CRESCENTINO DEMO PLANT

Challenges and opportunities

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Our Group

Mossi Ghisolfi is a multinational, family-run business established in 1953 by Vittorio Ghisolfi and Domenico Mossi.

- It is one of the world’s leading producers of PET resin.
- It is Italy’s second largest chemical company.
- It is a forward-looking company that is continuing to invest significant funds into bio-fuels and green chemistry research and development as part of its commitment to sustainability.
Biochemtex is a global engineering and technology company wholly-owned by Italy’s Gruppo Mossi Ghisolfi.

Biochemtex is specialized in delivering value-added project solutions for its clients in the bio-fuels, renewable chemicals, energy, environmental.
BIOLYFE: Demonstrating large-scale bioethanol production from lignocellulosic feedstocks

The Green Revolution

Wednesday, October 9th 2013

Official Opening Ceremony of the World's 1st commercial-scale cellulosic ethanol plant: the Crescentino bio-refinery.
Crescentino

- The Crescentino Plant is the first in the world to be designed and built to produce bio-ethanol from agricultural by-products or plants not suitable for food consumption.

- This has been made possible thanks to PROESA™ technology, developed in the Biochemtex laboratories.

- The expertise developed in Crescentino will enable similar plants to be built in USA, Latin America, Europe and Asia.

- The project was supported by European Commission as part of its Seventh Framework Programme for research and development.
Crescentino Plant is located in the province of Vercelli.

The Bio-refinery stands in an area which previously housed the Tecsid foundry (Fiat Group) inoperative for many years.

The plant is located in the center of an agricultural area dedicated to rice, wheat and maize production: a «natural reserve» for biomass at limited cost.
Proesa™ - The Technology

**Proesa™ Technology benefits:**

- Feedstock flexibility
- Continuous process
  - No chemical addition
  - Optimal sugar extraction with low enzyme dosage
- Fully integrated process design using continuous equipment to enable large scale plants
- Best in class technology with lowest capex and opex backed with performance guarantees
The project was started in 2010, work began in 2011 and the boiler started to produce energy in the autumn of 2012. In January 2013, bio-ethanol production began.
Crescentino – Vital Data

- Value of investment: € 150 million
- Production: 40,000 tons of bio-ethanol per year
- Biomass used: 180,000 dry tons per year (at maximum output)
- Electricity production: 13MW produced entirely from lignin (by-product of the ethanol process)
- Water recycling: 100% = zero water discharge
- Workforce: 100 operators (direct workforce)

The following were required to build the plant
- 370 pieces of equipment
- 1500 tons of steel structures
- 1400 tons of pipes and valves
- 18 km of underground piping
Crescentino Commercial Plant

✓ Commercial-scale
  40,000 ton per year cellulosic ethanol plant in Crescentino, Italy

✓ Price competitive
  Benchmark: Oil @ $70/bbl

✓ Cellulosic Costs Less
  Estimated cash costs:
  Ethanol: <$1.50/USG
  Sugars: 10¢/lb
The players

- The PROESA™ and the construction of the Crescentino bio-refinery were carried out by Mossi Ghisolfi Group companies.

- The objectives of Beta Renewables in partnership with Novozymes, is to promote PROESA™ technology globally.

- Biochemtex developed the technology and designed and built the plant.

- Italian Bio Products (IBP) is responsible for the operational management of the Crescentino plant.
The impact in Europe

Efficient use of resources, maximizing the potential of agricultural and forest residues, as well as waste

Diversification of agricultural income: potential of up to 40% additional income

Implementation of new supply chains that can revitalize the entire agricultural sector

New generations of products and materials "bio" based in modern biorefineries

Creation of infrastructures in Europe, with important implications for employment, 80% of them in rural or underdeveloped areas

Replace 30% of fossil chemicals with equivalent obtained from renewable sources (target 2030)

Provide input for the 25% of European transport with advanced biofuels (2030 target)
A NEW ERA BEGINS

Crescentino

World’s first advanced biofuels facility

Thanks