How to Use the Environmental Load Slide Rule

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Thank you for using the Environmental Load Slide Rule.

This Environmental Load Slide Rule is an instrument used to measure the effect human activity has on the environment. Iwate Prefectural Government devised this tool so people could realize the effect they have on the environment.

Below are a few examples on how to use the slide rule:

Example 1: When 4kg of kitchen refuse is incinerated:

1. Align the red line for "kitchen refuse" (middle strip) with the red "100" (bottom strip).
2. Carbon dioxide (CO_2) emission is shown on the top strip corresponding to 4,000 grams on upper half of middle strip.

Answer: Environmental load is approximately 1kg of CO_2.

Example 2: When 2kg of paper is incinerated:

1. Align the red line for "paper" (middle strip) with the red "100" (bottom strip).
2. CO_2 emission is shown on the top strip corresponding to 2,000 grams on upper half of middle strip.

Answer: Environmental load is approximately 4kg of CO_2.

Example 3: When a gasoline-powered car is driven for 5km:

1. Align the red line of "m" (middle strip) with red "100" (bottom strip).
2. CO_2 emission is shown on top strip corresponding to 5,000 meters on top half of middle strip.

Answer: Environmental load is approximately 2kg of CO_2.

Example 4: When 2,000 liters of city water (tap-water) is used:

1. Align the red line of "city water" (middle strip) with red "100" (bottom strip).
2. CO_2 emission is shown on the top strip corresponding to 2,000 liters on the upper part of the middle strip.

Answer: Environmental load is approximately 1kg of CO_2.

Scale on the bottom strip is 1,000 times larger than the scale on the top strip. Use the scale on the bottom strip when using large figures. (Note: Scale is logarithmic, not a scale at even intervals.)

The numerical values on both the top and bottom strip indicate weight of CO_2 emissions in grams or kilograms. Energy generated to produce 1 kg of CO_2 is almost equivalent to the metabolic energy of a human in one day (2,100 kcal). Using this metabolic energy as a base unit, one can see how many times more or how many day's worth of energy that human activity produces in comparison.

To convert weight of CO_2 into calories- units for measuring energy, align the green "kcal" line on middle strip with the 1 on the left side of top strip. Take the reading corresponding to the CO_2 emission value (top or bottom half of middle strip). The numerical values indicated on the middle strip will convert from grams to kilocalories as well as from kilograms to mega-calories. In addition, when the "kJ" mark is aligned in the same way as "kcal", the numerical values along the middle strip will convert grams into kilojoules and kilograms into mega-joules.

The "Japanese foot" and the "foot" measurement, which are units of length, are said to been derived from the human stride. The origin of measurements comes from using various parts of the body to measure length. Therefore, by using energy consumed physiologically by the human body as a base unit, the level of environmental burden becomes easier to comprehend.

Additionally, metabolic energy is a small value compared to the fossil fuel consumption from daily human activity.

The following notations on the middle strip of the slide rule are various causes of environmental load. They have been arranged so that the amount of CO_2 emissions can be read from energy required to produce or dispose of the matter. The weight of CO_2 can be deciphered from the top or bottom strip of the slide rule when the various causes of environmental load are aligned with the red "100" on the bottom strip.

Aluminum (g, kg): Energy needed for production of aluminum products such as cans is converted into weight of CO_2.

Hydrogen (g, kg): Energy of combustion generated by reaction with oxygen is converted into weight of CO_2.

Propane gas (l, m^3): Energy of combustion generated by reaction with oxygen is converted into weight of CO_2.

City gas (l, m^3): Energy of combustion generated by reaction with oxygen is converted into weight of CO_2.

Gasoline (ml, l): Energy of combustion generated by reaction with oxygen is converted into weight of CO_2.

Steel (g, kg): Energy needed for production of steel products, such as cans, is converted into weight of CO_2.

Plastic, Carbon (g, kg): Energy of combustion generated by reaction with oxygen is converted into weight of CO_2.

Wood, Paper (g, kg): Energy of combustion generated by reaction with oxygen is converted into weight of CO_2

Oxygen (g, kg): Energy of combustion generated by reaction with carbon is converted into weight of CO_2.

Burnable garbage (g, kg): Energy of combustion generated by reaction with oxygen is converted into weight of CO_2.

City water (l, m^3): Energy needed in process of preparation for tap water is converted into weight of CO_2.

Travel distance of an automobile (m, km): Energy consumed by traveling is converted into weight of CO_2.

Electric power consumption (Wh, kWh): Energy consumed by using power is converted into weight of CO_2.

Glass (g, kg): Energy difference between recycling and not recycling glass is converted into weight of CO_2.

Domestic effluent and human waste (l, kl): Energy consumed by purification with oxygen is converted into weight of CO_2.

Kitchen Refuse (g, kg): Energy consumed by reaction with oxygen is converted into weight of CO_2.

Concrete (g, kg): Energy needed for production of concrete is converted into weight of CO_2.