



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

Name(s) <p align="center">Howard C. Noz</p>	Project Number <p align="right">22457</p>
Project Title <p align="center">The Right Price for Light</p>	
<p align="center">Abstract</p> <p>Objectives/Goals Replacement of incandescent lamps (IL) with high efficiency lamps (HEL) should prove to be expensive because of higher costs of HELs, higher electricity prices and surcharges and the possible extra costs to accept the heavier and bigger HELs with byproducts like sound and electro-magnetic disturbances. Is the consumer paying a high price for keeping the lights on in his house?</p> <p>Methods/Materials In a box with 6 black cubby holes are placed 5 HELs, being advertised as 60W equivalent light sources, and 1 IL of 60W, being the Control. Prices, dimensions and weights were determined. 23 days light, temperature, sound, electro-magnetic radiation, current, and voltage were measured. The possible savings were calculated and compared against costs HEL bring to the consumer.</p> <p>Results The findings were placed in charts and graphs. The HEL compared to IL show: 4 HEL produced 149-173 % more light using 460-500% less energy. 1 HEL failed to produce same light level. Small sound at levels 0.1-0.8 dBA above ambient noise. Electro-magnetic levels of 0.8 - 5.2 mV(RMS) and peaks of 20mV (RMS) at 30 cm from source. Temperatures at 60 cm are 149-173% less. HEL are 30-85 grams heavier. 4 HEL were 0-2 cm larger in diameter or height. Large cost savings were calculated over 23 days and increase if electrical prices rise.</p> <p>Conclusions/Discussion The hypothesis is wrong for the lamps tested. The price for HEL is higher than IL. Sound, EMR, and extra weight are insignificant at this size of lamp to increase costs much. The energy savings justifies the replacement of the lamps. Certain applications appear not possible or difficult like dimming lights to a candle strength, changing color, and putting lights in series. The small detected sound and EMR levels and the weight may be important when this experiment is expanded to include lights that are much bigger than the 60W lamp. It would require a much bigger test box and the electricity cost for such an experiment will be high. It may prove however that consumers will have to pay extra for reducing the sound and EMR levels and the heavier ballast for the HEL need heavier more expensive fixtures. Lighting in theaters is very bright and there is a need for dimming. There it may prove difficult to apply HELs.</p>	
Summary Statement <p>Do consumers enjoy the same properties from HEL as from IL and is it really reducing costs?</p>	
Help Received <p>Dad assisted in borrowing instruments, laptop, and getting box material, taught wiring the lamps and using the instruments. Friend, Eugene Shin, helped with initial project thoughts. Teacher helped in project planning and display board requirements. Mom helped in reviewing text.</p>	