

# Docket # 15-BSTD-01

May 29, 2015

## **MAYBE LIGHTING RETROFITTERS NEED TO APPROVE CURRENT 15 DAY LANGUAGE BUT...**

Greetings

The existing 15 day language may be best that the CEC will allow for lighting retrofits and thank Gene Thomas at Ecology Action again to get the CEC to at least approve this.

But real lighting retrofitters and end-customers deserve much better. It should be to save the most energy in California. I feel like the CEC is a bad boss with its own agenda, and even though lighting retrofitters and end-customers, who want to do retrofits, have to listen to the boss, even if they know and have shown what is really needed to bring back lighting retrofits to levels before this Title 24.

It is my professional opinion that the CEC is selling California to special interests again, like it did when the existing Title 24 was originally approved.

It is my understanding that several dimming and control companies, big labor and acceptance testers have been very active trying to preserve the status quo. But where is their evidence? For example, I have seen numerous examples of people and companies specify excessive lumens and wattage to show how their dimming and controls can save energy when they are dimmed and controlled. Are they trying to protect themselves or are they trying to do what is best for California? If the CEC really followed the money and really understood lighting retrofits, I do not see any reasons that the CEC would give in to them.

If any person or organization can find any substantial inaccuracy with any of these 14 statements regarding lighting retrofits, please make a public statement.

1. There would be considerably more KWH and peak KW saved from lighting retrofits with no Title 24 or at least how the previous one was used than with this 15 day language. Just look at the total amount of energy saving from lighting retrofits with the previous Title 24 compared to now.

2. The free market is much better than Title 24 mandates. There is a big difference between electric contractors and lighting retrofit contractors, and lighting retrofit contractors do the vast majority of the lighting retrofits. There may be 25 – 50 major lighting retrofit contractors based in California or do considerable work in California, which do most of the lighting retrofit projects in California. I only know two union ones, and I do not think that they are any better than the good non-union ones. After many years of experience, these retrofit contractors know what is cost effective with lighting and controls for specific projects and customers. These retrofit contractors would get to very low LPDs and low KWH cost effectively without any Title 24 mandates, because increased saving accomplished cost effectively improves the percentage of end-customers approving projects. Also by now many end-customers also know what is cost effective for them. When controls are cost effective they will be included.

3. I agree that often there is not much extra cost for controls in new construction. For example the extra parts cost for a wall mounted occupancy sensor is not that much more than parts cost for a wall mounted switch and the labor for the sensor is also not that much more. But in retrofit that already has a wall switch, the extra parts and labor costs are substantial.

4. I do not understand any right that the CEC has to mandate how lighting retrofitters and end-customers do lighting retrofits. End-customers have the right to keep existing lighting and they and lighting retrofitters should be able to retrofit any way they agree. End-customers could sue the CEC for limiting their rights. If some end-customers only want a 'shallow' retrofit with limited cost that should be their right. Some energy savings is better than no energy savings. For many applications, it is more cost effective to do lighting by itself than controls by itself or lighting with controls, and end-customers should have the right to choose the best financial return with their money.
5. Let lighting retrofitters and end-customers decide if and when control experts and/or controls acceptance certification are cost effective. Years ago IBM in the SF Bay Area did a lighting retrofit that included wall sensors. IBM hired a 3<sup>rd</sup> party company to commission the sensors.
6. With currently available LED and even some high performance incumbent products, which can easily provide .3 - .5 WSF, basic wall sensors to advanced controls often have paybacks 15 years or longer based on saving energy, and may make the entire project not cost effective for end-customers to approve. Most end-customers will not accept more than a five-year payback and many do want more than a three-year one.
7. There is a big difference between saving energy and doing it cost effectively, but the CEC does not seem to have a practical understanding and may be swayed from various dimming and control lobbyists.
8. Occupancy sensors can increase annual hours of operation in various types of applications. So it would be better not to mandate them, but allow them to be installed when cost effective and get rebates for them. There is no benefit, just extra costs for automatic building turn-off if people are already doing a good job turning off the lights everyday
9. With very little low hanging fruit left and diminishing returns, which is still being able to save 20 – 60% of the energy, but the electric bill reduction is much less than in the past, any additional burden makes it more difficult for end-customers to approve lighting retrofit proposals. Additional burdens include time and effort to deal with the Title 24 process, having to buy and install controls even when they are not cost effective, etc., etc., etc.

I recently developed the below feasibility table for a California end-customer, who wants a re-retrofit based on retrofit I designed and was installed in 2007. With only 48 existing watts per fixture, which is not that uncommon, it is tough to make anything cost effective even without having to deal with Title 24 costs. This is a prevailing wage project, so labor costs are higher than non- prevailing wage or non-union projects. As you can see, the only decent paybacks are for the top four options, because they do not trigger Title 24, but they are not the best options. Adding a \$100 tunable LED task light to replace existing fluorescent T8 task lights even for those options brings the payback over five years. Based on the installed cost for a wall mounted occupancy sensor in each private office that has two re-retrofitted 2x4 troffers, the payback for the occupancy sensor is about 15 years. Many office workers in these private offices are doing a very good job of turning off their lights when they leave for meetings, lunch and end of the day, so the savings from occupancy sensors would probably be less. For office workers, who always turn off their lights, electrical cost could go up based on those workers allowing the 10 – 15 minute delay from the sensors to automatically turn lights off. Including lighting and sensors, the end-customer may choose to do nothing.

FEASIBILITY STUDY																			
\$0.14		blended KWH rate		1.05		additional air conditioning savings (1.00 is none)													
existing				proposed															
fixture type	watts	annual hours	annual electric cost	option	retrofit option description	rated lamp life hours @ 3 hour cycles	appr. watts	annual electric cost	watts per square foot (WSF) based on 1 troffer per 80 SF	% watts reduction	annual unit electric cost savings	appr. installed cost (excluding Title 24 costs)	appr. installed cost per SF (excluding Title 24 costs)	appr. KWH saved first year rebate multiplier	payback in years	GENERAL NOTES	CONTROL NOTES based on CEC DEER 16% savings with occupancy sensors, following are additional savings from each troffer retrofit		
2x4 troffer with ALP upscale kit, 2 30,000 - 36,000 hour rated 3100 lumen F32T8 850 lamps & high performance 77 BF instant start ballast (based on 1 fixture per 80 SF, 6 WSF) (2007 specification and installation)	48	3000	\$20.16	AT	Retrofit with 2 25W F32T8 850 extra long life fluorescent lamps, keeping existing ballasting (this may require 1 additional Prism PlanLED TL7000 or equivalent tunable LED task light per workstation at additional cost, which could replace existing task lighting)	50,000 - 60,000	38	\$16	0.48	10	21%	\$4	\$12	\$0.15	\$0.03	2.5	Ballast life is usually 15 years.	\$2.55	
				BT	Retrofit with 1 32W highest lumen F32T8 850 fluorescent lamp & centering kit, keeping existing ballasting (this would probably require 1 additional Prism PlanLED TL7000 or equivalent tunable LED task light per workstation at additional cost, which could replace existing task lighting)	30,000 - 36,000	25	\$11	0.31	23	48%	\$10	\$20	\$0.25	\$0.03	2.07	1.8	Ballast life is usually 15 years. Prism PlanLED TL7000 dimming and Kelvin changing LED task light costs about \$100. Cord and plug task lights are not included in Title 24 calculations.	\$1.68
				C	Retrofit with 2 approximate 25W TLEDs, keeping existing ballasting	50,000	35	\$15	0.44	13	27%	\$6	\$30	\$0.38	\$0.08	\$3.12	4.7	Ballast life is usually 15 years, but life may be increased with TLEDs.	\$2.35
				CT	Retrofit with 2 16 - 20W TLEDs, keeping existing ballasting (this would probably require 1 additional Prism PlanLED TL7000 or equivalent tunable LED task light per workstation at additional cost, which could replace existing task lighting)	50,000	24	\$10	0.30	24	50%	\$11	\$30	\$0.38	\$0.08	\$5.76	2.3	Ballast life is usually 15 years, but may be increased with TLEDs. Prism PlanLED TL7000 dimming and Kelvin changing LED task light costs about \$100. Cord and plug task lights are not included in Title 24 calculations.	\$1.61
				DT	Retrofit with 1 high lumen 32W F32T8 850 fluorescent lamp, centering kit & 1.15 BF extra efficient instant start ballast (this may require 1 additional Prism PlanLED TL7000 or equivalent tunable LED task light per workstation at additional cost, which could replace existing task lighting)	30,000 - 36,000	38	\$16	0.48	10	21%	\$4	\$55	\$0.69	\$0.03	\$0.90	12.3	Prism PlanLED TL7000 dimming and Kelvin changing LED task light costs about \$100. Cord and plug task lights are not included in Title 24 calculations.	\$2.55
				E	Retrofit with 34W Redbird or equivalent 5000K LED lightbar system	50,000 - 100,000	34	\$14	0.43	14	29%	\$6	\$100	\$1.25	\$0.08	\$3.36	15.7		\$2.28
				ET	Retrofit with 24W Redbird or equivalent 5000K LED lightbar system (this would probably require 1 additional Prism PlanLED TL7000 or equivalent tunable LED task light per workstation at additional cost, which could replace existing task lighting)	50,000 - 100,000	24	\$10	0.30	24	50%	\$11	\$100	\$1.25	\$0.08	\$5.76	8.9	Prism PlanLED TL7000 dimming and Kelvin changing LED task light costs about \$100. Cord and plug task lights are not included in Title 24 calculations.	\$1.61
				F	Retrofit with approximate 32W 3000 lumen 5000K LED troffer kit	50,000 - 100,000	32	\$13	0.40	16	33%	\$7	\$160	\$2.00	\$0.08	\$3.84	22.1		\$2.15
				FT	Retrofit with approximate 24W 3000 lumen 5000K LED troffer kit (this would probably require 1 additional Prism PlanLED TL7000 tunable LED task light per workstation at additional cost, which could replace existing task lighting)	50,000 - 100,000	24	\$10	0.30	24	50%	\$11	\$160	\$2.00	\$0.00	\$0.00	15.1	Unless utility allows an exemption, there is no rebate on 2x4 LED troffer kits, which provide less than 3000 out of fixture lumens. But that may change this summer or fall.	\$1.61
				G	Retrofit with PlanLED Beetle or equivalent maximum 32W dimming and 2700 - 6500K changing LED troffer kit and shared smart wall controller	50,000 - 100,000	32	\$13	0.40	16	33%	\$7	\$250	\$3.13	\$0.00	\$0.00	35.4	Unless utility allows an exemption, there is no rebate on 2x4 LED troffer kits, which can go over 5000K.	\$2.15
				GT	Retrofit with PlanLED Beetle or equivalent maximum 32W set at 24W, dimming and 2700 - 6500K changing LED troffer kit and shared smart wall controller (this would probably require 1 additional Prism PlanLED TL7000 or equivalent tunable LED task light per workstation at additional cost, which could replace existing task lighting)	50,000 - 100,000	24	\$10	0.30	24	50%	\$11	\$250	\$3.13	\$0.00	\$0.00	23.6	Unless utility allows an exemption, there is no rebate on 2x4 LED troffer kits, which can go over 5000K.	\$1.61
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Based on an occupancy sensor saving \$4 per year with 2 troffers in a typical private office, installed cost would need to be \$20 for the sensor for a 5 year payback, which is still too long for most end-customers. That \$20 installed cost for a wall sensor is well below the typical \$60 - \$80 installed cost. Just the labor is usually about \$20. If acceptance testing is required, that will increase the cost. The real payback would be 15 – 20 years, which is really infinite, because the controls may not last that long.

10. Title 24 should allow extra wattage for the biologic or non-visual part of the visual system for Human Centric Lighting benefits. For example, if additional high CCT lighting is turned on by a 30 minute timer in the morning to help suppress melatonin and improve alertness, performance and productivity, that should not be included in the general WSF calculations.

11. Electric car charging stations and addressable HVAC units are much more cost effective for automatic demand reduction than .5 or even somewhat higher WSF lighting.

12. There is no 'carrot' in Title 24. It is only 'stick' with extra time and cost without additional cost effective saving, lower customized rebates, no rebates on certain controls, fewer projects, etc. At least after the extra work is done with organizations like LEED, there is a certification, which can improve the value of the building and designers.

13. Since Title 24 for lighting retrofits does not need to apply county, city, airport and various other projects and it does not apply to hospitals, prisons, buildings with labs and various other applications, there does not seem to be a need for it in the rest of non-federal or Indian projects.

14. Since Title 24 provides no benefit for non-residential lighting retrofits, and actually is a detriment, it should be totally eliminated. Even if this 15 day language is accepted, many lighting retrofitters will still focus on federal, Indian and other projects that are exempt from Title 24 leaving other projects not done, suffer on profitability, or focus on projects outside of California.

Unless the CEC can find substantial errors in any of these 14 points, the CEC should make the existing and 2016 Title 24s more lighting retrofit friendly than the existing 15 day language or totally get rid of Title 24 for lighting retrofits.

If the CEC responds or not, I will probably use these 14 points in upcoming seminars and articles. If the CEC responds, I will include those responses.

I am glad that I have enough California projects that are exempt from Title 24 and out of California projects, but many other lighting professionals are not as fortunate.

You can email or call me 10 AM or later Pacific time during daylight savings time, which is 7 AM or later here in Hawaii. Thanks for your consideration.

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