

BARRANCABERMEJA REFINERY



- **Project:** operate a clean fuels facility and reduce reliance on imports of low-sulphur gasoline and diesel fuel
- **Cost:** \$1.02 billion
- **Contractors:** Technip, Foster Wheeler, Axens
- **Facility capacity:** 2,700 square metres, including nine reactors, 10 towers, 65 condensers and heat exchangers, 209 control systems and 12 storage tanks
- **Completion:** September 2010
- **Capacity:** 300,000 bpsd
- **Sulphur emissions reduction:** 98.8 percent, 47.2 metric tonnes per day
- **Current sulphur content in fuels:** 300 ppm for gasoline and 50 ppm for diesel

In September 2010 Ecopetrol began operation of its new clean fuels facility at the Barrancabermeja refinery in the Middle Magdalena Basin. This upgrade is representative of the Colombian downstream industry's most recent efforts to fulfil international environmental standards for its fuels. The Barrancabermeja refinery now produces gasoline with a sulphur content of less than 300 parts per million (ppm) per barrel. The sulphur content of diesel fuel from the refinery has also been reduced to less than 50 ppm per barrel.

One of the principle benefits of the new facility is the reduced reliance on imports of low sulphur gasoline and diesel fuel. While previous projects have already focused on the removal of lead and benzene, the refining facilities will allow Colombia to supply its cities with low sulphur gas, dramatically improving air quality and reducing acid rain. Ecopetrol has estimated that the new clean fuels refining facilities remove 47.2 metric tonnes of sulphur per day, which makes for a 98.8-percent reduction in sulphur emissions.

In 2007 Ecopetrol formally announced the hydro-treatment upgrade at Barrancabermeja. The Italian engineering, procurement and construction company Technip won the bid to be the project's main contractor. In 2008 Foster Wheeler was awarded the contract for the front-end engineering design. In total Ecopetrol invested \$1.02 billion dollars to upgrade the refinery, an investment that not only created the hydro-treatment facility but also increased its capacity by 50,000 barrels per stream day (bpsd).

The upgrade required extensive engineering and construction. The facility occupies 2,700 square metres and houses nine reactors, 10 towers, 65 condensers and heat exchangers, 209 control systems and 12 storage tanks. Workers removed 30,000 cubic metres of earth and poured 16,000 cubic metres of concrete to construct the facility. Overall, the project utilised 2,100 tonnes of reinforced steel and 2,500 tonnes of pipes. Ecopetrol estimates that the facility's massive upgrade produced an additional 8,800 jobs in 2007-2010, and the majority of these jobs went to local workers.

The clean fuels facility makes use of several advanced units to remove hydrogen sulphide from gasoline and diesel fuel and convert it into elemental sulphur and hydrogen, both of which can be resold for industrial purposes. Axens supplied a 19,000-bpsd gasoline hydro-desulphurisation unit as well as a 57,000-bpsd diesel desulphurisation unit. The project additionally required the installation of a sulphur recovery unit, a hydrogen production unit, a tail gas treatment unit, a sour water stripper and a gasoline/diesel amine regeneration unit to facilitate the facility's processes.

