

Conversion of Heavy Crudes and Residues into Light Products: EST (Eni Slurry Technology) Project

Eni Slurry Technology is a real breakthrough technology enabling the oil industry to solve crucial problems in the upstream and the downstream sectors. EST allows the valorization of unconventional crude oils, bitumen, and increasing and worsening refinery bottoms converting them to fuels of mandated higher quality.

In the upstream industry, the production of heavy crude oils will continue to grow over the next decades. Large reserves of unconventional extra heavy crude and bitumen exist in several geographic areas including Canada and Venezuela. Therefore, heavy oils are expected to increase their role in supplying worldwide all oil derivatives: as reserves of conventional crude oil continue to decline, these unconventional feedstocks have to be upgraded to meet the increasing demand for light and middle distillate fuels.

Refining industry, on the other hand, has to face the market evolution towards improving quality of road, air and maritime transportation fuels, and declining demand of fuel oil for industry and power generation. The increasing supply of higher sulfur and gravity crude oils and the increasingly stringent environmental regulations worsen an imbalance between the residues availability and the market demand.

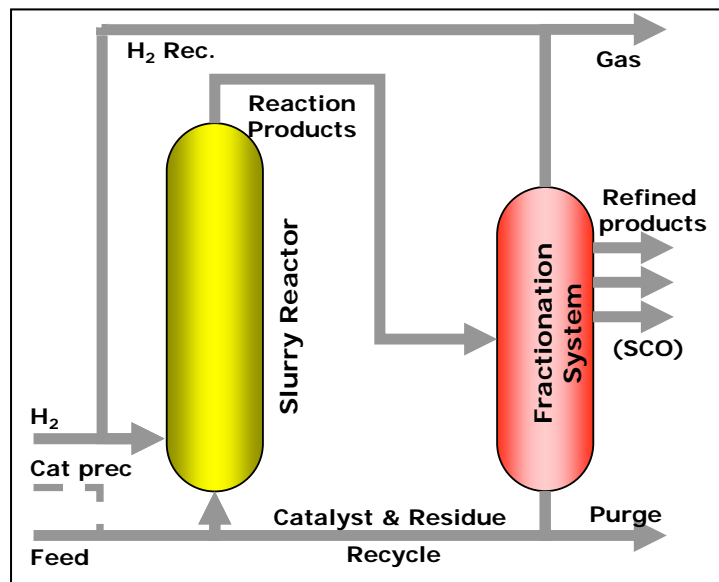
Therefore, a cost effective refinery modification in order to achieve a higher residue conversion is required for transforming the poor quality oil residues surplus into cleaner fuels.

On these premises, since early 1990s Eni has started the development of a new concept for full conversion and upgrading of the bottom of the barrel. The long lasting journey of this effort has brought to the development of a proprietary technology, Eni Slurry Technology (EST), which allows almost total conversion to distillates of the heaviest refinery bottoms as well as high upgrading performance by removing heteroatoms or reducing them to a level manageable in conventional refinery operations. From the technological point of view, EST can be classified as a hydrocracking process: its peculiar characteristics concern the use of dispersed catalysts and an original process scheme for the catalyst handling that allows an almost total feedstock conversion as well as high upgrading performance.

After an intensive R&D activity carried out at laboratory level and therefore at pilot plant scale, the EST outstanding upgrading performance has been demonstrated in test runs carried out at 1,200 BPSD Commercial Demonstration Plant (CDP) successfully operating in the Eni-Taranto refinery since 2005. Since the plant start-up, more than 230.000 bbl of different heavy oils have been processed successfully.

The positive results collected at CDP level have encouraged the decision for the first industrial application. Eni's Sannazzaro refinery has been chosen to host the first full scale industrial plant based on this new technology. The plant,

which will be fully integrated in the refinery scheme, will process 23,000 bpd of heavy Vacuum Residue to produce light and middle distillates. Reactors of the maximum industrial size will be installed in this plant, which will represent a strong reference in view of further industrial initiatives both in the upstream and downstream sectors.



EST excellences

- Oil is a finite and scarce resource and it should therefore be used to the maximum extent to produce the high value "light" products for which it is still irreplaceable.
- EST allows the complete conversion of the very Bottom of the Barrel into transportation fuels (gasoline, diesel).
- The synergetic combination of catalyst development, reactor development and process configuration allows the achievement of overall complete feedstock conversion, thus avoiding fuel oil fatal production of current hydroprocessing technologies.
- EST may represent the solution for the profitable exploitation of the huge reserves of heavy crude oils and bitumen, ensuring the availability of additional strategic reserves.
- Eni's refinery at Sannazzaro will host the first EST industrial plant at full scale (23.000 BPSD); a reactor of the maximum industrial size will be installed to establish a sound reference in view of further large size industrial initiatives.