's Generic Environmental Impact Statement for License Renewal of Nuclear Plants attempted to evaluate the environmental impacts of energy sources that may serve as alternatives to license renewal. It said "To serve as a source of commercial power, photovoltaic systems and concentrating solar power systems would need to work in conjunction with energy storage systems such as batteries." On that basis, you dismissed renewable energy as a viable alternative to the relicensing of a nuclear power plant.

We pointed out in our comments on the 2009 GEIS what was actually happening with solar power in California at that time, that California does not consist primarily of "homes in remote locations that cannot be easily connected to the transmission grid," that "the GEIS's version of wind and solar power and renewable energy storage technology was cursory, severely out of date or wholly lacking, and of no use in an alternatives analysis that should evaluate the viability of nuclear power plants over a 20-year period that will be marked by increasing costs of plant maintenance and repair, simultaneously with smart grid and renewable energy storage technologies coming on line, as the price of solar and wind power continues to drop, all pointing toward the potential commercial obsolescence of nuclear power within the relicensed period."

Six years later, here we are again. The NRC has replaced its circa-1980 assessment of renewable energy with a new exclusionary strategy: A requirement that any replacement for Diablo Canyon's power be just like Diablo Canyon: A utility-scale, stand-alone source of always-on baseload power.

Dr. Mark Cooper in the new report *Power Shift*, notes this "failure of the NRC to adjust to the changes in the electricity sector," and states that "In the current technological and economic environment this focus is tantamount to an irrational baseload bias and a utility-scale fetish that is out of touch with reality."

Dr. Cooper points out that PG&E echoes the NRC's utility-scale baseload fetish in its Amended Environmental Report, with a focus on "standalone" energy sources. "PG&E also assumes that a significant amount of natural gas generation will be needed to replace the amount of electricity generated by Diablo Canyon. But there are a large number of possible combinations of many resources that can meet the need for electricity in a low carbon environment. PG&E has chosen a single combination that relies on a large amount of gas, which increases the environmental impact of that alternative. More renewables, distributed generation, geothermal, and efficiency would achieve the same outcome with a much more environmental and consumer-friendly impact."

Dr. Cooper notes that: "one need only compare PG&E's Amended Environmental Report with the California Energy Commission documents PG&E relies on. PG&E rejects the option of geothermal energy based on the assumption that a single new geothermal plant would be built in PG&E's service territory. Making the conservative assumption that the PG&E service territory includes half the geothermal resources in the state, geothermal resources are twice as large as Diablo Canyon's capacity. Adding in efficiency and other distributed resources, the alternative energy capacity would be four times the capacity of Diablo Canyon."

Further, "PG&E's analysis of the supply-side of the California electricity sector also obscures a simple fact: non-hydro renewables, i.e. wind and solar, have increased dramatically and are poised to surpass nuclear generation, which has been in decline."

We trust the EIS alternatives analysis will take note of this fact, as well as the fact noted in *Power Shift* that "nuclear power and central station generation are at a severe economic disadvantage as the technologies of distributed generation continue to develop and deploy."

The EIS should analyze and contrast "short-term operating costs, long term total resource costs, including efficiency as a resource, identify the implications of the dramatically declining cost of renewables, and recognize the economic problems of aging reactors in wholesale markets where renewables and efficiency are putting downward pressure on prices."

The EIS should incorporate Power Shift's assessment that the economics and necessity of Diablo's reactors are undermined by a:

- 40 percent increase in the operating cost of aging reactors;
- 40 percent decrease in the cost of wind;
- 60 percent decrease in the cost of solar;
- low-cost energy efficiency technologies that have taken a bite out of load growth;
- demand response that has become an increasingly valuable and effective resource;
- huge investments in storage technologies that are on the brink of redefining the value of intermittent resources; and

- advanced information and control technologies that transform the approach to reliability.

The alternatives analysis should incorporate Dr. Cooper's findings that "aging reactors are more costly than efficiency, wind, gas, and some solar in the near-term. In the mid-term more solar becomes competitive with aging reactors as do several other generation sources, including biomass, geothermal, micro- turbines, and even offshore wind."

In view of the fact that your 2009 GEIS insisted that "to serve as a source of commercial power, photovoltaic systems and concentrating solar power systems would need to work in conjunction with energy storage systems such as batteries," the alternatives analysis in the EIS should acknowledge the April 2015 introduction by Tesla of affordable residential and industrial battery storage systems; the implications of this technology's instant, widespread acceptance; and its projected growth to become a \$19 billion industry by 2017. If the EIS does not incorporate such an analysis, we will know that the NRC has again chosen to remain strategically out of date so as to exclude viable alternatives to license renewal.

Finally, the EIS should dispense with PG&E's argument that Diablo Canyon is needed to meet the goals of carbon reduction. Recent projections by the Department of Energy's Energy Information Administration (EIA) based on multiple scenarios for carbon emission **reductions found** that nuclear power does not help achieve greater carbon emission reductions.

Per Dr. Cooper, "pointing out that 60% of our current low carbon generation comes from nuclear as a basis for suggesting that nuclear must play a central role in the future decarbonization of the electricity sector is simply wrong as a matter of fundamental economics and totally irrelevant to policy making. The existence of nuclear power is a very old sunk cost.... In the mid- to long-term, none of the existing nuclear reactors will make any contribution to decarbonization. They will all have to be replaced and their future costs, compared to the available alternatives, are all that matters."

In its Clean Power Plan, the EPA concurred, rejecting a proposal to allow states to count 6 percent of existing nuclear generation toward clean energy goals. In its final rule, EPA states "we believe it is inappropriate to base the BSER (Best System of Emission Reduction) on elements that will not reduce CO2 emissions from affected electric generating units below current levels.... Existing nuclear generation helps make existing CO2 emissions lower than they would otherwise be, but will not further lower CO2 emissions below current levels. Accordingly... the EPA is not finalizing preservation of generation from existing nuclear capacity as a component of the BSER."

This should be included in the EIS alternatives analysis.

Thank you for your attention to these issues,

Andrew Christie
Chapter Director