The Food and Agriculture Organization (FAO) wanted to develop a Windows-based software that can calculate human energy requirements. This software will run on any system running the OS Windows 95 or higher. Users will be able to download the application from the FAO website and can run it as a standalone program on their computers.

Our solution consists of two main parts, the application that runs on the end user's desktop and the application module that enables the download. The main modules of our solution are:

Desktop application:

The desktop application is the program that can be downloaded onto the client system by a user so that he/she can perform computations pertaining to energy requirements. This program can run as a standalone application so that the users can work on it offline.

Customize/input data

The calculations have to be done using a set of values other than the existing default values. This module will provide the interface to input the desired value star calculations.

Energy requirement calculator

The Energy Requirement Calculator can compute the following, based on factors like age group, sex, population, birth rate, PAL, and BMI:

- Body weight and height
- Country-level PAL according to urban percentage of population under consideration
- BMR
- Total energy expenditure
- Estimated average energy requirement
- Approximate cereal equivalent in metric tonnes of the estimated average daily energy requirement that correspond to the percentage of the national daily intake composed of cereals. For example, if the daily calorific needs of the country are 1.29 E + 12 kcal (equivalent to 2927 kcal per person per day) for a population of 520 million persons, and if 55% at the diet were composed of cereal intake, then at 4kcal/gram, the daily need would be T 2E + 8 metric tonnes per day. The user would provide the percentage and choice of cereal, such as wheat or rice.

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## UOM converter

The resulting energy requirements can be expressed in terms of kilo calories (kCal), kilo joules (KJ) or mega joules (MJ). This module also allows conversion from one unit to another. All inputs like weight/height/age can be entered in any unit that the user is comfortable with. This program contains all the required conversion formulas and will make suitable adjustments to compute energy requirements. The user would choose one or more unit types that need to be displayed in the output report.

Reports

Reports based on age group/per capita/sex or any other specified parameters can be generated. These reports can be country/region specific or a comparison between different parameters. The reports can be exported to Excel/Access/Word formats and displayed as graphs and charts also. Comparisons can be shown for the customized data against total population (male and female), total males, total females, specific age groups for a country or a comparative report can be generated based on these parameters for different countries as well. The report should list all the parameters used, such as the country or area-level adult PAL value (either calculated by program or input by user), the birth rate, and urban rate.

The diagram below shows the module structure of the desktop application.
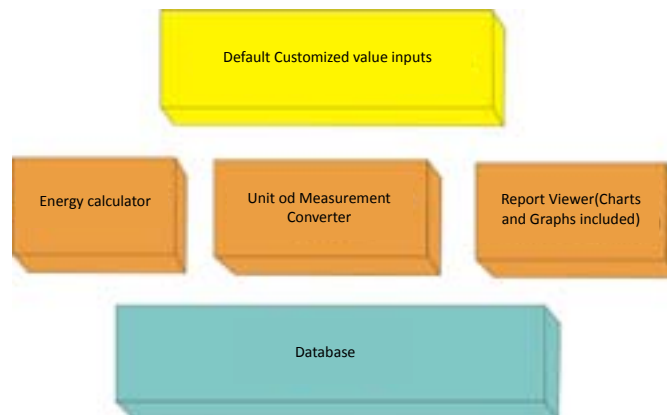
A sample report is shown in the graph, which indicates the daily energy requirements for a given number of males in kilocalories.