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April 20, 2015

Dr. Robert Weisenmiller, Chair
California Energy Commission
1516 Ninth Street, MS-31
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Dear Chair Weisenmiller:

Thank you for the opportunity to comment on the March 2015 *Existing Buildings Energy Efficiency Draft Action Plan.* We applaud the stated goal of reducing carbon emissions 85 percent from today's levels by 2050. In order to achieve this goal, we suggest that California needs to pursue a more aggressive approach than that which is outlined in the draft, and we recommend that the State rely (to a greater degree than reflected in the draft plan) on California's universities to accelerate the applied research and pilot projects needed to attain the State's challenging carbon emissions goals.

The potential to tap and accelerate research applications is already evident. The State's support for applied research and pilot projects has stimulated innovation and early adoption of new technologies across such essential areas as illumination, fuel cells, photovoltaics, plug-load efficiency, cooling and refrigeration, smart microgrids, intelligent vehicle charging, thermal and electric energy storage, energy efficiency, "big data" analytics, demand management, building monitoring and controls, laboratory equipment controls, heat pumps, and wind turbines. Incentives have compressed the time for applied research innovations to impact our operations, guided by policy that has placed energy efficiency at the top of the State's "loading order" and enabled by the Statewide Energy Partnership (SEP). This supportive environment has enabled the University of California to launch an energy efficiency retrofit program that is attracting national attention. The key success factors are:

1. UC has issued 15-year tax-exempt revenue bonds to finance a large energy retrofit program for which the debt is serviced with utility savings at no net added expense to the University.

2. The Statewide Energy Partnership has provided fiscal incentives that have stimulated application of new ideas by rewarding reasonable risk-taking for adopting new technologies and new applications.

3. UC has a challenging, near-term (2025) climate-neutrality goal that requires aggressive energy efficiency.

State operations have not yet implemented a comparable-scale energy efficiency retrofit program. The reasons are understandable, but should be remediated. Universities do benefit from the proximity of operations to applied research, which the State does not have, but which it could emulate by reaching into its research universities and proactively connecting applied research and energy retrofit applications with State operations. **The Commission's draft plan could go further to address these elements and, in so doing, rely heavily on the bench-to-operations technology adoption model that California's universities are eager to share, since we agree deeply with the environmental imperative.** This model is generating not only substantial energy savings and GHG reductions, but also significant cost savings that will continue to accrue to taxpayers and tuition-payers.

We encourage the Commission to focus on big, game-changing strategies to accelerate California toward an exemplary level of energy efficiency performance. The Governor and Legislature recognize the urgency of achieving high levels of energy efficiency, and it takes more than a challenging goal and an inspiring vision to create a real "action" plan.

Suggested Game-Changing Strategies

The financing element that is essential to success is not fully developed in the draft plan. The draft extols the value of "leveraging" subsidies and incentives to maximize capital invested in energy efficiency retrofits, although it stops short of suggesting a financing implementation concept. For the public sector, the ability to use borrowing such as the UC program has employed is essential. The "deep" retrofit projects that improve efficiency more than 50 percent typically require 8-10 years to pay back. For the private sector, a massive expansion of a statewide on-bill financing program – clearly needed as evidenced by the rapid depletion of available funds in the IOUs' on-bill programs – is a game-changing idea. Such a program need not be zero-interest, but it could be low interest if the State were to provide tax-exempt financial backing for a program administered by the IOUs. The widely held view is that on-bill financing is a "no brainer" for a CFO since it has no negative impact on debt capacity, yet it confers GHG benefits as well as long-term savings. And if there is any question about what retrofits warrant on-bill financing, the IOUs need to look no further than UC's experience with almost 1,000 completed, proven, low-risk retrofits to various kinds of buildings including residential, office, parking, site lighting, hospitals, outpatient facilities, and laboratories.

Other game-changing strategies to consider:

1. The draft plan does not recognize the full potential of deep energy efficiency as a major contributor – not a marginal one – to California's overall carbon abatement goals. We know from UC's progress so far on the Statewide Energy Partnership, coupled with the known, remaining opportunities to go even further, that energy efficiency itself can approach *half* of

the desired carbon reduction rather than the 15-20 percent that was typically cited only a few years ago.

2. An "action plan" that sets the overall goal for deep energy efficiency at the 40-50 percent level needs to formulate policy strategies that incentivize *deep* energy efficiency. Such a policy would provide higher incentives for deep energy retrofit projects – ones that save at least 30 percent – and these incentives would ramp up when the associated energy savings exceed 50 percent. The Action Plan's stated goal is whole-building energy retrofits. Therefore, an incentive philosophy needs to support this goal.

3. A related policy that we believe would strengthen and accelerate movement toward California's GHG goal would be to equalize all forms of energy efficiency incentives based on essentially equal ratios of carbon abatement per dollar of subsidy, with an incentive-tilt toward deep energy efficiency retrofits, as discussed above. Such policies would, in combination, reinforce a direct, visible, and clear relationship to the State's ultimate carbon reduction goal, and provide a metric to assure ratepayers and utilities that a consistent, cost-effective investment per unit of carbon abatement is being achieved across all alternatives available to attain California's ultimate GHG goal.

4. If the State of California is going to raise the bar for everyone else in the State, it needs to be a credible exemplar itself. This is a simple but powerful idea. For State operations, a reasonable goal might be to reduce the aggregate carbon footprint by 50 percent by 2025 – or halfway to the goal that has been adopted by the entire UC system. Sacramento can tap our Statewide Energy Partnership experience to jump-start an aggressive, accelerated program for all State agencies and operations. We are ready and eager to assist.

5. Minimizing bureaucratic complexity should be a stated goal. The building managers, energy managers, and facilities directors who make decisions about whether to pursue ambitious energy projects tend to lose patience with bureaucratic complexity and excessive paperwork. This needs to be recognized as a factor that can thwart success or stimulate it – accelerate it, or grind it to a halt. A related policy suggestion is to scan the proven, low-risk (predictable cost, predictable savings) "deep" energy retrofits that have consistently yielded more than 50 percent energy savings from UC's vast portfolio of completed SEP projects; and for the retrofits that have produced consistent, predictable energy/carbon savings, formulate a list of "pre-qualified" products and retrofit projects eligible for a streamlined incentive approval process.

Suggestions that Extend Beyond Building Energy Efficiency

The Commission has long recognized the importance of integrating the interrelated, essential elements of energy efficiency, renewable energy, distributed generation, energy storage, demand response, and "smart" grid management in California's energy plans and policies. While the primary aim of this letter is to respond to your *Existing Buildings Energy Efficiency*

Draft Action Plan, we support your view that a broad, comprehensive strategy is needed to attain California's challenging GHG goal, and we would like to suggest some related policy and applied research ideas that we hope you will find worthy of further discussion. A game-changing policy that we believe would stimulate adoption of more distributed solar would change the RPS requirement so that it applies to a service territory regardless of which side of the meter installations occur. This policy change would not have a subtle effect, but rather a massive impact, by putting IOUs and "green" customers on the same page, thus eliminating the numerous disincentives that now thwart distributed renewable generation.

We would also welcome the opportunity to discuss with you the energy storage and load management pilot project ideas emerging from the University's recently formed Global Climate Leadership Council. This applied research will become more important as the margin of excess and tolerated inefficiency is reduced by a successful energy efficiency retrofit program for existing buildings in California. Air-conditioning/ventilation and illumination levels have little margin for load-shedding once they have been reduced to necessary, safe levels. Therefore, the load management solutions that California will increasingly need must come from large-scale strategies rather than building-based load-shedding.

Researchers in our Global Climate Leadership Council are eager to develop scalable feasibility studies and pilot projects of game-changing strategies in the load management domain, such as: a load management strategy that modulates the pumping timing, speed, and load for the entire California Water Project as needed to add load when excess solar or wind power creates a grid imbalance, or to cut load when a negative grid imbalance occurs; converting large air conditioning systems from evaporative cooling towers to ground-source heat pumping for heat rejection (with massive concomitant water savings); large-scale, distributed chilled water (air conditioning) storage, functioning as a "distributed battery" in combination with modulated chiller operation, creating a major tool for California energy storage, load management, and harvesting of "excess" renewable power; and harvesting surplus wind and solar energy at times of supply over-balance to convert wastewater to hydrogen through hydrolysis. If you believe that these ideas may warrant further consideration, we would welcome the opportunity to discuss them face-to-face.

In Summary

An "action plan" needs to proactively address the scale of actions needed and the scale of incentive policies required to accelerate deep energy efficiency and whole building retrofits, statewide. Moving California toward its greenhouse gas goals, at the speed needed, requires a bold action plan. We urge you to rely heavily on the University of California's deep energy efficiency track record in the Statewide Energy Partnership, its applied research institutes and centers that are ready to accelerate efforts toward California energy and carbon goals, and our

campuses and national laboratories with advanced technology, instrumentation, and microgrid pilots to provide test beds for scalable innovations that will benefit California's climate solutions agenda.

Sincerely,

Rachael Nava

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