

**Building Dimmers
vs. Building Power Plants:
An Economic Analysis**

Technical white paper
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August 24, 2009



Building Dimmers vs. Building Power Plants

Executive Summary: It costs \$0.35 to save a Watt of electricity with a dimmer. It costs between \$1.40 and \$7.75 to build a watt of electrical generating capacity. It is therefore 4 to 22 times more expensive to build generating capacity than it is to conserve capacity through the use of dimmers.

Residential Dimming

The average investment for a Lutron® residential dimmer is \$16. Using this dimmer can save \$7.36 (or more) in electricity costs per year. Now consider what it costs to save a Watt of power with a residential dimmer:

- Average residential dimmer load = 300 W¹
- Average energy savings while dimmer is in use = 20%²
- Average power saved by using a residential dimmer = decrease in load = 300 W x 20% = 60 W
- Cost per Watt to use a dimmer to free up electricity for other users = $\$16 \div 60 \text{ W} = \mathbf{\$0.27 / W}$

It costs 27¢ per Watt to save electricity using a residential dimmer

Commercial Dimming

The typical investment for a Lutron® commercial dimmer is \$100. Using this dimmer can save \$85.68 (or more) in electricity costs per year. Now consider what it costs to save a Watt with a commercial dimmer:

- Average commercial dimmer load = 1200 W³
- Average energy savings while dimmer is in use = 20%²
- Average power saved by using a commercial dimmer = decrease in load = (1200 W x 20% = 240 W)
- Cost per Watt to use a dimmer to free up electricity for other users = $\$100 \div 240 \text{ W} = \mathbf{\$0.42 / W}$

It costs 42¢ per Watt to save electricity using a commercial dimmer.

Combined Average

The combined average cost to save electricity with any dimmer = $(27\text{¢} / \text{W} + 42\text{¢} / \text{W}) \div 2 = \mathbf{35\text{¢ per Watt.}}$

Cost of Generating Equipment

Consider the cost to build additional power generation equipment to support the nation's growing demand for electrical energy:

- It costs **\$1.40 per Watt** to build a coal-powered power plant⁴
- It costs **\$1.48 per Watt** to build a large grid-connected wind generator⁷
- It costs **\$3.00 per Watt** to build a nuclear-powered power plant⁵
- It costs **\$7.75 per Watt** to build a solar powered power plant⁶

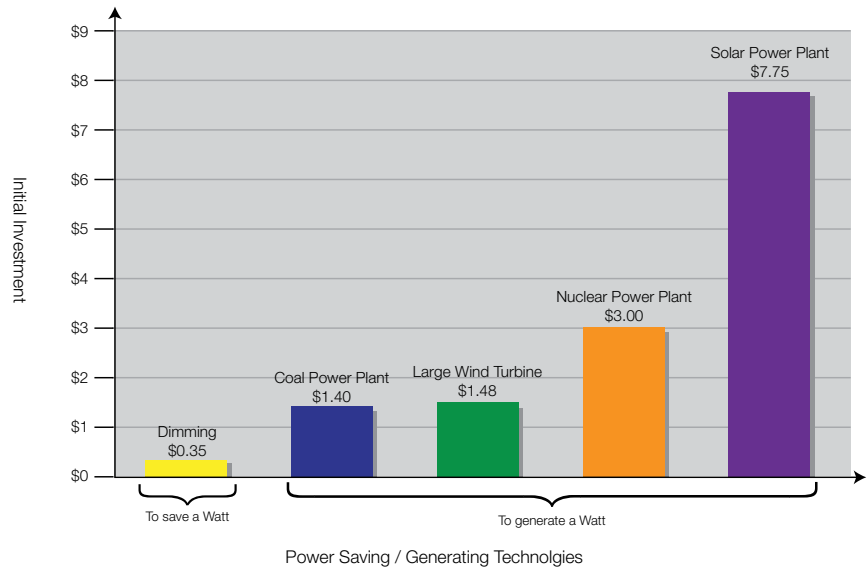
Economic Analysis

Using the average cost of 35¢ per Watt to conserve electricity by dimming, we can now compare how much it costs to save electricity by dimming vs. how much it costs to create additional electrical generating capacity.

Note: This conserved energy is sometimes referred to Negawatts⁸, since it represents power that no longer has to be generated.

Source	Cost per Watt (\$ / W)	Cost per Watt compared to dimming (ratio)
Dimmer Negawatts	\$0.35	1.0
Coal	\$1.40	4.0
Wind	\$1.48	4.2
Nuclear	\$3.00	8.6
Solar	\$7.75	22.0

Investment to Save / Generate a Watt



At 35¢/ Watt, it is far cheaper to conserve electricity with dimmers than it is to install new power generating equipment. Another advantage: Dimmers are available immediately and can be installed on the same day of purchase, whereas it can take decades to plan and build a power generating plant.

Conclusion

It is 4 to 22 times more expensive to build new generating capacity than it is to conserve energy with Lutron® dimmers.

References

- 1 Lutron® survey of customers and employees
- 2 California energy study
<http://www.energy.ca.gov/efficiency/lighting/VOLUME01.PDF>
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<http://www.nrel.gov/docs/fy07osti/41435.pdf>
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