Workshop
2008 California Building Energy Efficiency Standards
June 13 2007

I am Jerome Blomberg representing Sunoptics Prismatic Skylights, located at 6201 27th Street, Sacramento, CA 95822.

I had planned to attend this final public workshop on the 2008 California Building Energy Efficiency Standards to support the proposed revisions to the daylighting portion of the standards, knowing that the proposed revisions are overly conservative. The mandates of the revisions will pay for themselves many times over during the life of the skylight installations.

My position has changed over the last month, after reading a new book written by Peter Ward Ph.D.. Dr. Ward is a highly credentialed paleontologist who has spent the last thirty years studying mass extinctions on the planet. He and his co-researchers believe that four or more of the mass extinctions, other than the asteroid that hit the Yucatan area of Mexico which wiped out the dinosaurs, have been caused by the build up of carbon dioxide in the atmosphere. In the past, huge volcanic discharges supplied the carbon dioxide necessary to create the toxic oceans that terminated sea life, plant life, and animal life.

His research indicates that for the last three million years, CO2 in the atmosphere has ranged between 180 to 240 parts per million until the industrial revolution started. Since then, man and or nature has added 140 parts per million for to total of 380 parts per million today.

As China and India with their billions of people, rapidly move towards an industrialized society and want what we have in the Western Industrialized Countries, the rate of CO2 emissions will accelerate. Ward's position is that 500 parts per million of CO2 in the atmosphere, is the tipping point at which the increased temperature of the air and oceans will cause the ocean to belch out the stored CO2 and methane that has been sequestered in the ice caps and cold ocean waters. Since increased air temperature will hold more moisture vapor, which adds another effective greenhouse gas, the combination of these factors would be ever accelerating, until all the ice on the planet has melted. When the temperature differences on

the planet are very small the wind stops blowing and there are no ocean currents. Warm ocean water holds no oxygen and all sea life ends. In the meantime, when the ice melts on the land mass of Greenland (the first to go) the seas will rise approximately 20 feet, and when the ice on Antarctica melts completely, the seas will rise an estimated 240 to 250 feet.

If life is to be maintained on the planet, it is up to science to find a way to take out and sequester some of the CO2 that is in the atmosphere. Science must be careful not to remove too much, because when there was only 180 parts per million in the atmosphere, the earth had a mini ice age. Whatever way the CO2 is removed, it won't be cheap. It is far less expensive to use cost effective, energy efficiency measures now, than to take the CO2 out of the atmosphere later.

I stand by the proposals I made at the Workshop on July 13, 2006 as being cost effective and thereby required by the enabling legislation.

In 1984 I presented to the Energy Commission, at a workshop like this one, a synopsis of a couple articles on CO2, global warming, and climate change written by NOAA scientists.

I immediately believed they were probably onto something important because of an experience I had working with Lawrence Berkeley National Laboratory in evaluating various gases that could replace the air contained in insulating glass units. The goal was to identify which gas would maximize the resistance to heat flow through the glass. CO2 is not the best gas to improve the insulating glass's thermal performance, but with replacing only 1/4" of air with CO2, **the resistance to heat flow through the glass was increased by 25%.**

To quote Dr. Ward in his book UNDER A GREEN SKY "I'm scared as hell and I'm not going to be silent anymore". I am also scared as hell and I'm not going to be passive anymore.

We all need to be happy warriors, Although knowing that what we alone in California can do will not save the planet, we must however do our part, and above all show the rest of the world how energy efficiency need not reduce the quality of life. In fact, energy efficiency improves our quality of life, with less dependence on foreign energy sources, cleaner air, less

water pollution and when daylighting is the method used for increased energy efficiency, we improve our spaces in which we work, shop, learn and play.

The State Legislature and the Governor have committed the State of California to reduce CO2 emissions to nearly impossible, if not impossibly low levels in the next couple of decades. If the CEC ignores its mandate to create Energy Efficiency Standards that are cost effective and will not consider all cost effective daylighting measures then, they either believe the Legislature and the Governor were just grand standing and can be ignored or the CEC Commissioners and Staff, are betraying the Legislature and the Governor, in their effort to make California a leader in an International effort to curb CO2 emissions.

I urge you to reconsider the reduction of ceiling height from 15 feet to 12 feet if not the 10 feet in my proposal of last July. I am including a copy of those proposals.

Thank you for your time and interest. Get the book UNDER A GREEN SKY by Peter D. Ward. It will scare the hell out of you and you won't be silent or passive anymore either.

Added comments as of 6 – 26 – 07.

After reading the Draft Report Updates to Skylight Requirements, I am deeply disappointed that you continue to use the low skylight transmittance of 39%. There isn't a skylight manufacturer in the State of California that cannot produce a skylight that has light transmittance of at least 59% and still maintain a 90% or higher haze factor. It is inconceivable that any skylight manufacturer could compete in the market place if their skylights delivered 33% less light than their competition.

Obviously using this low light transmittance makes it more difficult to show lower ceiling heights to be cost effective. Adding to that difficulty is the myth that a certain portion of the electric lights must remain on, even when there is sufficient daylight. Wal*Mart, Kroegers, Food for Less, WinCo Foods, Smiths and other retailers that turn off all their electric lights when there is sufficient available daylight, are proving this myth wrong. Please reconsider closing the loophole you have created by exempting the daylighting requirements in spaces with a ceiling height of 14' 11 7/8" or less.

Workshop
2008 California Building Energy Efficiency Standards
July 13 2006

I am Jerome Blomberg representing Sunoptics Prismatic Skylights, located at 6201 27th Street, Sacramento, CA 95822.

I do not know what revisions to the Daylighting portion of the 2008 Standards Jon McHugh is going to present. In the following comments and recommendations, I may be supporting Jon, or I may be challenging his position to be more aggressive in requiring Daylighting with skylights wherever they are cost effective**, as the enabling legislation requires.**

The skylight requirements in the 2005 Standards, reflects excessively high installed costs for skylights. The costs used for photo-controlled electric lighting devices included electrical equipment that would be required in buildings with or without daylighting, artificially reducing cost effectiveness. The performance of the skylights (light transmittance and light distribution) was also lower than standard industry practice.

The illuminance predictions from skylights, were and are based on flat skylights on a flat roof. This reduces the theoretical hours the electric lights can be dimmed or turned off, reducing their cost effectiveness. On roofs with a slope of less than 4" and 12", skylights are required to be domed by code. Domed skylights catch more light at low sun angles than flat skylights do, bringing more light into buildings, early in the morning and late in the afternoon, in summer, and in winter, domed skylights will perform better all day long.

I think it was reasonable for the 2005 Standard to be based on these very conservative assumptions, but I do not think it is reasonable to use those same assumptions when the 2008 Standards are written. This is particularly true if California is to achieve its' greenhouse gas reduction goals in the years ahead.Based on more realistic skylight costs

and today's higher skylight performance, I would recommend the following changes for the 2008 Standard.

1.Reduce the mandated skylighted area from 25,000 square feet 8,000 square feet.

2.Reduce the ceiling or roof height requirement from 15 feet to 10 feet.

3.Elliminate the requirement for photo-controls on electric lighting in unconditioned daylighted spaces of less than 8,000 square feet, when the skylight to roof area ratio is 4% or more.

4. A one hour spring wound timer should be considered as an alternate to automatic lighting controls in conditioned spaces of less than 5,000 square feet, when the skylight to roof area ratio is 4% or more.

5. In schools, aggregate and daylight classroom spaces of 700 square feet or more, to meet the 8,000 square foot requirement.

6.Daylight all modular classrooms of 700 square feet or more.

All of these recommendations are cost effective, and items 3 and 4 are recommended to make daylighting more cost effective in small areas, where daylighting with skylights would be voluntary, not mandatory.

Presently, every month, Sunoptics Prismatic Skylights is producing enough skylights that will be installed in retail stores, to replace 6 megawatts of connected electric lighting during 70% to 80% of the daylight hours. These savings occur during much of the utilities peak demand hours.

Most of these skylights are shipped out of California. Each 4'X8' or 5'X6' double glazed skylight, when installed in retail stores that are open 7 days a week, can replace 2800 kWh of electric lighting each year. The approximate installed cost for each skylight is $600. The actual cost of the skylights are about one-third their installed cost.

To dramatize the cost effectiveness of daylighting with skylights, let's look at the cost of a photovoltaic (PV) system to replace 6 megawatts of peak electric demand. At $8,000 to $10,000 per peak kW, the PV's installed cost would amount to $48,000,000 to $60,000,000. Compare that to the $3,000,000 for the installed cost of the skylights which also saves the same 6 megawatts of peak electric demand.

California Energy Commission document #CEC-300-2005-013-FS indicates that a one kW PV system can be expected to generate 1350 kWh per year. Each 4'X8' or 5'X6' skylight, installed in a retail store, open 7 days a week, can replace 2800 kWh of electric lighting per year. That means, it would take $99,000,000 to $124,000,000 of PV to generate the same amount of electricity as Sunoptics can save with one month's current production of skylights. We have the capacity to double that production rate.

Utility incentives for PV installations have ranged in the $3.00 to $4.00 per peak Watt installed. The incentives to install 6 megawatts of peak PV panels would then amount to $18,000,000 to $24,000,000. **Both Skylights and PV are solar devices using the same renewable energy source, the sun.** It is just that, reducing our nonrenewable energy use with PV is 30 to 40 times more expensive than getting the same results with skylights. The production of PV panels also creates more pollution than the production of skylights.

Replacing electric lighting 1900 hours per year extends lamp and ballast life, thereby adding to the energy savings with reduced lamp and ballast replacement costs as well as their end of life disposal costs. Proper daylighting also reduces air conditioning loads for more energy savings.

Studies indicate that daylighted spaces increase productivity, reduce errors, improve product quality, kids learn faster in daylighted classrooms, sales are greater in daylighted retail stores, and there is less absenteeism in every daylighted venue.

It is time to be aggressive, to reduce electric demand and annual electricity consumption, with the use of skylights to daylight every appropriate building.

Optimizing the use of natural daylight in our buildings is much less expensive than building new power plants, and daylighting buildings with skylights produces no greenhouse gasses, does not pollute our air and water, and does not require the secure storage of nuclear waste for thousands of years.

Let's see if we can make Edgar Casey wrong. Edgar Casey was an internationally renowned psychic of the early 20th century. Casey, in his daily trances often saw the central valleys of California as an inland sea. I don't think Casey ever heard of greenhouse gasses or that global warming is probably caused by human activity.

Maybe Al Gore in his movie "An Inconvenient Truth" is right. Maybe the cover of Time Magazine's issue on global warming "BE WORRIED, BE VERY WORRIED" is right. Maybe Tim Flannery in his book "The Weather Makers" is right. Maybe Commissioner Rosenfeld, with his decades long concern about global warming, is right. Maybe we don't have a minute to lose. Maybe it's already to late and we will all become boat people here in the Central Valley, along with hundreds of millions of other flood victims around the world. Many scientists believe there is 250 feet or more of increased ocean depth stored in the polar ice that is on land.

For me there is no maybe, I know, it doesn't make sense to be timid and not do everything in our power, to minimize our consumption of carbon fuels. We need to become energy independent, which would improve the U.S. trade deficit. While we are working on the above issues, we can also improve the environments in which we learn, work, shop, and play.

Daylighting with skylights can help achieve all of the above and in the long run the savings will not only pay for the skylight installations, but can return their installed cost many times over in their 20 to 30 year useful life.

Sunoptics and the rest of the skylight manufacturers in California are geared up and ready to meet any new demands the 2008 standards may create.