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My message today is simple. We must harness the full potential of energy efficiency and other clean energy measures to ensure a politically, financially and environmentally sustainable energy future. To do so will require innovation, collaboration, and the creation of new laws and policies that transform markets and change behaviors. This is the challenge we all face and the vision that I hope we all share.

California Background:

California has adopted as state policy a “loading order” of preferred electricity resources. This loading order requires investment in all cost-effective energy efficiency savings as the energy resource of first choice. This policy choice reflects a 30-year history of implementing highly successful energy efficiency programs through the California Public Utilities Commission’s (CPUC) utility regulatory programs, state building and appliance standards, and state and federal research and development programs.

California’s long history of success in energy efficiency is reflected in the California Air Resource Board’s (CARB) scoping plan for achieving the Greenhouse Gas (GHG) reduction mandates set forth in Assembly Bill 32 (AB32). Efficiency measures in buildings will produce 15 percent of the reductions needed to reach 1990 emissions levels by 2020. This strategy is the second largest source of emissions reductions – right behind fuel efficiency standards for light duty vehicles which will provide an 18 percent reduction.

Energy efficiency is a critical tool for reducing GHG emissions for several reasons. First, it is available now. We have a wide range of available technologies, programs, measures and practices. Second, by actually reducing consumer costs, energy efficiency generates economic benefits that mitigate the impact of higher cost reduction measures. In a December 2007 report, McKinsey & Company concluded that, in the United States, “at 710 megatons annually in the mid-range case, energy efficiency improvements in residential and commercial buildings (including the appliances inside) make up the largest cluster of negative-cost abatement opportunities.” Estimates for California show that in 2020 energy efficiency can result in a **net savings** of \$20 per ton of carbon dioxide reductions.

In addition, energy efficiency is the “no regrets” policy on global warming in California. In other words, we would maximize energy efficiency investments even if there were no global warming problem because energy efficiency provides a tremendous benefit to the California economy. Not only does it lower

our energy bills, but energy efficiency is in large part a domestically produced resource. From the research and development at our universities and in Silicon Valley, through sales of equipment, to on-site installation by contractors, energy efficiency creates jobs throughout all sectors of our economy

Factors Needed for a Sustainable Energy Future:

To build a clean energy economy requires structural changes in the way consumers and businesses think about energy and how buildings are designed, constructed, used and maintained. There are five factors in particular that we must have in place to achieve long-lasting, comprehensive sustainability:

1. Clear legal and regulatory mandates and policies
2. End-to-end long-term strategic planning
3. Significant changes in consumer behavior
4. Research and technology
5. Workforce training and retraining

Let me address each of these factors in turn.

Factor 1: Clear Legal and Regulatory Mandates and Policies

Many states in addition to California have shown significant leadership on clean energy. According to the Pew Center on Climate Change, 26 states have energy efficiency mandates or goals. The Lawrence Berkeley National Laboratory reports that ratepayer-funded energy efficiency spending in the U.S. increased five-fold in the last 5 years, and it is likely to continue to grow from approximately \$6 billion in 2009 to a forecasted \$20 billion by 2020.

This leadership on energy efficiency is mirrored by state action on renewables. According to the U.S. Department of Energy (DOE), 21 states have renewable energy standards or goals. And, in California, we have a goal of having 33% of our electricity supply provided by renewable energy by 2020. Unfortunately, California was not successful this year in putting this mandate in law. It must be a major priority for California's next governor and Legislature.

But there is no doubt that a federal law could provide substantial benefits. So let me list the top areas I would target in federal energy legislation. The first and most obvious is the 24 other states without energy efficiency mandates and the states without renewable standards. Enacting national mandates for both energy efficiency and renewables, accountable at the state level, must be the highest priority. The second area is the establishment of long-term funding for programs and R&D, beyond the current stimulus program. The third area is establishment of a comprehensive, well-coordinated federal assistance program

to states on program implementation, evaluation, and best practices in energy efficiency. Fourth, also in the area of energy efficiency, is the establishment of uniform standards and methodologies to measure and verify energy efficiency savings. Fifth and finally is the adoption and regular updating of national building efficiency codes to set the floor for savings.

The failure of the Senate to consider a climate bill is hugely disappointing but by no means signals the end for federal action on energy efficiency. This is demonstrated in a forthcoming U.S. Environmental Protection Agency (EPA) guidance on GHG permits for facilities covered by the Clean Air Act. The guidance is expected to focus on energy efficiency as the primary control technology for GHG reductions. Energy efficiency measures will become the best available control technologies for GHG reductions in major stationary sources of pollution.

The proposed federal Homestar legislation and the bills to revive property tax financing schemes are also solid foundations. The Senate just recently proposed stand alone renewable energy standard (RES) legislation which would also allow energy efficiency credits to be used to satisfy up to 26% of the RES mandate. And, as I mentioned above, EPA has proposed that energy efficiency will become the new best available control technology for GHG emissions reductions under the federal Clean Air Act. These, coupled with stimulus spending, are significant actions and invaluable tools in our development of a clean energy future.

Factor 2: End-To-End Long Term Strategic Planning

A long-term strategic clean energy plan is vital to effect real change in our economy. In California, the CPUC adopted its first Long-Term Energy Efficiency Strategic Plan in 2008, and we recently adopted a new chapter that sets forth our strategic plan for lighting. (Both available at: www.californiaenergyefficiency.com.) Our Strategic Plan provides a framework for the next generation of energy efficiency programs and policies, with concrete goals, strategies and near-term, mid-term and long-term actions. Further, in order to move away from programs that just “tread water”, the programs and policies are selected and designed to achieve market transformation.

Let me focus on what I mean by market transformation. At the CPUC, we define market transformation as follows:

Long-lasting, sustainable changes in the structure or functioning of a market achieved by reducing barriers to the adoption of energy efficiency measures to the point where continuation of the same publicly-funded intervention is no longer appropriate in that specific market. Market transformation includes promoting

one set of efficient technologies, processes or building design approaches until they are adopted into codes and standards (or otherwise substantially adopted by the market), while also moving forward to bring the next generation of even more efficient technologies, processes or design solutions to the market.

With market transformation as our overriding theme, the California Strategic Plan identifies targeted timeframes for specific market transitions and the process for tracking progress. Thus, it is clear at what point a program has made a successful transition, or conversely, is having problems. In either case, these programs will be moved out of ratepayer-funded programs on a continual basis to make way for the next wave of technologies and programs. This is what we mean by end-to-end planning.

In addition to the focus on market transformation, several broad themes underlie the California Long-Term Energy Efficiency Strategic Plan:

1. A sustained focus on strategies, programs, measures and institutional structures that provide long-term results.

As I explained earlier, energy efficiency is a long-term resource and programs must prioritize long-term planning and permanent savings. Energy efficiency strategies cannot be selected solely on the basis of short-term payback periods or quick results. This requires patience and a longer term commitment of funding to get complex programs off the ground, or to promote consumer adoption of best available technologies.

2. An interdisciplinary approach that encompasses all aspects of energy efficiency.

The success of energy efficiency requires inputs from a variety of areas, including research and development, commercialization of emerging technologies, codes and standards, public education, marketing and outreach, and workforce education and training. A broad focus on the maximization and integration of each of these necessary inputs will ensure success.

3. Engagement of a wider range of entities and institutions in developing and delivering programs.

In the past, states have emphasized utility programs, utility funding and utility customers. This approach has resulted in a narrow focus that does not effectively account for or leverage actions of non-governmental, non-utility efforts and talents, particularly academic institutions and the private sector. Cost-effective use of resources for maximum reductions in energy demand requires the commitment of the most influential decision-makers across the economy who can affect comprehensive change. In order to reach a goal of making energy efficiency an integral part of “business as usual,” we need a

pronounced commitment from businesses, universities, and government leaders and a more collaborative approach that involves all key stakeholders.

4. Integrated whole building solutions

In the building area in particular, we need outcome-oriented planning that links strategies “end-to-end”, from research, development and deployment (RD&D) and emerging technology, through incentive and technical assistance programs, and eventually to permanent market transformation via statewide codes and standards. We must understand how the programs intersect and take advantage of the interactions.

Factor 3: Significant Changes in Customer Behavior

In order to achieve the market transformation to a sustainable future, we need behavior transformation. We need such behavior transformation from consumers, businesses and governments. And, this must encompass all aspects on understanding and using energy.

I’m very excited because here in California, we will soon be launching a state-wide, integrated communications and outreach plan for clean energy. This effort is based on extensive market research and will include a state-wide clean energy brand, social marketing best practices and segmentation research to develop messages for specific target audiences, including low income and ethnic communities.

California’s outreach includes a state-of-the-art web portal to enable information sharing, collaboration, and communication between clean energy professionals. The portal, which can be accessed at www.engage360.com, is a user-driven, secure platform that supports user-developed content and provides access to information and professional networking to advance best practices, policies and technologies. I encourage all of you to join and become active contributors.

Similar efforts are needed in every state and on a national level. A highly successful marketing, education and outreach (ME&O) program will create the demand pull for energy efficiency that is a fundamental part of any successful energy efficiency effort. The practice of energy efficiency requires a sustained effort on the part of the consumer, in information acquisition, in motivating implementation, and in on-going behaviors. A successful education and outreach effort will move consumers through a transitional process from awareness of the value and importance of clean energy, to attitude change to adopting clean energy values, to daily actions supporting sustainability.

Factor 4: Research and Technology

End-to-end clean energy planning requires a strong focus on research, development and deployment (RD&D). We must create the products and tools

that drive continuous improvement in efficiencies and buildings. Programs must encompass the entire technology advancement continuum from basic and applied research, to product design and testing, to commercialization and finally to general use. Since many demand-side technologies require a human interface, research programs must also include operational and behavioral factors that impact technology use.

In order to reach our goals, we need to accelerate the development and deployment of new technologies at a pace that matches or eclipses the consumer electronic industry in innovation, time to market, and consumer acceptance. Coordination and collaboration between the nation's research labs, policy makers and the private sector is critical to establishing research priorities and leveraging public and private funding sources. For example, ratepayer-funded programs can create substantial demand pull for new technologies, but the technologies must align with the states' policies and goals. Conversely, government agencies need to understand the efficiency technology and implementation markets, identify breakthrough technologies and practices and adapt policies and programs to achieve market transformation for those technologies.

We need to engage with each other to avoid missed opportunities and duplication of efforts and act in concert to ensure the success of promising technologies. Collaboration will create links between policy makers and the energy efficiency industry (technology companies, venture capital and research labs) so that breakthrough technologies can inform future rounds of program development, and industry can better understand the role of state agency decision making. We need public/private partnerships that connect state and local governments with leading edge companies to foster private sector energy efficiency investments and workforce development.

Factor 5: Workforce Training and Retraining

By its nature, energy efficiency is a continually evolving profession. As efficiency measures or practices become widely accepted by consumers or incorporated into building codes and appliance standards, new technologies will arise and programs must evolve.

The skill sets and expertise required for technology development, effective strategic planning, delivery model design, program implementation, and verification of energy efficiency are broad and diverse. A number of federal and state programs focus on critical training for on-the ground retrofit and retro-commissioning contractors, home builders and developers, HVAC specialists, and solar installers. There is an equally important need to train and retrain the policy makers and energy efficiency program staff. Many colleges and universities have adopted clean energy curricula and established clean energy programs and centers. These are needed and should be expanded.

However, there is a critical lack of capacity that is often overlooked - in government agencies that are charged with designing, approving, and overseeing clean energy programs. As I have noted, 26 states have energy efficiency goals or standards yet almost all states lack sufficient funding to add needed staff or even pay for training existing staff in best practices.

No organization across the public sector, civic sector or private sector is filling this critical technical assistance gap and, as a result, many state and local energy agencies lack the necessary information on best practices in implementation and the trained workforce to carry out those practices.

This is critical to the future of energy efficiency. The current wave of enthusiasm for energy efficiency must result in successful programs that produce measureable, long-term energy savings in the next three to four years. These savings must be large-scale and long-lasting so that the number of avoided or shut-down power plants is measureable, carbon reductions are significant, and individual consumers see reductions in their energy bills.

Conclusion

Let me end with a simple message: we need **collaboration**, **innovation** and **integration**. Sustainability is a way of life; it is not just government, or academics, or others. It is all of us.

We need the essential components for sustainability:

- Given the billions of dollars to be invested and the role of the private sector, we need to have written, strategic “roadmaps”. The California Long-Term Energy Efficiency Strategic Plan is a start but we need similar plans in every state and a national strategic plan.
- We need to be clear on goals, metrics to measure progress, and engage the full range of stakeholders.
- For the academic community this means the following:
 - You need to understand the limits/ opportunities in government and the private sector.
 - You need to support policy makers through the work that you do and seek to ensure that your research and efforts will find a voice in government and the private sector.

This is a movement. We must pursue sustainability at every level and in all aspects of our lives, personally and professionally. Let us waste no time in embracing this as our vision, our mission, and our passion. Thank you.