





1. In an article in the New York Times, Google announced their power use attributed to Google searches is 12.5 million Watts. (a) How much energy per day in kWh? (b) Calculate the carbon emissions related to all Google searches based on the energy use in lbs. CO<sub>2</sub>. Assume the electricity is generated in PG&E territory with a 0.524 lbs CO<sub>2</sub>/kWh emissions factor. (c) Assume there are 1 billion searches per day. What is the carbon footprint of an individual Google search? Report your final answer in **grams CO<sub>2</sub>e per Google Search**.

$$12.5 \times 10^6 \text{ W} \times 24 \text{ h} = 300 \text{ MWh}$$

5 points

5 points

$$300 \text{ MWh} \times 0.524 \text{ lbs CO}_2/\text{kWh} = 157.2 \text{ million lbs CO}_2$$

- 2.

drivers use the same amount of energy ~~to get~~, how many gallons of gasoline would this displace each year?

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4. The US imports 12 million barrels of oil (bbl) ~~per~~ day (hint: note that this is a rate of energy consumption because it is energy per unit time). Each bbl contains ~~58 x 10~~ energy, often referred to as a barrel of oil equivalent). (a) Convert the rate of daily oil imports into power (GW). (b) If the US wanted to electrify auto fleet using nuclear power, how many Diablo Canyon nuclear plants worth of power ~~could~~ be needed (each can provide 2.35 GW of power)? (NOTE: EVs are more efficient than ~~EVs~~, so the actual number of Diablo Canyon plants would be lower, probably about 1/3 of the number you calculate here).

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