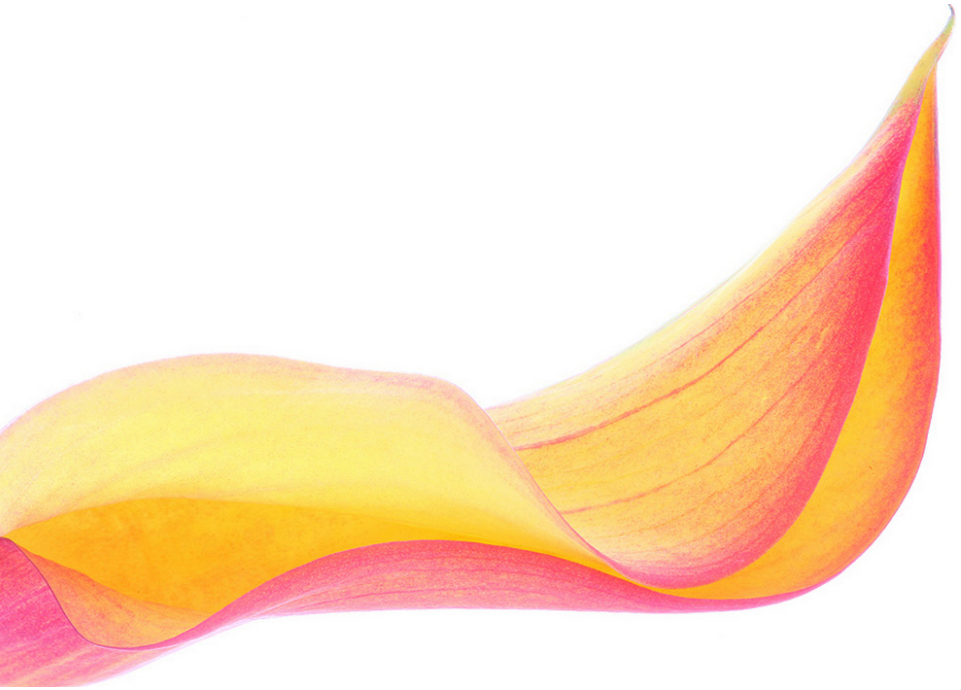
WFF project

From Waste to Fuel, from fuel to Food



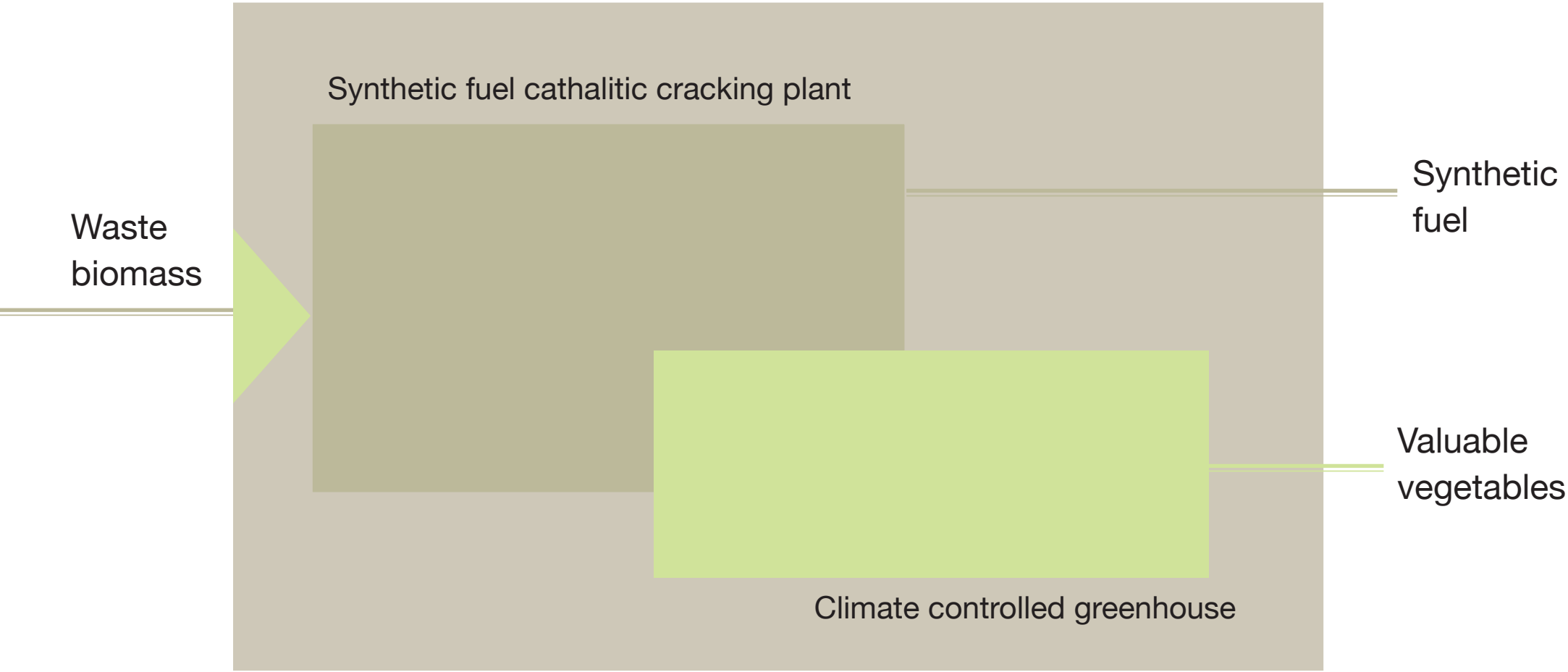
Everything produced from the earth can create new raw material.

WFF project is a combined industrial and agricultural system for the production of synthetic fuel and food from the recycling of the organic waste biomass, small in size, shaped on the territories needs.

WFF project is a system able to transform the organic waste matters in a second generation, cost-effective synthetic fuel (in the form of diesel fuel), with identical features to fossil-origin hydrocarbons, recovering at the same time: water, carbon dioxide, mineral salts and thermal energy (second raw materials generated by the synthetic fuel cathalitic cracking plant), for the production of food, in environmentally-controlled greenhouses with significant saving of land, water and energy.

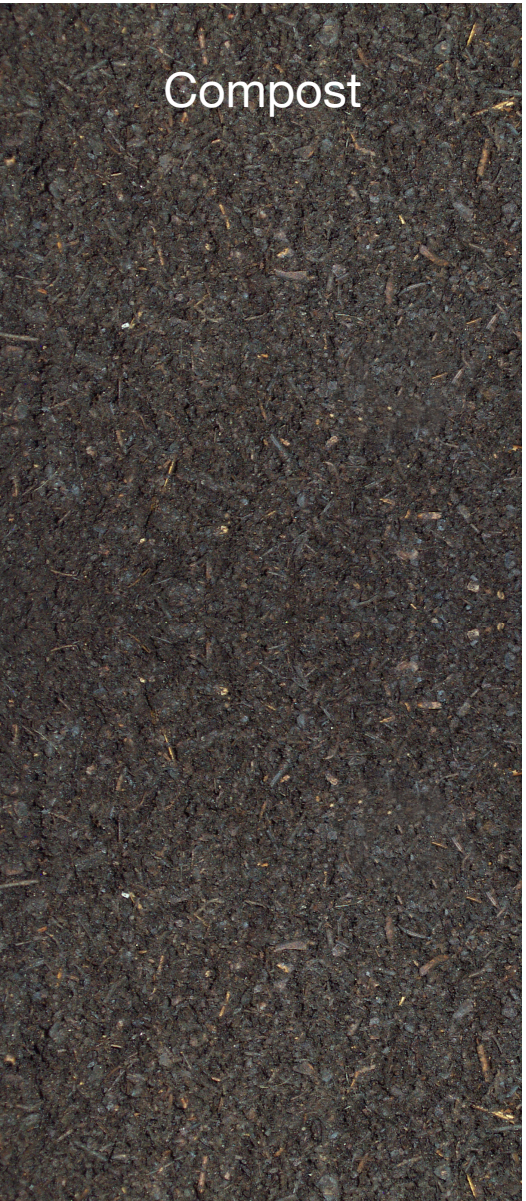
The choice to industrialize and market a small-size system, suitable to use waste organic matters, stems from the will to propose environmental and economic sustainable solutions for small communities, even in geographically disadvantaged areas.

WFF project - From Waste to Fuel, from fuel to Food

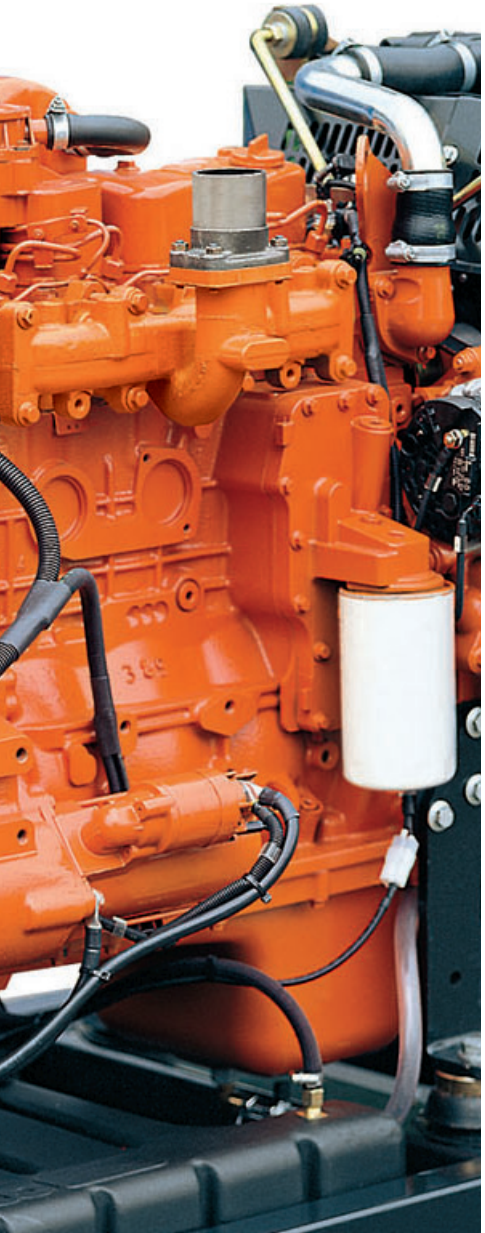


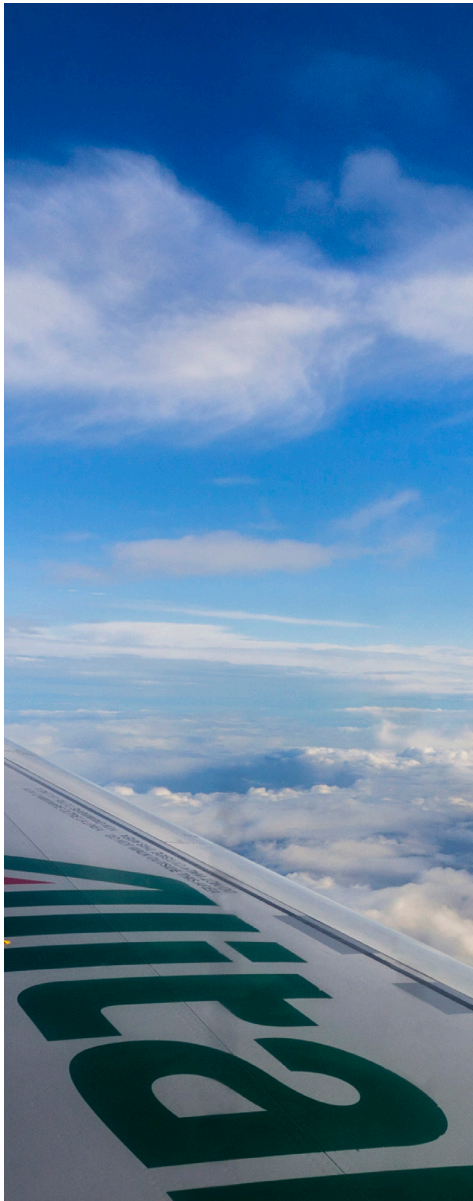
A synthetic fuel from any kind of biomasses, for any kind of engine.

From any kind of biomasses,



to any kind of engine.



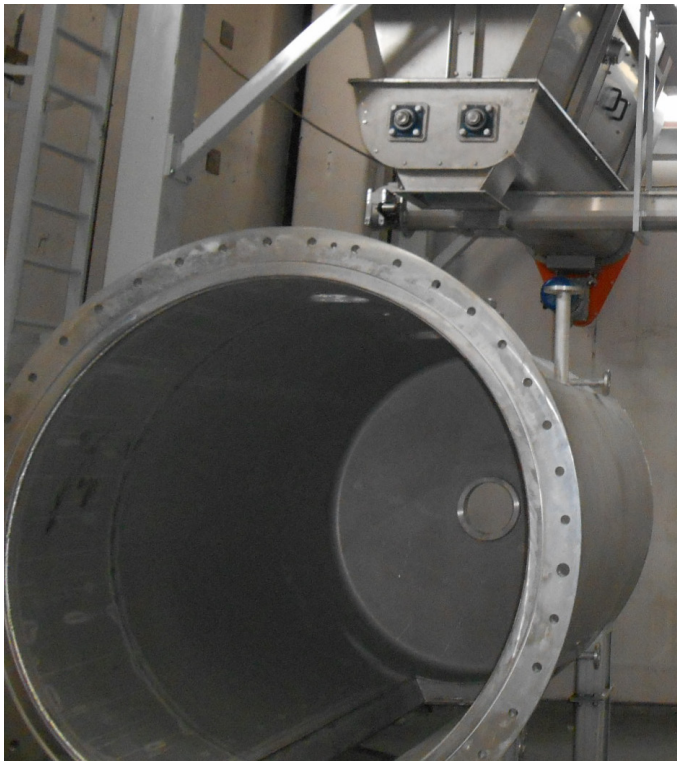


SFCC

The Synthetic Fuel Catalytic Cracking process

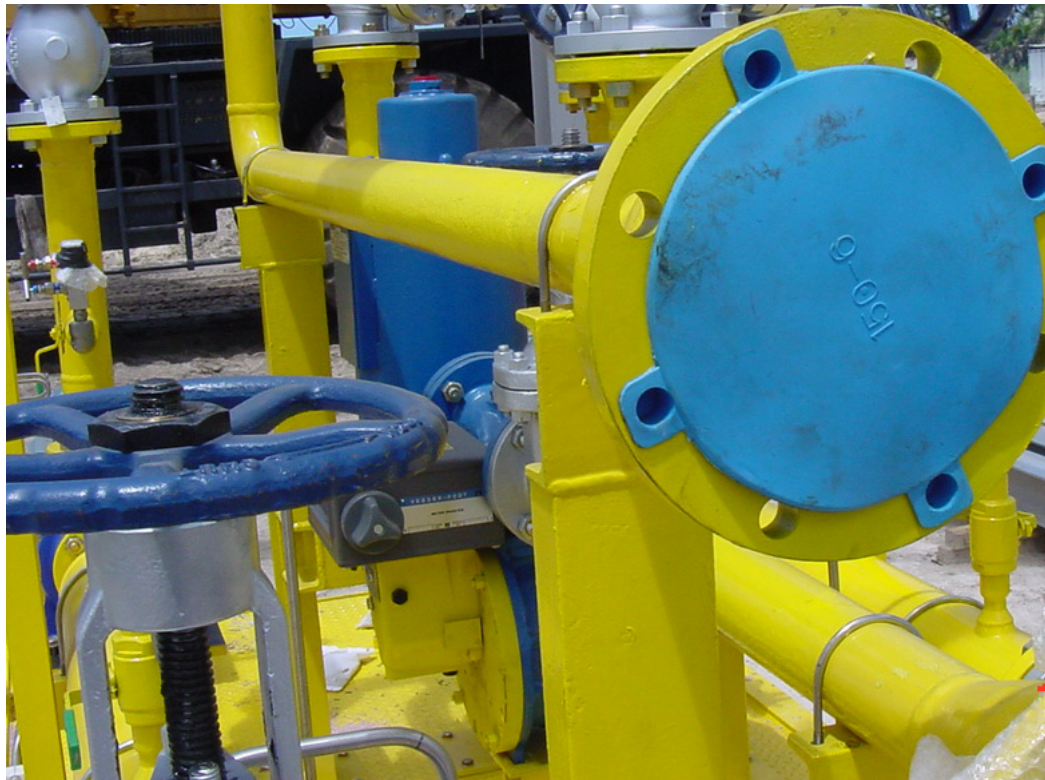
Process description

The Synthetic Fuel Catalytic Cracking, hereinafter SFCC, is based on the catalytic cracking process, a thermo-chemical catalyzed process that, combined with a series of ancillary equipment, allows the transformation of waste organic matter into synthetic fuel having the same chemical composition of the fossil fuels.

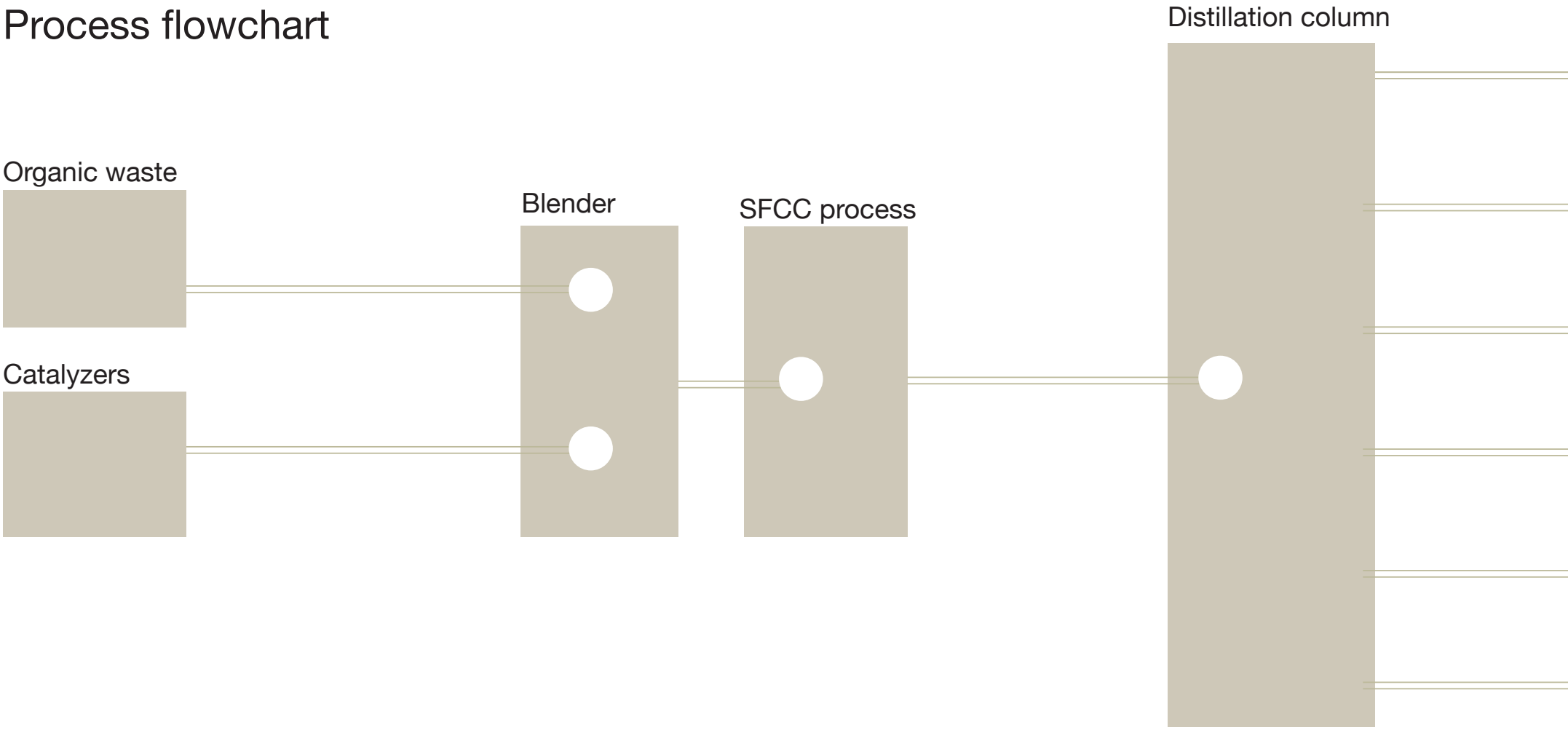


Process description

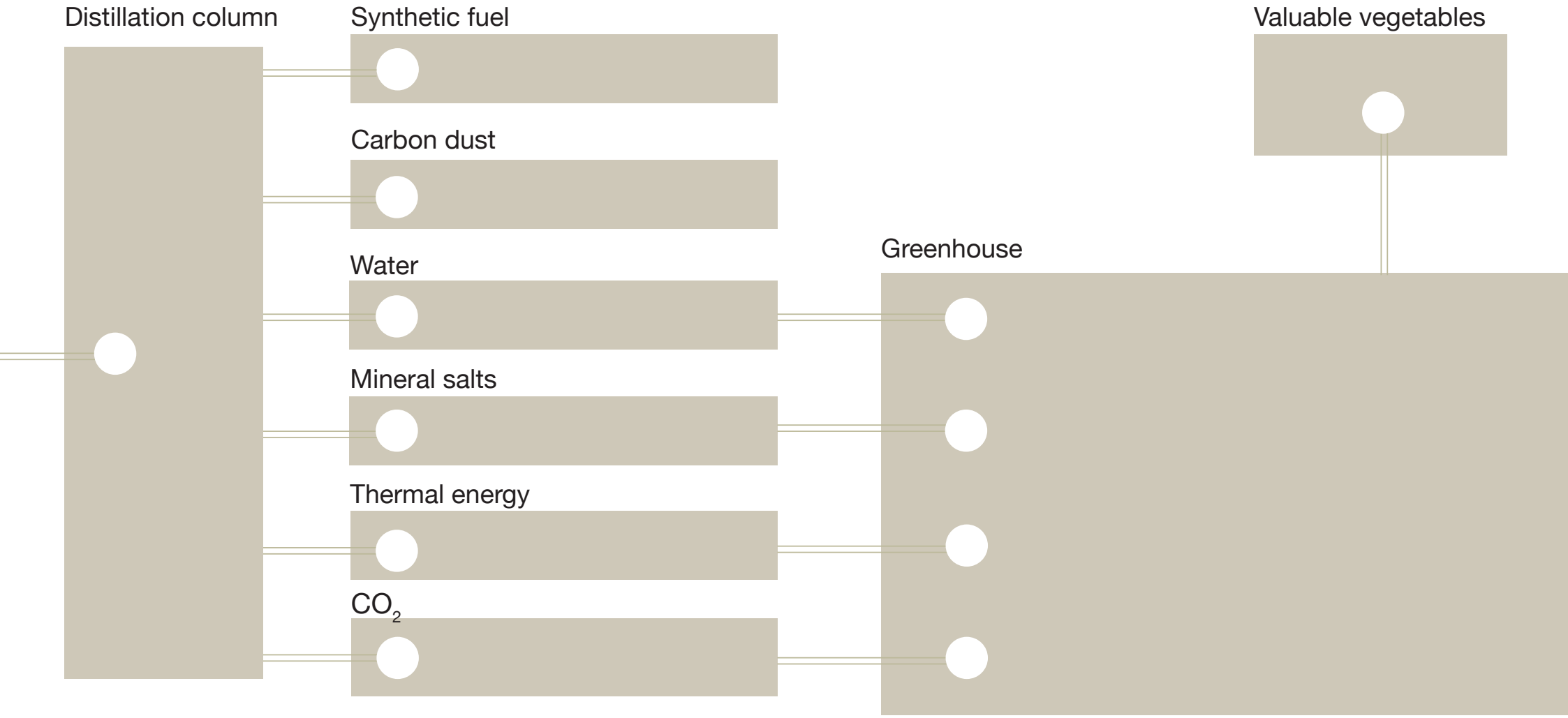
The SFCC technology has been shown to be able to transform the solid carbon-based products in light fuels (diesel and/or kerosene), ensuring high standards of quality and high production capacity. The experienced process develops so that the organic-base raw material reaches the physical conditions that permit rapid processing of three dimensional complex organic compounds, maintaining the hydrogen bond with the carbon to form the linear molecule of hydrocarbons (C_n H_{2n+2})and avoiding the production of light gases.



Process flowchart

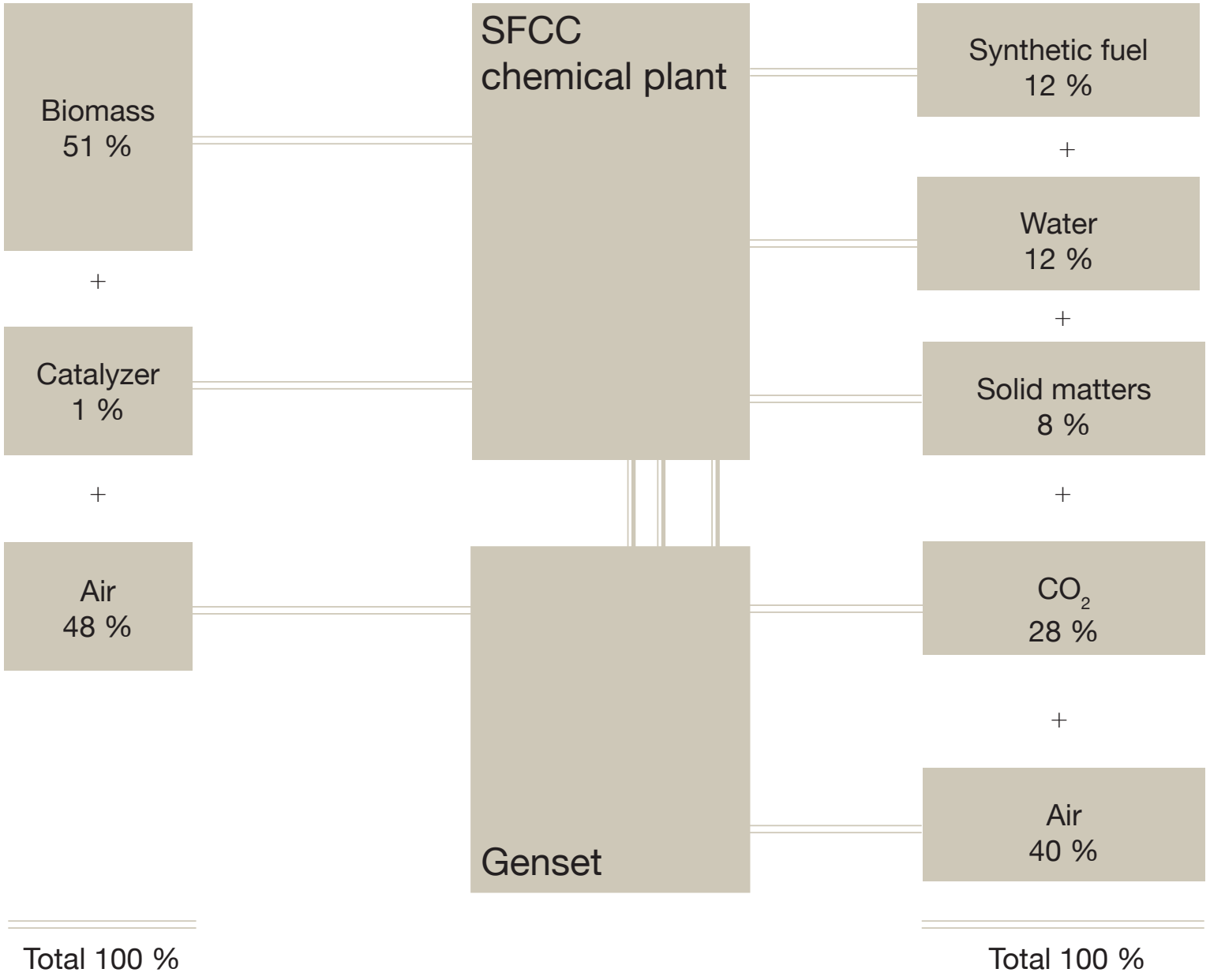


The organic matter is introduced together with proper catalysers inside a blending system. The blending process transforms the product in heavy oil. The heavy oil is treated in the SFCC process which transforms it in light hydrocarbons. The hydrocarbons are separated in a distillation column in function of their molecular weight. The solid fraction of the biomass is divided in mineral salts and carbon dust.



Part of the produced synthetic fuel (estimated in about the 15% of the energy produced by the system), is used by a genset able to produce 100% of the system energy requirements. Synthetic fuel and carbon dust are sold at market value; mineral salts, water, CO_2 and thermal energy are used inside the greenhouse; the greenhouse generates valuable vegetables to be sold in the market and waste biomass recycled within the system.

Mass balance



Greenhouse

The climate controlled greenhouse

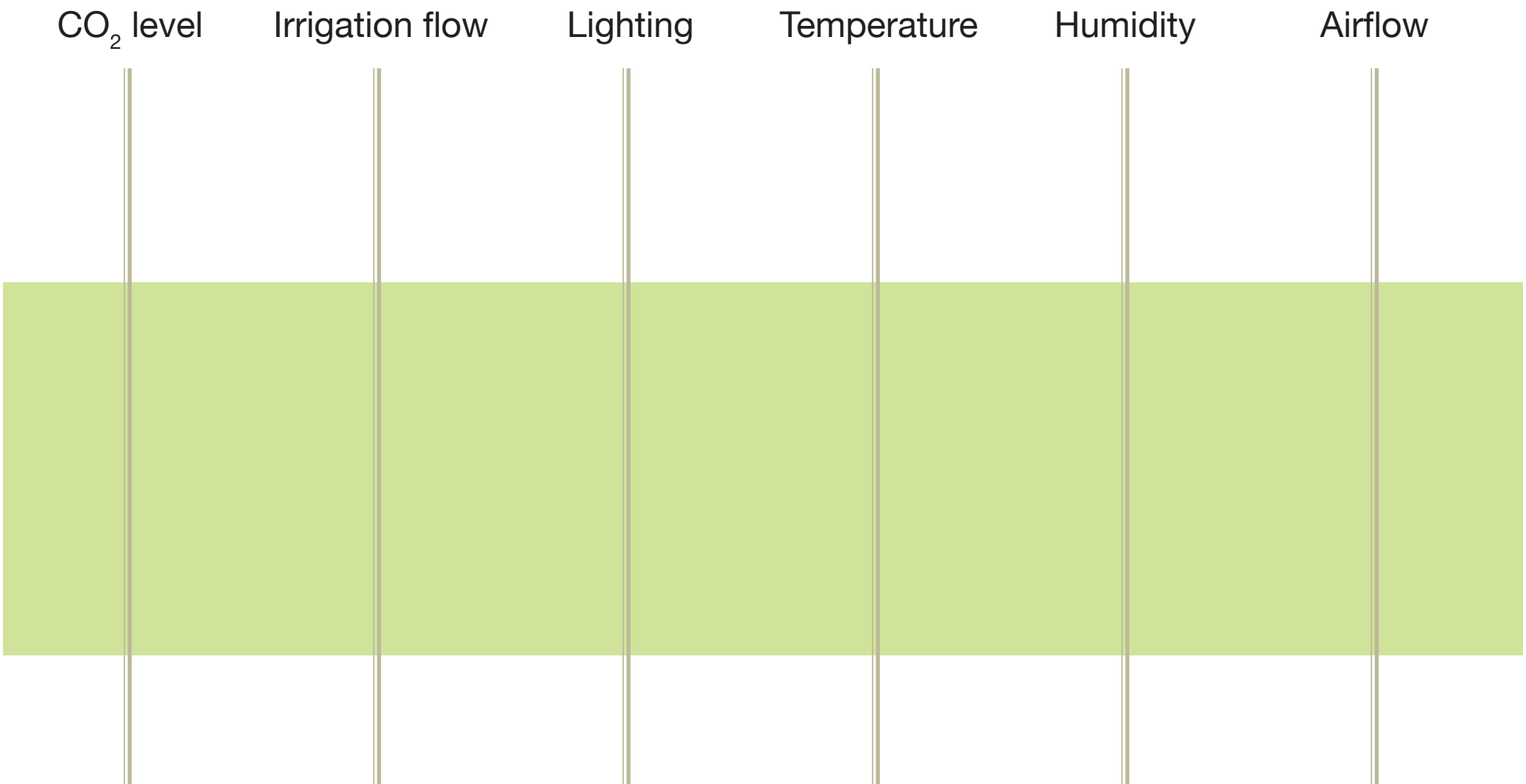
The WFF project doesn’t produce waste materials to be treated in landfills or incinerators and have no emissions into the environment.

The WFF project is totally energy self-sufficient.

The WFF project is able to meet the nutritional and energy needs of small areas.

Climate controlled greenhouse

To improve the production, in a climate controlled greenhouse, it's possible to manage the following parameters.



Climate controlled greenhouse

To grow the plants under the best conditions, it is necessary to provide them with the correct amount of CO_2, water, light, temperature, humidity and airflow: this allows to improve the production of more than 20 times in comparison with the standard open air cropping. Moreover acclimate controlled greenhouse allows valuable vegetables to be available all the year around.

	Standard cropping	Climate controlled cropping	Advantage
CO_2 level	300 ppm	From 300 ppm to 3.000 ppm	> 5 x
Irrigation flow	According to location	Best according to cropping needs	> 2 x
Lighting	2.000 h/y	Up to 8.700 h/y	> 4 x
Temperature	According to location	Best according to cropping needs	> 2 x
Humidity	According to location	Best according to cropping needs	> 2 x
Airflow	According to location	Best according to cropping needs	> 2 x