

## The Bioenergy Program and Society

The Bioenergy Program is meant to support the development of specialised entities that have an interest in the use and exploitation of bioenergy, and to assist them in the production of energy crops (topinambur, rapeseed, jatropha, sunflower, poplar, etcetera) to obtain biofuels, conduct quality controls and put them on the market. The synergy of the projects constituting the Program represents an advantage to both privately owned and Estate-run institutions, which can thus get qualified advice on any of the Program-related topics or participate in the Program by integrating their needs into the objectives of certain specific projects and consequently benefit from very specific technological definitions, which have been thoroughly studied and validated on the basis of real experience.



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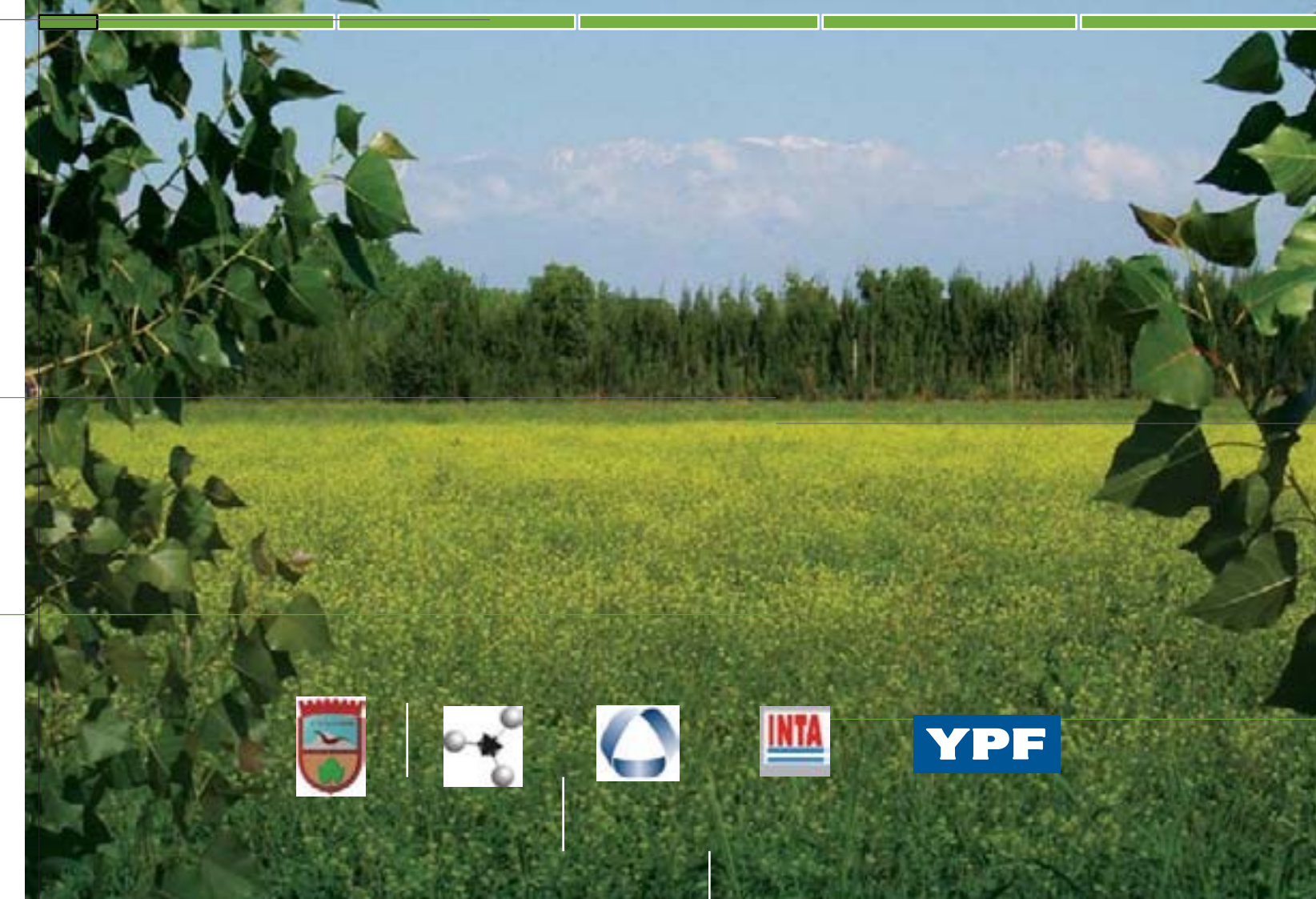
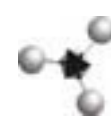
## Bioenergy Program 2014/2019

MENDOZA - ARGENTINA

## Structure of the Bioenergy Program

The Program is structured as follows:

NAME AND PROFESSIONAL DEGREE	PROJECT	INSTITUTION
Dr. Jorge E. Núñez McLeod, Engineer	Director of the Bioenergy Program	National University of Cuyo / School of Agrarian Sciences
Arturo Somoza, Agrarian Engineer	Energy Crops	National University of Cuyo / School of Agrarian Sciences
Dr. Selva S. Rivera, Engineer	Biofuels	National University of Cuyo / School of Engineering
Dr. Norma Valente	Calidad	Universidad Nacional de Cuyo
Dr. Raymundo Forradellas	Traceability & Logistics	National University of Cuyo / School of Engineering

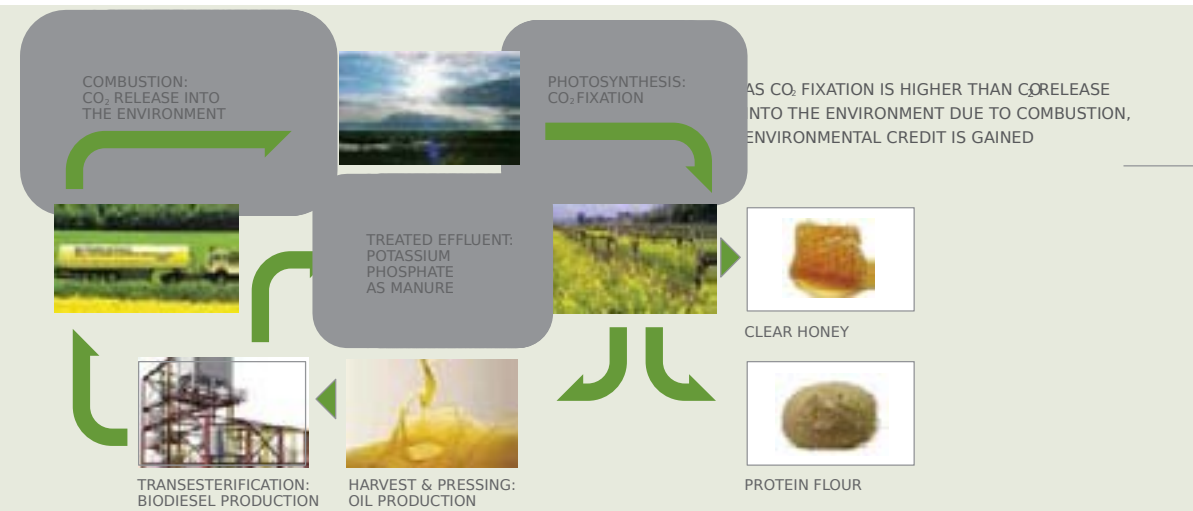
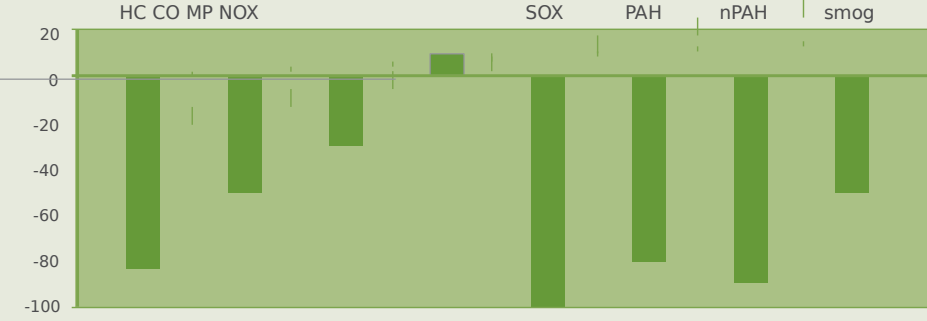




## The Bioenergy Program

The Bioenergy Program supported by the National University of Cuyo (UNCuyo) encompasses the different steps of the biofuel cycle -from selecting basic raw materials to producing its own supplies of biofuels by 2010. Over its 4-year length, the Program is to have the quality of biofuels certified, to consolidate both research and research along their lines of study and to train resources technically and scientifically in the subject of biofuels. In order to achieve these Strategic Objectives, institutions like the School of Agrarian Sciences, the School of Engineering of the National University of Cuyo, together with Argentina's National Institute of Agricultural Technology (INTA) and YPF have been invited to take part in the Research and Development Program covering the full cycle of biofuels. This Program integrates 11 projects which

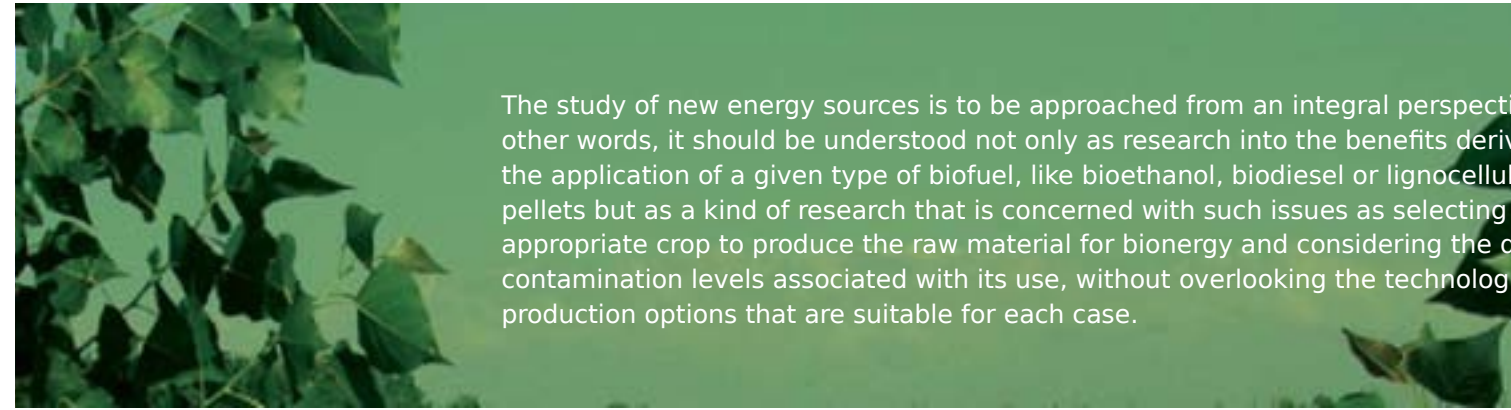
### Reduction of Contaminating Emissions



### A PROGRAM LOOKING INTO THE FUTURE

The Bioenergy Program is concerned with the generation of knowledge in connection with the new sources of energy and focuses on how to develop and exploit them. It also centres on human resources and how to provide them with grade and post grade levels of training so that they can access a new field of study. Additionally, through the Program, it is possible to assist small and medium-sized producers and SMEs whose activities relate to biofuels, i.e. they range from selecting the energy crop to deciding on the type of technology to produce them. The Bioenergy Program constitutes a response to the future reality of the region.

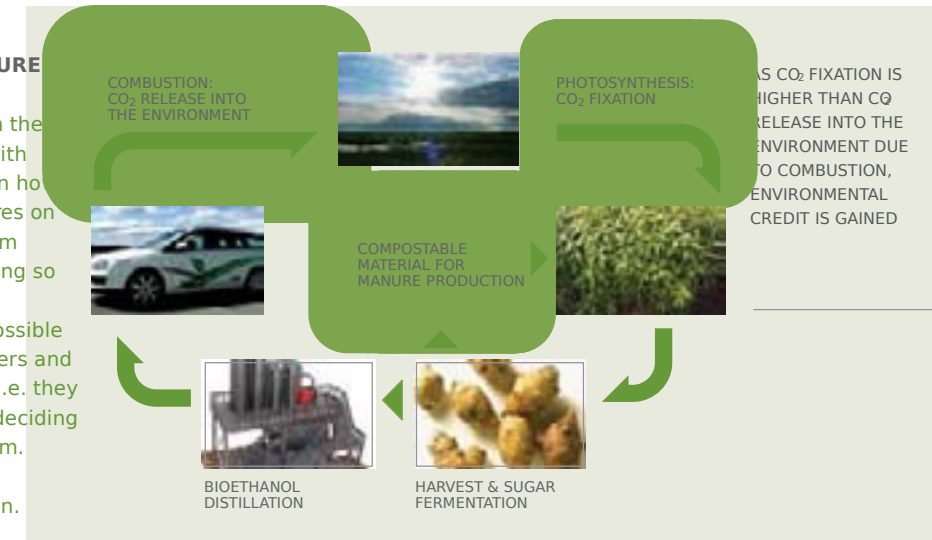
## Approach of the Biofuel Study



The study of new energy sources is to be approached from an integral perspective. In other words, it should be understood not only as research into the benefits derived from the application of a given type of biofuel, like bioethanol, biodiesel or lignocellulosic pellets but as a kind of research that is concerned with such issues as selecting the appropriate crop to produce the raw material for bioenergy and considering the different contamination levels associated with its use, without overlooking the technological production options that are suitable for each case.

## The Cycle of Biofuels

On a first stage, the Bioenergy Program is concerned with the cycles of bioethanol, biodiesel and biomass of vegetable origin. Rapeseed represents a special case because all of these cases, the cycle starts when the given species is planted to get the raw material which will be the basis of the biofuel. Both willows and poplars are suitable for producing the pellets, fire logs and chips which will be eventually used as fuels in household or industrial furnaces, while the organic matter remaining is compostable. Topinambur is a promising resource, because the sugars derived from this crop can be fermented to obtain bioethanol, while the organic matter remaining is compostable. Sunflower, jatropha and rapeseed yield which can be transesterified into biodiesel. The full cycles of biofuels represent a series of additional benefits, which go beyond the environmental credit gained. In this respect, the use of biodiesel helps to eliminate the production of sulphur composites, to substantially reduce particulate and aromatic material emissions and consequently to improve the quality of air. By selecting and/or developing the right technology, by-products which would be otherwise regarded as waste- acquire added-value. Finally, all biofuels are burnt. As combustion takes place, biofuels release CO<sub>2</sub> to the environment (carbon dioxide) at a rate that is lower than the amount fixed during the cultivating process. Then, where does the rate difference go to? This difference is incorporated into the land as compostable material or as manure, and constitutes the so-called environmental credit.



## Integrating and cross-sectional aspects Research and Technological Development



Selecting energy crops is a relevant issue. It will also control automobile exhaust terms of the economic opportunities, emissions, which will be related to the constraints and expectations that agricultural producers might have locally, in Mendoza, production processes involved. This will help and on the basis of the profitability to optimise the value chain as well as the associated to the exploitation of these crops environmental impact associated with the use of biofuels. Six research projects focus on this subject and study the cases of jatropha, sunflower, topinambur, salicaceae (willow and poplar), alternative sources of raw materials to get and two centre specifically on rapeseed (biodiesel and, with the aid of a Certification is concerned with the productive aspects of laboratory, it will be able to characterise this crop and the other with the integral quality of the biodiesel or bioethanol that can be derived from the different sources. Two of the projects concentrate on the technology applied to produce bioethanol and biodiesel. Both discuss the need to design and build Pilot Plants where biofuel-sensitive points of the production process and production-applied technology can be help to outline a work scheme which will developed and which can eventually supply the National University of Cuyo with the all the biofuel it needs for its vehicles. A Certification-specialised Laboratory will control the quality of the biofuels produced locally and ensure that they conform to national and international standards.

Six research projects deal with the selection of energy crops.

### Obtaining Heat Cost Comparison

