

Sartec ENERGY SOLUTIONS



Sartec from Saras: large experience made available to our customers

Sartec, established in 1996, is the technology and applied research company of the Saras Group.

Sartec develops and supplies effective solutions and services based on leading edge technology for oil refining, petrochemical, chemical and energy industry and for the environmental sector.

Sartec employs 150 people, mainly industrial engineers with academic degree/PhD.

Sartec assets:

State of the Art Laboratory for chemical analysis

Hydrocracking and HSD pilot plant

Staging area for the construction of instrumentation cabinets, monitoring systems and process packages

DCS platform for applications development, off-line testing and training



Sartec proposition

Due to a wide experience in homecompany refinery
300.000 B/D refinery integrated with petrochemical
plant and IGCC unit

Nelson Complexity Index 10

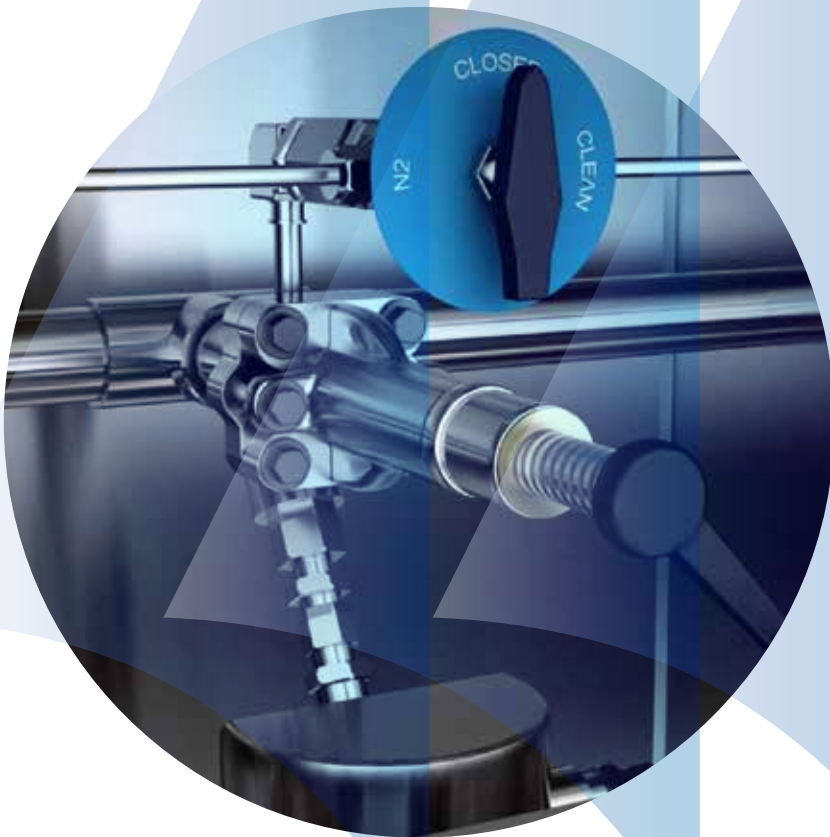
High conversion capacity units (FCC, Vis breaking,
mild-Hydrocracking)

Sartec can provide a wide range of service sto oil
refining and large industrial units:

- Refinery assessment and quick wins
- Profitability and Performance Improvement
- Planning/scheduling
- Energy optimization
- Process automation and control
- Technical Assistance – Troubleshooting
- Reliability and Maintenance optimization
- Project Development and Execution supervision
- Skid Package units and EPCM revamping projects
- Environmental engineering



Overview of proposed services



REFINERY ASSESSMENT AND QUICK WINS

- Process configuration
- Appraisal of process units and utilities systems
- Identification and analysis of bottlenecks
 - Low/no capex debottlenecking options
- Maintenance and inspection best practices
- Tank farm assessment

PROFITABILITY AND PERFORMANCE IMPROVEMENT

KPI definitions and monitoring in several refining key operations areas:

- Cash operating expenses and margin;
- Reliability Maintenance;
- Energy optimization;
- Oil losses;
- Refinery utilization and availability;
- Identify the performance gap versus industry leaders;
- Develop with the Refinery gap closure plans:
 - Improvements with a better use and management of all the available resources and facilities;
 - Minor investments for upgrading the day by day operations and practices;
 - Identification of structural inefficiencies and improvement roadmap definition.
- Process engineering is supported by a modern chemical laboratory and hydroprocessing pilot plants:
 - Catalyst performance evaluation
 - Feedstock quality impact on process performance
 - Process optimization
- Selection of the most appropriate technology in complex projects as owner representative

Depending on the current refinery configuration and performance, a comprehensive improvement plan can yield up to 1-2 \$ / BBL.



PLANNING/SCHEDULING

Planning and Optimization

- Detailed refinery operations modelling
- LP model advanced outcomes
 - Investigation of trade offs between processing and sale of crudes and feedstocks
 - Definition of the best value for product sales and optimal recipes
 - Studies about new intermediate streams routing for margin improvement
- Develop long range Refinery studies with respect to:
 - New product specification driven by new laws
 - Different product demand
 - New technology applications
- Support the refinery in setting targets for crude and products
- Support the development of a refinery target configuration for future needs exploiting the current process facilities

Scheduling

- Scheduling models development for day-to-day optimization
 - Optimal crude segregation strategy and replenishment
 - Manage operational disruptions in order to reduce lost opportunities
 - Optimize product blend avoiding expensive give aways or reblendings

ENERGY OPTIMIZATION

Energy cost often represents more than 50% of cash operating expenses in a typical Refinery. Energy consumption is evaluated using the Solomon Associates methodology:

- Identification of gaps versus best performers
- Gap closure plans development
- Tracking of improvement plans results

PROCESS AUTOMATION AND CONTROL

- Design, configuration, commissioning and start-up of Distributed Control System (DCS) and Emergency Shut-down System (ESD)
- Scope definition, design and implementation of Advanced Process Controls systems
- Training services
- Field instrumentation
- Process analyser design and construction

TECHNICAL ASSISTANCE AND TROUBLESHOOTING

- Scheduled turnarounds and units' start-up
- Technical services:
 - Catalyst monitoring
 - Fractionation monitoring
 - Hydrogen balance
- Assistance to the Refinery staff during the take off phase of improvement programs
- Operating problems analysis to identify best solution and assistance in implementation



RELIABILITY AND MAINTENANCE OPTIMIZATION

- Review of maintenance work practices in use
- Resource usage optimization
- Implementation of reliability practices (Asset Management)
 - Risk Based inspection (RBI)
 - Fitness for Service assessment (API 579)
 - Reliability Centered Maintenance (RCM)
 - Software selection and implementation
- Review and optimization of turnaround practices and sequences

PROJECT DEVELOPMENT AND EXECUTION SUPERVISION

Typical activities:

- Develop project basis memorandum with Refinery;
- Assist the Refinery to qualify the engineering contractor for "FEED" activities:
 - Design specifications and cost estimate;
 - Process flow diagrams review;
 - Engineering of long lead items .
- Assist the Refinery in choosing the optimal contractual solution;
- Monitor engineering procurement and construction development;
- Assist in start-up planning;
- Conduct performance acceptance testing.



SKID PACKAGE UNITS AND EPC_M REVAMPING PROJECTS

For skid package units:

- Best technology selection
- Basic design, front end and detailed engineering, including interconnecting OSBL
- Procurement
- Fabrication and mounting

EPC_M revamping projects

Typology of projects:

- Process analysis system and continuous emissions monitoring system
- Automation and control
- Power grids
- Small/medium revamps for units optimization

ENVIRONMENTAL ENGINEERING

Permitting

- Environmental impact studies for new projects
- Site pollution assessment
- Site specific risk-analysis
- Site authorization in accordance to IPPC legislation

Soil remediation

- Wide range of technologies: selection of the most appropriate for the specific pollutants and the site targets
- Preference to on-site and in-situ technologies, to reduce cost and environmental impact

Advanced environmental monitoring

- Fugitive emissions identification with IR imaging (Smart LDAR programs)
- Odor sources and impact evaluation
- Surveys with drones
- Pollutant dispersion modelling (atmospheric, underground)
- Environmental data management system





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