



# SARAS REFINERY: A STRATEGIC ASSET IN THE MIDDLE OF THE MEDITERRANEAN

Focus on Saras complexity and operational features

Investor Day Sarroch Oil Refinery - Sardinia 30<sup>th</sup> January 2007



# Agenda



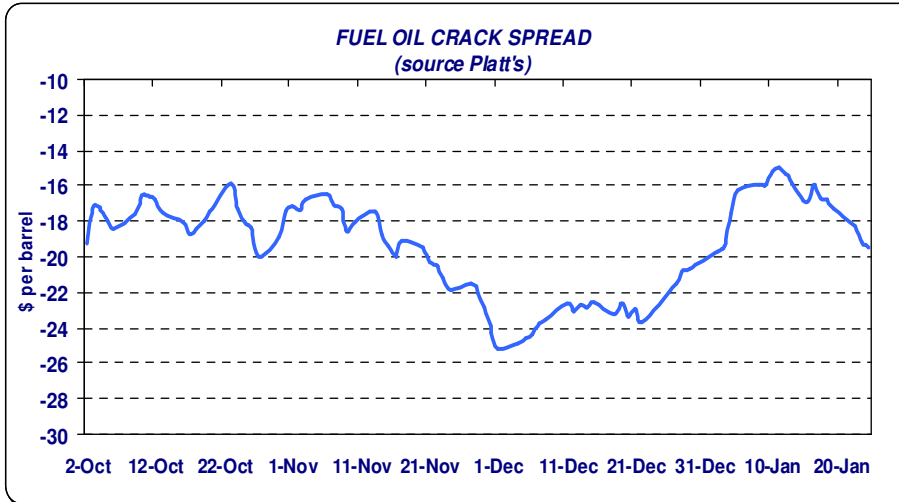
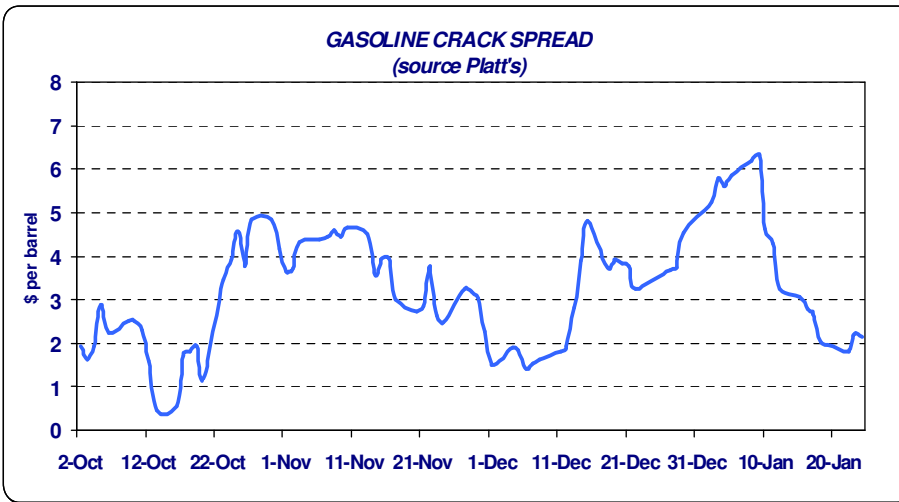
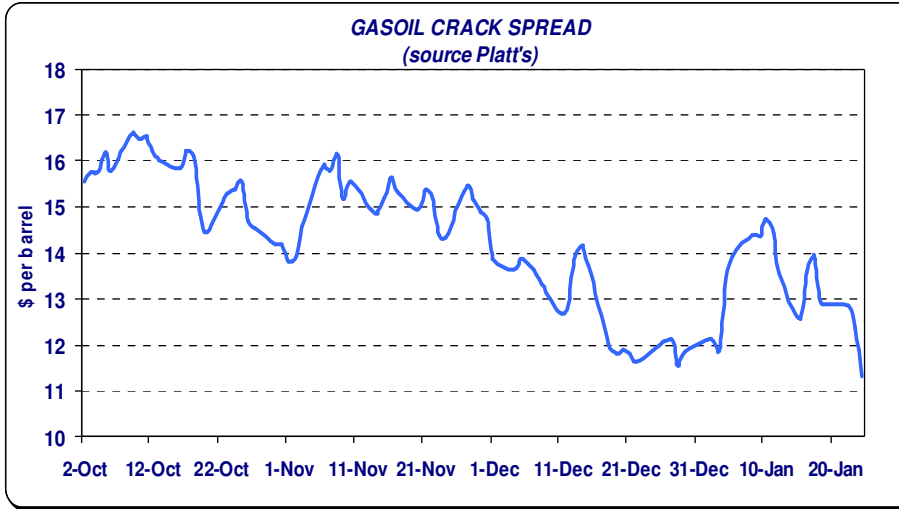
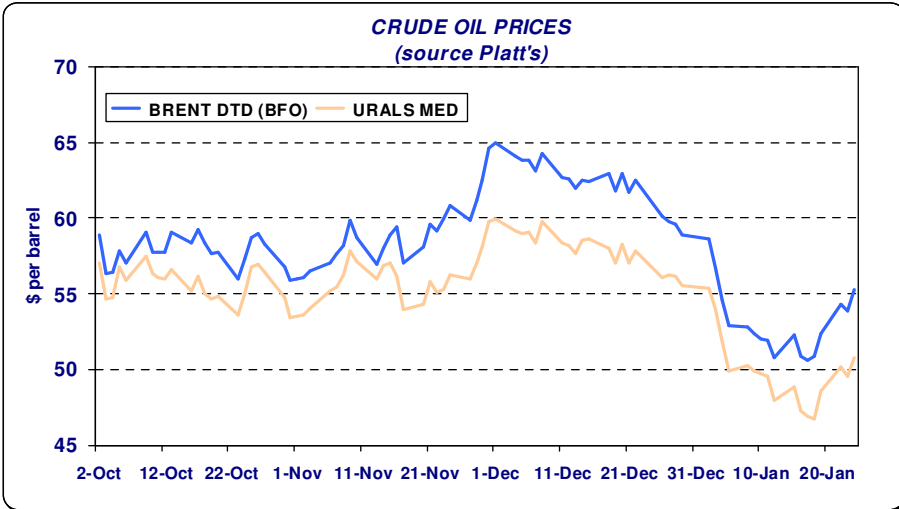
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- ❑ Introduction Dario Scaffardi, *General Manager*
  - ❑ CIP6 and CO<sub>2</sub> update Corrado Costanzo, *CFO*
  - ❑ Setting the scene: reference market and competitive positioning Francesco Marini, *P&C Director*
  - ❑ Saras' refinery: main features Antioco M. Gregu, *Refinery Director*
  - ❑ Saras' refinery: insight of a continuous upgrading programme Giuseppe Citterio, *Technical Director*
  - ❑ Conclusions Dario Scaffardi, *General Manager*
  - ❑ Refinery visit Bruno Demuru  
Francesco Mura



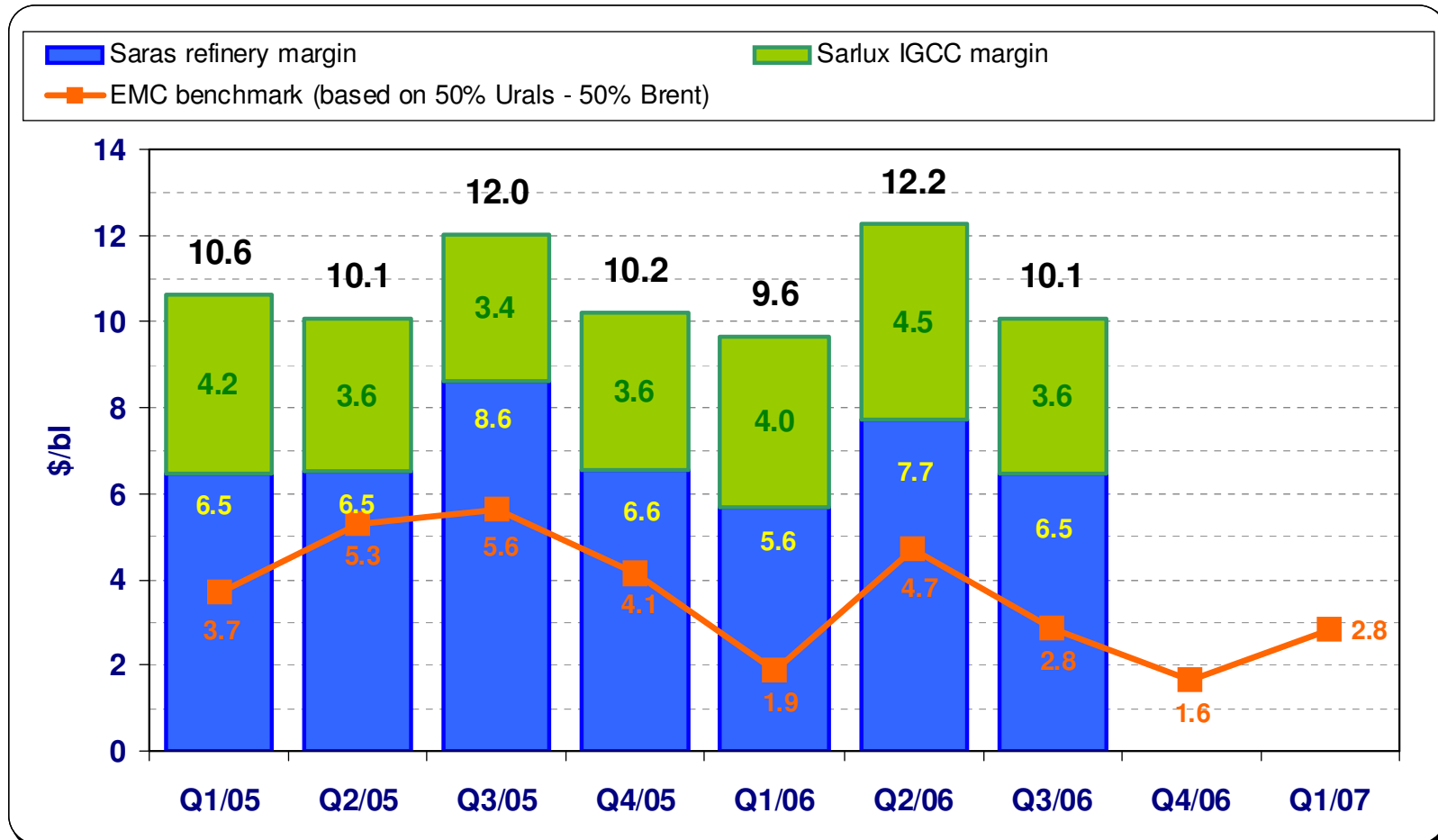
- Introduction
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# Recent market trends



# Saras' superior margins





# Contents



- Introduction
- **CIP6 and CO2 update**
- Setting the scene: reference market and competitive positioning
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- Resolution No. 249/06, dated 15 November 2006 from the Italian energy authority modifies the criteria for evaluating the fuel cost component of the price of the electricity generated by CIP 6 plants
- Saras believes that the above mentioned resolution is unlawful for several reasons and consequently challenged the resolution before the relevant Court
- The recently approved budget law for 2007 (art.1117) confirms applicability of CIP6/92 law for all the plants already built and operational



- **Article 7bis of CIP6/92 law** state: “the sale price of electricity will be updated in case of changes of regulations implying higher or additional costs for the producers”
- The guidelines of Italian energy authority, issued on 15th November 2006, confirm applicability of article 7bis to the CO<sub>2</sub> related costs and also define reimbursement mechanism.
- Final resolution from the energy authority expected in the coming weeks



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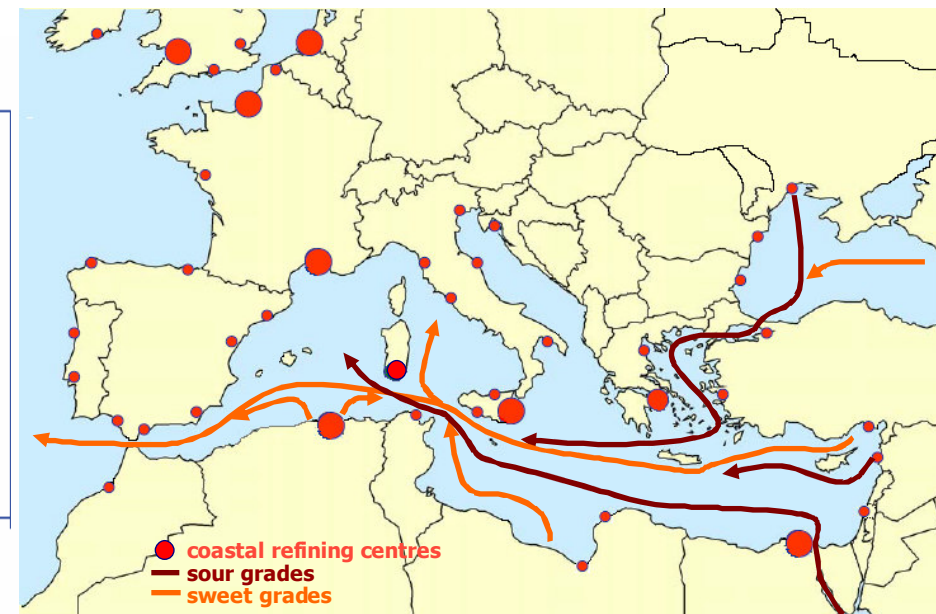
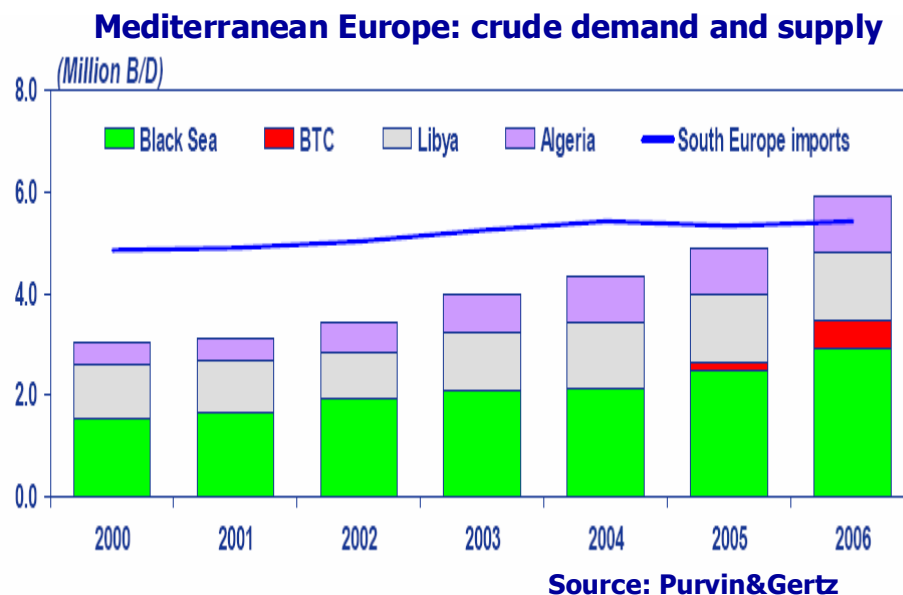




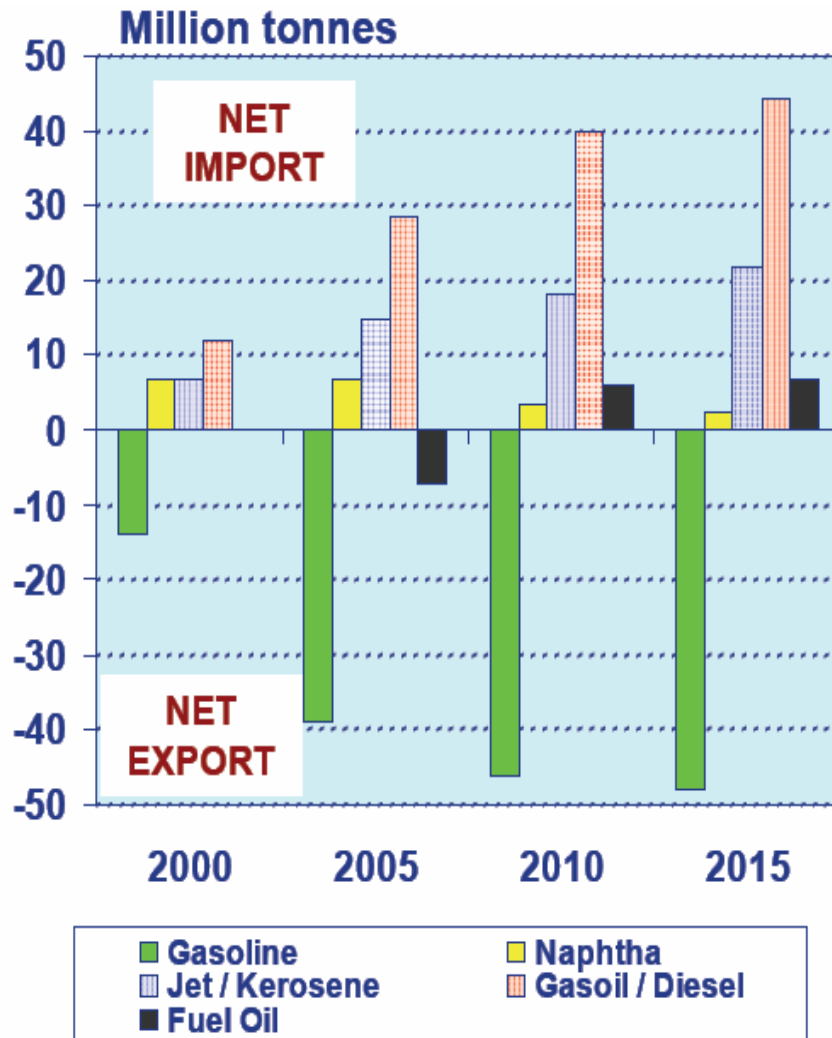
# Supply of crude in the Med: some relevant trends

- Supply of indigenous crude in the Med is constantly increasing
- The Med is becoming a net crude exporter
- The Med crude slate is forecast to become sweeter and lighter, an exception to world average
- The Med is expected to become a “crude-buyers” market

**➡ The right place to be for complex and flexible refiners**

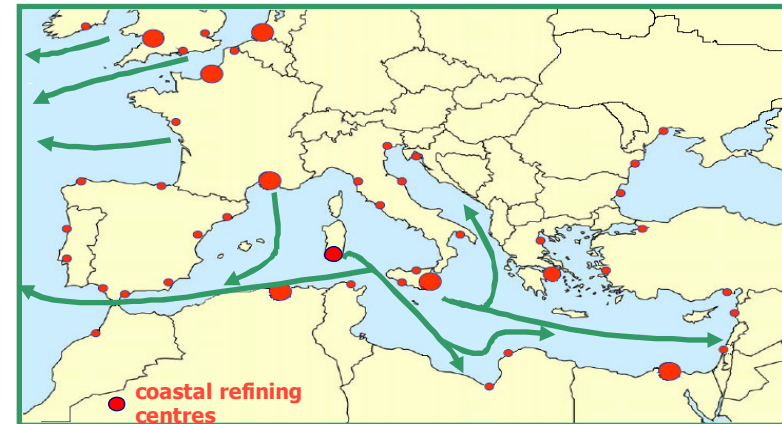


# European market will rely on trade to balance supply and demand



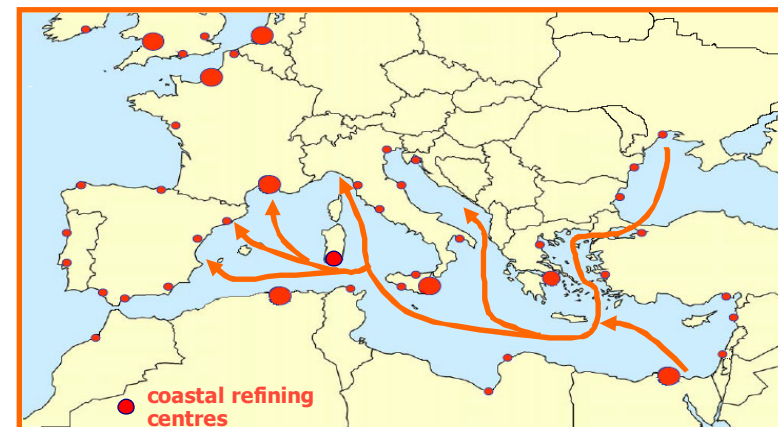
Source: Purvin&Gertz

## Gasoline trade flows



- Structural surplus of gasoline likely to grow

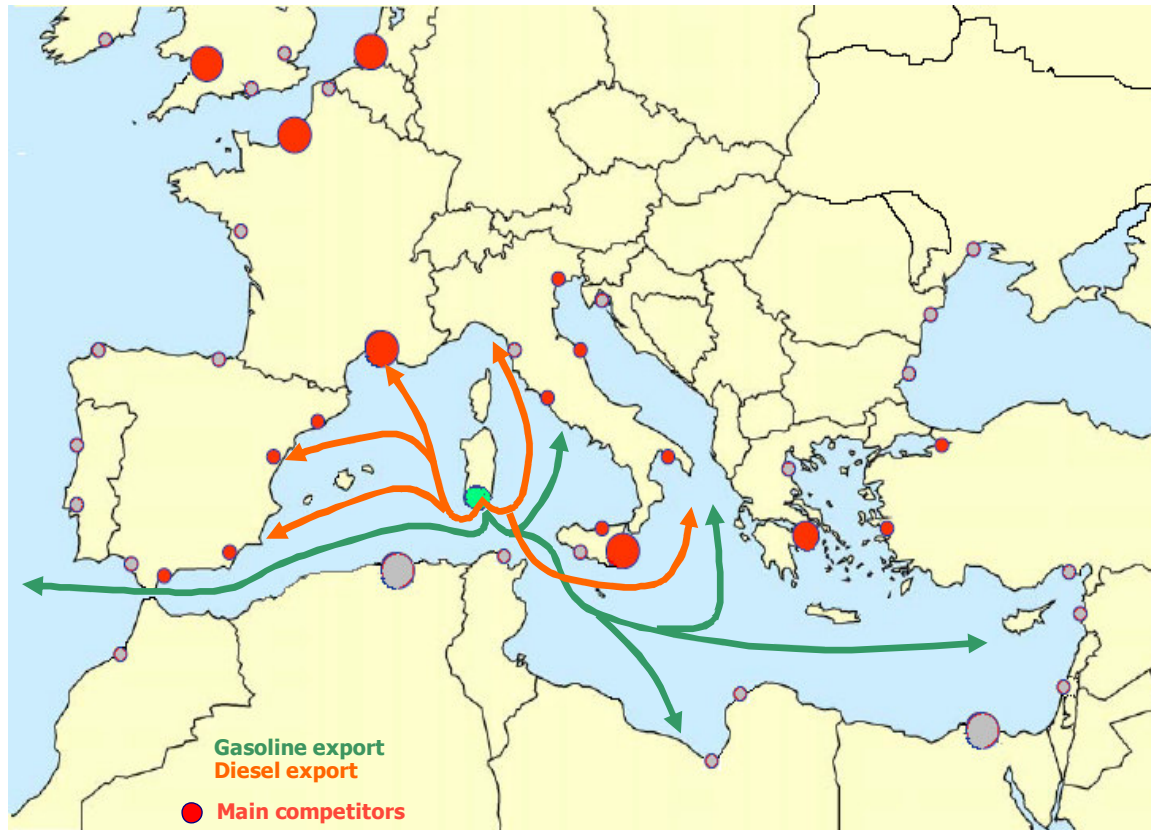
## Middle distillates trade flows



- Shortfall in diesel and kerosene becoming more difficult to satisfy



# Saras' trading environment

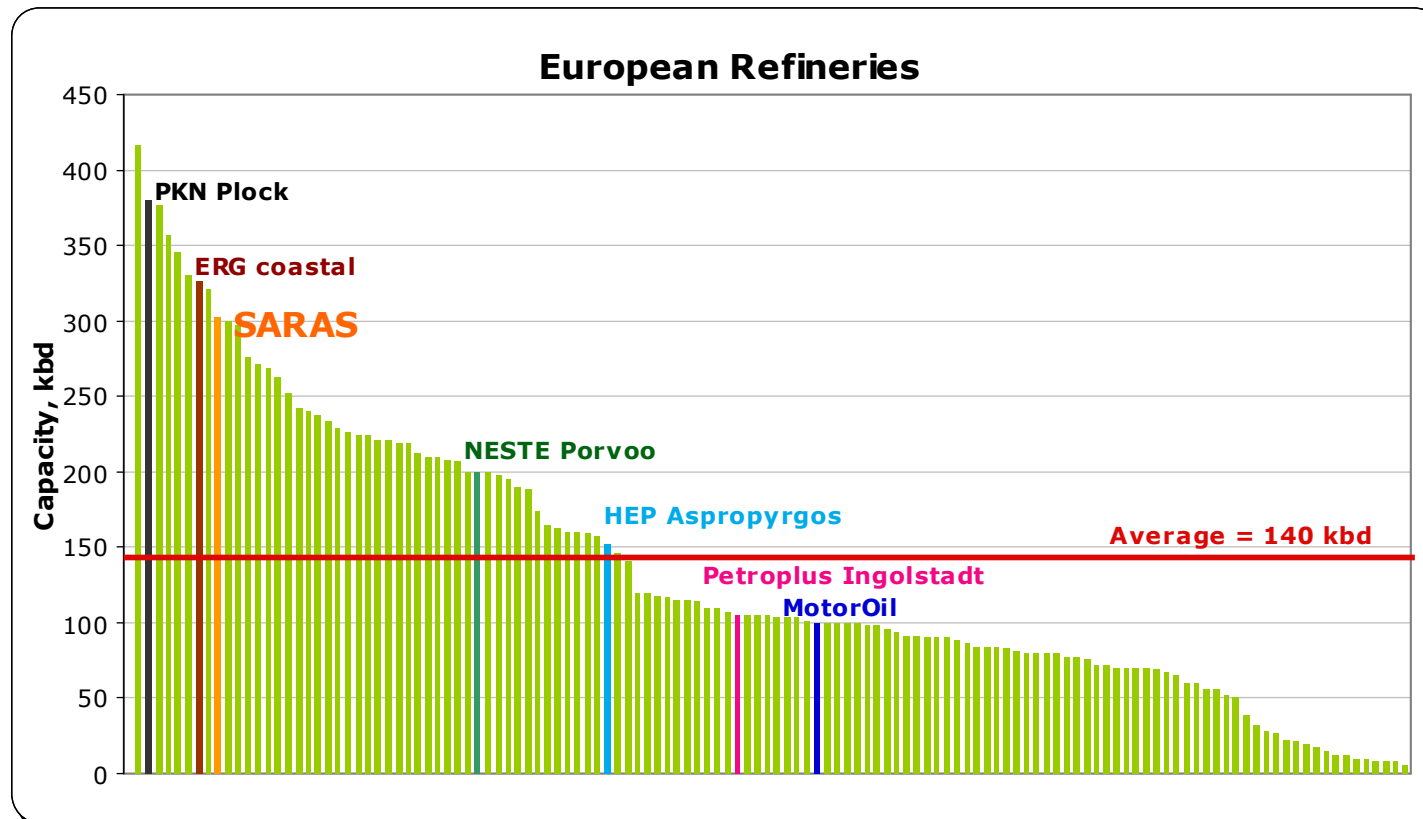


- Saras is at the crossroads of the main oil routes
- Saras is a key supplier of diesel to the North of Italy, South of France and Spain, which are all importing regions
- Saras is a supplier of gasoline to Italy, the Eastern Mediterranean and North Africa with a small surplus for the US market

# Saras is



the 10th largest European refinery with its 300,000 bcd capacity, more than twice the average European size



Source: OGJ Worldwide Refining Survey  
NOTE for ERG: coastal refining data, capacity as from recent company presentations (new 2007 configuration)



# Saras' complexity



**Complexity is a measure of historical capital investment and, as a result, should reflect the capability of an asset to produce high quality and high value products.**

- There are two main international complexity indexes: Nelson and WoodMac
- They use slightly different factors to evaluate the relative complexity of the various units (\*) but the most relevant difference is that Nelson methodology doesn't provide a complexity factor for the Gasification unit
- Adding the value of Gasification (using the factor provided by WoodMac) to Nelson calculation the two methodologies give very similar results as shown below

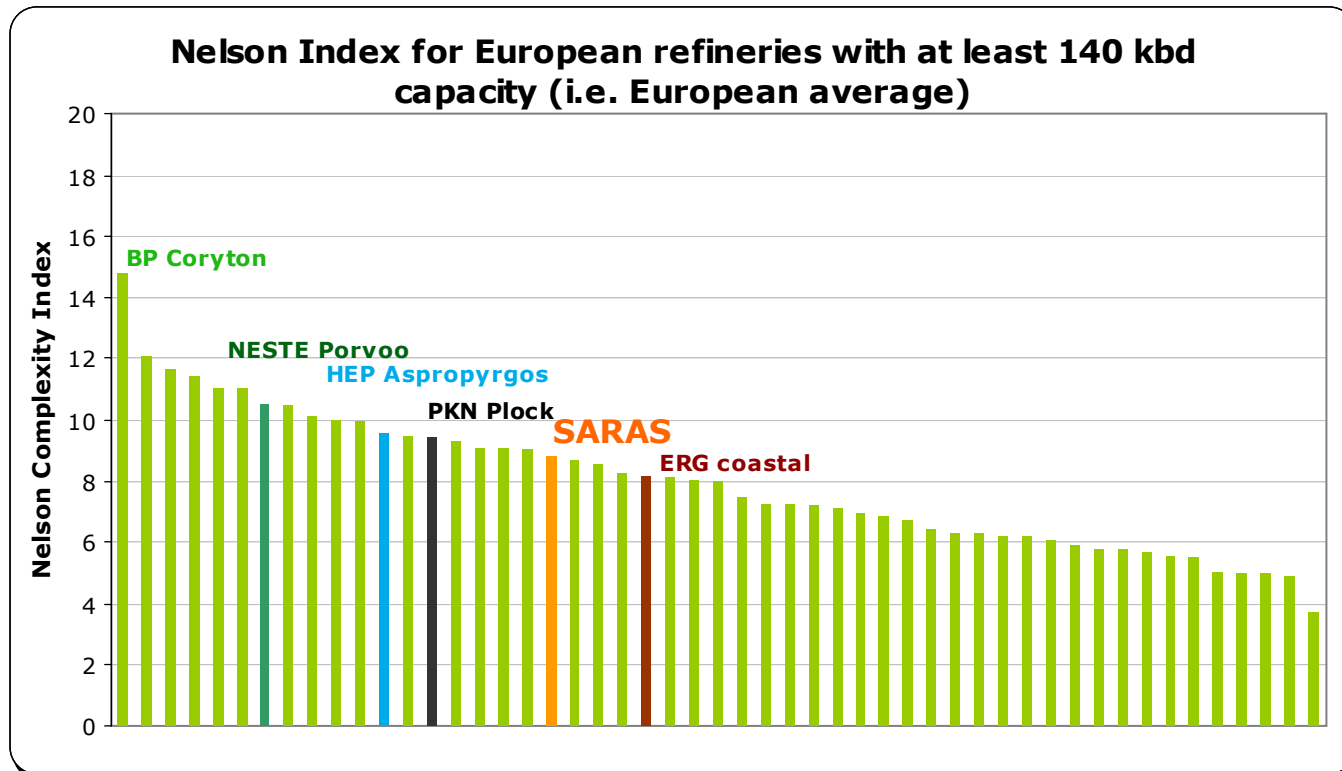
	<b>Saras complexity</b>
<b>NELSON</b>	<b>7.9</b>
<b>WOODMAC</b>	<b>8.6</b>
<b>NELSON with Gasification</b>	<b>8.7</b>

- In the following slides the Nelson Index reported is with the contribution of Gasification unit (for Saras as well as for other refiners)

# Saras is



The 20th most complex refinery according to Nelson Complexity Index (8.7), considering the European refineries with above average capacity (>140,000 bcd)



NOTE:

If we take into account also the long term processing agreements that Saras has with the units of the nearby petrochemical site (Polimeri Europa and Sasol), Nelson Complexity Index becomes 9.7 (12th in the previous ranking)

**NOTES:**

**Saras: 100% IGCC included, petrochemical integration excluded**

ERG: coastal refining data, 51% IGCC included, capacities as from recent company presentations (new 2007 configuration), new FCC feed pretreatment included

NESTE: 2007 diesel project included

Source for capacities and complexity indexes: 2006 OGJ Worldwide Refining Survey

# What is the meaning of Nelson complexity index?

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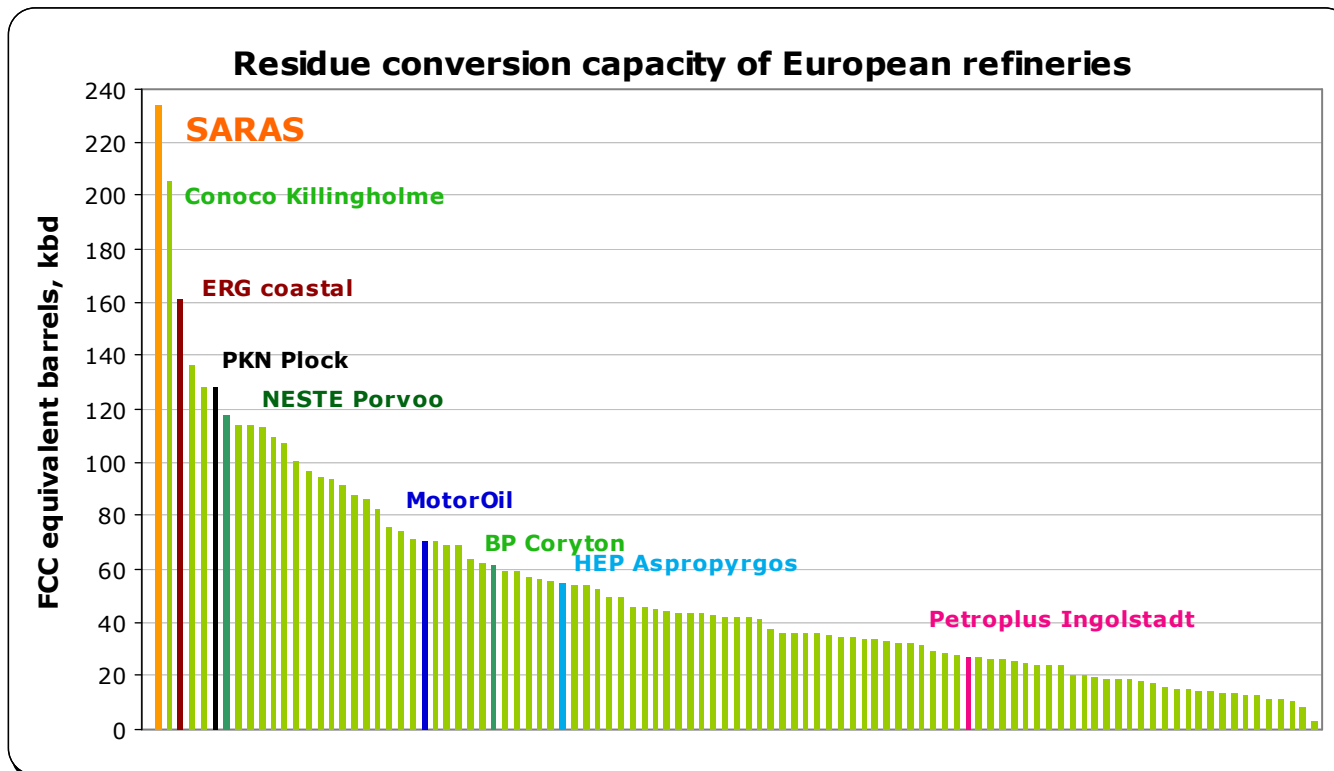


- The Nelson complexity index mainly reflects mechanical complexity and, as a consequence, construction and maintenance costs: therefore **it's certainly related with replacement cost, but we don't believe that it's the most appropriate way to measure profitability**
- In the current and forecast European refining business environment, hydroskimming capacity earns no or very low margins. Refining margins are largely the result of the capability to convert atmospheric residue into lighter products
- To capture this, another important metrics for refineries is the **FCC Equivalent index**, that expresses the conversion capacity compared to the one achieved by an FCC of identical capacity

# Saras is



the largest European (and in the world top 10) refinery in terms of residue conversion capability, with its 78% FCC Equivalent Index (i.e. 234,400 bcd) of FCC equivalent conversion installed



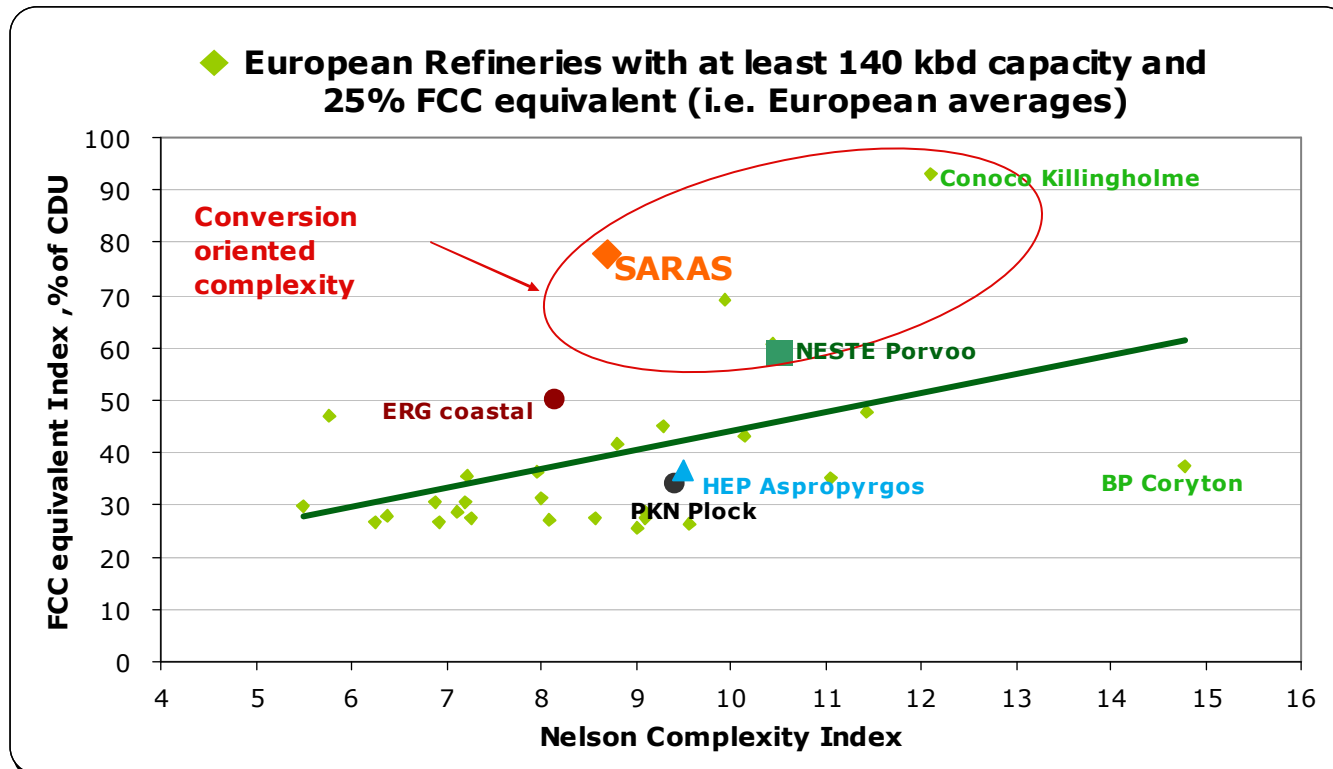
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NESTE: 2007 diesel project included

# Saras has a conversion oriented complexity



**NOTES:**

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Source for capacities and complexity indexes: OGJ Worldwide Refining Survey

Source for FCC equivalent Indexes and IGCC complexity Index: Wood Mackenzie





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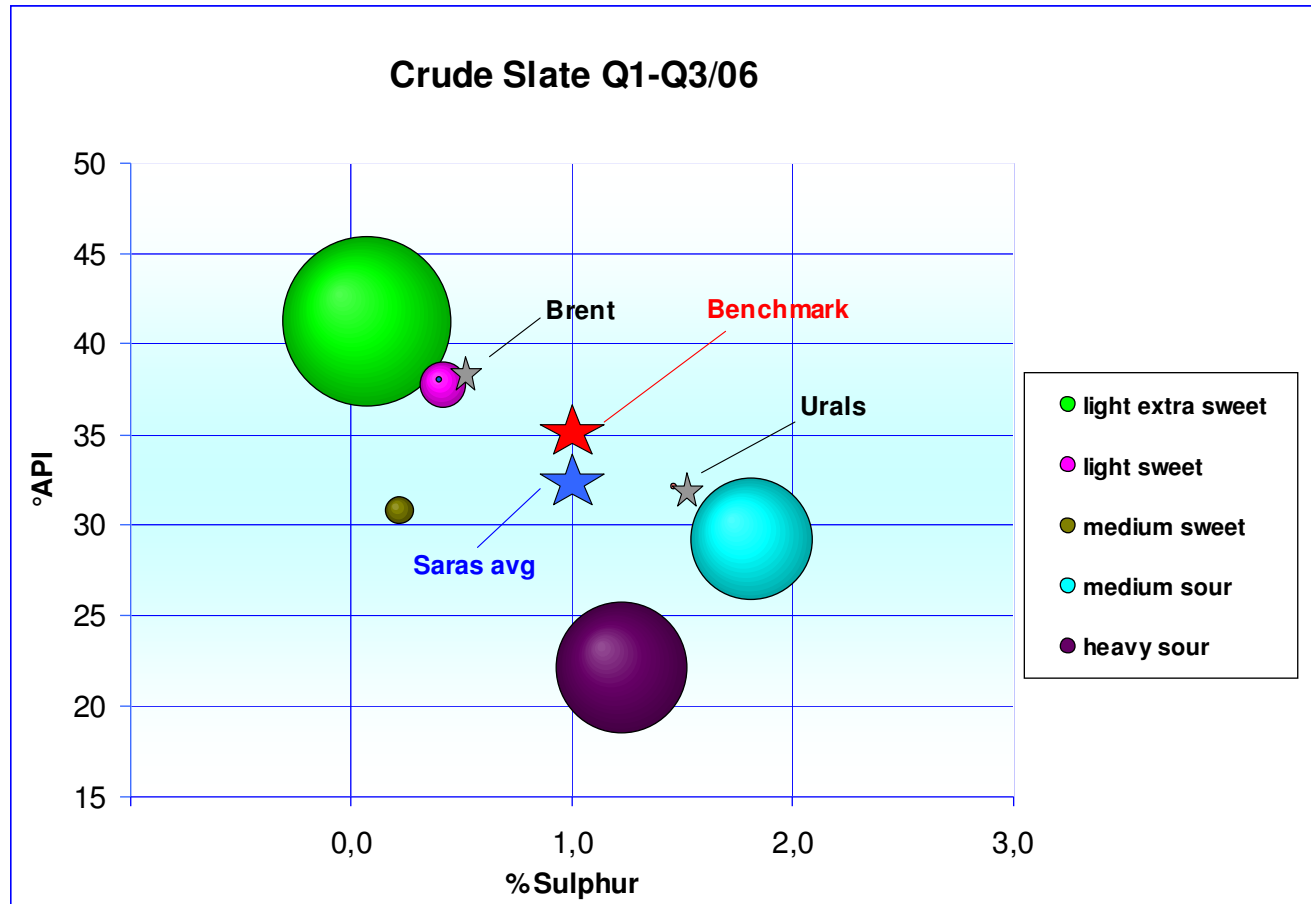
# Strengths of the refining structure

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- **Size**
  - ✓ 300,000 bcd distillation capacity
- **Flexibility**
  - ✓ Flexibility in crude oil supply and processing
  - ✓ Large storage facilities
  - ✓ Multiplicity of many key units
  - ✓ Multi-source hydrogen supply for conversion and clean fuels production
- **Complexity**
  - ✓ Complete upgrading cycle for heavy distillates and residues
  - ✓ Minimal production of Fuel Oil
  - ✓ Diesel oriented production
  - ✓ Integration with power generation and petrochemical operations
- **Strong health, safety and environmental commitment**

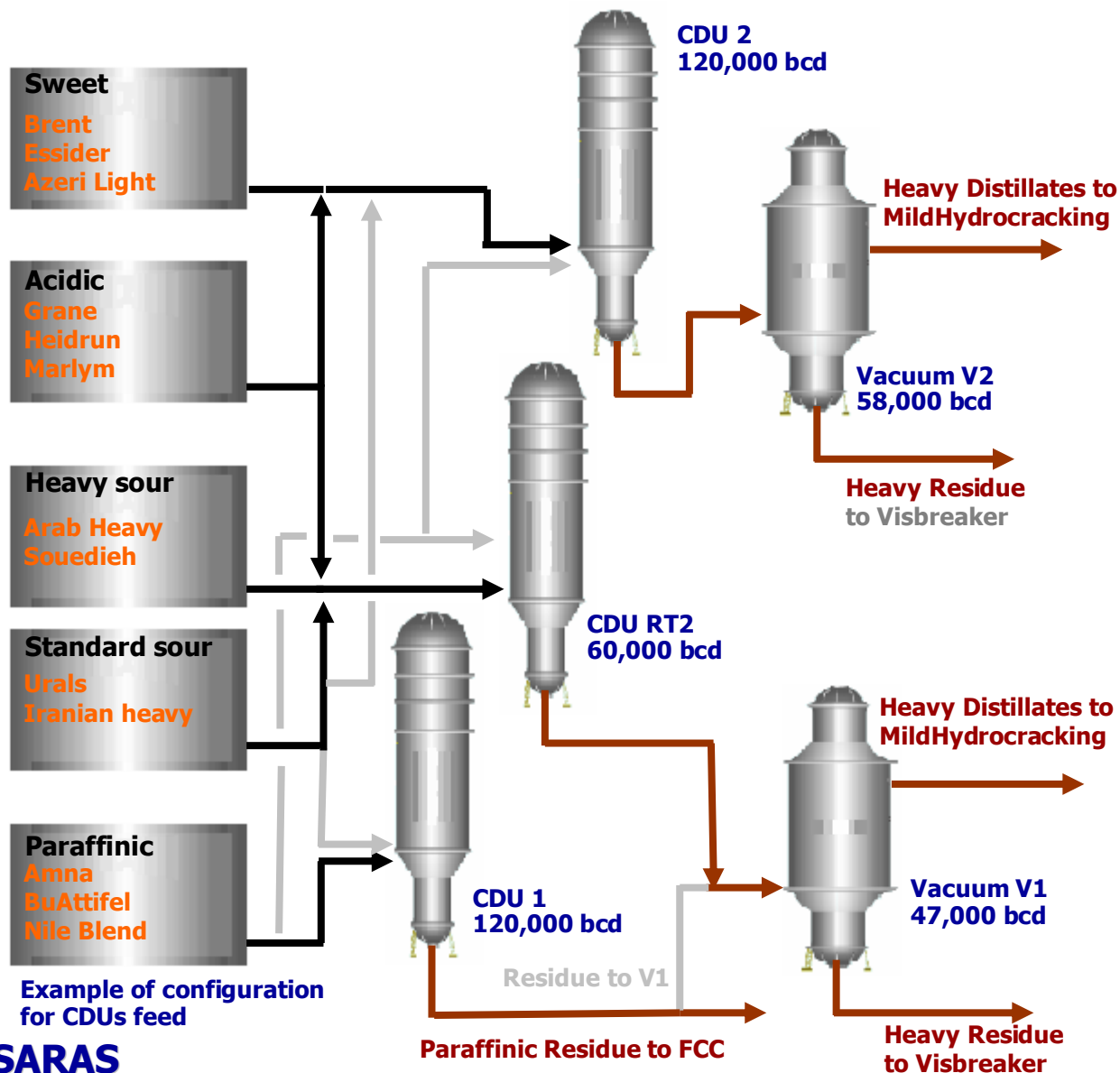
# Crude slate



- Saras runs "extreme" crudes (both for the heavy and light grades) rather than the standard reference crudes like Brent or Urals

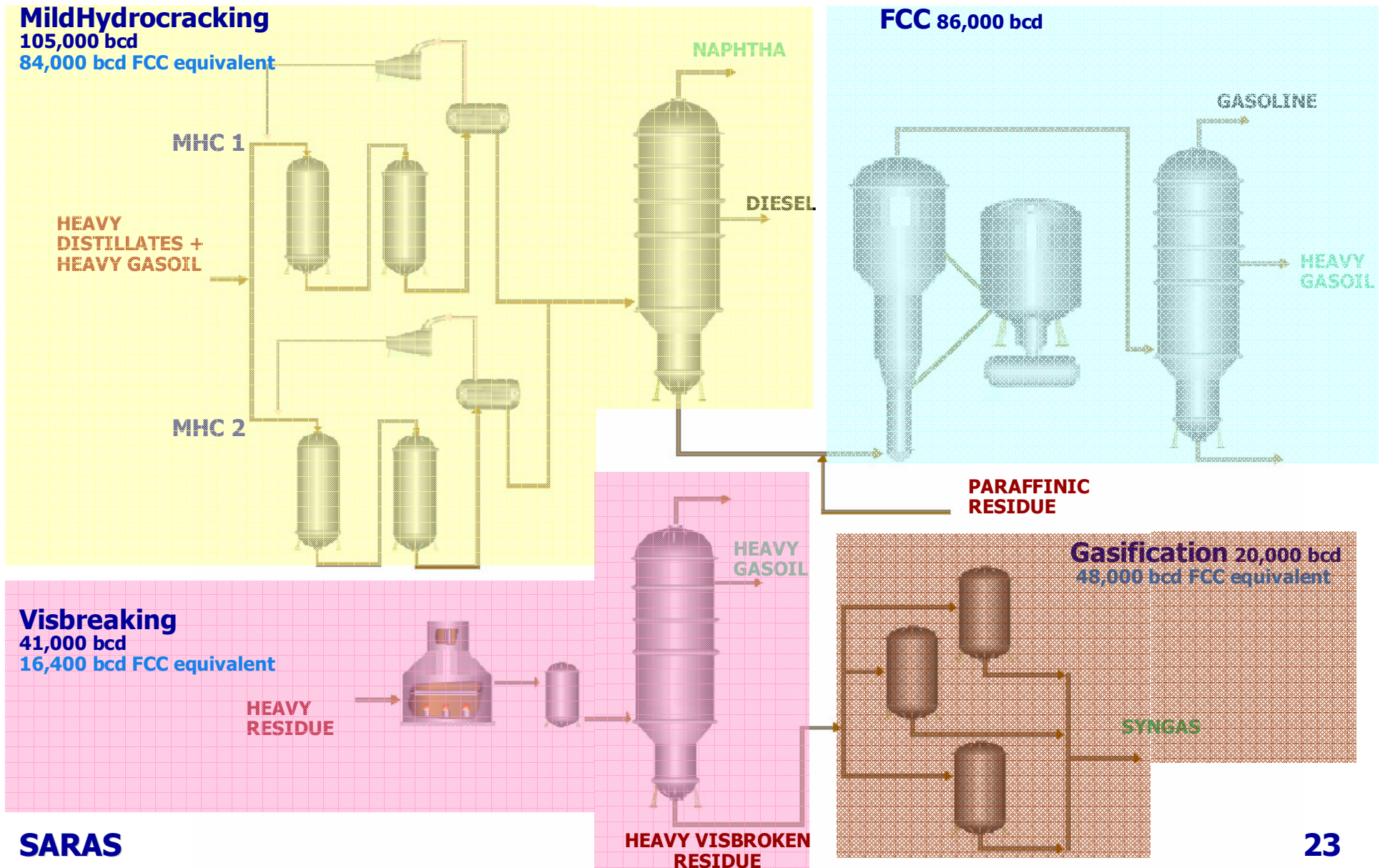


# A flexible configuration for crude distillation



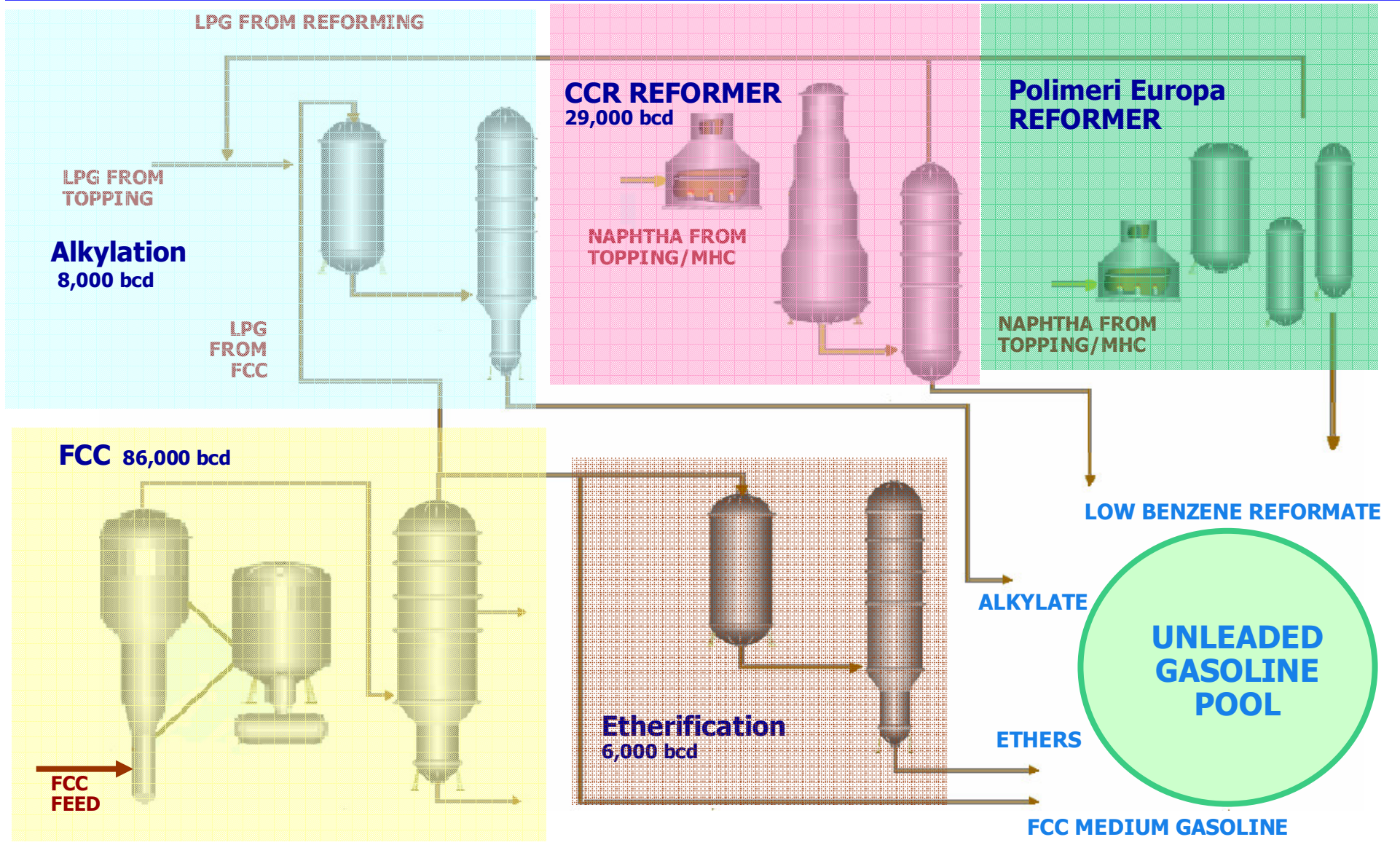
- The large storage capacity and the complex interconnecting with CDUs allow Saras to run simultaneously up to 5 crudes, some of them very different in nature (to the best of our knowledge one of the very few European refineries able to do it)
- The blend of different grades allows Saras to process opportunistic "difficult" crudes (high density/high acidity/high pour point etc.)

# A complex, complete and integrated conversion scheme: the engine of refinery profitability

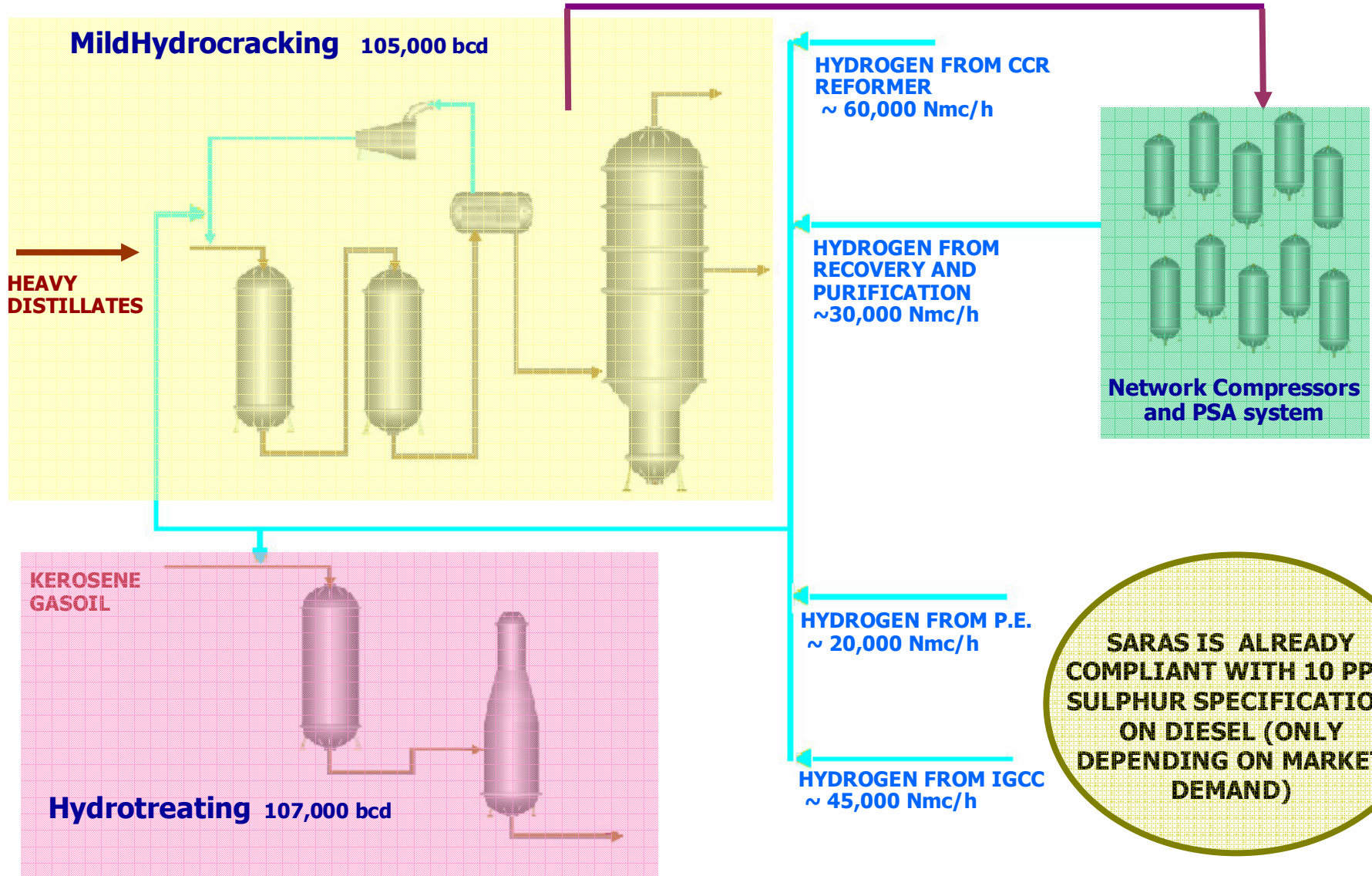




# Gasoline production and blending



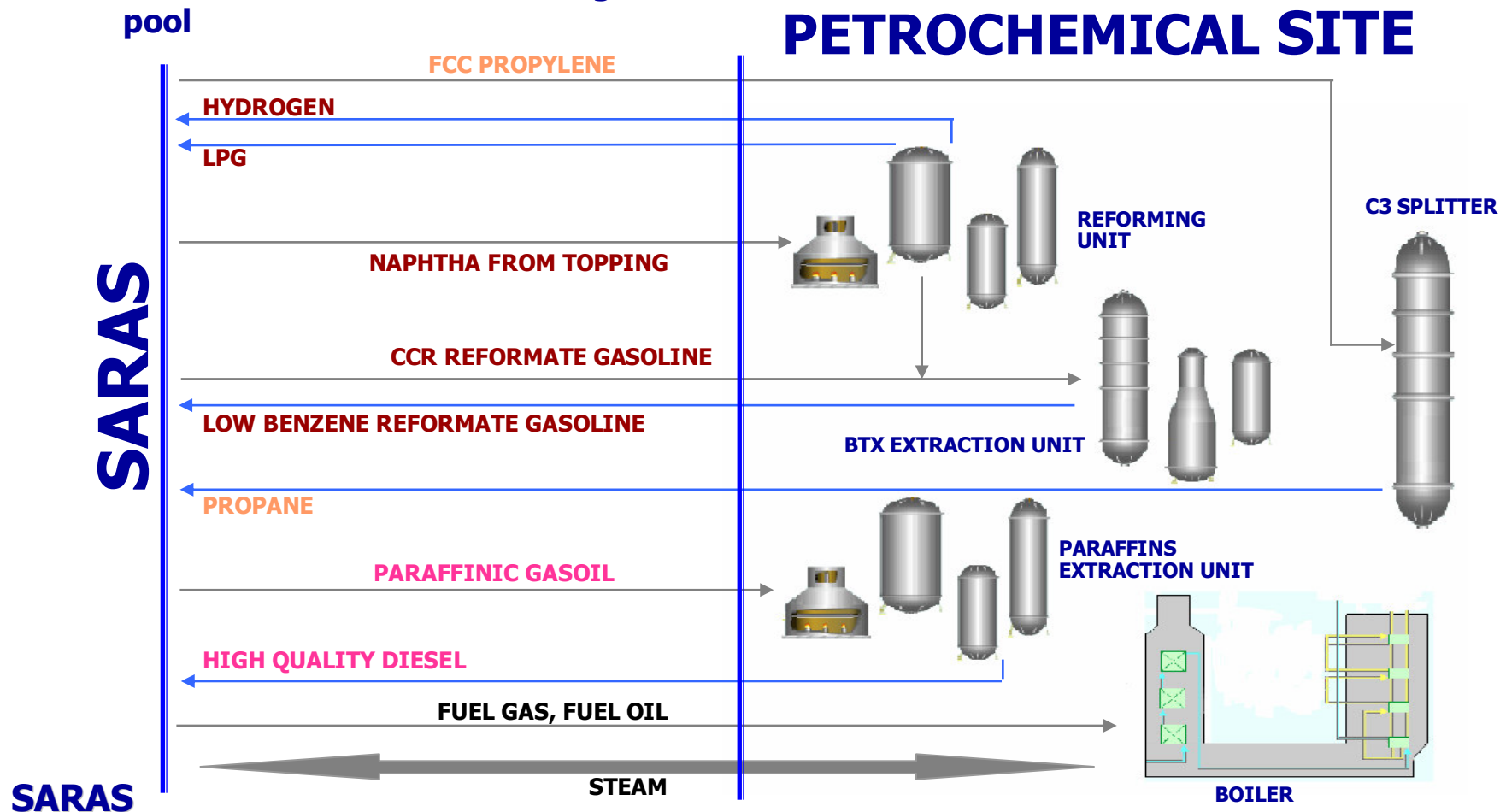
# Diesel production and blending: the importance of hydrogen for conversion and clean products





# The importance of petrochemical integration

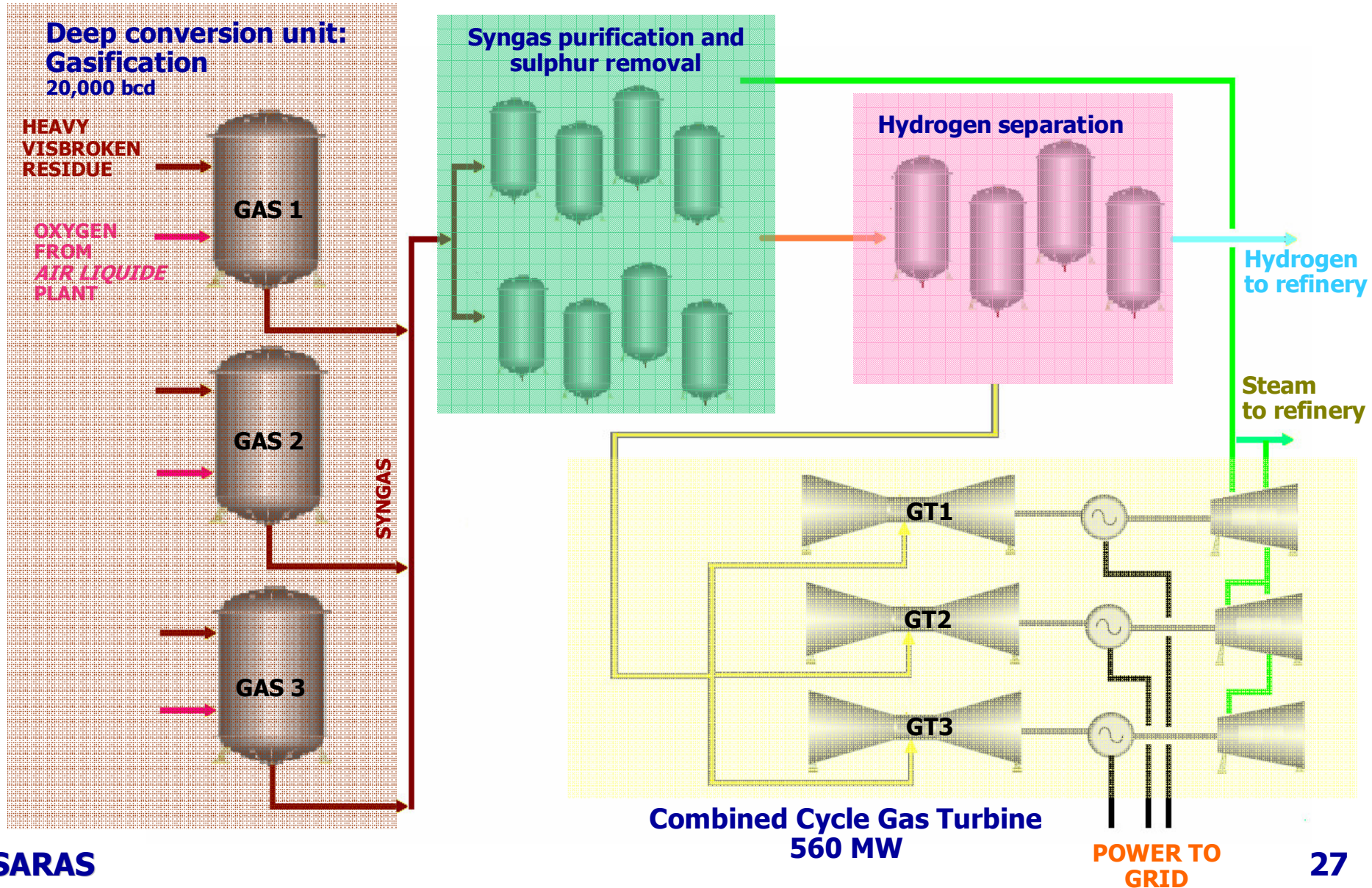
- Upgrade of naphtha into high octane gasoline
- Hydrogen production
- Benzene extraction from the gasoline pool
- Cold flow properties improvement on diesel pool
- Additional reliable source of steam







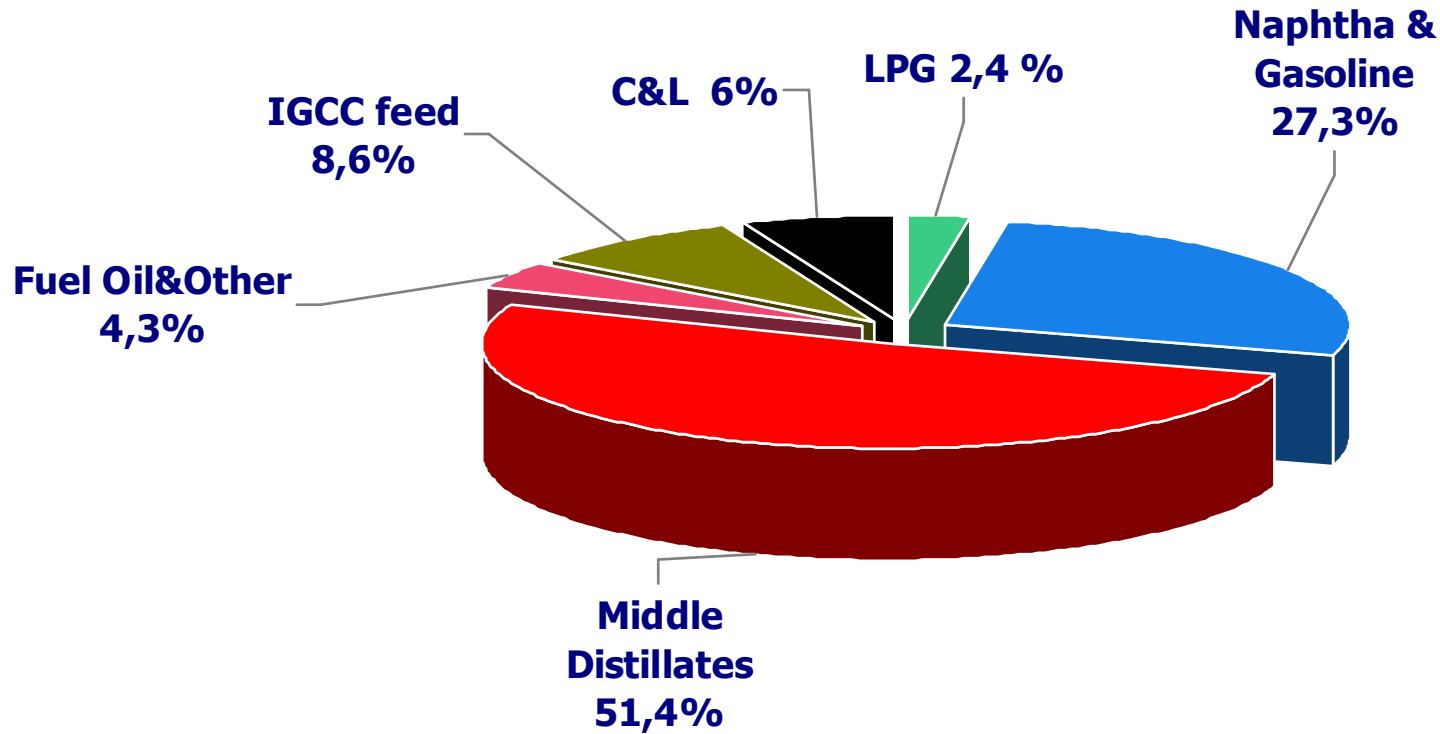
# Power generation



# Yields: a diesel oriented refinery



## Q1-Q3/06 Production



# The marine terminal



- Saras has a large marine terminal which is very well protected from prevailing winds
- It has in total 11 berths
  - 9 berths are used for refined product loadings and discharge, each one is able to load, simultaneously, different products
  - Two deep sea berths are dedicated to crude oil vessels where very large crude carriers of up to 300,000 sdwt can discharge
- Extreme attention to quality and safety of vessels, and continuous monitoring during operations (“Saras minimum safety criteria”)
- Terminal up to date with the latest anti-pollution equipment, specialized task force on duty 24/7
- Highly trained personnel in emergency response





# Maintenance policy for continuous operations

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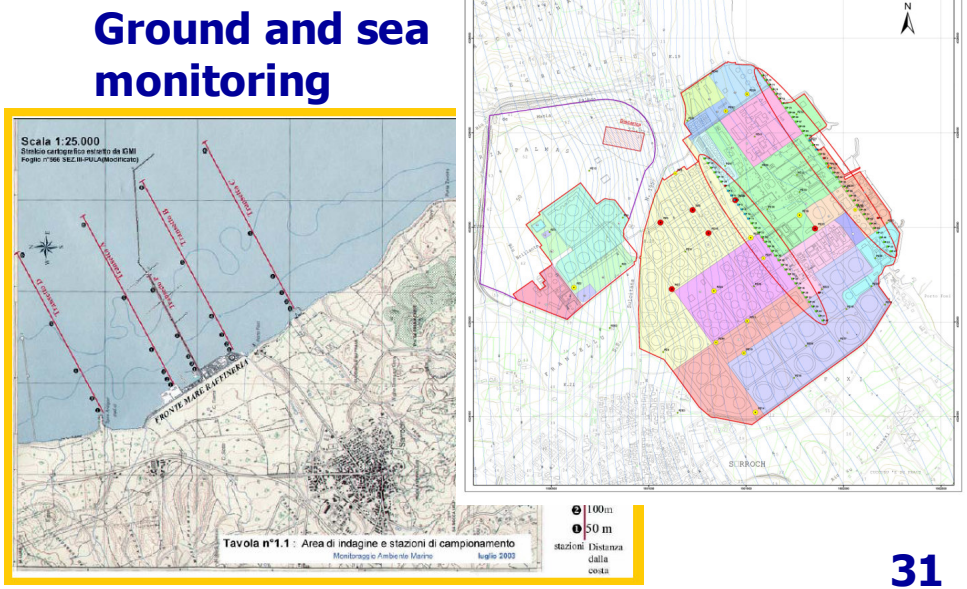
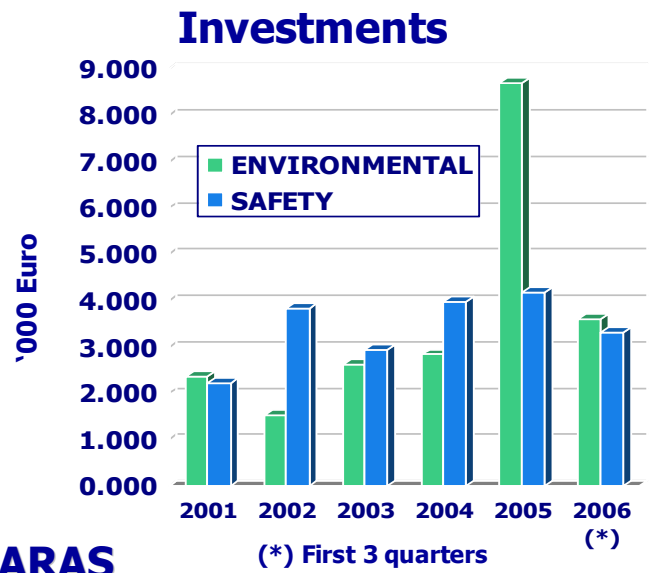
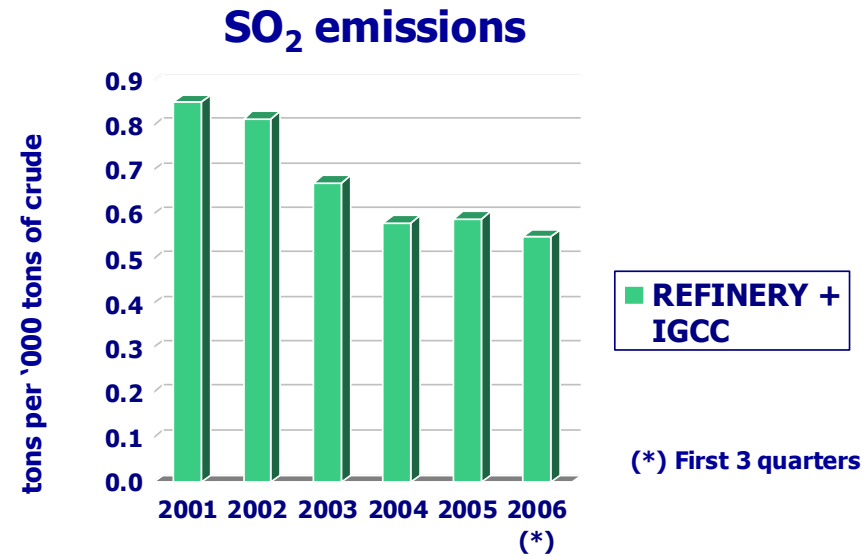
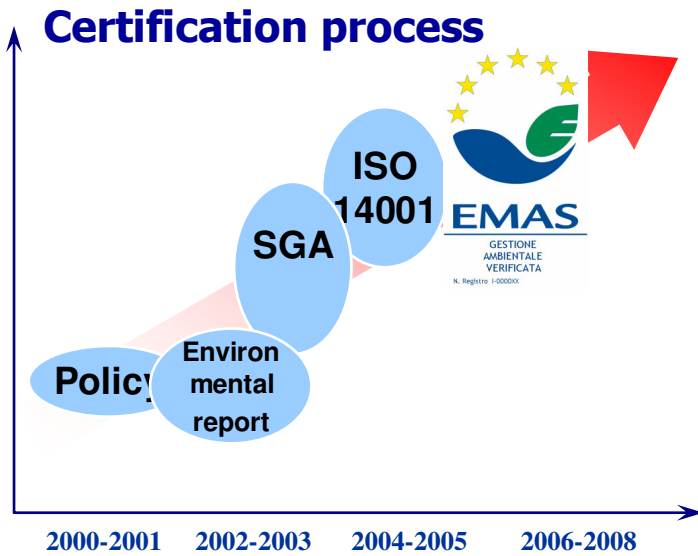


**Saras' maintenance policy, on a long term base, allows the refining structure to have a global service factor in line with the best standards of the industry but with higher flexibility**

- The multiplicity of many processing units (Crude distillation, Vacuum, Hydrotreating, Mild Hydrocracking, Reforming, Gasification) allows Saras not to shut down the refinery also during important maintenance programmes of groups of units, and this
  - ✓ reduces the risk of being a single site company
  - ✓ eliminates the operational risk of shutdown/startup of the whole refining complex
  - ✓ prevents from the congestion of external workforce
- The grouping of the units to be shut down has the goal to minimize the whole economical impact
- The definition of maintenance plans is based on a multi-year optimization and can be fitted to investment execution



# Some topics of environmental and safety issues



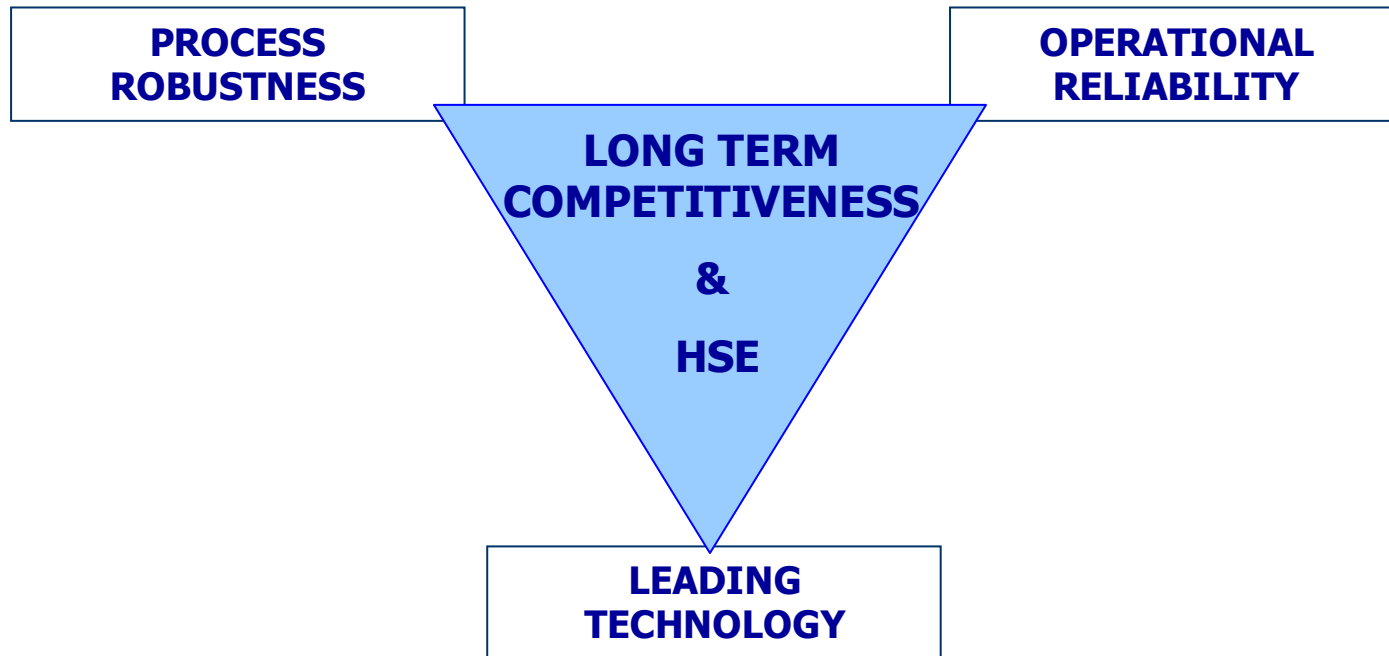
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# Key pillars of sustainable superior profitability



- **Saras has a track record of “no regret” upgrading of the refinery**
  - ✓ **lower investment risk (addition rather than step change)**
  - ✓ **synergies with existing units, thanks to a long term view**

# Key concepts of industrial approach

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- Sarroch supersite was designed, built and continuously developed with a careful effort to include Best Available Techniques; it is being further upgraded with the same criteria
- Saras' industrial approach is oriented towards long term sustainable and competitive operations
- Capex and replacement activities are driven by the three key concepts of industrial approach: process robustness, leading technology and operational reliability
- The development of the industrial site is carried forward with a steady collaboration with main international technology providers (UOP, Shell, Axens, GE, Honeywell, etc.) and engineering companies (i.e. recent agreement with Foster Wheeler, Parsons, Snamprogetti)

# Ongoing construction activities

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- **FCC MEDIUM GASOLINE DESULPHURIZATION**

- ✓ **scope** full production of 10 ppm sulphur gasoline
- ✓ **technology** Axens PrimeG+
- ✓ **status** civil construction, operations expected in mid 2008

- **SULPHUR TAIL GAS TREATMENT**

- ✓ **scope** reduction of SOx emissions from sulphur recovery system
- ✓ **technology** Shell/Jacobs
- ✓ **status** civil construction, operations expected in H2 2008



# 2007 process improvements



- **CDU RT2 – VACUUM 1 – VISBREAKER**

During Q2/07 turnaround there will be a number of activities aimed to improve the reliability and efficiency of the most important train of units for IGCC feeding like:

- ✓ re-tubing of furnaces
- ✓ upgrading of main fractionators internals
- ✓ extensive improvement in equipment operational reliability

- **CRUDE TANK FARM - CDU 1**

Various activities for improving the processing capability of “opportunity” crudes will be developed along the year and during the planned shutdown of T1 at end 2007

- **C&L REDUCTION**

Distributed activities for the continuous improvement and as part of the medium term margin expansion strategy

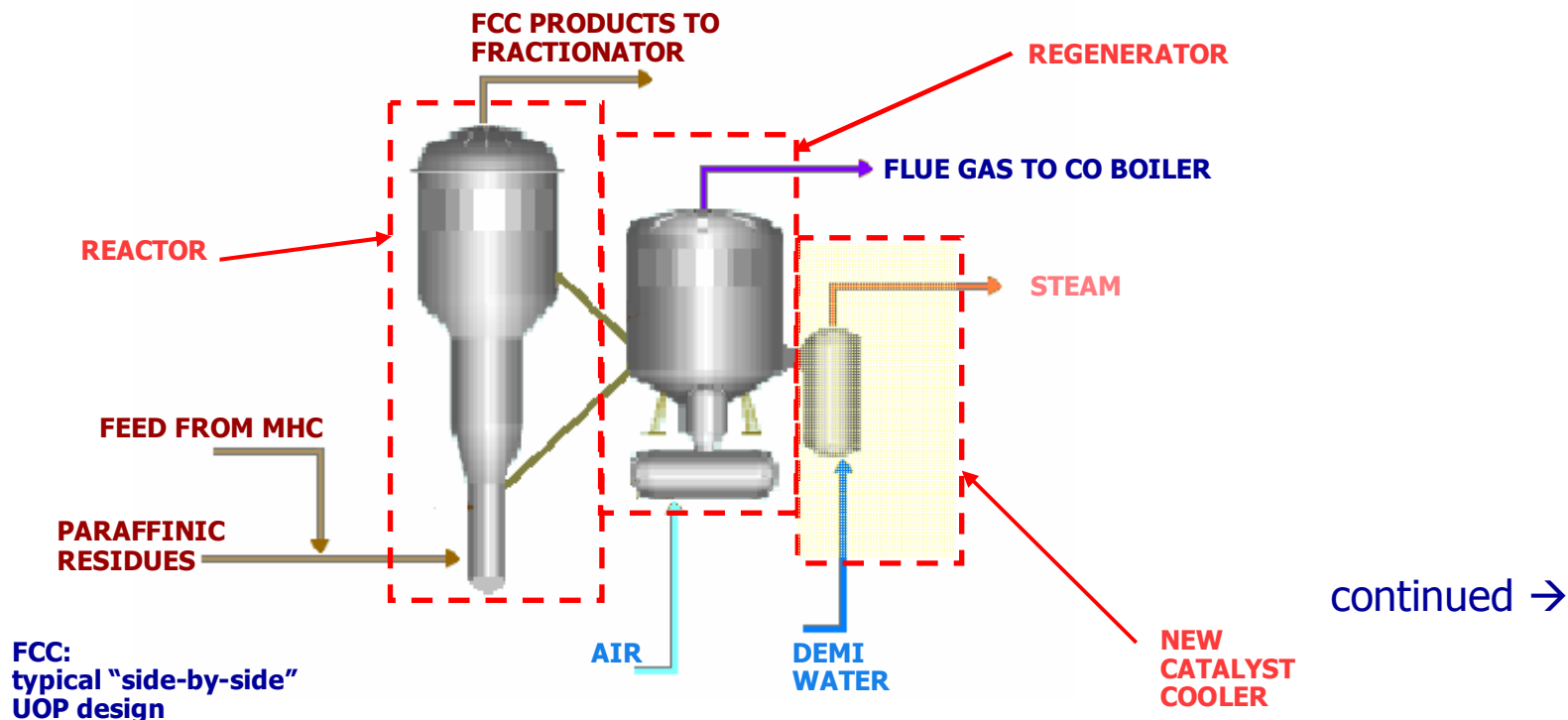


# Other process improvements

There are other projects for process improvements that will be completed during the future general maintenance of the involved units:

- FCC IMPROVEMENTS**

The scope is to enhance carbon burning capacity in the regenerator (to improve the flexibility on paraffinic residues quality) installing a "catalyst cooler"



FCC:  
typical "side-by-side"  
UOP design

# Other process improvements



→ continued

- **ALKYLATION REVAMP**

Alkylation units converts olephinic LPG from FCC into high quality gasoline.

The project is to increase the production of the unit thanks to a technology update (ConocoPhillips) of the feed injection system and other debottlenecking activities.

- **ENERGY EFFICIENCY**

- ✓ Heat recovery from exhausted gas
- ✓ Process units heat integration
- ✓ Fuel gas network optimization
- ✓ Continuous improvement of recoveries (steam and fuel)

All of the activities are part of the medium term margin expansion strategy

# Offsites and services

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Continuous long term upgrading in key areas with best equipments:

- Control rooms reconfiguration (marine terminal, utilities, oil movement) and control system updates (process units, utilities, power network)
- Automation extended to marine terminal
- New chemical laboratory
- Tank farm and pipeways soil protection
- Cooling water system upgrade



# Heavy up crude slate: whole project

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**The overall project aims to process a more “difficult” crude slate (heavier and sourer) and increase the conversion towards high quality diesel; it’s a part of the medium term margin expansion strategy**

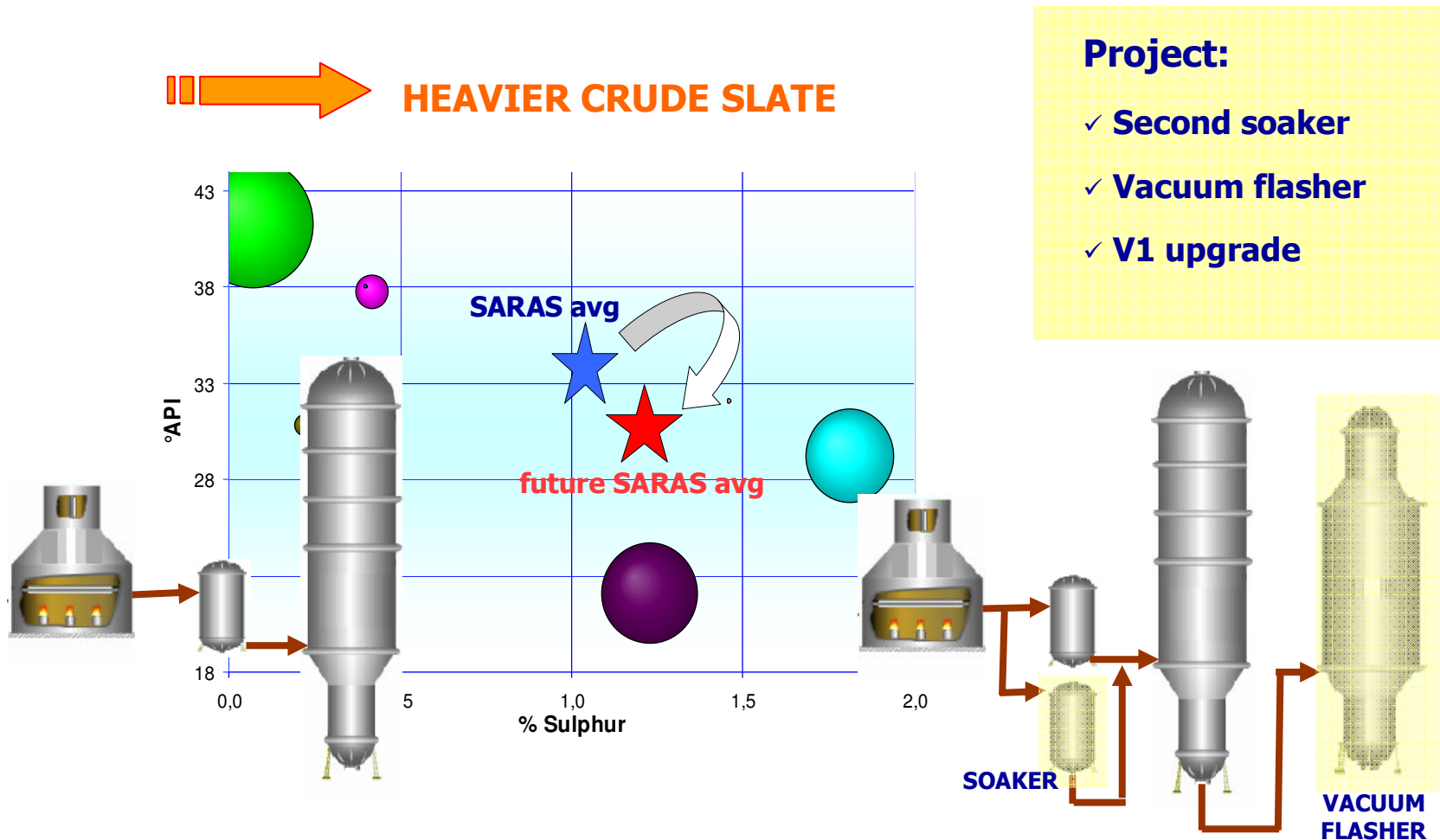
The project involves:

- ✓ MHC 2 revamp for a more severe operation and higher conversion
- ✓ New hydrogen plant: steam reformer
- ✓ Hydrogen production revamping in the IGCC plant
- ✓ Visbreaker revamp with a new Vacuum Flasher unit
- ✓ Vacuum 1 and offsites upgrade for heavy and high viscosity crudes



# Heavy up crude slate: Visbreaker (and V1) revamp

- Visbreaker revamp (and Vacuum 1 upgrade for heavy and high viscosity crudes)







# Heavy up crude slate: MHC2 revamp + H<sub>2</sub> plant

## Project:

- ✓ New H<sub>2</sub> plant
- ✓ Third MHC2 reactor
- ✓ New recycle gas scrubber and compressor

