

# The Petrochemical Industry – From Middle Eastern Perspective?



شركة صناعة الكيماويات البترولية (ش م ك)

**PETROCHEMICAL  
INDUSTRIES COMPANY K.S.C.**

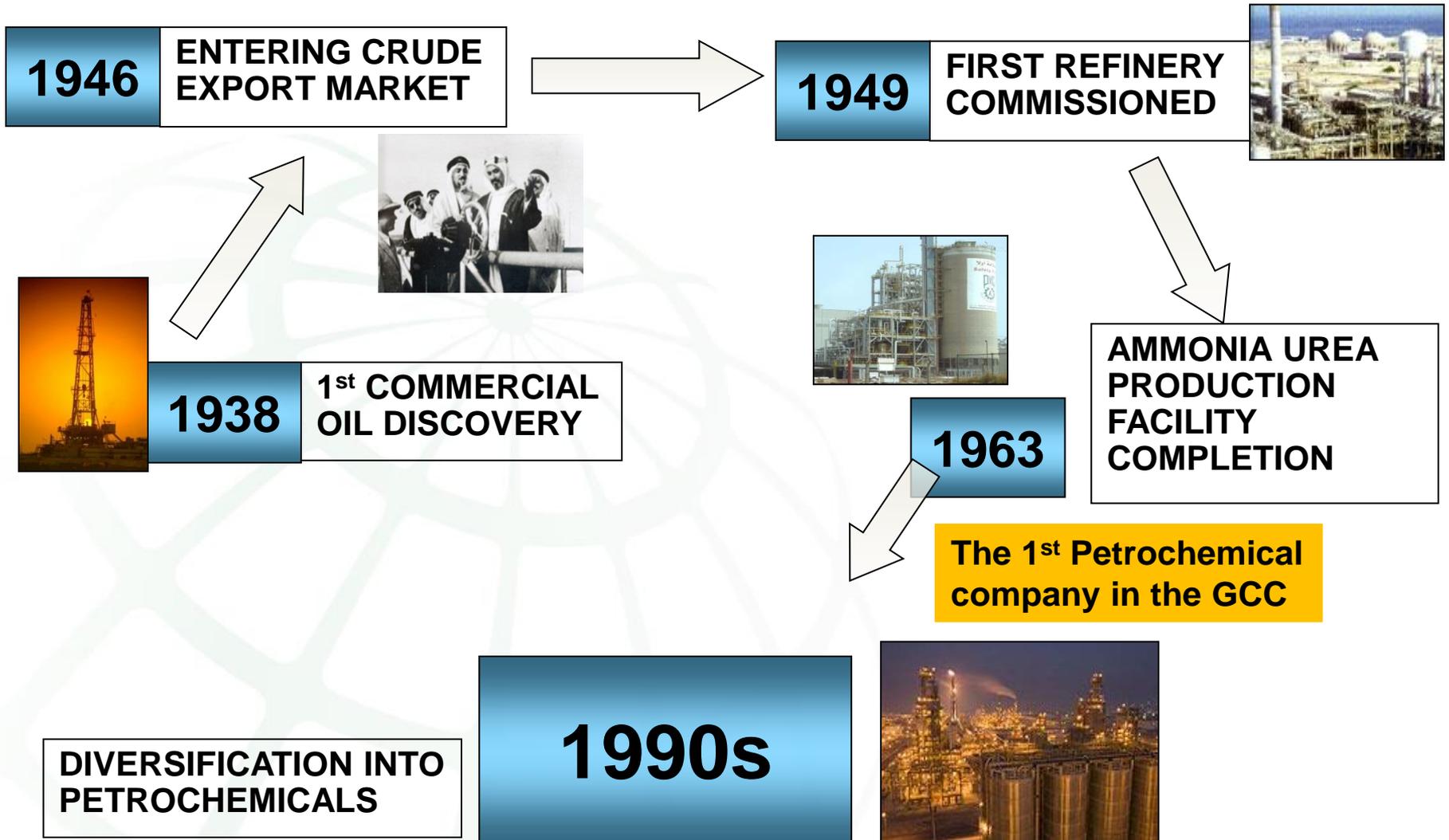
إحدى شركات مؤسسة البترول الكويتية

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# Hydrocarbon Journey in Kuwait

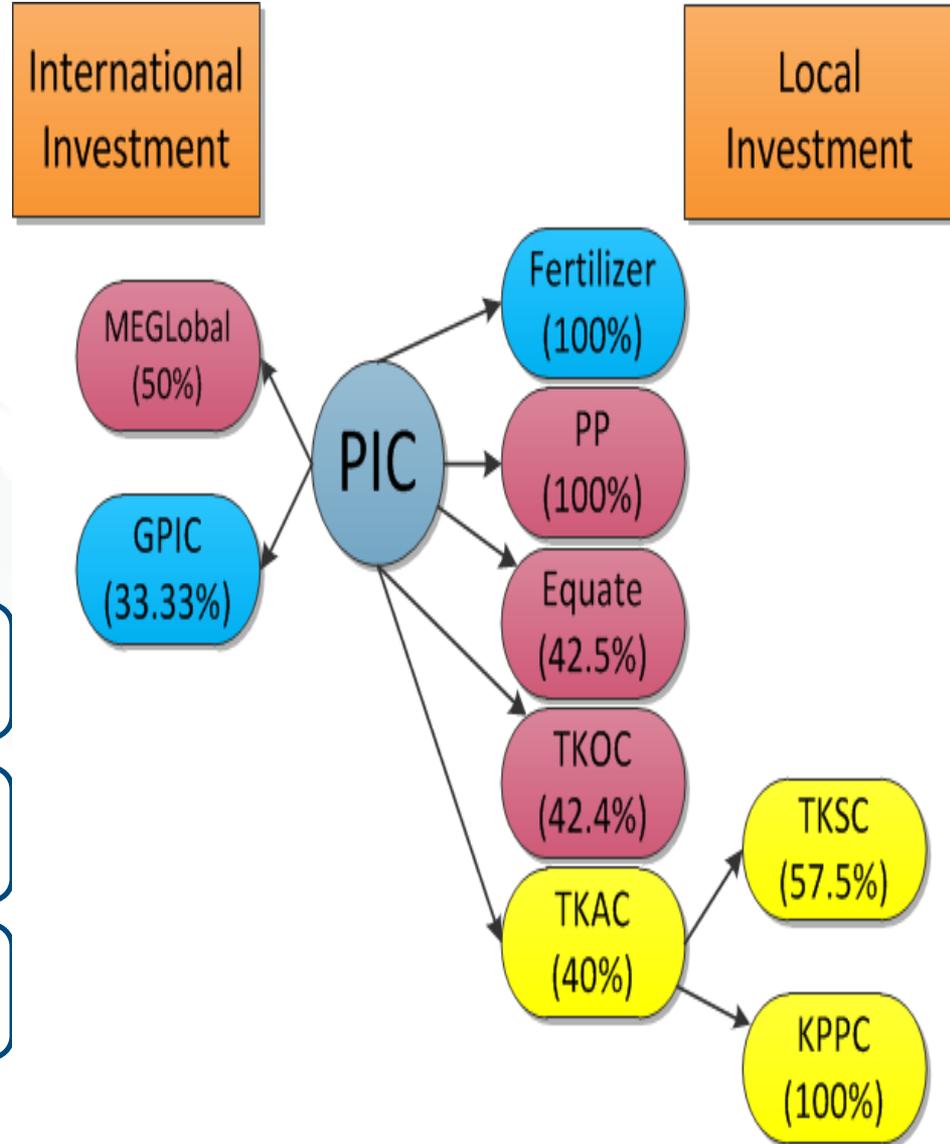




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# PIC Portfolio

- PIC has diversified its position as a significant player in Petrochemicals, with local and International investments many of which are regarded as Success Stories





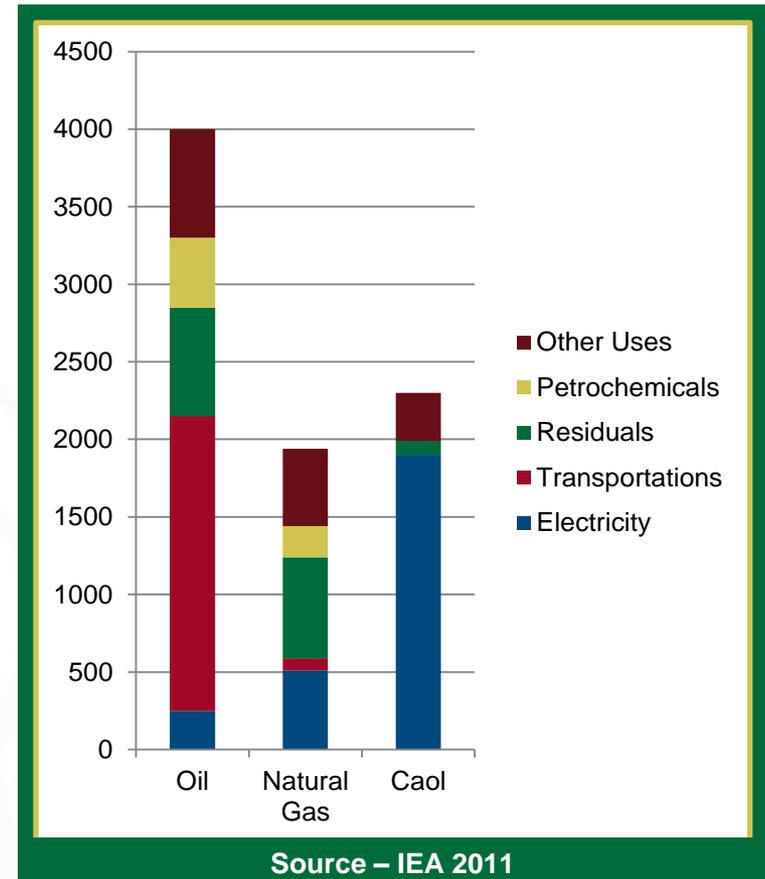
# Overview of the Global Petrochemical Industry

- The chemical industry is one of the largest manufacturing industries in the world, selling products worth of \$2941 billion and employing over 10 million people.
- Chemical International trade is growing by 5.5 % annually
- Production growth is hovering around 3% annually
- Job creation and capital depends heavily on energy-driven raw material which dictates to some extent the expansion of the petrochemical sector
- Prices are at the top of the production cost curve which means higher cost leading to slower demand



# Sources of Petrochemical

- Oil is the leading source of energy and still the major source for Petrochemical followed by Natural Gas and very slight stake coming from Coal.
- Coal has yet not developed as major source for petrochemical, however oil prices above 100 \$ per barrel might boost broad range of petrochemicals from Coal
- Production Expansion is still dominated by Middle East, however Shale gas will bring United states Petrochemical Industry again as a major player.





# The Global Petrochemical Industry

## United States:

- The US petrochemical industry was built around gas liquids feed.
- Today ethane accounts for 55% of the olefin slate, propane 20%.
- Shale gas is bringing cheap feed stocks and more ethane cracking.

## Asia:

- Refinery naphtha is the main cracker feed.
- Driving the global demand
- Butane is an alternative imported feed



# Global Petrochemical

## Europe:

- Refinery naphtha is the main cracker feed.
- Naphtha and condensates provided about 75% of the feed to the European ethylene crackers.
- 12.5% came from ethane, propane and butane and the balance from gasoil and other sources
- Cracker modifications to take LPG as feed (primarily propane) began in the 1980's.

## Middle East:

- Ethane is the primary cracker feedstock.
- Some countries has promoted, through incentive pricing, LPG cracking.
- ME has been leading the petrochemical expansion due to the relatively rich hydrocarbon availability in the region, however the feed equation is being changed as the shift from light feed slate to heavier feed is becoming a new trend in the Middle East.

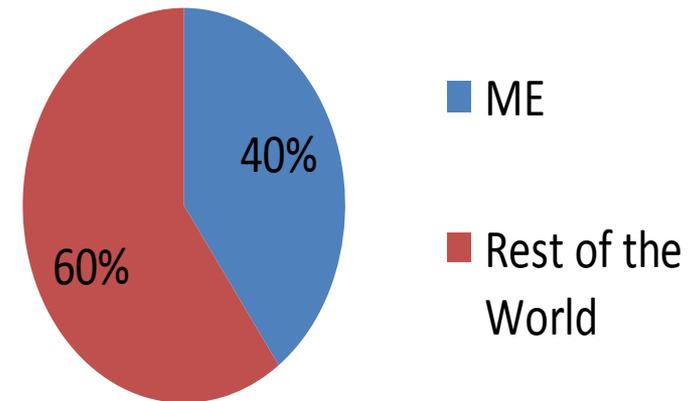


# The Petrochemical Landscape in The ME

## Will the strategic Competitiveness of Middle Eastern producers remain?

- MEG is the most ME significant derivative commodity from global perspective account for more than 40% of the world MEG
- MEG has a competitive advantage for the ME producer as it has a relatively easy of handling, shippable nature and logistics cost
- Proximity to Asia where most demand growth exist

**ME accounts for 40% of the Global MEG production**

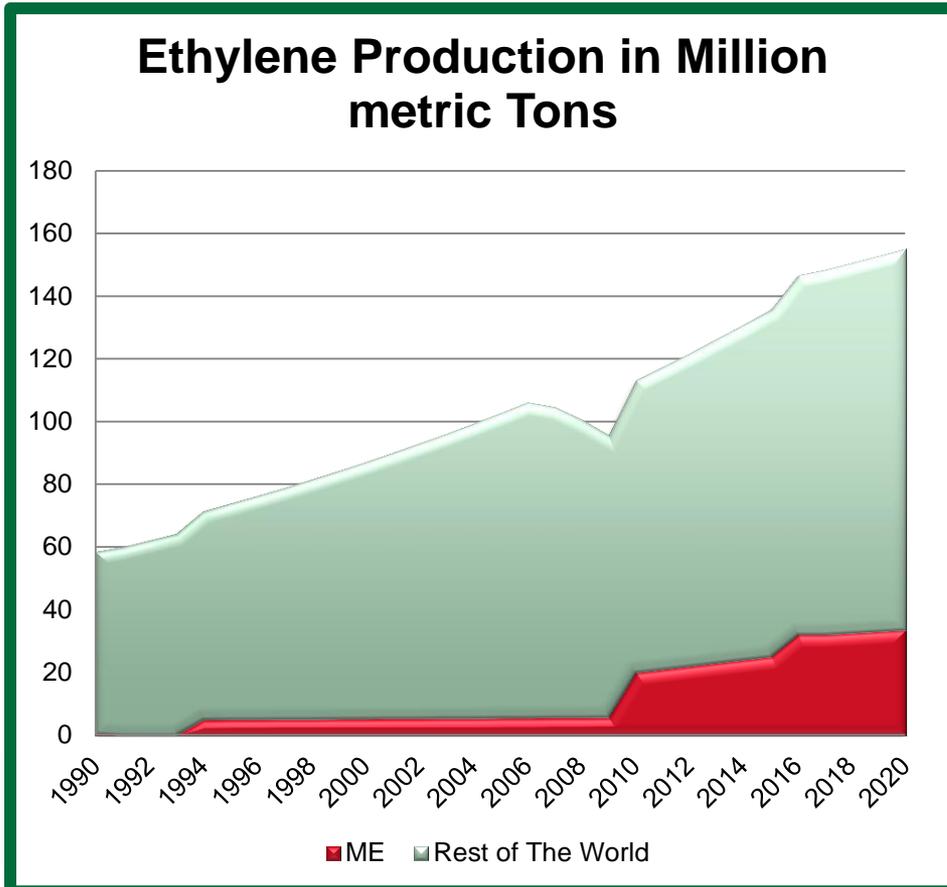


Source – GPCA 2012

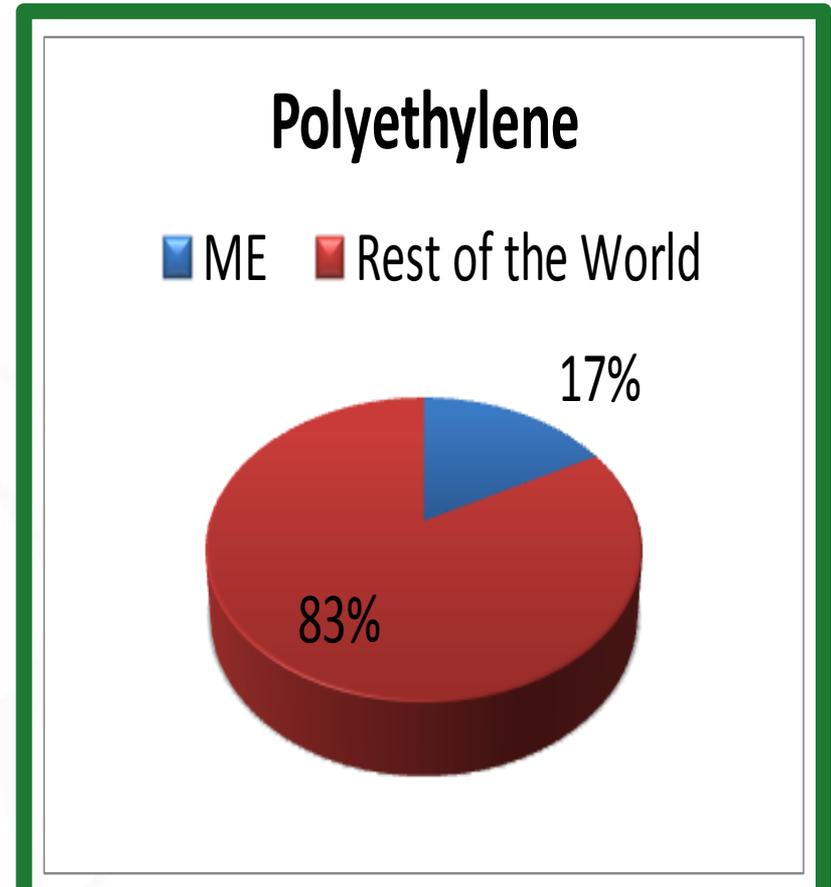


# Middle East Core Competency

**ME Ethylene Production constitute 20% of the total World production**



**ME Stake of Global Polyethylene**





# The ME Petrochemical Industry Encountering new Landscape

- Use a mix of ethane, propane and butane as there is shortage in the historical cheap ethane in the region
- Naphtha also being added to the feed mix
- Integration is the name of the game in the middle east
- Conversion zones have been identified near major petrochemical production centers
- Job creation is a main driver for the expansion in the region

## Move to Heavier Feedstock

**Propane  
Butane**

**Condensate**

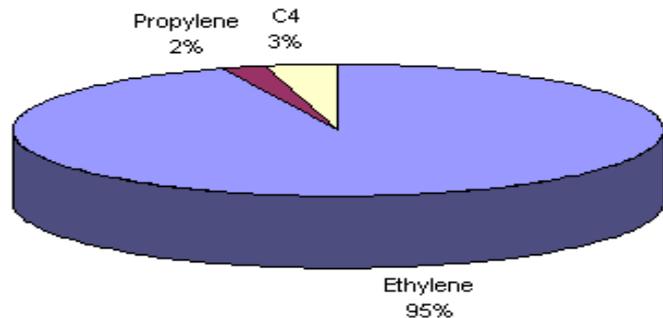
## Advantages

- 1- Availability
- 2- Numerous derivatives
- 3- Co-Products

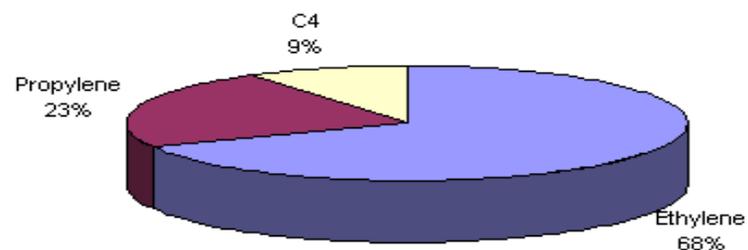


# Alternative feedstock to gain valuable C3, C4 output

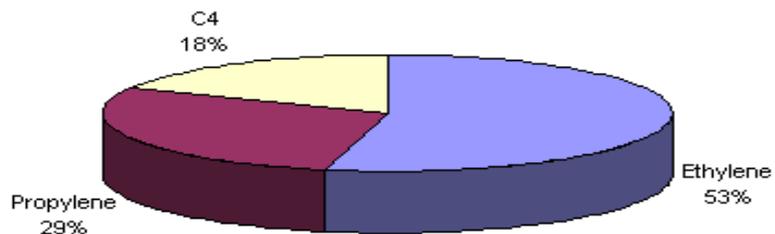
**Olefins Slate from Ethane Feed**



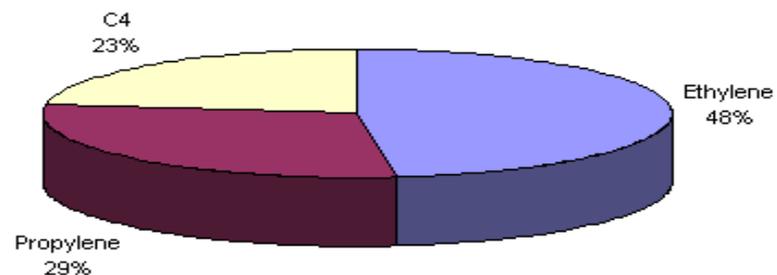
**Olefins Slate from LPG Feed**



**Olefins Slate from Naphtha**



**Olefins Slate from Gas Oil**

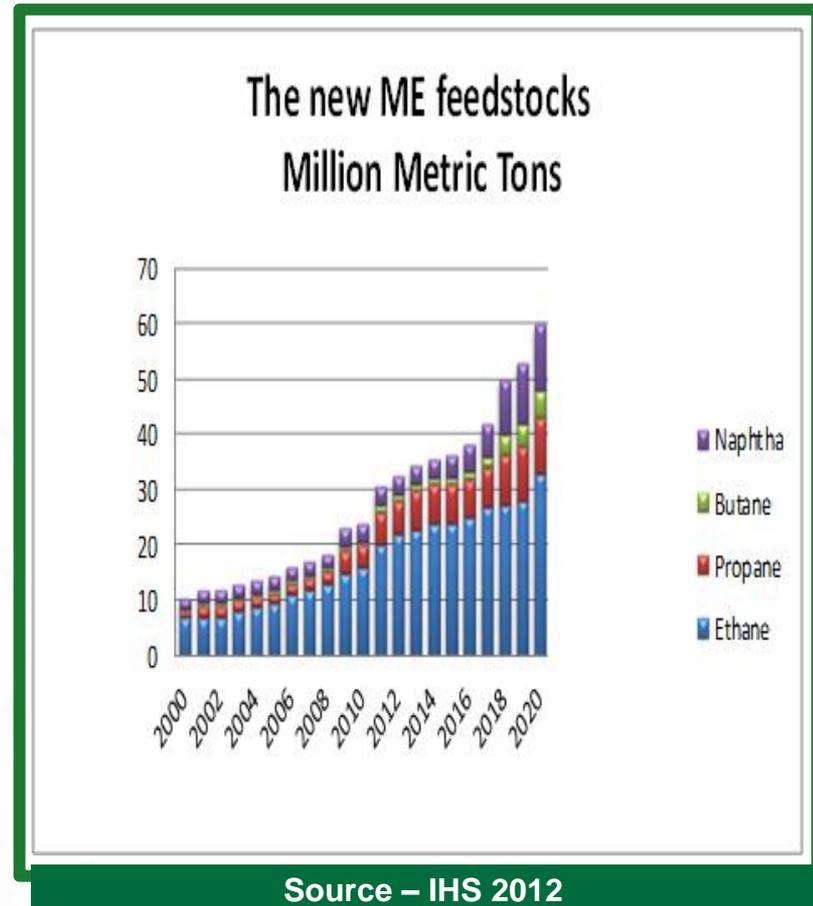




# The New landscape of ME Feed

Cracking going towards heavier feed means more down stream like propylene, butadiene and SBR etc.

- ME producers have realized the need to diversify its Petrochemical portfolio to overcome the vulnerability in case of the Ethane shortage
- ME shift has started 10 years back from ethane due to evident shortage in ethane
- The prospect of Middle East Feedstock will move from 70% Ethane to almost 50% 50% basis
- ME shifted to heavier feed through integrated projects
- New mind set in terms of Full integration with refineries will be soon a noticeable trend in the region





# Opportunities and Limitation of Refineries and Petrochemical Integration

ME new strategy of integration results into advantages and disadvantages

## Roses

- Feedstock flexibility
- Reliability of feedstock supply
- Produce gasoline fuels to meet the Local demand
- Meet shortage of power through and steam generation by burning low cost fuels
- Develop High-value return streams to refinery, such as HD Diesel, FCC Gasoline
- considerable savings in storage necessity
- Shared support services
- Autonomy of feed stocks and supply security

## Thorns

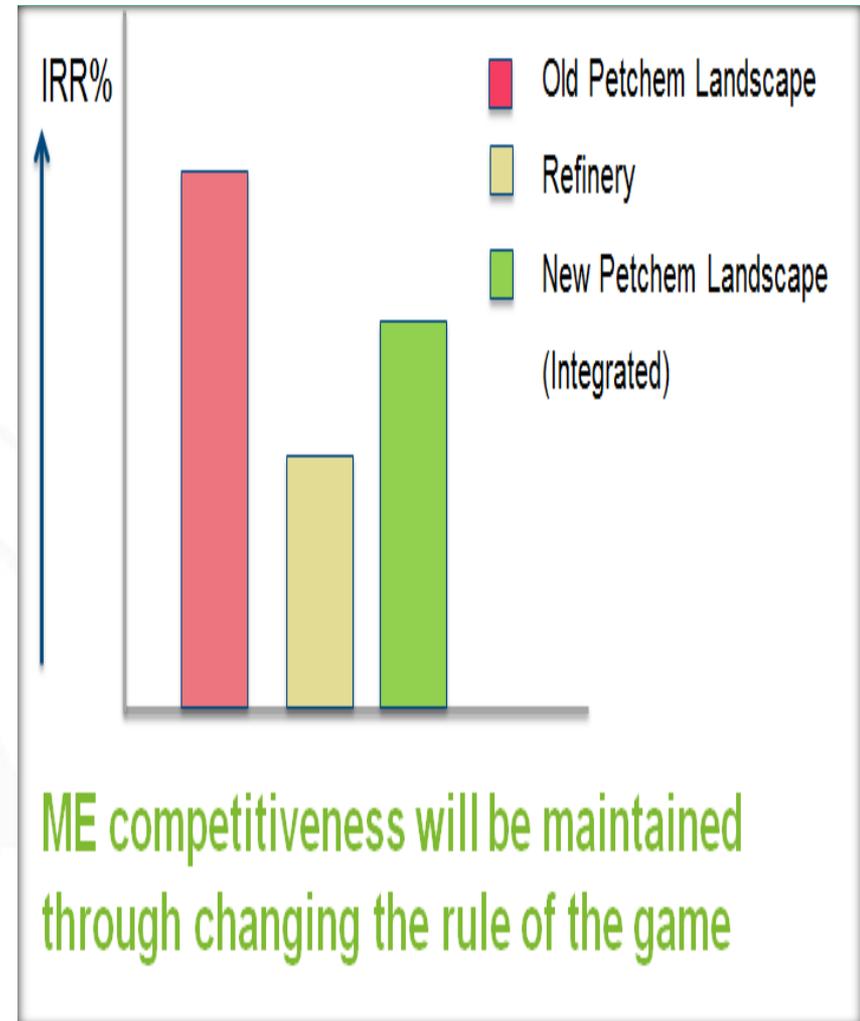
- Increased complexity of operation
- Limited operational flexibility
- Mismatch between integrated parties especially in operational objectives
- scatter business focus
- New trend
- New learning curve
- Challenging technical issues



# ME and the Paradigm Shift

## ME Competitiveness

- New shale gas forced NGL prices to drop which might lead to change product towards ethylene in US
- This shift will led to reduction in C3 and C4 products In USA
- ME will be advantaged to compensate the reduction in US C3 and C4 if follow strict operational discipline in an economical diversification model

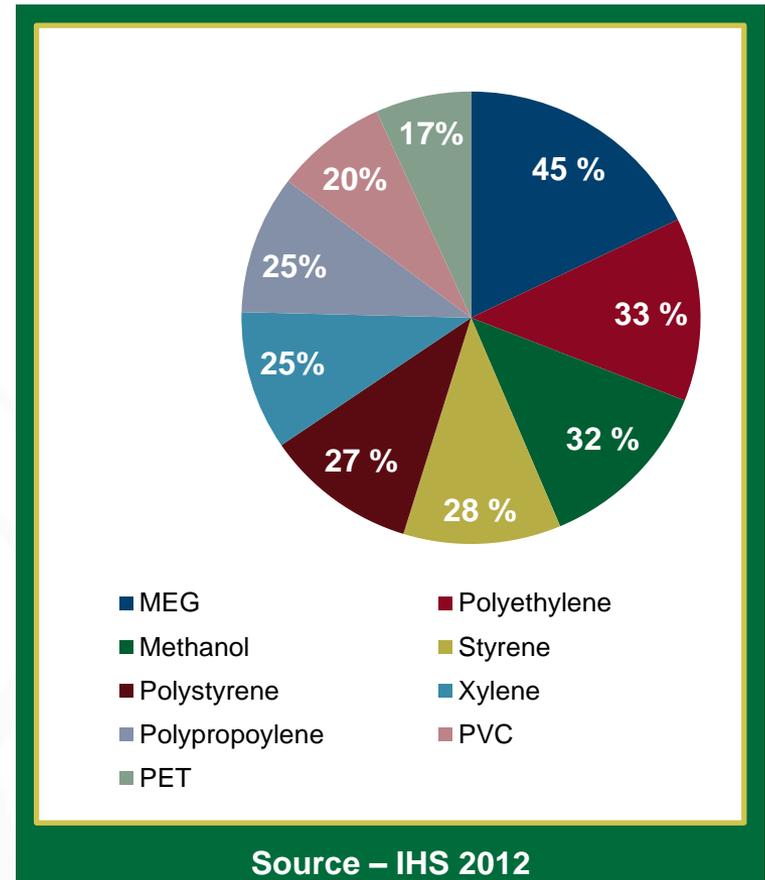




# Petrochemical Future Outlook

Where all basic chemicals and plastics heading on 2020 Outlook

- Emerging Economies will derive growth appetite for basic chemicals and plastics
- Easy handled plastic resin will take precedence over logistically more complex products





# Concluding Remarks

- The Middle East Petrochemical Industry have to bid farewell to lucrative feedstock as era of "cheap gas" draws to a close. Will retain its traditional export position but amid increasing competition.
- The new ME advantage will come from scale, new hardware, technology and access to financial capabilities
- Non-ethylene base chemicals are likely to rise from a 30% share of Middle East base chemical capacity in 2013 to a 50% percent share by 2020
- The new ME diversified and integrated environment must position itself towards Price makers rather than price takers



# Concluding Remarks

- Large scale capital project can be exploited to managed and leverage Scarce talent in ME
- ME has a strong position of maximum competitiveness, but technology provider must start breakthrough Innovative product development through Advanced solutions ted cracking improve the margin of liquid feed cracking
- building large-scale refineries associated with Petrochemicals complexes will be the main focus in the Middle East for the upcoming years.

