

Lighting the way to the future

[Science](#), [Physics](#)



and Lighting the Way to the Future Data 22% of the U. S. annual electrical energy consumption is for lighting. This is equivalent to 8. 2 Quads.

$$1.0 \text{ Quad} = 1015 \text{ BTU}$$

Assumption: Power plant operating at 30% efficiency produces 8. 2 Quads

$$\text{Primary source} = 27.3 \text{ Quads}$$

$$\text{a) } 1.0 \text{ Quad} = 181 \text{ Mboe}$$

$$27.3 \text{ Quad} = ?$$

$$27.3 \times 181 = 4941.3 \text{ Mboe}$$

1

b) Current price level of a barrel of oil is \$75. 64/barrel

$$1 \text{ barrel} = \$74.64$$

$$4941.3 \text{ Mboe} = ?$$

$$4941300000 \times 75.64$$

1

$$= 373759.932$$

$$= \$373,759,932,000$$

c) 1.0 Quad = 2.93 x 10¹¹ Kwh

$$27.3 = ?$$

$$27.3 \times 2.93 \times 10^{11}$$

1

$$= 79.989 \times 10^{11} \text{ Kwh}$$

$$\text{If } 1 \text{Kwh} = \$0.12$$

$$79.989 \times 10^{11} = ?$$

$$79.989 \times 10^{11} \times 0.12$$

1

= \$9. 59868 x 10¹¹

d) Yes, it is a reasonably achievable goal.

First by consumers being informed of the necessity of keeping off lights whenever it is not needed.

Introducing other lighting options like solar or wind power.

Improving the efficiency of the power to 60% by subsequent research and development in technology. This will in turn translate to 13. 65 Quads of feedstock energy.

Yes it is worth the trouble because when that energy is saved, operations cost put in supplying the lighting energy go down. Cost efficiency is an aspect that is positive for every economic sector.

Question 2

China's approach to building efficiency is a step towards the right direction. According to the article, The Building Technologies Program (BTP) is a good investment towards Research and Development (Office of Energy Efficiency and Renewable Energy, 1). It will reduce both energy consumption and waste by significant levels. In the article, the author states that China has over 81 million buildings that consume more energy than any other sector in United States. Hence, the approach of being more energy efficient by investing in the BTP is a great step to the right direction because it will promote not only energy conservation but also efficiency. The model is workable for United States because according to the data, residential houses use up to 45% of energy for space heating alone (U. S. Energy Information Administration , 1). The data also shows that residential houses use 18% of energy for water heating (Boston Business, 12). Thus, if the country would use the BTP in its

buildings, it would become energy-efficient. While the approach would be appropriate in the U. S, it is undesirable. Reason being, the Unites States weather is not like the one in China. Another reason is that the technology that the country uses in buildings is not similar to the one in China. Hence, to use BTP in the country would mean change in building models.

Question 3

The setting of Corporate Average Fuel Economy (CAFÉ) Standards has been successful. The government first created the law in 1975. The government set the limits for the improvement of usage of fuel for cars from 27. 5mpg to 37. 8 mpg (Crovitz, 7). What the law essentially means is that the government requires the combination of the usage of fuel by cars and trucks to an average of 34. 1 mpg (35% rise) by 2016. The reason the setting of the standards is successful is because of the improvement that automakers continue to make. For instance, BMW, fuel use in 2008 was 22. 5%. In 2013, it became 27. 4%. Similarly, Nissan's fuel use in 2008 was 22. 7%. In 2013, it became 23. 1% (Crovitz, 11). If compared to the tax that the government adds for every gasoline that a car owner purchases in a gas station, the CAFÉ standards are better than the tax. Reason being, with a growing economy, people have more disposable income than they had. Therefore, they will have a cushion for the tax that the government adds. It will end up having no effect in energy consumption and conservation efforts.

Works Cited

Boston Business. " The Office of Energy Efficiency and Renewable Energy (EERE." Boston Business 2011: n. pag. Print.

Crovitz, Gordon. " The Car of the Future Will Drive You." Wall-street

Journal 2012: n. pag. Print.

Office of Energy Efficiency and Renewable Energy. " Building Technologies Office | Department of Energy." Office of Energy Efficiency & Renewable Energy | Department of Energy. Office of Energy Efficiency & Renewable Energy | Department of Energy, 2014. Web. 19 Nov. 2014. .

U. S. Energy Information Administration (EIA). " Table 1a. U. S. Commercial Buildings Site Energy Consumption by Census Region and Principal Building Activity, 1992-2003(Trillion Btu)." U. S. Energy Information Administration (EIA). U. S. Energy Information Administration (EIA), 4 Dec. 2004. Web. 19 Nov. 2014.