



IdeaLab Co-Adapt + UA
Modeling of biomass use as a circular resource in residential areas

Co-Adapt
Communities For Climate Change Action

User manual for the software **«ORGANIC WASTE ENERGY PRODUCTION SYSTEM»**

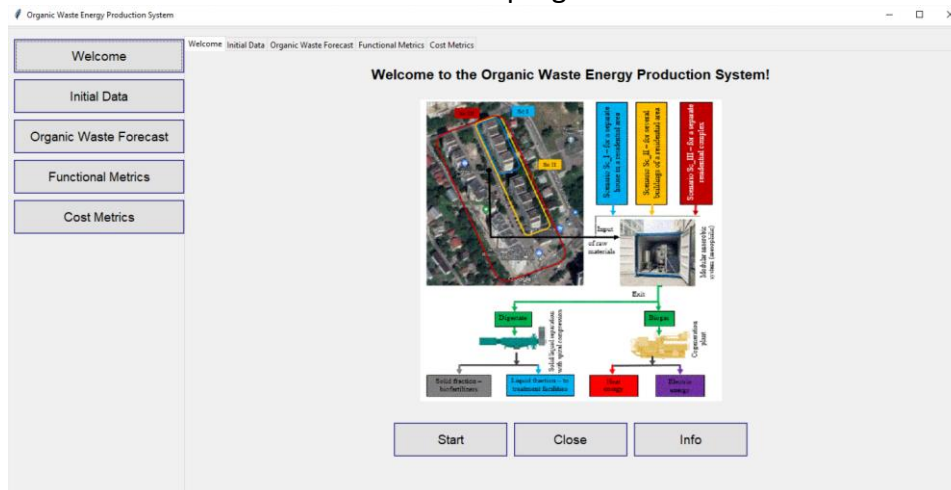
Welcome to the user manual for the Organic Waste Energy Production System software. This program allows you to predict the functional, economic and environmental performance of bioenergy production systems from organic waste. The manual will help you to use the software effectively.

Navigate through the pages

1. Welcome

On the Welcome page, you will see three buttons:

- Start: Start working with the program.
- Close: Close the program.
- Info: View more information about the program.



- To get started, click on the "Start" button.

2. Initial Data

The Initial Data page allows you to enter the initial data for calculations. This page contains the following elements:

Fields and sliders for entering data:

- Characteristics of the residential area:

- Settlement Type: select the type of settlement (city, village, township).
- Income level of the population: select the income level of the population (low, medium, high).
- Residential Area, m²: the area of the residential zone in square meters.
- Number of households, units: number of households.
- Number of inhabitants, persons: number of inhabitants.
- Select Organic Waste Source:
- Select Organic Waste Source: food waste (FW), yard waste (YW), mixed food and yard waste (FYW), mixed organic waste (MOW).
- Average daily volumes of organic waste per inhabitant, kg/person: average daily volumes of organic waste per person (slider from 0.10 to 0.60 kg/person).

Buttons:

- Save data: Save the entered data.
- Clear data: Clear all data entry fields.
- Go to forecasting process: Go to the forecasting process.

After entering the initial data into the individual fields and sliders, click the “Save data” button to save them. If necessary, you can clear all the fields by clicking on the “Clear data” button, or go to the next page by clicking on the “Go to forecasting process” button.

3. Organic Waste Forecast

On the Organic Waste Forecast page, you can forecast the generation of organic waste. Here you will find the following elements:

Buttons:

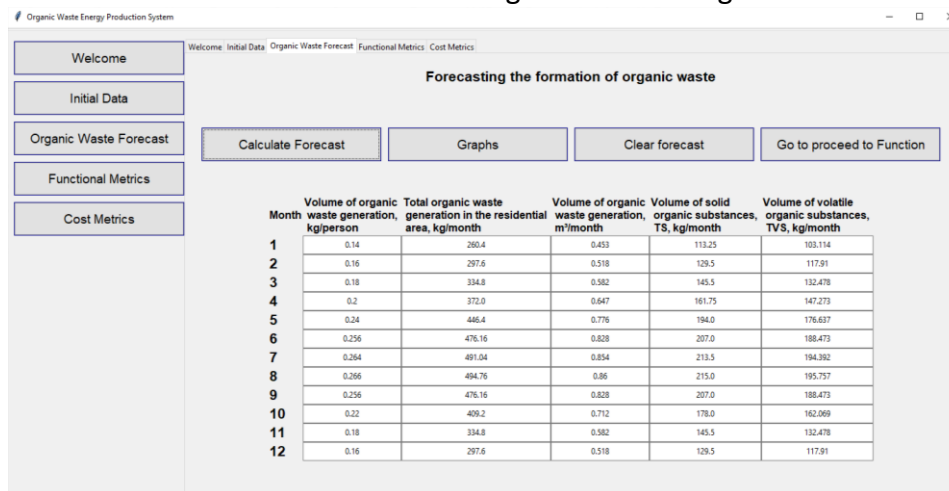
- Calculate Forecast: Calculate the forecast.
- Graphs: View forecast graphs.
- Clear forecast: Clear forecast results.
- Go to proceed to Function: Go to proceed to functional metrics.

Table with forecast results:

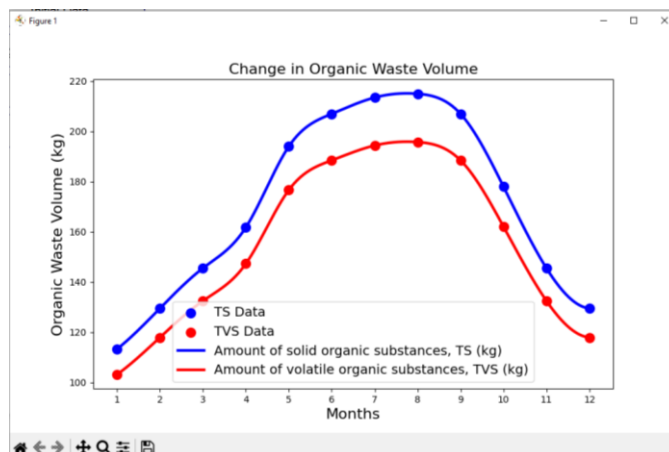
- Month: Month of the forecast.
- Volume of organic waste generation, kg/person: volume of waste per person.

- Total organic waste generation in the residential area, kg/month: the total amount of waste in the residential area.
- Volume of organic waste generation, t³/month: the volume of waste generated.
- Volume of solid organic matter, TS, kg/month: volume of solid matter.
- Volume of volatile organic substances, TVS, kg/month: volume of volatile substances.

To forecast the volume of organic waste generation, click on the "Calculate Forecast" button. After that, a table with the results of the forecasting of the following indicators will be filled in.



To visualize the trends in the change of the forecasted indicators, click on the "Graphs" button. After that, graphs of changes in the volume of solid organic matter, TS, kg/month and volatile organic matter, TVS, kg/month will appear in separate windows.



If necessary, you can clear all the fields by clicking the "Clear forecast" button, or proceed to the next page by clicking the "Go to proceed to Function" button.

4. Forecast Functional Metrics

The Forecast Functional Metrics page displays the results of determining functional metrics. Elements of this page:

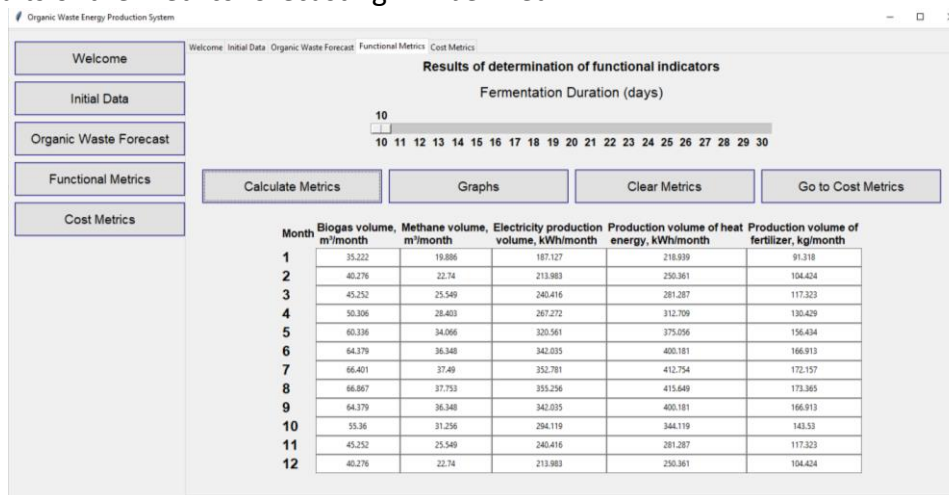
Buttons:

- Calculate Metrics: Calculate functional metrics.
- Graphs: View metrics graphs.
- Clear Metrics: Clear metrics results.
- Go to Cost Metrics: Go to cost metrics.

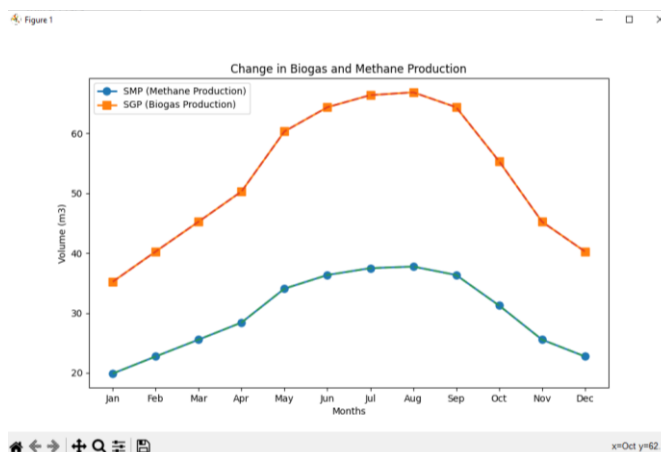
Table with the results of functional indicators:

- Month: Month of the forecast.
- Biogas volume, m³/month: volume of biogas produced.
- Methane volume, m³/month: methane volume.
- Electricity production, kWh/month: volume of electricity produced.
- Heat production, kWh/month: amount of heat produced.
- Fertilizer production, kg/month: the volume of fertilizers produced.

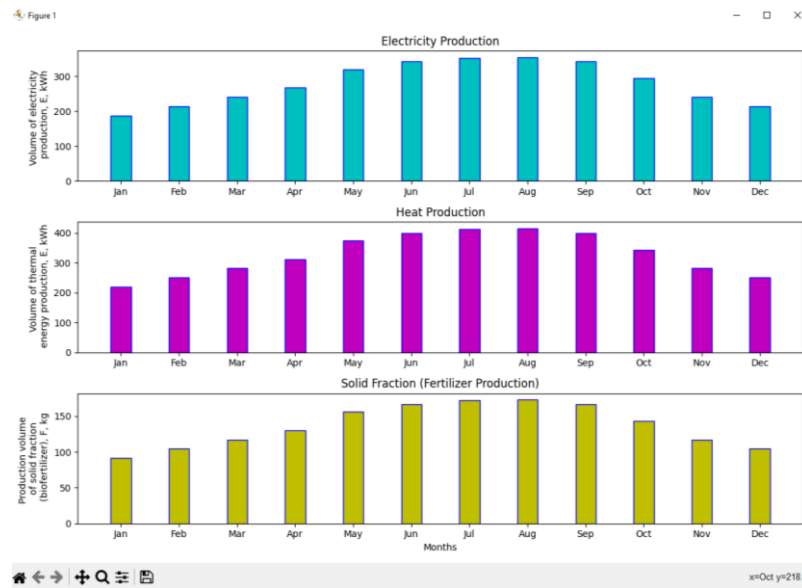
To forecast functional indicators, click on the "Calculate Metrics" button. After that, a table with the results of the metrics forecasting will be filled in.



To visualize trends in functional indicators, click on the "Graphs" button. After that, two graphs will appear in separate windows. The first one shows the trends in the volume of biogas and methane m³/month.



The second graph shows the trends in electricity production, kWh/month, heat production, kWh/month, and fertilizer production, kg/month.



If necessary, you can clear all the fields by clicking the “Clear Metrics” button, or go to the next page by clicking the “Go to Cost Metrics” button.

5. Cost Metrics

On the Cost Metrics page, you can define cost metrics. Elements of this page:

Fields:

- ✓ Choose a currency: Select a currency (EUR).
- ✓ Time Period (years): Select the period in years (from 1 to 20).

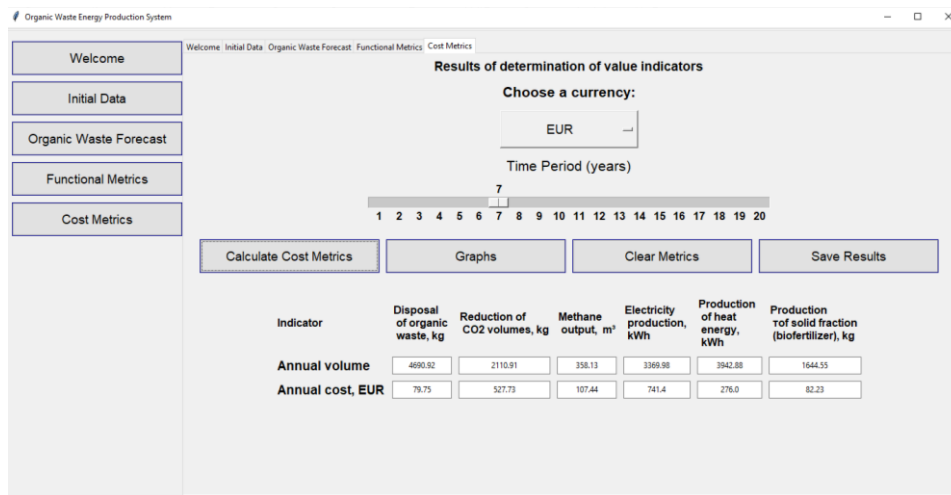
Buttons:

- ✓ Calculate Cost Metrics: Calculate cost metrics.
- ✓ Graphs: View cost metrics graphs.
- ✓ Clear Metrics: Clear metrics results.
- ✓ Save Results: Save results.

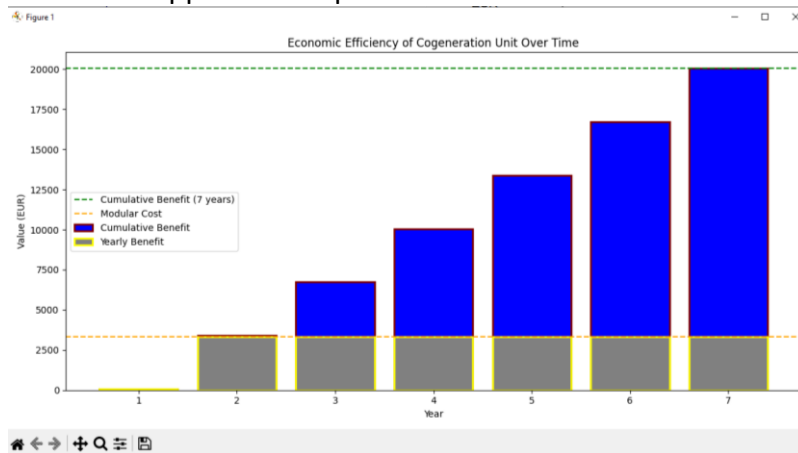
Table with the results of the cost indicators:

- Metric: Name of the metric.
- Annual volume: volume for the year.
- Annual cost, EUR: cost per year in euros.
- Disposal of organic waste, kg: volume of disposed waste.
- CO₂ reduction, kg: volume of CO₂ reduction.
- Methane output, m³: volume of methane produced.
- Electricity production, kWh: amount of electricity produced.
- Heat production, kWh: the amount of heat produced.
- Production of solid fraction (biofertilizer), kg: the volume of solid fraction produced.

To forecast cost indicators, you should select a currency (for example, EUR) and set the life cycle period of the bioenergy system in years (from 1 to 20) on the slider. After that, by clicking on the “Calculate Metrics” button, a table with the results of the cost forecasting will be filled in.



To visualize trends in value indicators, click on the “Graphs” button. After that, a graph with trends in value indicators will appear in a separate window.



The results show that the payback period of a modular bioenergy plant for a residential area will be about 2 years, which is economically beneficial for the residents of this residential area.

If necessary, you can clear all fields by clicking on the “Clear Metrics” button. To save the results to a file, click on the “Save Results” button.

Thank you for using the “Organic Waste Energy Production System”. We hope this manual will help you in working with the software. If you have any questions or need additional information, please contact the support service.