Iran’s Petrochemical Industry and its Futures:
Limits to Development and Policy Recommendations

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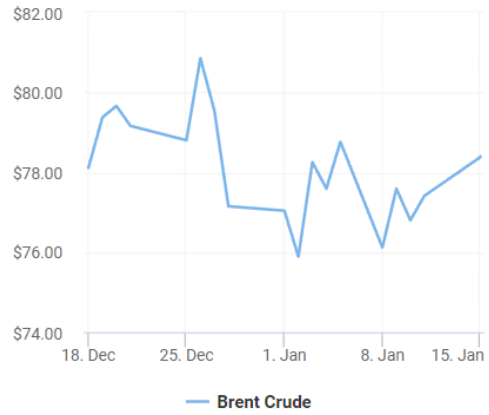
Winter 2024

Contents

BRENT Crude Oil ($/b)

15/01/2024

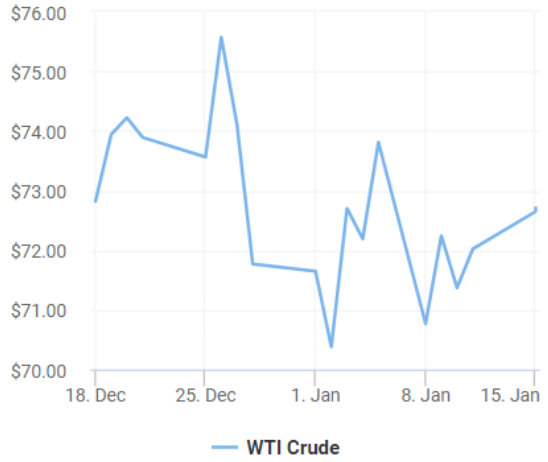
78.38



WTI Crude Oil ($/b)

15/01/2024

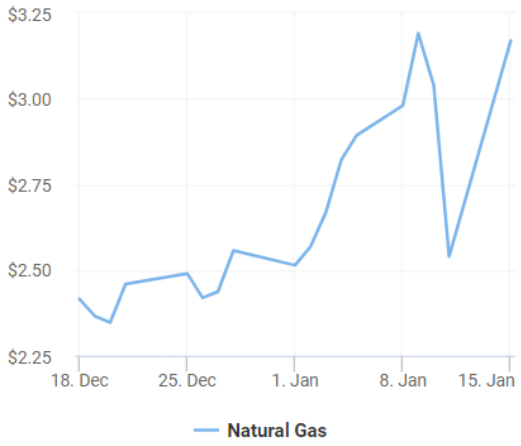
72.65



Henry Hub Natural Gas ($/MMBtu)

15/01/2024

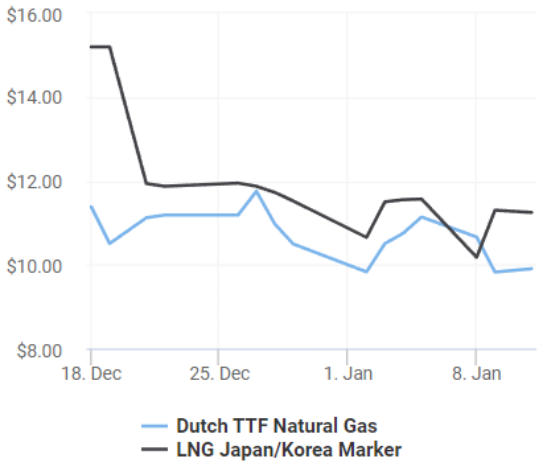
3.17



Europe & Asia Natural Gas ($/MMBtu)

11/01/2024

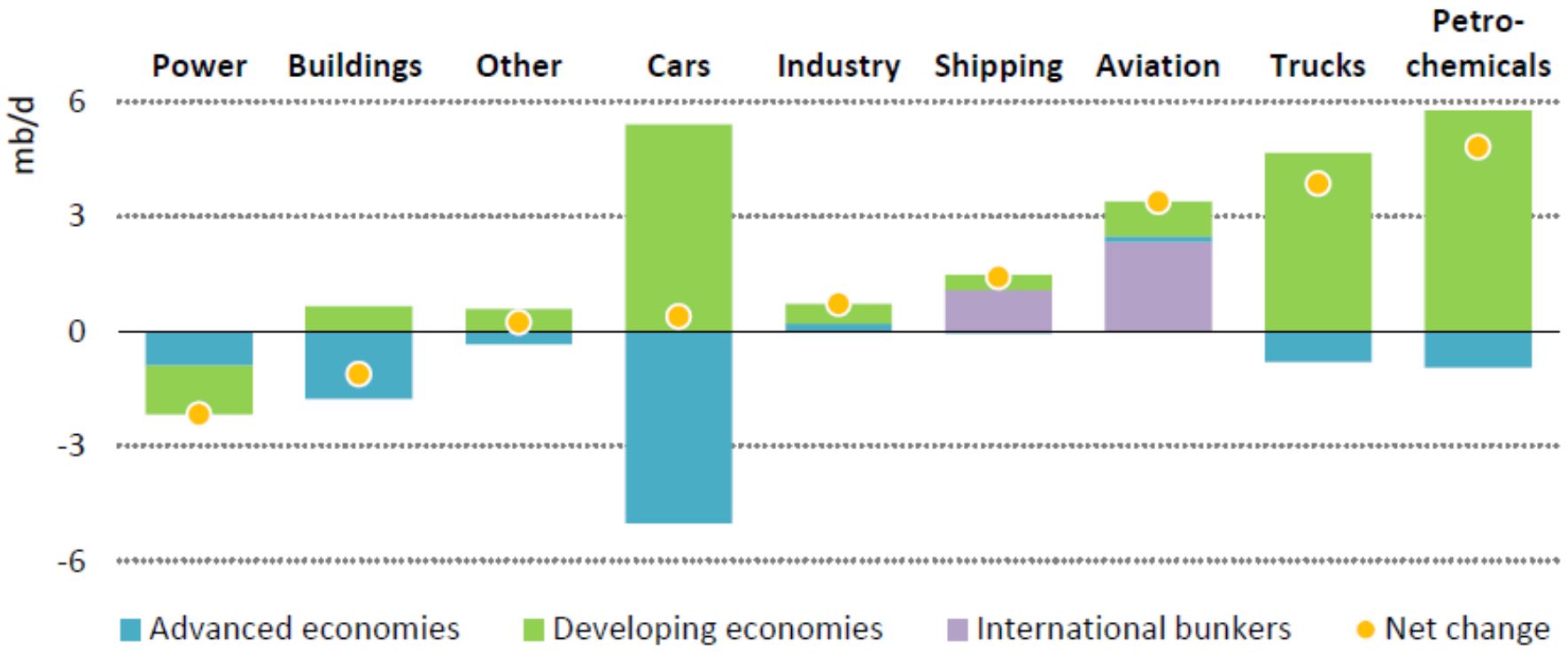
9.90 11.25



Brent Crude Oil
price fluctuations from January 2019 to the 15 Jan 2024: **78.38 $/b**

WTI Crude Oil
price fluctuations from January 2019 to the 15 Jan 2024: **72.65 $/b**

Natural Gas Henry Hub
price fluctuations from January 2019 to the 15 Jan 2024: **3.17 $/MMBtu**



Change In Global Oil Demand By Sector, 2020-2040

Petrochemicals, trucks and aviation dominate future oil demand growth

(Source: WEO, 2022)

Introduction to an analyses of Iran's capacity of petrochemical industry

- Oil and Gas, still the most important suppliers of energy in the world
- With 150 billion barrels of proven conventional crude oil reserves, Iran has about 10% of the world's crude oil supply
- Also owner of the 55 trillion cubic meters or 17% of the world’s proven conventional natural gas resources
- Iran's unique situation has not yet been properly utilized:
  - Non-priority of energy and related issues
  - The lack of technological ability to extract energy
  - The lack of sufficient capital in the field of production
  - U.S. sanctions and its consequent limitations for Iran’s trade

Petrochemical industry: in the world and in Iran

Worldwide

- The amount of fuel received by the petrochemical industry: Only 15% of primary hydrocarbon energy sources
- The sales value of the products of this industry and its complementary industries (2020): $3670 billion

Iran

- 75 petrochemical complexes with a capacity of about 90 million tons
- Fulfilling an income equivalent to $ 15 billion for the country in 2021
- About fifteen thousand companies are active in downstream industries of the petrochemical industry
- One of the most important factors for the growth and development of these enterprises is the sustainable provision of the feedstock they need

Hydrogen Revolution

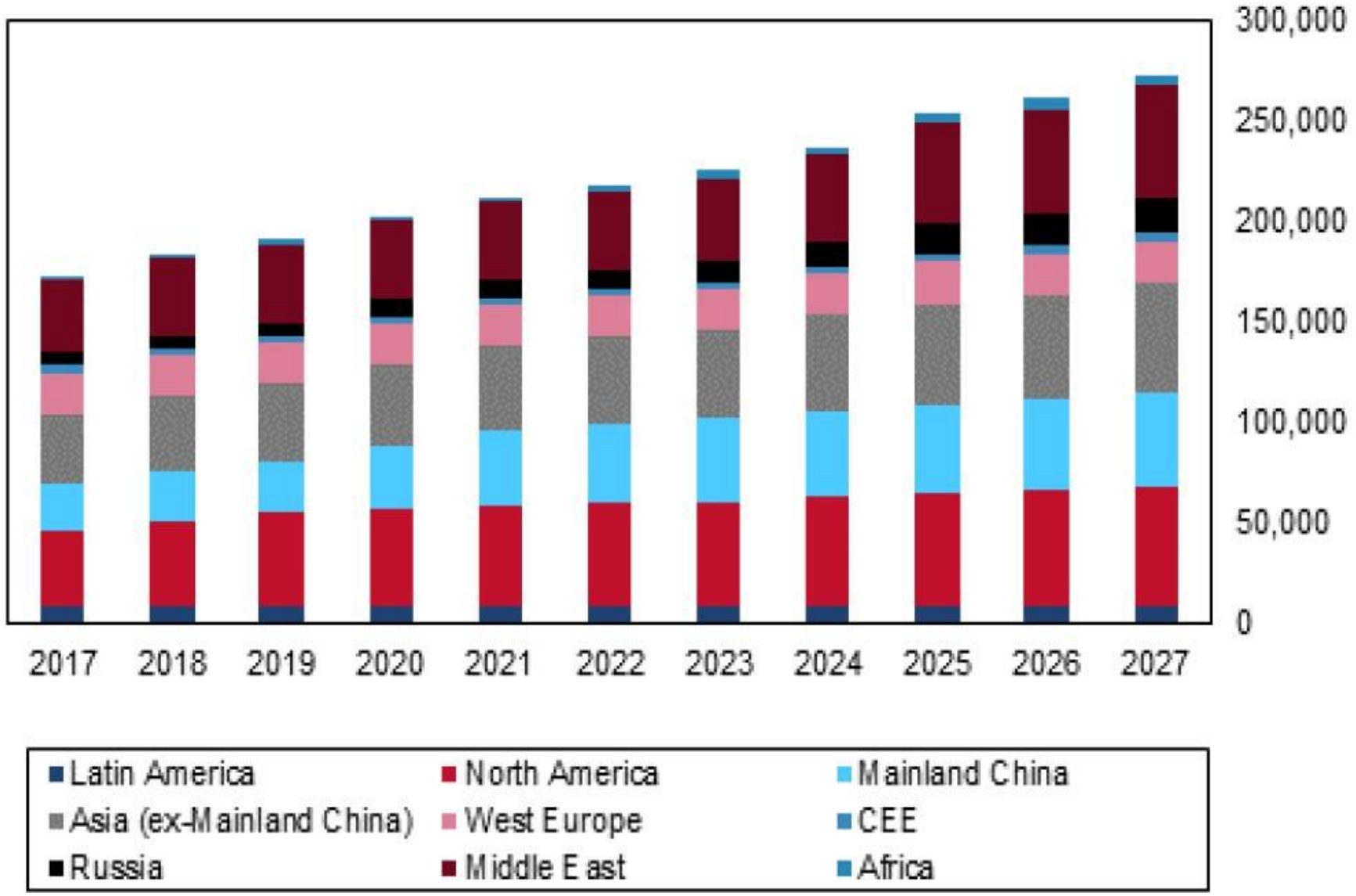
- Development of a green hydrogen economy offers the prospect of a long-term revival
- Requires significant growth in renewables capacity.
- If achieved over the next decade,
  - Plans for green hydrogen could provide the feedstock for ammonia and methanol production
  - Revive the chemicals chain
- Will be de-linked from the oil and gas sectors

Hydrogen Revolution (2)

- In petrochemical units, hydrogen is used for the production of products like ammonia, synthetic fertilizers
- Hydrogenation of raw materials, one of the most important functions of hydrogen in petrochemical industry
- Purification in refineries include:
  - Chemical purification
  - Hydrogen purification

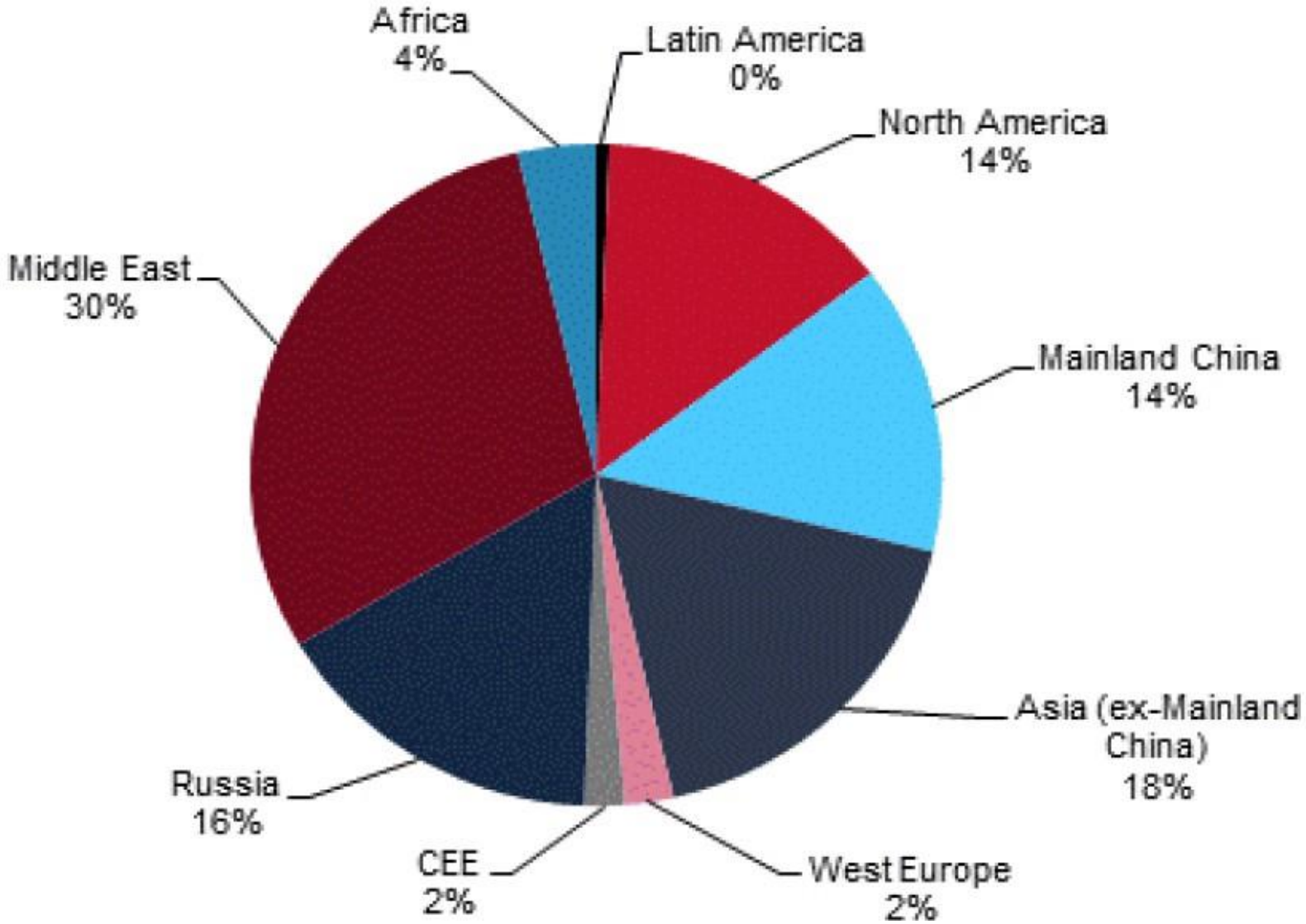
54mtpa Of New Ethylene Capacity Due Onstream By 2027

Global - Forecast Cracker Capacity Expansion ('000tpa)



Middle East Leads Expansion

Contribution To Global Ethylene Expansion By Region (2022-2027)



Petrochemical industry development and policy considerations

- Planning, policymaking, and offering a roadmap to all social strata in the energy sector are essential to Iran's overall growth outlook
- The growth of the oil and gas industry's upstream sector is not only crucial, but also essentially required
- Sustainable, economical, safe energy, domestic and international environmental protection legislation are significant reasons states create comprehensive energy strategies.

Petrochemical industry development and policy considerations (2)

Oil and gas resources will become increasingly important under the commodity-oriented strategy:

- Hydrocarbons serve as a fundamental raw element in petrochemical industries, from which a wide range of goods are derived
- It is utilized as a source of fuel and energy required by industry and is employed in the form of utility

Petrochemical industry development and policy considerations (3)

- Petrochemical industry, one of the main non-oil export options for economic growth, technology indigenization, and secondary industry expansion, including downstream industries and industries that provide technical, engineering, and research needs, is crucial
- Establishing upstream petrochemical units and figuring out how to properly distribute feed to them so that base and upstream petrochemical products can be produced in Iran
- However, the cost of feed for the petrochemical industry in Iran shouldn't be unduly inflated by political and economic uncertainties

Petrochemical industry development and policy considerations (4)

- Iran produces 4% of the $700 billion petrochemical products produced worldwide
- Trade with fifteen petrochemical export items boosts Iran's comparative advantage internationally

Petrochemical industry development and policy considerations (5)

Two strategies form the foundation of the nation's development plans, which include the growth of the oil and gas industry and, in particular, the petrochemical industry:

- Five-year economic development plans
- Annual budget rules

Petrochemical industry development and policy considerations (6)

- Despite the detrimental impacts of the US's primary sanctions against Iran and secondary sanctions on Iran's trade with other countries, the petrochemical industry has grown significantly
- Iran is a risky place to invest, therefore it is best to employ its own companies for development and hold off on signing big deals with International Oil Companies (IOCs) until things settle down and foreign companies' perceptions of Iran's business climate improve
- Because its resources are readily available and affordable, Iran's petrochemical industry enjoys a competitive edge and is recognized as the driving force behind the industrialization of the nation's energy sector.

Petrochemical industry development and policy considerations (7)

- By utilizing green technologies and developing ways to compensate for the manufacturing of petrochemical products, Iran's petrochemical industry can grow
- Iran's industry can grow at a rate of up to 10% a year until 2030
- Policymakers in Iran continue to be concerned about the imbalance in natural gas supply, although the petrochemical industry can continue operating by importing natural gas, especially liquified natural gas (LNG)

Conclusions

- Asia continues to be the leading region for global petrochemicals development
  - Robust investment and growth across all segments
  - Dominated by China
- Middle East and North America host the second- and third-largest petrochemicals project pipelines globally
  - Led primarily by Iran
  - Saudi Arabia
  - U. S.
- Spurred by strong public investment
  - In climate change-related transitions
  - Overall increased focus on government support for net zero objectives

Conclusions II

- There is increasing focus on
  - Green hydrogen
  - Bio-based feedstock
  - Circular economy in chemicals production
- Moving the industry gradually away from fossil fuels
- Emphasis will remain on natural gas as the feedstock of choice
- Asia hosts the largest share of the global cracker project pipeline, bolstered by activity in key emerging markets:
  - India
  - China
  - South East Asia
- In Europe operations are under threat due to pressures on margins

Thank you for your attention

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