

## 2013 Award, Italy

### Waste to Biofuels

by Francesca Raganati



### Theme

#### Waste to Energy

The first law of thermodynamics (at the base of the famous statement "nothing is created, nothing is destroyed, everything is transformed"), if adopted for waste, is the proof that "waste to energy" is an effective solution to meet the needs of industries, agriculture and services, especially in cases where the use of alternative energy sources is not economically efficient.

The 2013 Altran Foundation for Innovation Award in Italy rewarded technology-based innovations designed to produce energy from waste. This not only helps to reduce the amount of waste in landfills, but also the impact of waste on the environment. It is also a key factor in limiting the cost of energy.

### Laureate

#### Waste to Biofuels

This project aims at developing an innovative response to two critical issues of food/beverage industries as regards the "waste to energy" question:

- The need to treat waste (water) streams of the food/beverage industry;
- The need to preserve raw materials used for biofuels that do not compete with resources allocated to the food market.

The process is based on the possibility to convert the sugar fraction of food waste (water) streams into biofuels (biobutanol) which can be transformed into butanol, usable for automotive. This process can also be implemented on other kinds of food products. It only depends on the concentration of sugar.

The project has been proposed within a cooperation between the Dipartimento di Ingegneria Chimica, dei Materiali e della Produzione Industriale of the Università degli Studi di Napoli Federico II and the Institute of Research on Combustion of the Consiglio Nazionale delle Ricerche.

### Altran's support

A team of eight Altran consultants helped the Italian laureate Francesca Raganati to develop her "Waste to Biofuels" project for six months. The technological support aimed at ensuring the viability of a pilot plant and at strengthening the project funding.

In particular, the Altran team dealt with the technical and engineering support to design the plants. Thanks to economic, environmental and regulatory studies, the consultants helped the laureate progress from tests under laboratory conditions to the development of a pilot plant.

## Jury

The Foundation entrusts the national jury the task of selecting a laureate from among the candidates. The jury members are independent experts in the field of the chosen theme: specialists from research, politics, teaching, industry, etc.

In 2013 in Italy, the jury was mainly composed of experts in the field of technology and energy, with in particular the presence of the President of the Faculty of Engineering of the University of Naples, a professor of chemical plants and a member of the Head of Technical Unit for Environmental Technologies ENEA-UTTAMB.

## Finalists

### **RISEN - from Rice Straw to ENergy**

#### **Elisabetta Arato**

The project will be devoted to the sustainable management of the residues produced during the harvest of rice (mainly rice straw). An efficient handling of this waste will lead to the development of new and alternative procedures for creating energy.

The residual straw will make up the feedstock of a gasification process by means of a spouted bed reactor and the resulting syngas will be used to produce either heat or electricity.

### **HYSYTECH S.r.l. Waste-to-Energy on-site plant for industrial purposes**

#### **Andres Saldivia**

Waste-To-Fuel (WTF) technology implies the thermal processing of industrial waste streams or low-value by-products through the process of gasification, cleanly converting them into useful energy: fuel gas. WTF technology could be "plugged" to the existing industrial process and the produced fuel gas can be used directly "on-site", leading to 30% of natural gas savings without further investments. Alternatively, fuel gas could also feed an electric power generator. As an indication, 1,000 kg/h of waste generates 1MWe of electric power. In both cases, the environmental footprint is significantly reduced.

### **Energy recovery from waste heat through the use of thermoelectric cells**

#### **Brigida Raimondi Cominesi**

The project is located in the area of interest "of the waste heat recovery technologies conversion thermoelectric." The technology allows the production of energy from the residues generated in the production processes which is efficient, economic and reliable.

Converting the waste heat into electricity will increase the net return plant. The prototype is applicable to any reality in which there are thermal losses.