Green Refinery

The Green Refinery project is the first example in the world of conversion of a conventional refinery into a biorefinery.
At a difficult time for the European refining industry, eni identified the opportunity to reuse the catalytic hydrodesulfurization section in the Venice refinery, reconfiguring it into a biorefinery. Inside the detected configuration, it was utilised the proprietary EcofiningTM technology, previously developed by eni in the laboratories of San Donato Milanese in partnership with Honeywell-UOP.
Following the conversion, the biorefinery will be able to produce high-grade biofuels – in particular green diesel, but also green naphtha, LPG and potentially even jet fuel – from raw materials of biological origin, to meet the requirements of the EU Directive on renewable energy and derive 10% of energy in conventional fuels from renewables by 2020.
With the start up of the Green Refinery, eni will be able to produce around 300,000 tonnes per year of green diesel already in 2014. The feedstock will initially be palm oil; in the second phase, also animal fats, used oil, oils from algae and various types of biological waste.

For further information, see the page dedicated to the Venice refinery.

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The EU directive[1] on renewable energy, also known as RED 20-20-20, provides member states with significant targets to be reached by 2020.

- a 20% reduction in greenhouse gas emissions (GHG – Greenhouse gases: CO2, CH4, N2O, etc.) compared with 1990 levels;
- a 20% reduction in energy consumption compared with the projections for 2020;

- 20% of energy production from renewable sources, with a level of 10% (on an energy basis) of renewable and sustainable biofuels for road transport.

In 2011 biofuel consumption in Italy reached 2 million tonnes, mainly imported from EU countries. Demand in both Italy and the EU is still rising and, in particular, consumption of biodiesel[2] is expected to grow until 2020.

While adding bioethanol[3] and biodiesel to traditional fuels is the simplest and most immediate way of responding to regulatory provisions, the quality of such products is quite poor when compared to conventional fuels, making their use problematic. For biodiesel in particular the disadvantages are related to low levels of chemical stability, inadequate cold reactions, fouling and low levels of energy content per unit of energy. Many car manufacturers now advise against the use of biodiesel in their engines. The maximum proportion of biodiesel that can be added to conventional fuels without causing severe engine problems is currently around 7%.

Current regulations (Fuel Quality Directive[4] – FQD) also foresee a minimum reduction of 6% of greenhouse gas emissions compared with fossil fuels, a target that is unreachable only through the use of biodiesel.

It is consequently necessary to develop new fuel biocomponents that could substitute biodiesel, at least in part, and improve engine efficiency while reducing emissions. The solution proposed by eni is Green Diesel, produced using the proprietary EcofiningTM technology, which is able to meet these requirements.

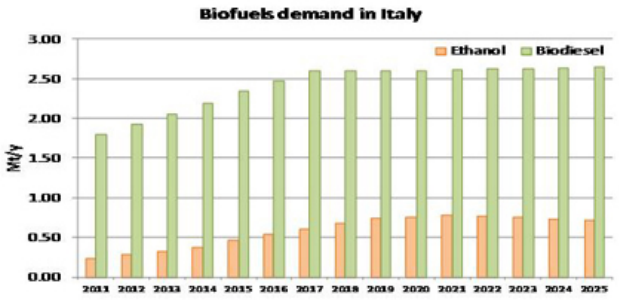

Figure 2: Biofuel demand in Italy (source: Parpinelli)

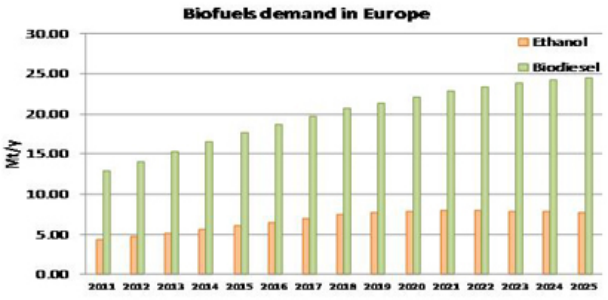

Figure 3: Biofuel demand in Europe (source: Parpinelli)

[1] Renewable Energy Directive (RED) – 2009/28/CE

[2] Biodiesel is a fuel obtained from renewable sources (vegetable oil and/or animal fat) using a chemical process; for its chemico-physical properties, it can partially be mixed with diesel derived from petroleum.

[3] Bioethanol is ethanol (CH_3CH_2OH) produced from biomass by a fermentation process.

[4] Fuel Quality Directive (FQD) – 1998/70/CE

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