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A new platform for the production of biofuels and biochemicals: the Proesa® experience

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Renewable feedstocks and the Circular Bioeconomy



KEY DRIVERS

MINIMIZATION OF EXTERNAL (COMMUNITY) COSTS

- **CO₂ emissions** – reduction thanks to renewable raw materials and low transformation energy in production (LCA)
- **Good and efficient use of biomasses and agro food residues as feedstock** (non intensive agronomic protocol, not genetic modified)
- **Improve Product / Goods Technical properties to minimize littering issues** (eco design – end of life management – recycle/reuse – bio degradation)
- **New Integrated Technologies**, maximum exploitation of biomasses and cascade use of byproducts also for advanced bio-fuel

Prioritize sustainable value chains in areas where environmental impact is high and fossil products can/must be replaced with same or better performances

- **New products from renewables**
- **Biodegradable products**
- **Products / Goods easy to be recycled**



Lubricants Herbicides
Rubber Bio Plastics
Packaging Bio Fibers
Fibers

Crescentino Highlights



**2G sugars and Bioethanol
production plants from
biomasses with Proesa®
technology**

Construction: **2011**

Plant start-up: **2013**

Capacity: **~ 25 kta of bioethanol**

Bio gas – production plant



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Crescentino: all-around sustainability



WATER RESOURCES

After industrial use, the water is **cleaned, recycled and reused in a closed loop**, minimizing consumption.

The water doesn't come into contact with *chemicals* but only with biomasses.



EMISSIONS

The **environmental impact of the Crescentino plant is particularly low** and, on the contrary, saves atmospheric emissions equivalent to those of 40.000 cars. Emission abatement systems are installed, certified and controlled.



SAFETY

Working with ethanol and straw, highly flammable materials, done in cooperation with Vercelli Fire Brigade. Crescentino bio-refinery is **equipped with all the safety devices** and in compliance with the strictest HSE standards.



INTEGRATION

Crescentino is a **fully integrated biorefinery**. Lignin is co-produced by the bio-ethanol plant. Bio-gas is co-produced from waste water treatment. EE is co-produced by lignin and biomass to feed the plant with renewable EE



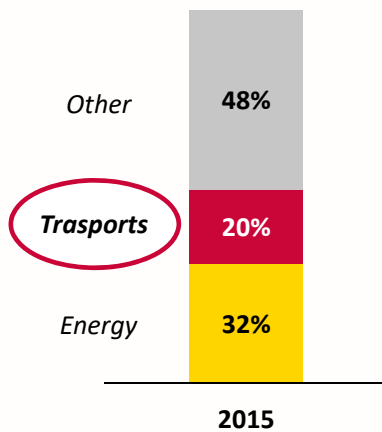
«Advanced bio-fuels»: a growing demand



GHG emissions

The transport sector determines 20% of GHG emissions, therefore it is essential to act in this field.

CO₂ Emissions per segment



Source: Climate Action Tracker

Bio-fuels legislation and request

«Advanced bio-fuels» are the key for the achieving of European objectives (bio-ethanol for gasoline, bio-fuels for diesel & kero).



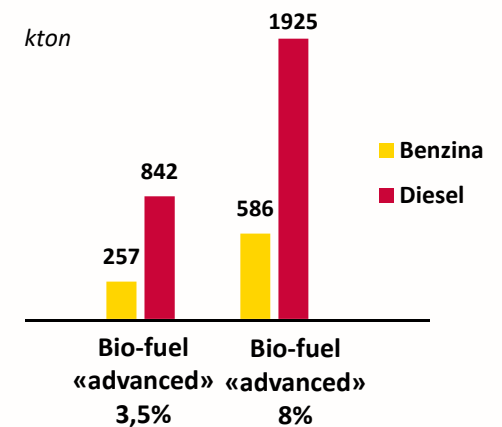
Renewable Energy Directive II

«In order to integrate renewable energy use into the transport sector, each Member State sets an obligation on fuel suppliers to ensure that by 2030 [...] **the contribution of advances biofuels and biogas produced** [...] as a share of final energy consumption in the transport sector is **at least 0,2% in 2022, at least 1% in 2025 and at least 3.5% in 2030**».

Fuel consumption in Italy

The achieving of European targets requires the production of important volumes of advanced bio-fuels for gasoline and diesel. Here below, an estimation of the volumes required, based on current fuel consumption in Italy.

Italy fuel consumption 2018: 7331 kton gasoline
24061 kton diesel



Versalis licensing approach in the market of Proesa® technology



OPERATING REFERENCE PLANT

To support project development and ensure continuous improvements



GLOBAL LICENSING STRATEGY

To support licensees worldwide directly or through our partnerships



FULL SERVICE LICENSING OFFERED TO OUR GLOBAL CUSTOMERS

- Technology package and basic engineering
- Proprietary equipment
- Unique biochemical solution provided in cooperation with our partners
- On site training and technical support

An aerial photograph of an industrial plant, likely a refinery or chemical processing facility, taken at dusk. The scene is illuminated by the warm glow of the setting sun and the artificial lights of the facility. In the foreground and middle ground, several large, cylindrical storage tanks are visible, some with metal ladders and walkways on top. A network of pipes and walkways crisscrosses the site. In the background, a tall distillation column or tower stands out against the darkening sky. A large, semi-transparent yellow circle is overlaid on the left side of the image, containing the text "THANK YOU FOR YOUR ATTENTION" in white, bold, sans-serif capital letters.

**THANK YOU
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