Two million acres of forest would be needed to absorb the CO_2 saved by Lutron lighting controls

Each year, installed Lutron commercial dimmers save an average of 1.02 billion kilowatt-hours **(Table 1)**, and installed Lutron residential dimmers save an average of 7.25 billion kilowatt-hours **(Table 2)**. **Altogether, the energy savings add up to 8.27 billion kilowatt-hours per year.**

It's reasonable to assume that the no-longer-needed electricity would have been generated at coal-fired power plants, because coal is the fuel of choice among American utilities. And, since the average coal-fired power plant generates 1.3 billion kwh/yr, this means that **Lutron light controls save the same amount of electricity as generated by 6.3 coal power plants (Table 3).**

Coal, although an abundant and inexpensive fuel, releases CO_2 when it burns; in fact, 1.9 lb CO_2 is emitted for every kwh generated. On an annual basis, therefore, **6.3 power plants emit 15.7 billion pounds of CO_2 (Table 4).**

The global ecosystem uses CO_2 in many natural processes. For example, green plants absorb carbon dioxide in the process of photosynthesis, and the EPA estimates that an acre of forest sequesters (i.e. absorbs) carbon at the rate of one metric ton per year. At that rate, **it would take 2 million acres of forest to absorb 15.7 billion pounds of CO_2 (Table 5).**

Table 1

Description	Value	Units	Source
Average commercial circuit load (undimmed)	712	W	Average load of 25 Lutron GRAFIK 7000 jobs chosen randomly between 2005 and 2009 (SEM=15W, N=2072, 25th percentile=140W 75th percentile=1200W)
Average power consumption percentage for a dimmer relative to a switch	80%		Power Correction Factor for Dimmers. California Energy Commission Study, p. 83. http://www.energy.ca.gov/efficiency/lighting/VOLUME01.PDF
Average power reduction percentage for a dimmer relative to a switch	20%		100% - 80%
Commercial usage	70	hours/ wk	Average Full Time Equivalent Lighting Hours Per Week for Large Office. California Energy Commission Study, p. 104. http://www.energy.ca.gov/efficiency/lighting/VOLUME01.PDF
Commercial usage	50	wks/yr	
Energy saved by Lutron commercial dimming circuit	498.4	kwh/yr	(712) x (0.2) x (12) x (250) x (1.00) / 100 = 498.4
Number of installed Lutron commercial dimming circuits	2.05 million		Lutron internal report, 2010
Total energy saved by Lutron commercial dimming circuits	1.02 billion kwh		2.05 million x 498.4 kwh/yr

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Table 2

Description	Value	Units	Source
Connected load in residential dimmer locations	296	kwh/yr	http://apps1.eere.energy.gov/buildings/publications/pdfs/ssl/lmc_vol1_final.pdf and privately commissioned Ipsos Market Research Study (2004)
Average power consumption percentage for a dimmer relative to a switch	80%		Power Correction Factor for Dimmers. California Energy Commission Study, p. 83. http://www.energy.ca.gov/efficiency/lighting/VOLUME01.PDF
Average power reduction percentage for a dimmer relative to a switch	20%		100% - 80%
Energy savings from installed residential dimmer	59.2	kwh/yr	296 x 0.2 = 59.2
Number of installed Lutron residential dimmers	122.5 million		Lutron internal report, 2010
Total energy saved by Lutron residential dimmers	7.25 billion	kwh/yr	59.2 kwh/yr x 122.5 million

Table 3

Description	Value	Units	Source
US coal generating capacity (2005)	2.013 billion	kwh/yr	http://www.eia.doe.gov/cneaf/electricity/epa/epat1p1.html
US coal generators (2005)	1,522		http://www.eia.doe.gov/cneaf/electricity/epa/epat2p2.html
Average energy produced by a single coal power plant	1.3 billion	kwh/yr	2013 / 1522 = 1.3
Equivalent number of coal power plants needed to generate 8.27 billion kwh/hr	6.3		8.27 / 1.3 = 6.3

Two million acres of forest would be needed to absorb the CO_2 saved by Lutron lighting controls

Table 4

Description	Value	Units	Source
CO_2 emissions from fossil fuel generating capacity	1.9	Lb CO_2 / kwh	http://www.eia.doe.gov/cneaf/electricity/page/co2_report/co2emiss.pdf
Equivalent CO_2 emissions prevented as a result of Lutron dimmer use	15.7 billion	lb CO_2 / yr	8.27 x 1.9 = 15.7

Table 5

Description	Value	Units	Source
Rate at which afforestation sequesters carbon	1	Metric ton of C/acre/yr	http:/www.epa.gov/sequestration/rates.html
Conversion of C to CO_2	8	Lb CO_2 / kilo C	
Afforestation that would absorb the equivalent CO_2 emissions prevented	2.0 million	acres	15.7 / 8 / 1 = 2.0