PETROCHEMICAL FEEDSTOCK OPTIONS AND OUTLOOK

Presented by:

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at:

6th Petchem Feedstock - 2007

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Shenzhen, China

PURVIN & GERTZ INC.

Agenda

- Condensate Supply and Demand
- Naphtha Supply and Demand
- LPG market and Cracking attractiveness

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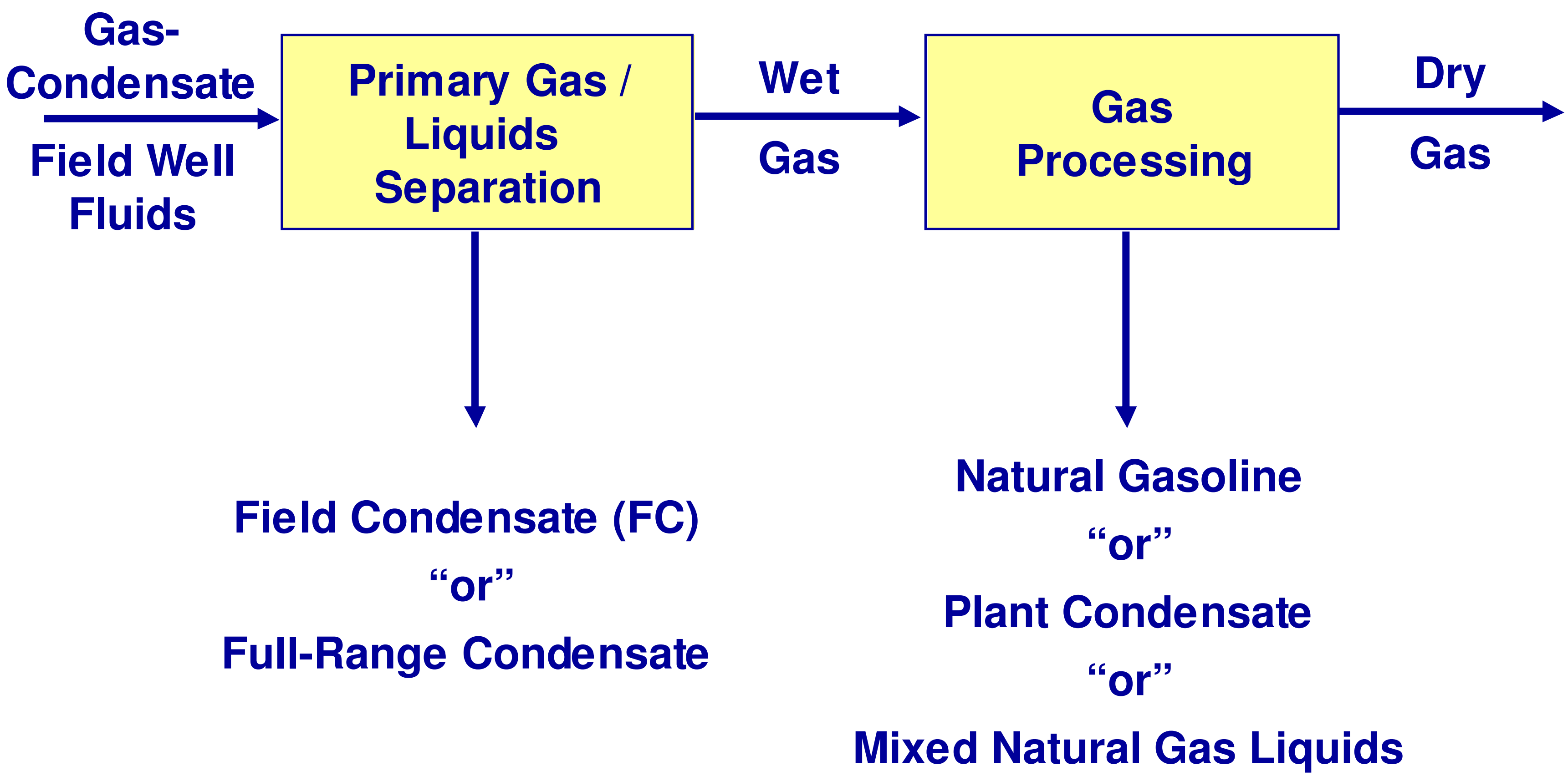
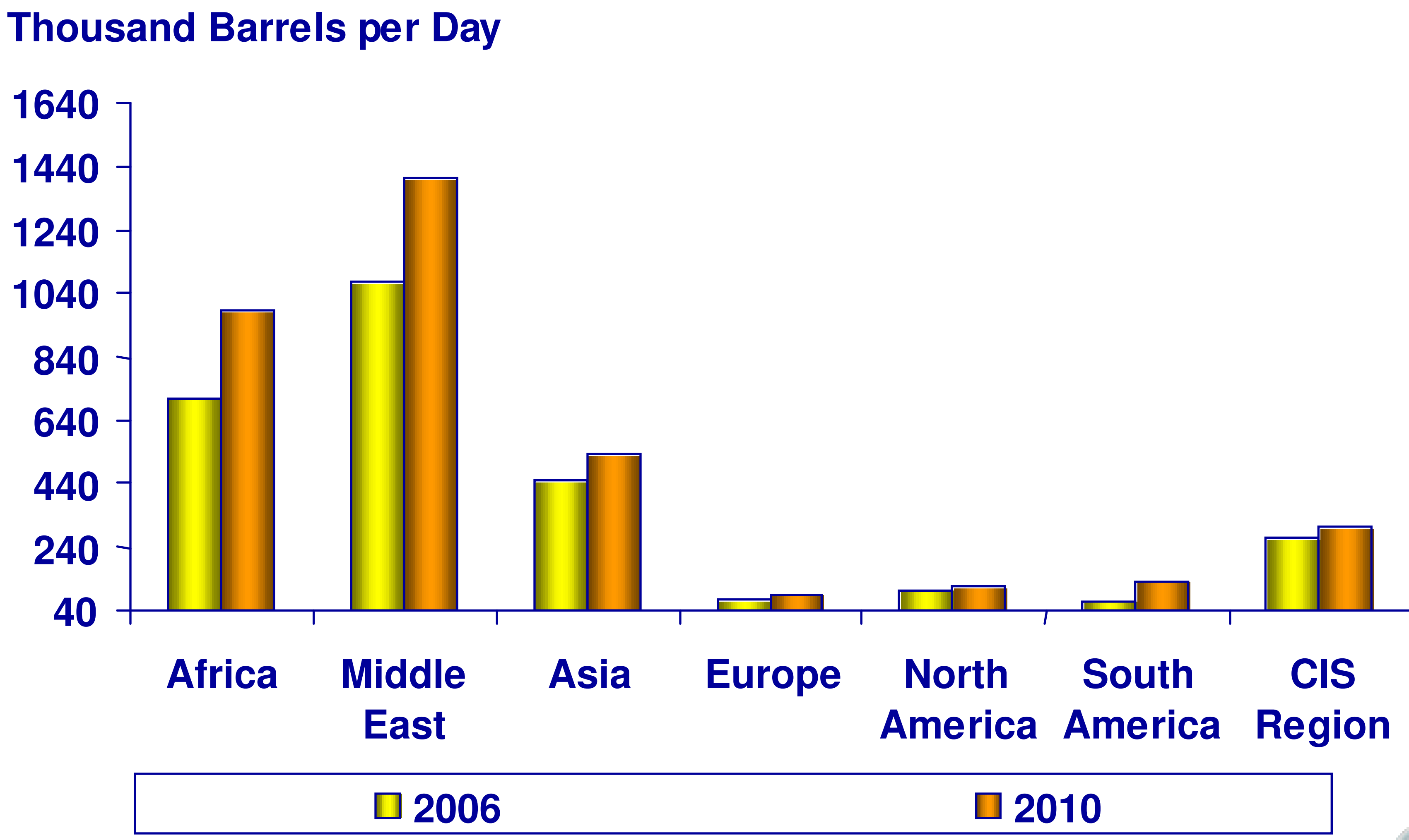
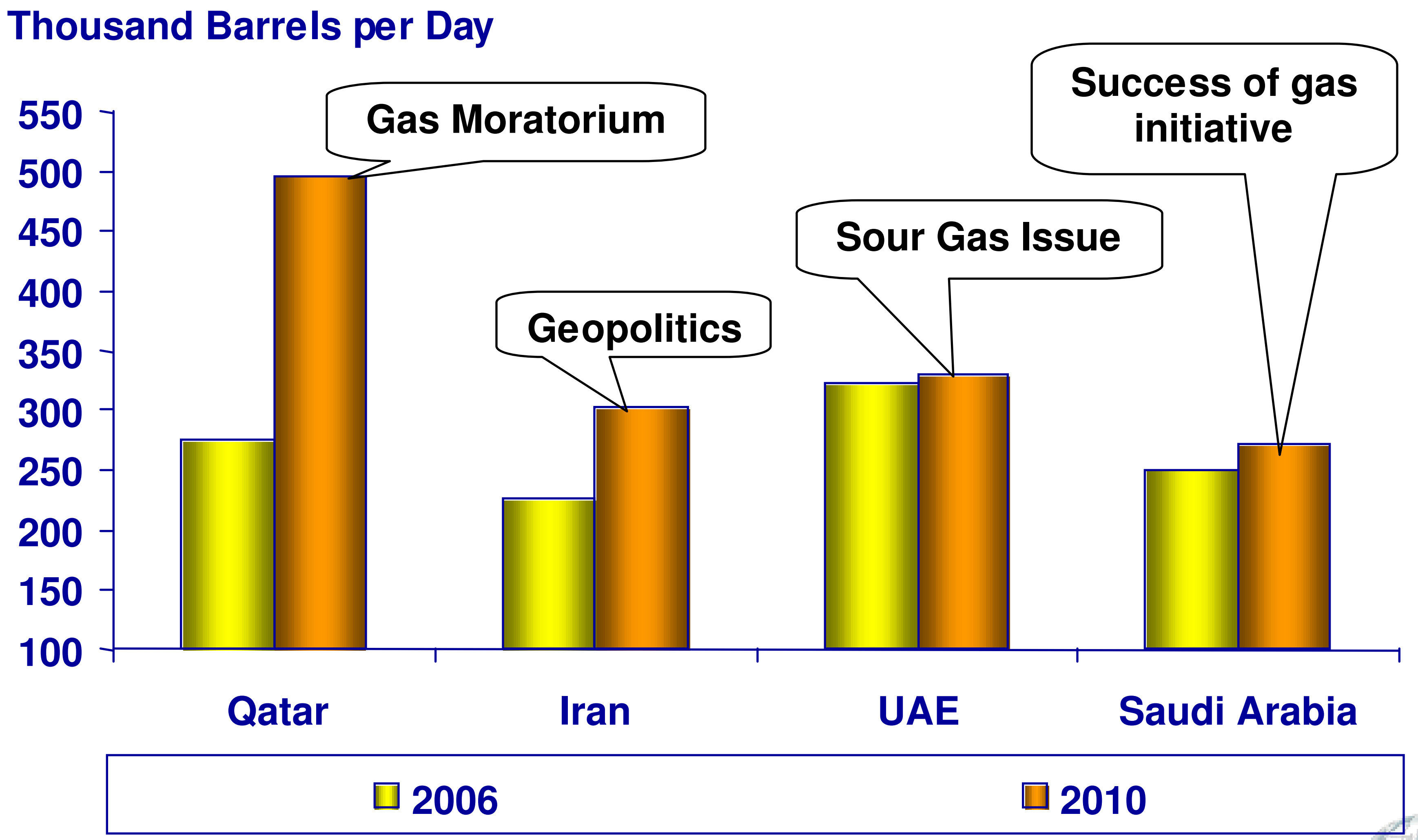
“Condensate” is a generic term that must be defined



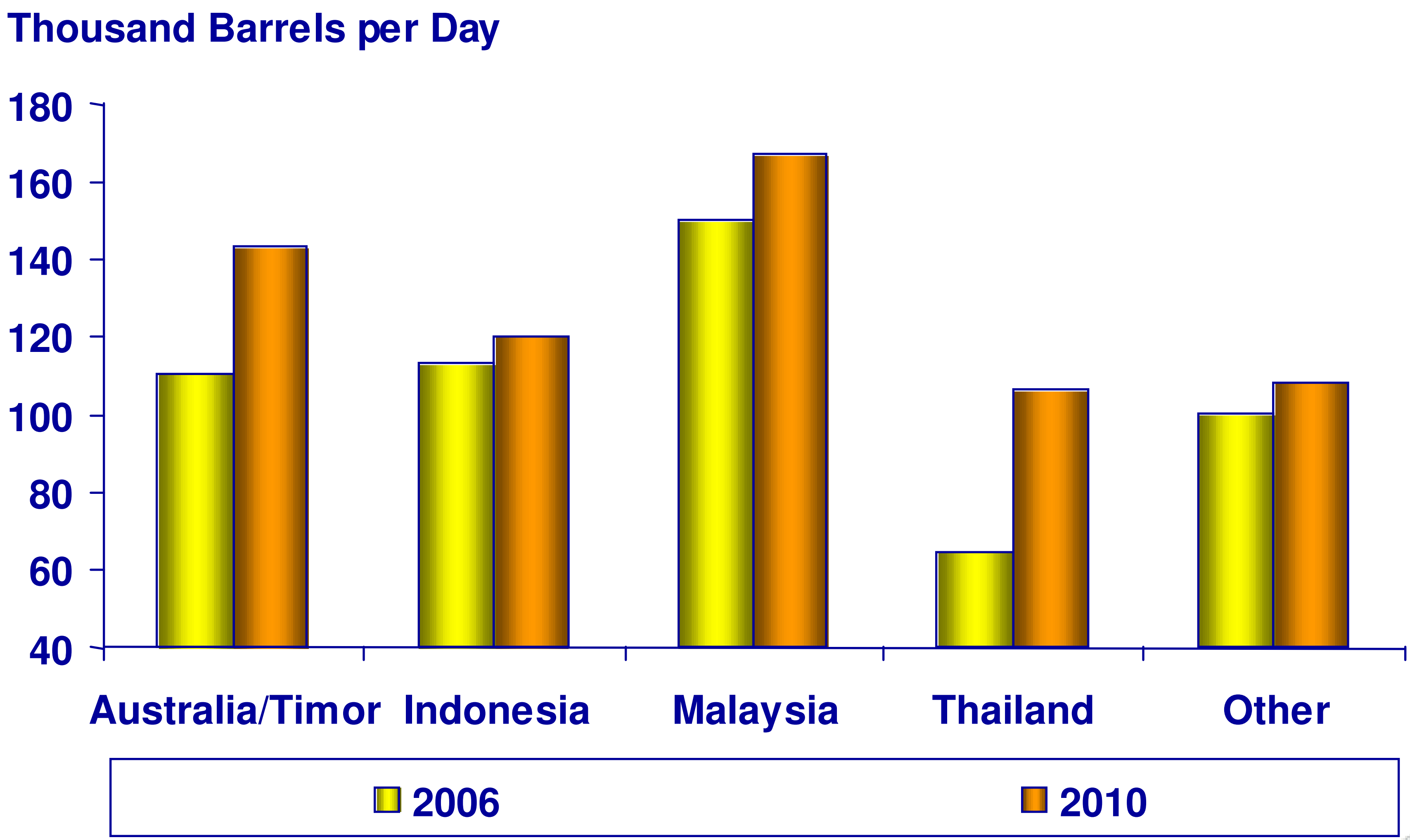
Major FC supply increases forecasted to be in ME and Africa



Middle East forecasted to account for about half of the increase, though uncertainties abound



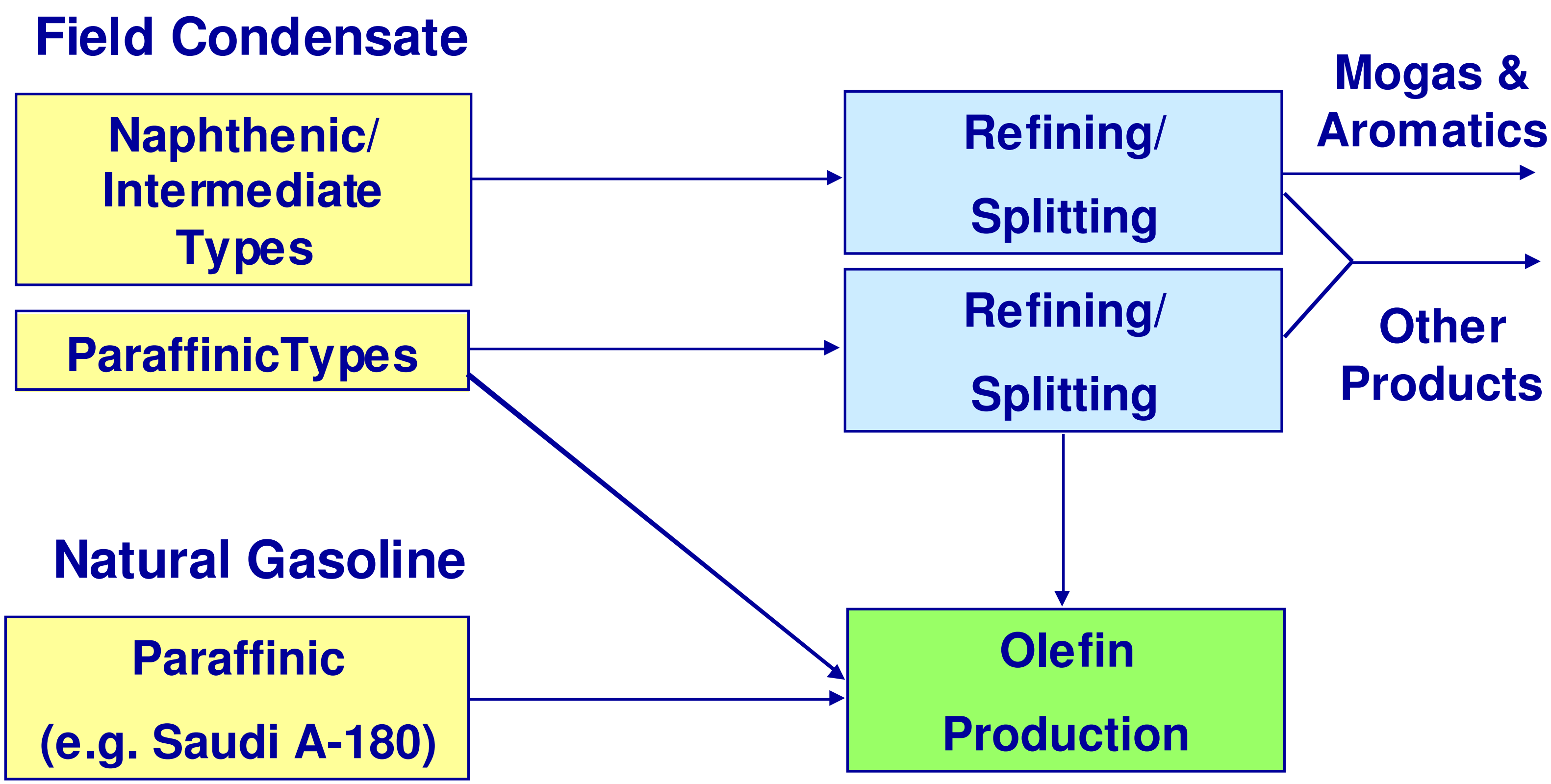
In Asia the FC supply increase is in Australia, Thailand and Malaysia



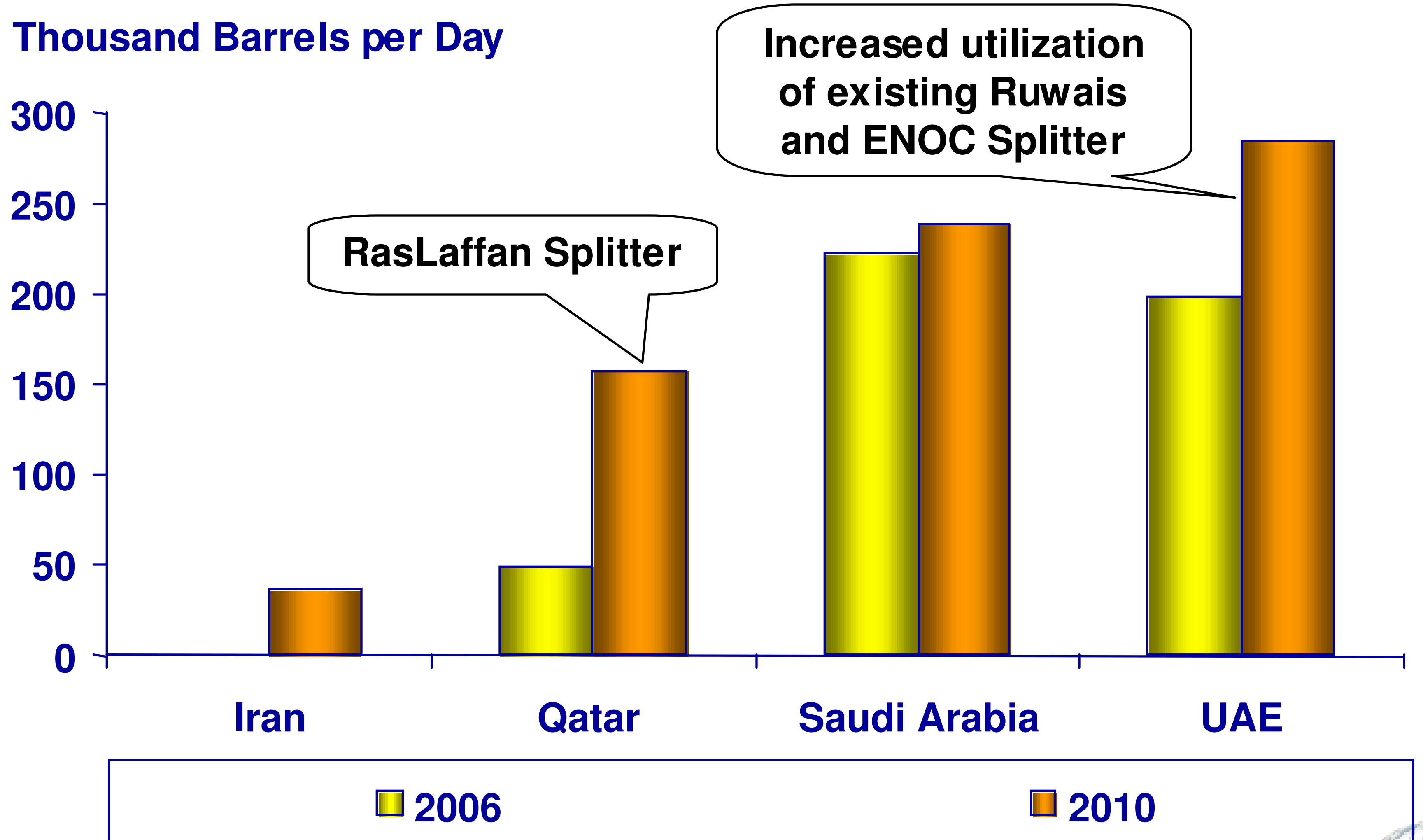
Condensate is a by-product of natural gas production: “demand” will equal supply

- **The condensate market is supply-driven, not demand-led**
- **The issue is whether sufficient capacity exists to accommodate available supply**
  - **Demand for condensate as an olefin plant feedstock**
  - **Capacity in dedicated condensate splitters or refineries**
  - **Capacity for condensate in regular refineries**

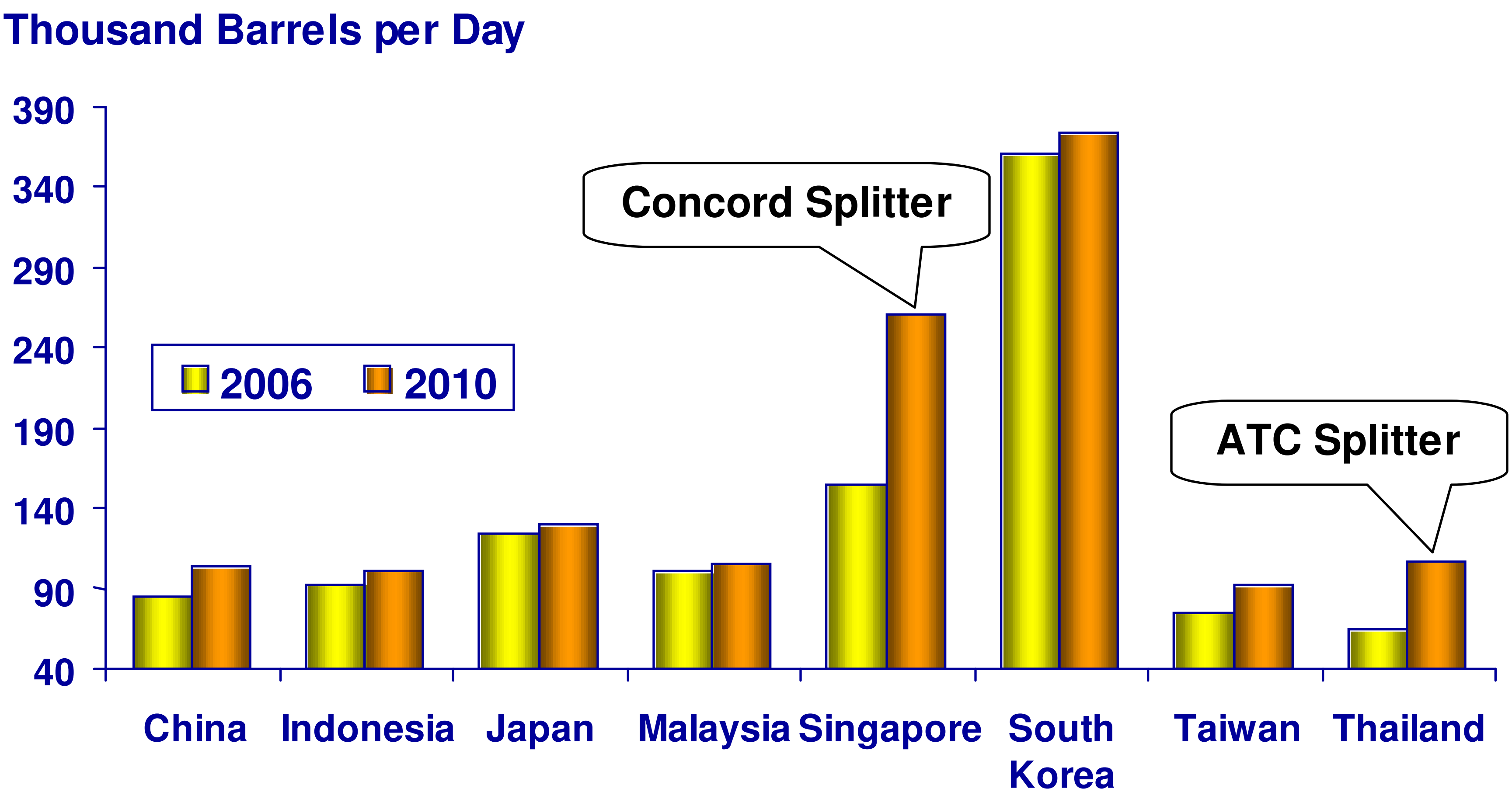
FC is similar to very light crude oil and is mainly used as refinery feed



About 75% of incremental condensate produced will be consumed in ME



East-Of-Suez (Asia+ME) condensate production forecasted to exceed condensate splitting capacity



Incremental condensate to be run in Asian refineries substituting crude

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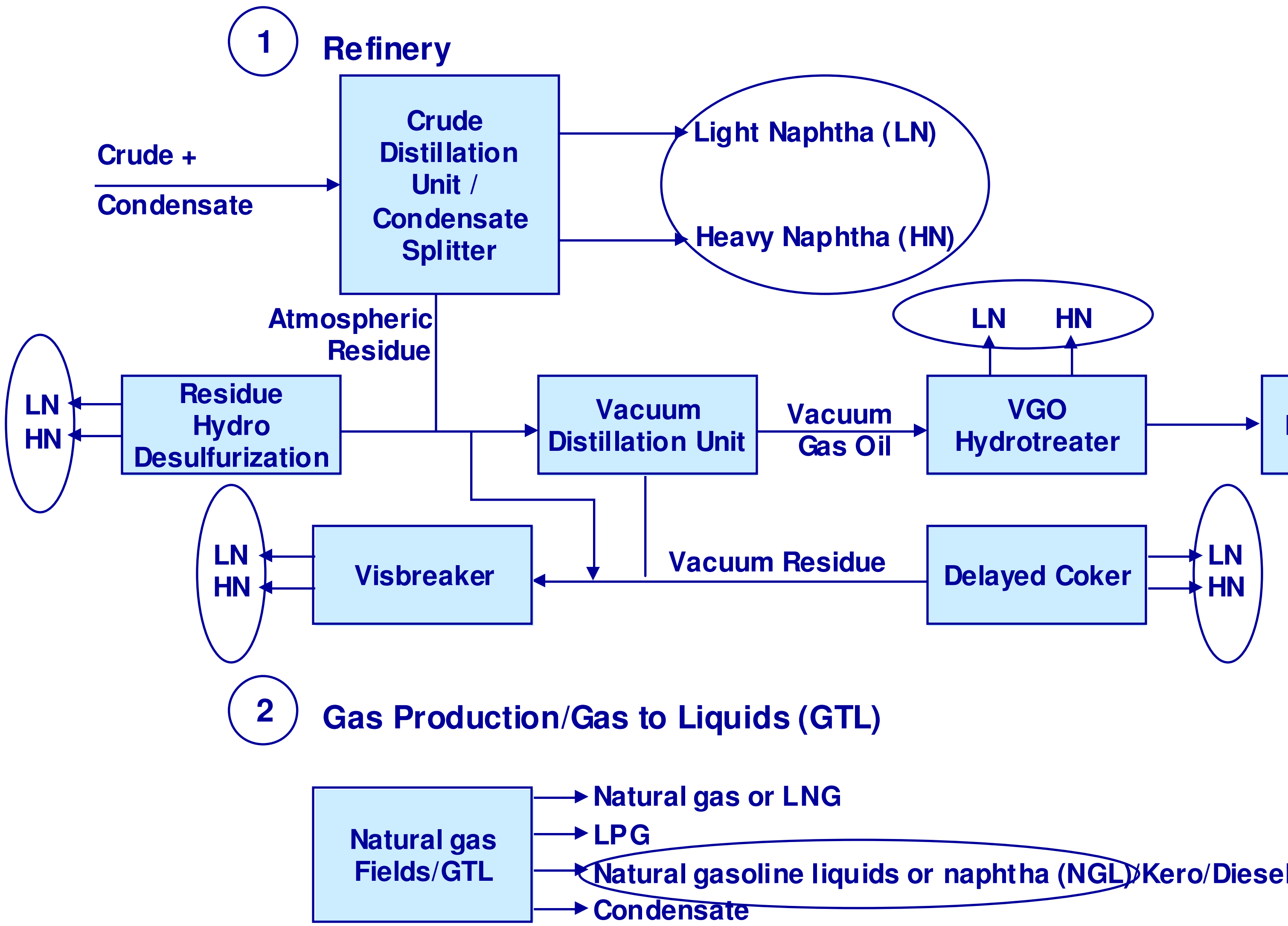
- **Naphtha Supply and Demand**
- LPG market and Cracking attractiveness

Naphtha is produced not only from crude distillation



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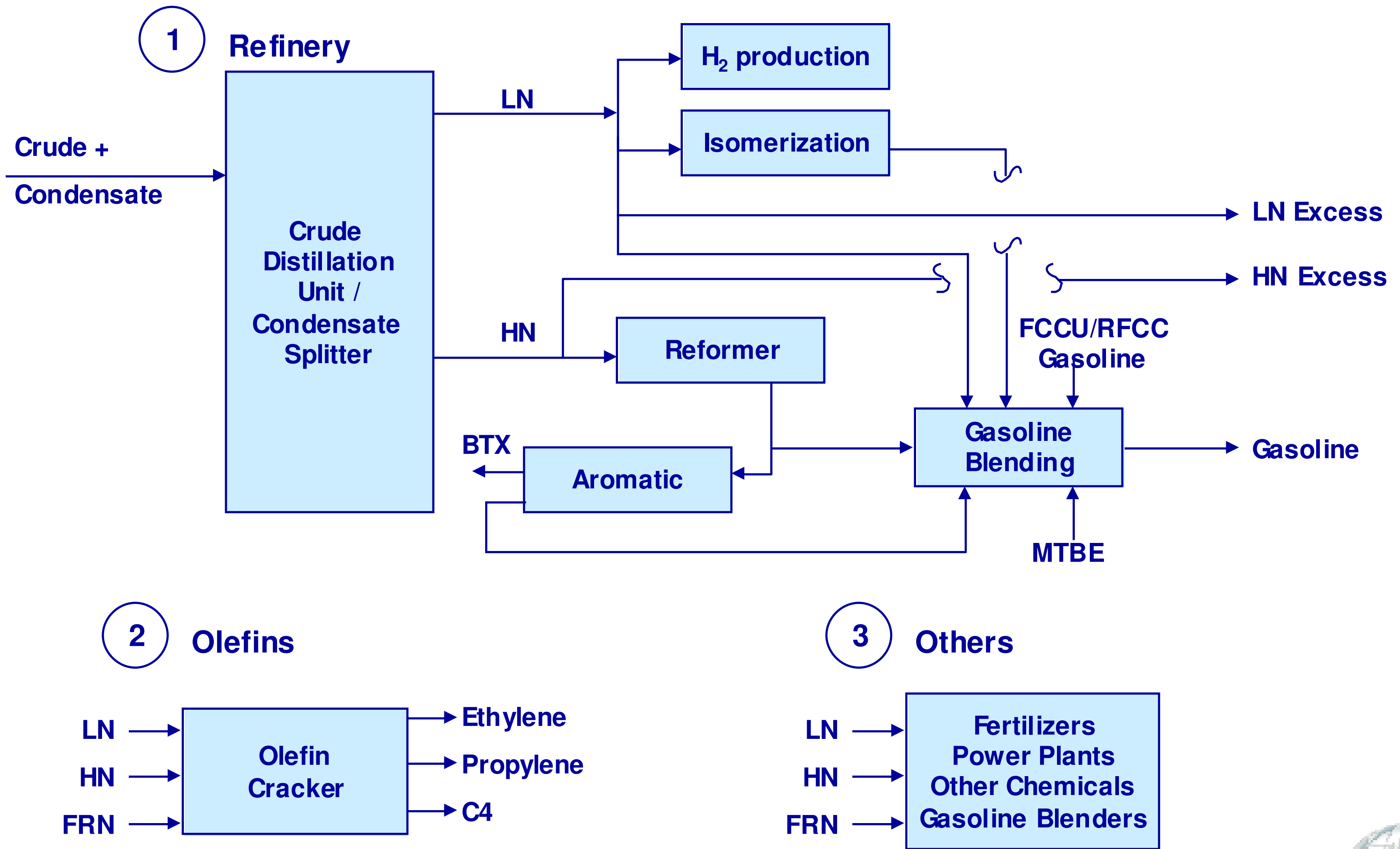
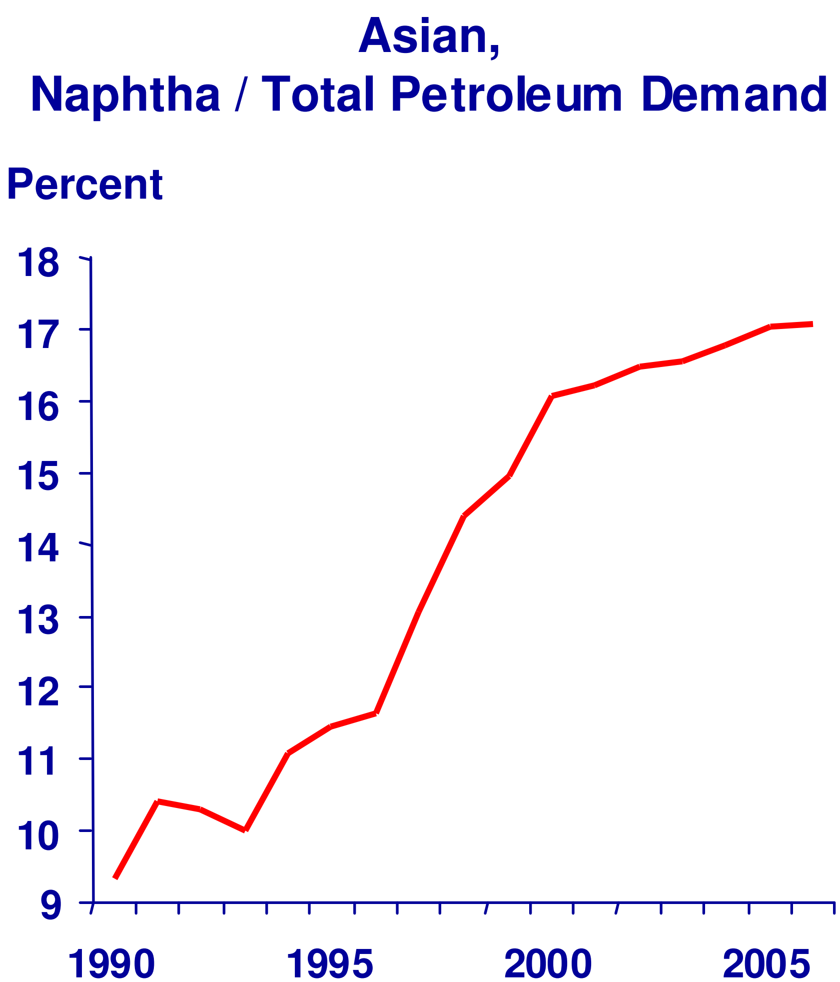
A portion of the naphtha produced is consumed within the refinery itself



Bottom up approach best accounts for feedstocks supply/demand

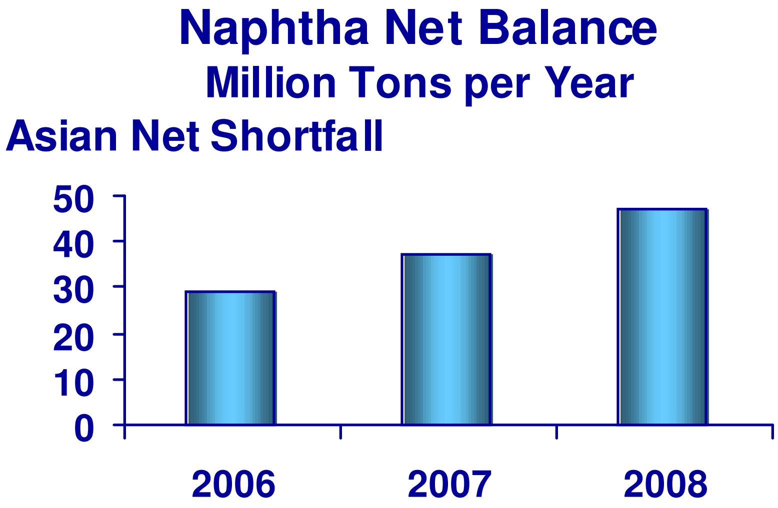
- **Projecting monthly supply/demand balance considering projects, maintenance shutdowns, margins and seasonal demand**
- **Balances done at each facility level for Asian/Middle East Refineries and Olefin crackers for better accuracy, accounting for :**
  - **Crude and condensate processed**
  - **Configurational differences**
  - **Reformer and gasoline blending requirement**
  - **Alternate feedstock capability**

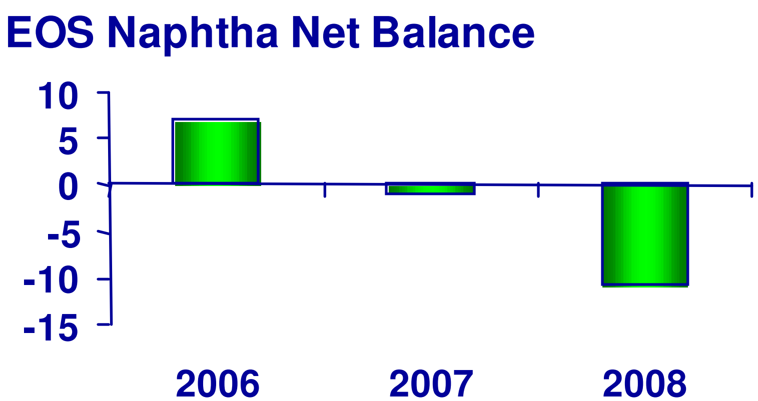
Naphtha demand is approaching the natural limits of crude oil content



- Each crude oil has its own naphtha content
- Not all naphtha in Asian crude oil can be diverted to olefins
  - Some naphtha is used for gasoline
  - Aromatics too require naphtha
- Beyond the limit, imported or synthetic naphtha is required

Asia naphtha shortfall is forecasted to increase over the next two years

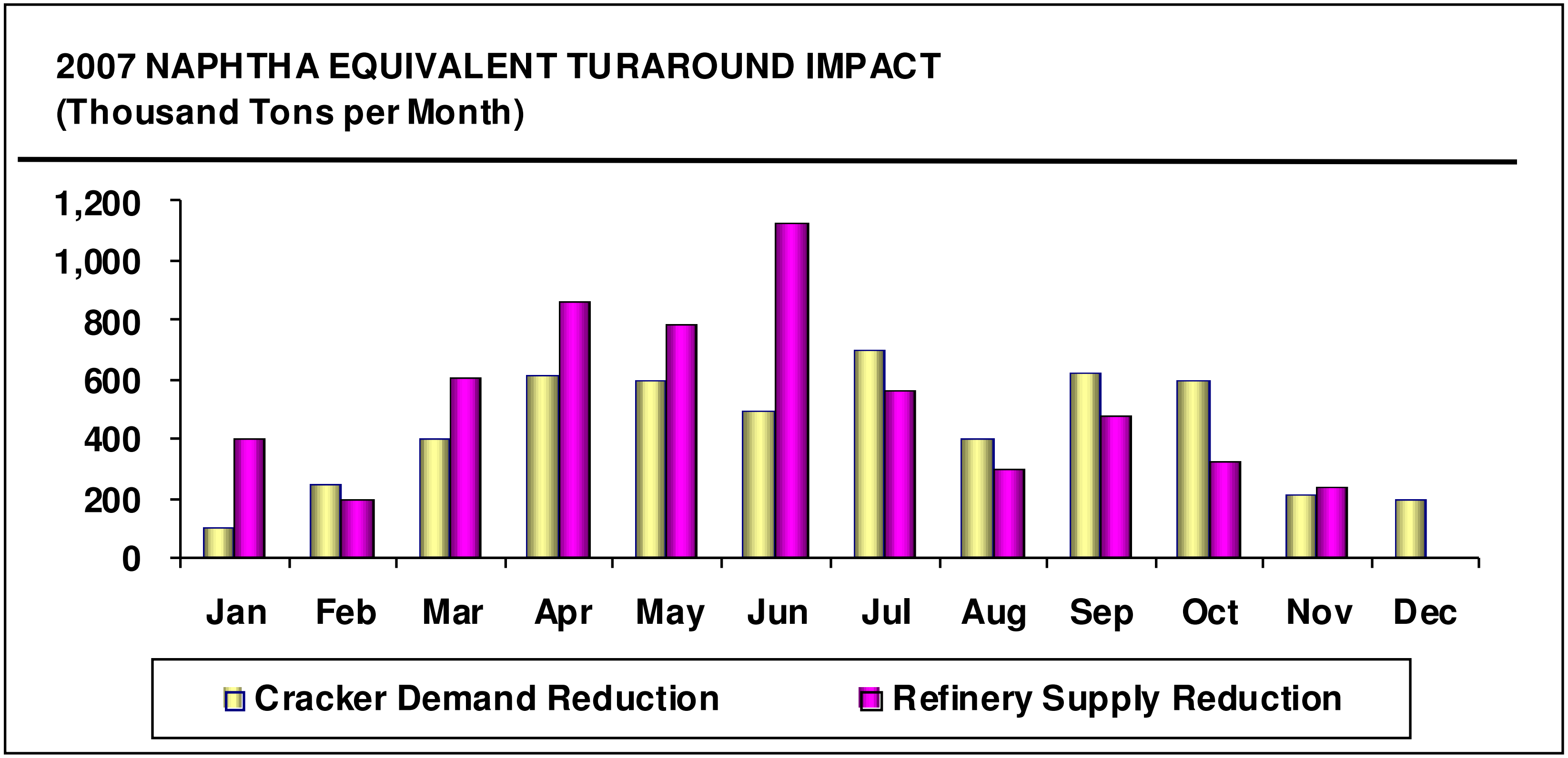




- Petrochemicals expanding at a higher pace than refining
- Most refinery projects also have naphtha consuming reformer units, which doesn't alleviate supply tightness
- Increased condensate processing alleviates tightness to some extent

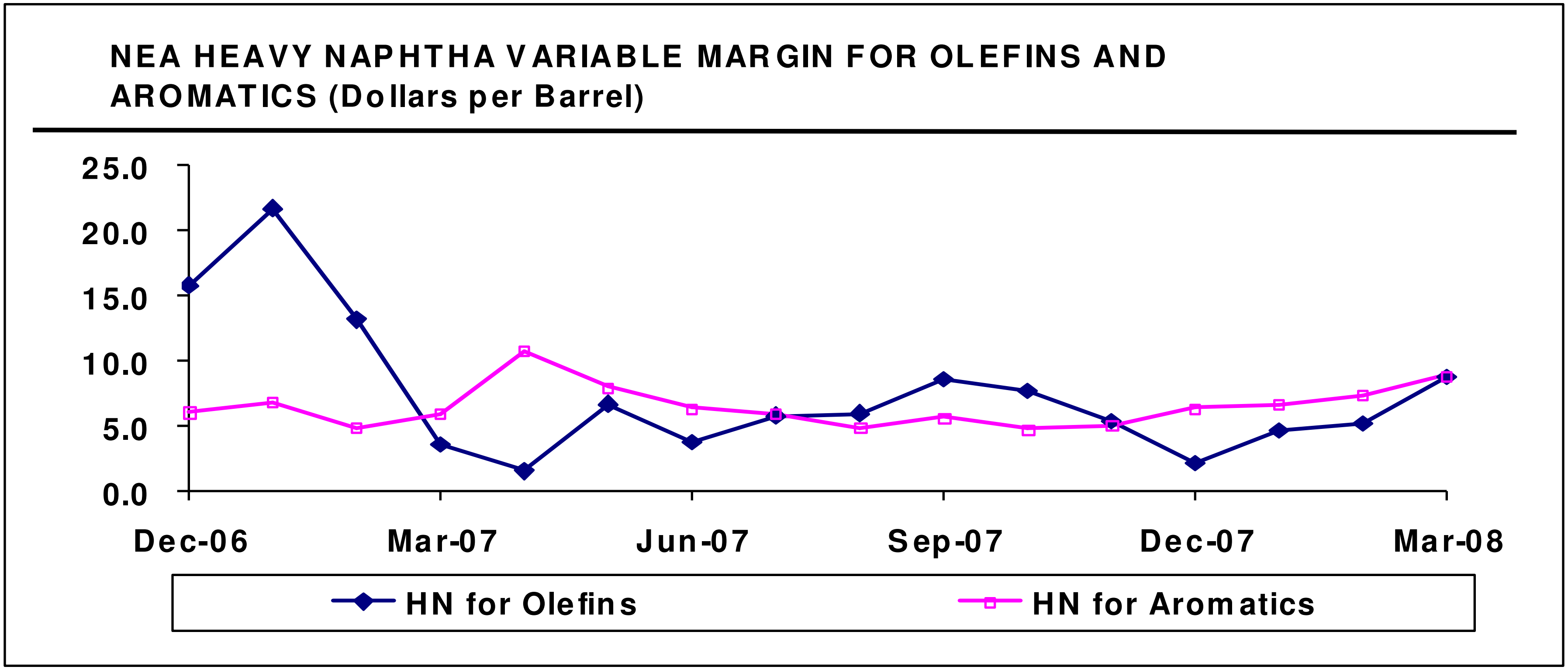
East-of-Suez (EOS) including Asia and ME is forecasted to be net short, with naphtha movement West to East

For 2007, major refining shutdown period in May-June and petchem shutdown in July & Oct timeframe



- **Total petrochemical shutdown activity is lesser in 2007 than 2006**

Expanding olefins production capacity is seeking the same feedstock as aromatics



- With the tight supply situation, there appears to be intercompetition between aromatics and olefins producers for heavy naphtha

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- Naphtha Supply and Demand
- **LPG market and Cracking attractiveness**

LPG production continues to rise

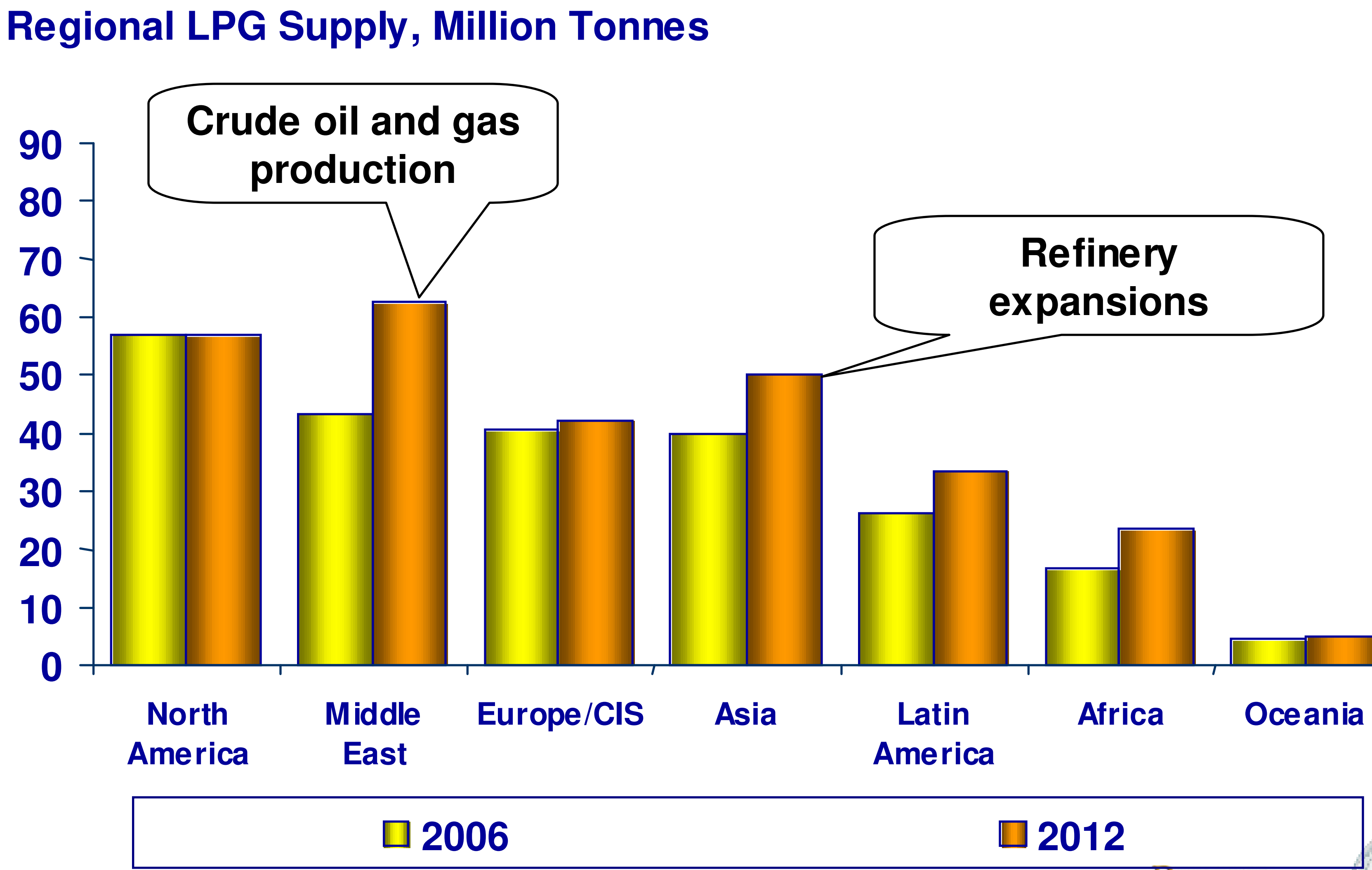
- **LPG is a BYPRODUCT of:**
  - **Crude oil production (via the processing of Associated Gas)**
  - **Gas Production (via the processing of Non-associated Gas—Including LNG)**
  - **Refining**

- **Under the current scenario, the strong global demand is pushing up the production via all the three routes**

Global LPG market has moved to supply driven

- **High LPG prices driven by high crude prices are having a negative impact on demand growth in developing markets**
- **Middle East LPG production and exports have ramped up—driven by higher crude oil and gas production rates**
- **The market has moved from a demand-driven market to a supply-driven market over the past two years**
- **Global LPG supply surplus is building—This is starting to exert downward pressure on LPG price relationship relative to crude**

Majority of the supply increase is in ME and Asia



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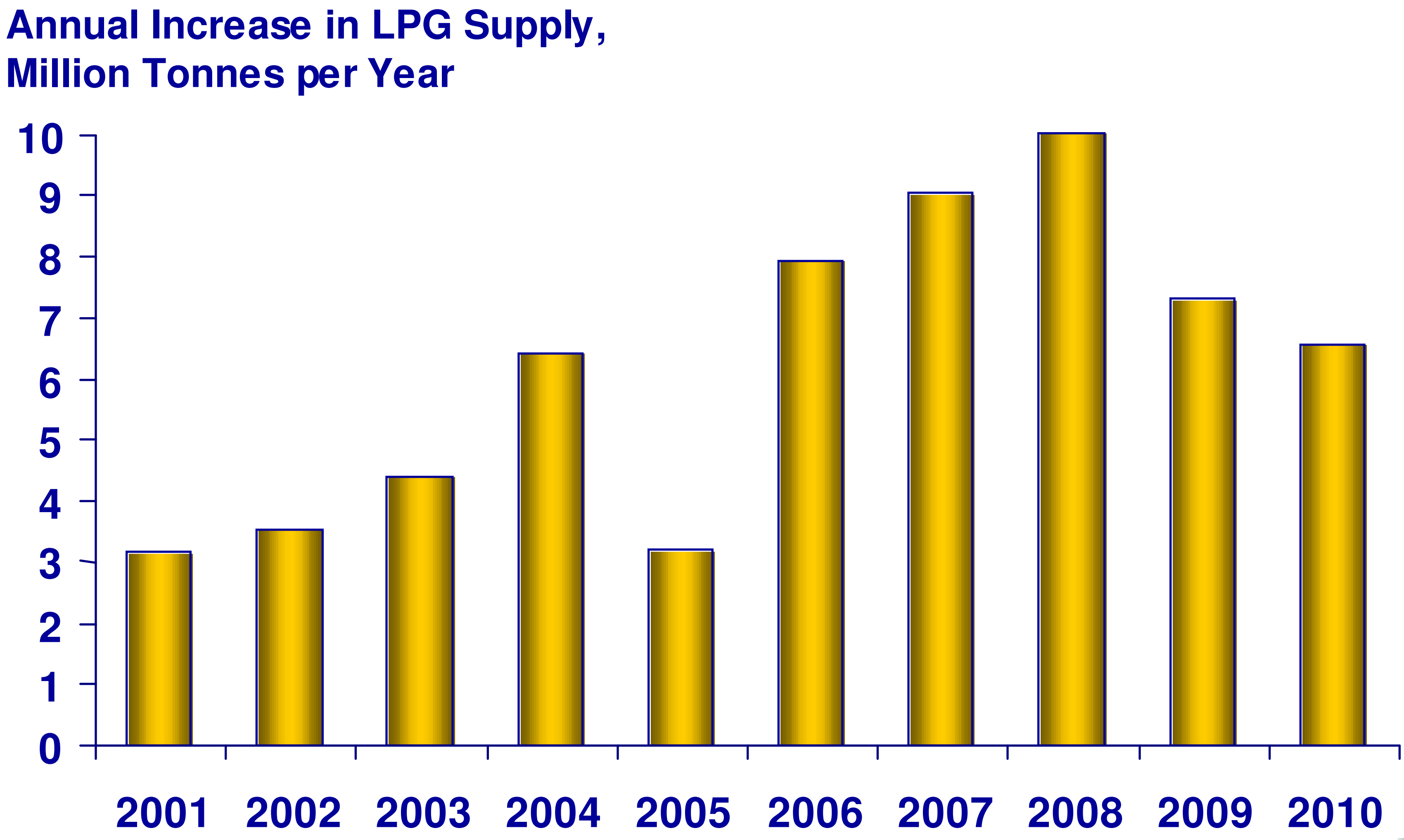
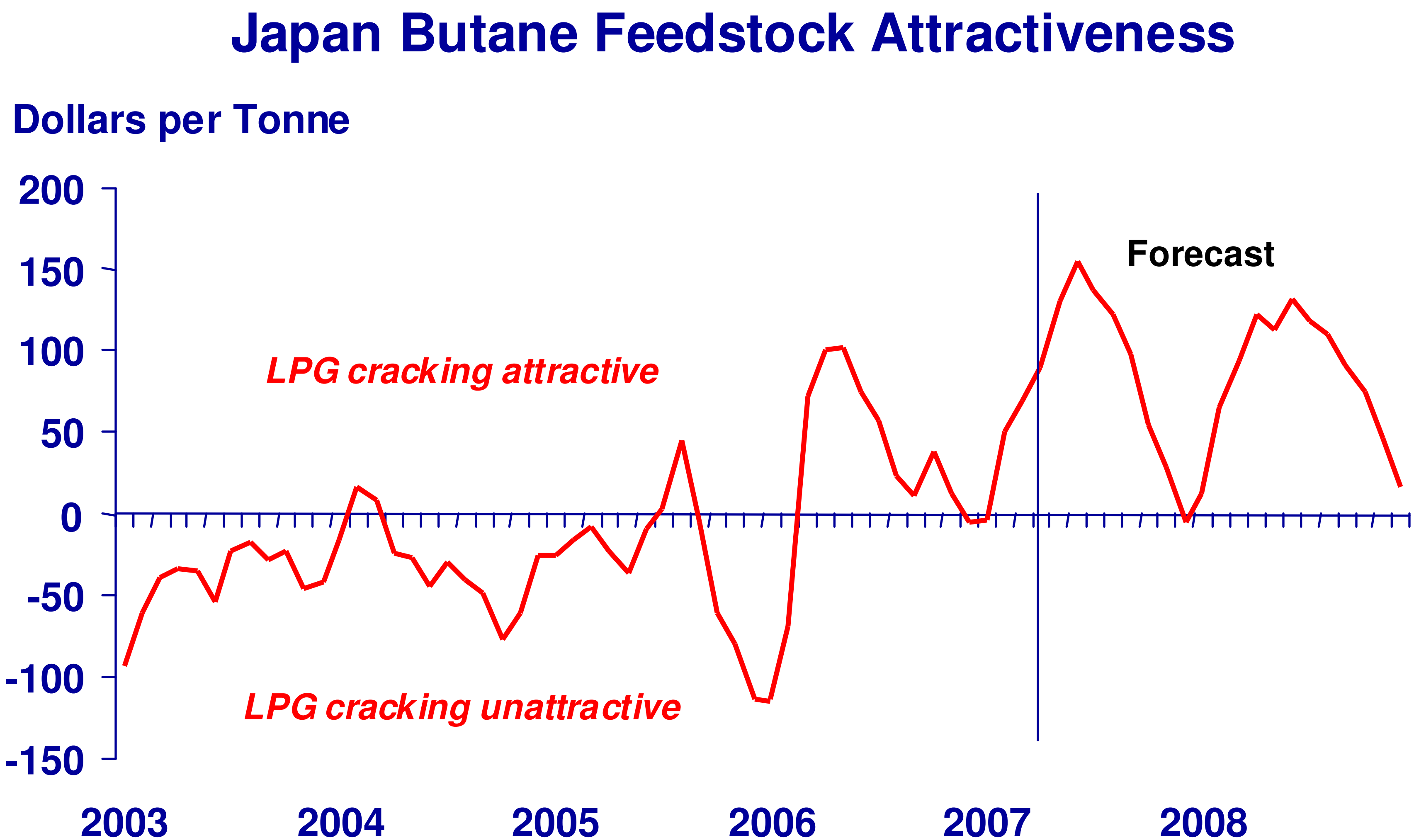
Global LPG supplies are expanding faster than in the early 2000 putting downward pressure on pricing



Naphtha substitution by LPG is expected to increase



Summary

- Condensate production to exceed condensate splitter capacity addition
  - Refinery processing will remain the key market clearing mechanism
- Naphtha market forecasted to be demand driven for the near term
- LPG market forecasted to be supply driven
- LPG cracking forecasted attractive for prolonged periods compared to historical
  - More substitution of naphtha expected, subject to logistics and unit constraints

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