

QUANTITATIVE ESTIMATION AND DATA VISUALISATION

FERMI ESTIMATION MINI PROJECT

INSTRUCTIONS

- Answer all 3 questions below.
- Upload one submission per group by 23:59 pm Friday, 15th October 2021.
- All group members should do research: to gain background knowledge and to find useful information about each question.
- On Tuesday, 19th October 2021, each group will have 10 minutes to present their solution to the class.

In preparing your submission, follow these guidelines:

- Attribute sources of data that you use, including an author and date if available, and a website URL. Remember, online sites that do not attribute sources of data and statistics are not considered credible.
- Give a narrative to your solution (“talk us through your solution”), including assumptions, key steps, decisions, and reasoning
- Calculations should be clear and easy to follow and include units of measure
- The final answer should be a complete sentence response to the original question and include units of measure.

Question 1

How many plastic toothbrushes are thrown away by Ghanaians each year? Estimate the mass and volume of plastic this represents. Give numerical pegs to put the numbers in context.

Question 2

How many mobile phones are discarded by Ghanaians in one year? How much gold could potentially be extracted from mobile phones discarded by Ghanaians in one year? How does this compare to the amount of gold produced in Ghana in a year?

Question 3

According to the report *2020 Electricity Supply Plan for Ghana*, published by The Supply Plan Committee and including technical experts from the Energy Commission, GRIDCo, VRA, BPA, ECG and NEDCo (available at <http://www.gridcogh.com/electricitysupplyplan>), “The Ghana power system recorded a coincident peak demand of 2,803.7 MW in 2019. This occurred on December 3, 2019” (p. ii). If Ghana wanted to use solar power to cover 30% of peak demand, how many solar panels would be needed? About how much space would these panels require?