European Biofuels
TECHNOLOGY PLATFORM

Biofuel Fact Sheet

Beta Renewables – commercial plant in Crescentino, Italy

Lab scale | Bench scale | Pilot Plant | Demonstration | Commercial

Introduction

Beta Renewables is a leader in the field of advanced biofuels and biochemical compounds at competitive costs. It was established at the end of 2011 as a joint venture between Biochemtex, a company of the Mossi Ghisolfi Group, and the U.S. fund TPG (Texas Pacific Group) with a total investment of 250 million Euro (350 million dollars). Beta Renewables owns the **Proesa**™ technology, applied to the field of biofuels and chemical intermediates. Beta Renewables manages the plant in Crescentino (VC), the first commercial facility in the world for the production of second-generation ethanol. The Crescentino biorefinery was launched under the NER300 bioenergy project.

Technology description

Proesa™ belongs to the so-called "second-generation" technologies which allow the use of the sugars present in lignocellulosic biomass to obtain fuel and other chemicals with lower greenhouse gas emissions and at competitive costs compared to fossil fuels (oil, natural gas).

It is the result of an investment of over 150 million Euro, started by Biochemtex in 2006. The **Proesa**™ technology was designed to use non-food biomass, like rice straw and sugarcane bagasse. Thanks to the efficiency of the **Proesa**™ process, non food sugars can be obtained at competitive costs and without incentives, thus enabling a widely spread use of bio-products from renewable sources.

The advantages of Proesa™:

- The cost of the product is competitive compared to oil (70 dollars / barrel)
- The industrial plants can be adapted to local conditions.
- The separated lignin is used to obtain energy.
- During the processing, biogas is generated as another energy source.
- No land is subtracted to food crops and this does not affect their price to the consumer.
- Dependence on fossil fuels is reduced as well as the impact on greenhouse gas emissions.

The technology is protected by 14 patent families, 4 of which are public.

BETARENEWABLES

Figure 1: Beta Renewables plant in Crescentino

Technical Details

Project owner	Beta Renewables (joint venture with the Mossi Ghisolfi Group)
Project name	Crescentino
Location	Crescentino (VC), Italy
Technology	Biochemical conversion
Raw Material	Lignocellulosic crops (rice straw, wheat straw and from Arundo Donax, the common giant reed)
Input Capacity	200,000 t/y
Product(s)	Ethanol
Output Capacity	40,000 t/y
Facility type	Commercial
Project Funding	The project was supported by the European Commission under the Seventh Framework Programme for research and technological development
Status	Operational
Start-up Year	2013 (october)
Web	http://www.betarenewables.com

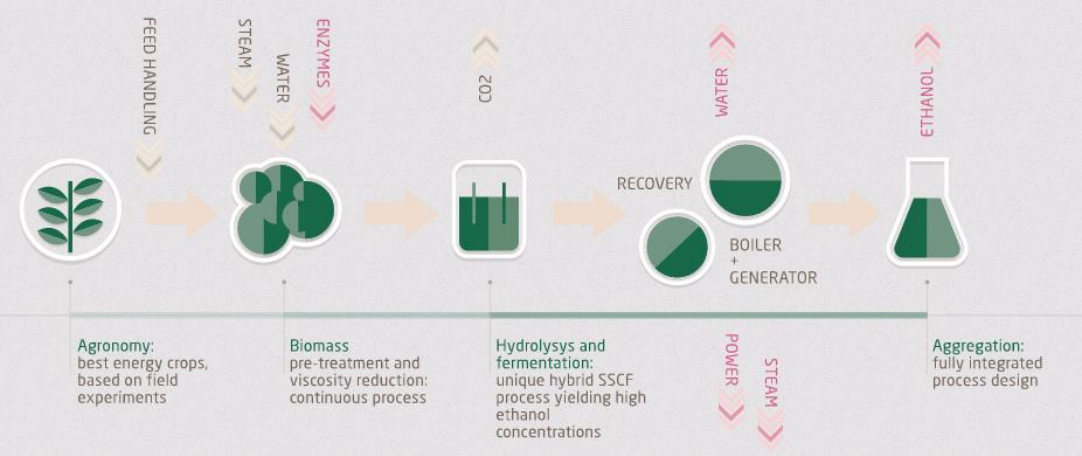

Figure 2: Beta Renewables – flow chart of PROESA™ technology

Project history

The first-of-a-kind commercial scale industrial production of second-generation bioethanol was started up in Crescentino, province of Vercelli, at the end of 2012. For the development of this technology, agronomic studies and logistics modelling have been conducted. Before being applied in Crescentino, **Proesa**™ was tested at length in the Rivalta Scrivia (Alessandria) pilot plant, which boasts a capacity of 1t/day of biomass treated.

2010
- Authorization request: 2010
- Company starts buying critical materials: September 2010

2011
- Permits obtained: April 2011
- Ground breaking: April 2011
- Beginning of works: end of June 2011

2012
- Completion of mechan. work, energy section: Aug. 2012
- Start up of boiler: October 2012
- Completion of mechan. work, ethanol section: Dec. 2012

2013
- Start up – ethanol section: October 2013
- Operational

Beta Renewables & Biochemtex – More projects

Project name	Bioflex 1
Owner/Operator	GranBio
Location	Brazil
Technology	Biochemical
Raw Material	Sugar Cane Straw
Product(s)	Ethanol
Output Capacity	65,000 t/y
Facility type	Commercial
Status	Operating
Start-up Year	2014

Project name	Fuyang Bioproject
Location	China
Technology	Biochemical
Raw Material	Wheat straw and corn stover
Product(s)	Ethanol
Output Capacity	185,000 t/y
Facility type	Commercial
Status	Planned
Start-up Year	2018

Project name	Alpha
Location	North Carolina, USA
Technology	Biochemical
Raw Material	Energy Grasses
Product(s)	Ethanol
Facility type	Commercial
Status	Planned
Start-up Year	2017