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Opportunities and Challenges for ASEAN Petrochemicals amid Growing Global Competition

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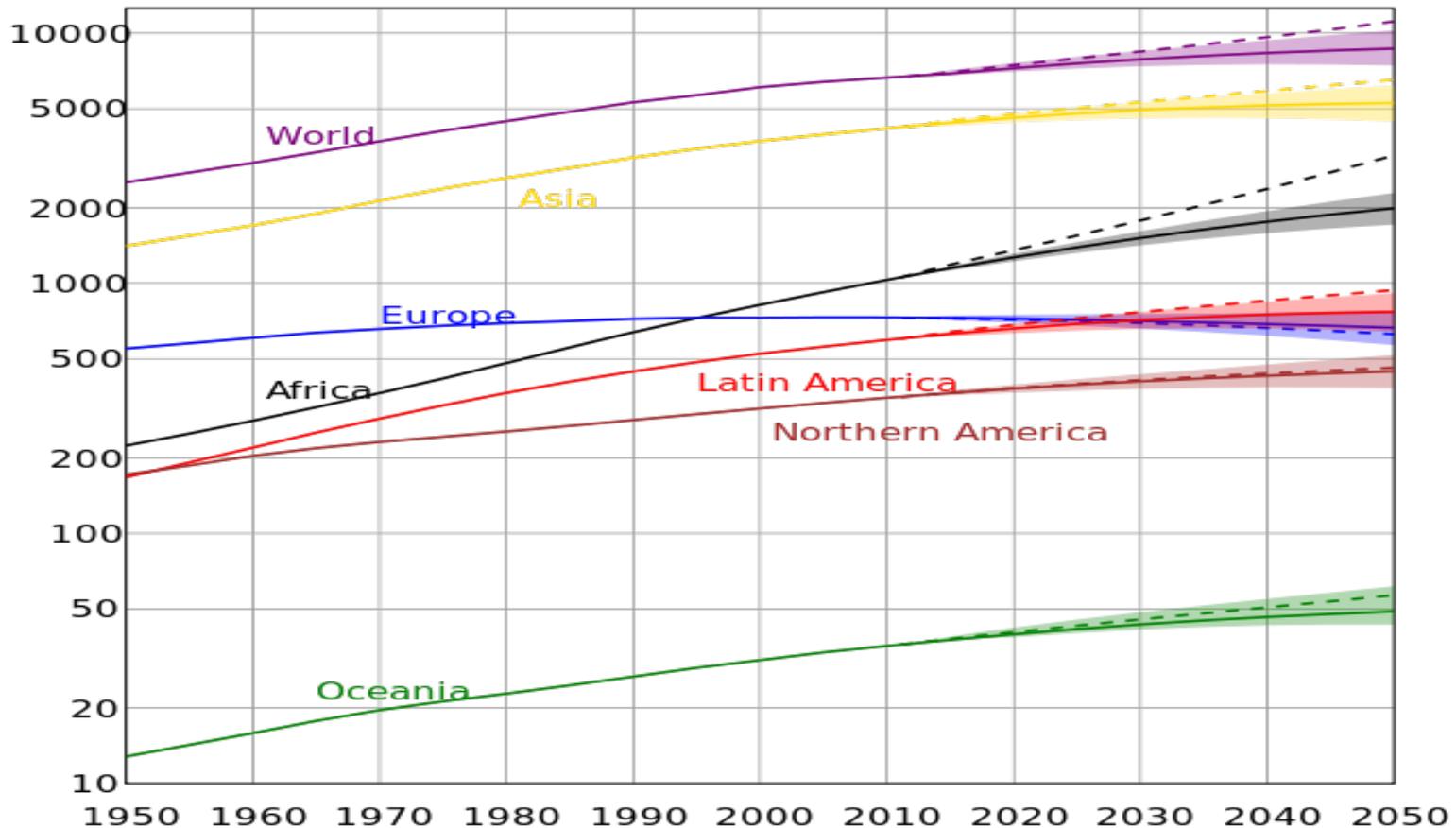
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OUTLINE

- ◆ Global competitive landscape
- ◆ Opportunities and challenges for ASEAN petrochemical development
- ◆ Conclusion

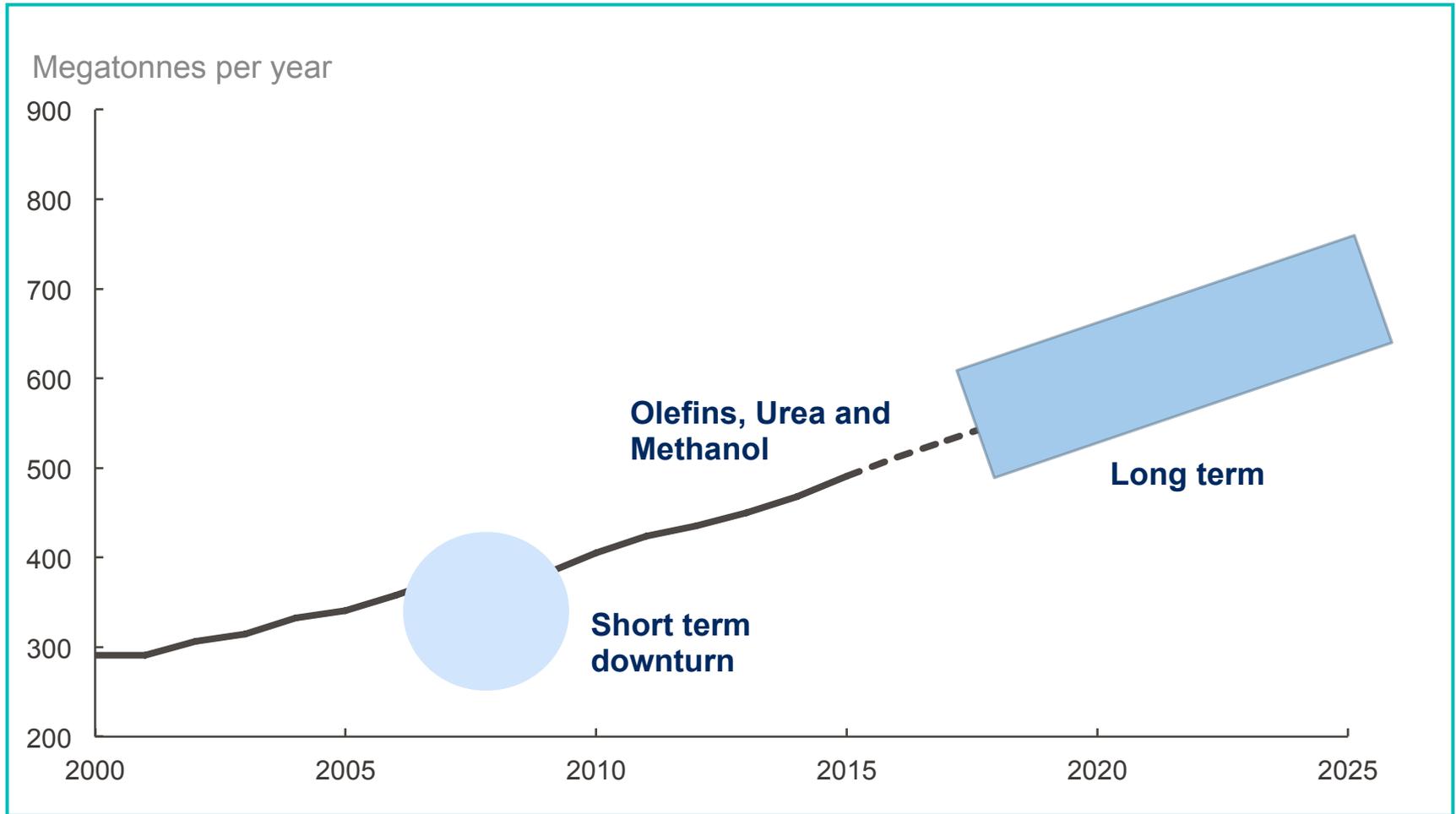
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SOURCE: UN

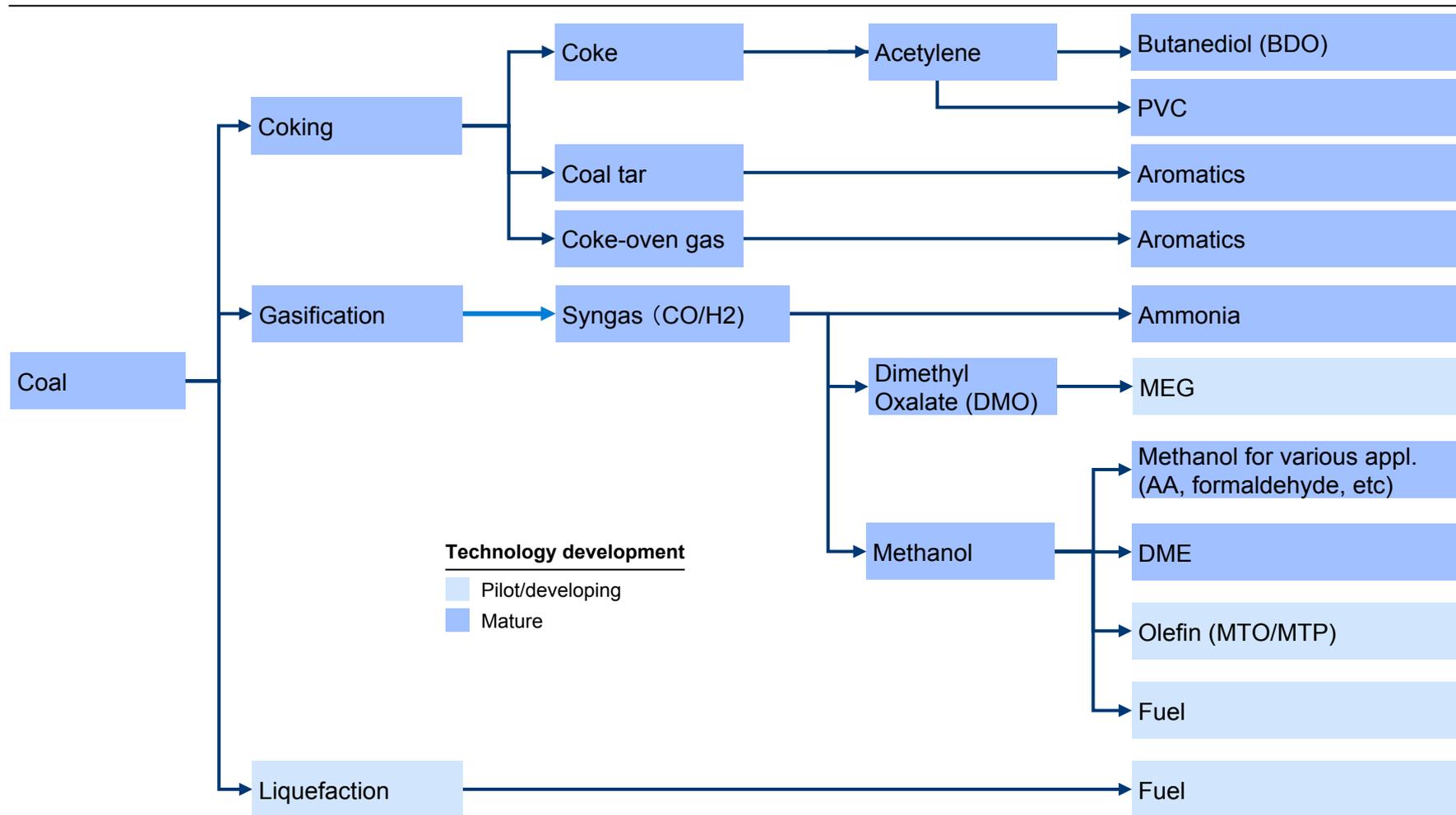
As population grows so does the demand for Petrochemicals



SOURCE: IHS, Fertecon

Taking advantage of its cheap and abundant coal, China's chemical industry has leveraged historical processes and invented brand new ones

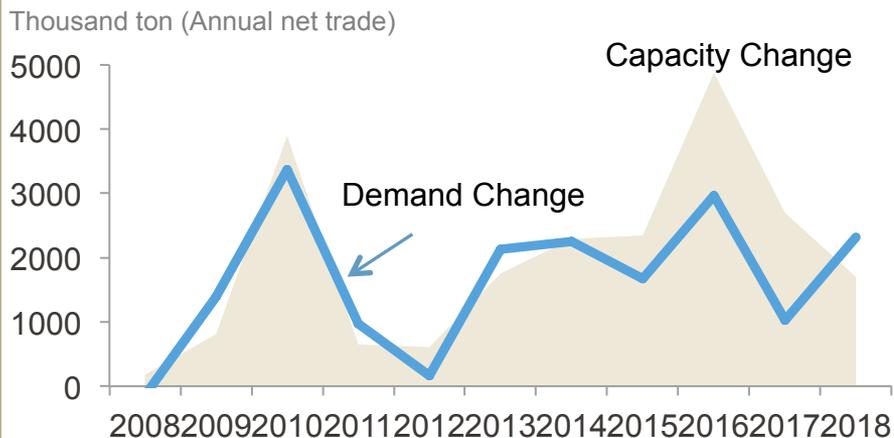
Coal chemical value chain



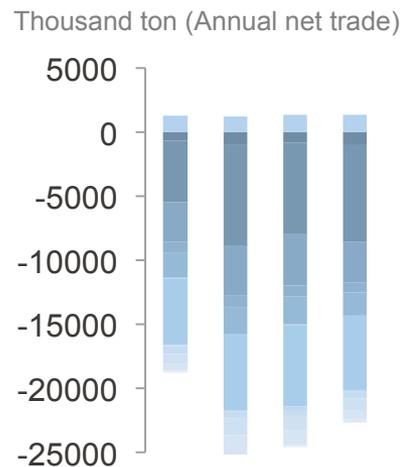
Source: McKinsey, Jacobs and ICIS

With an aggressive capacity building, China is moving towards self-sufficiency, but will they?

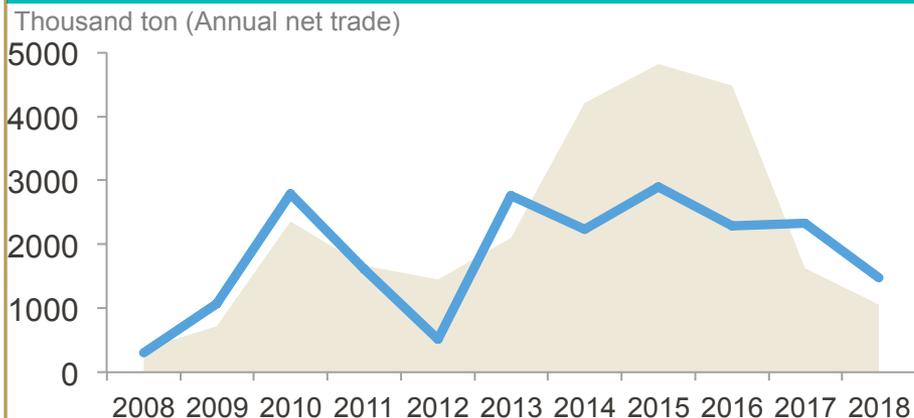
China ethylene capacity increases



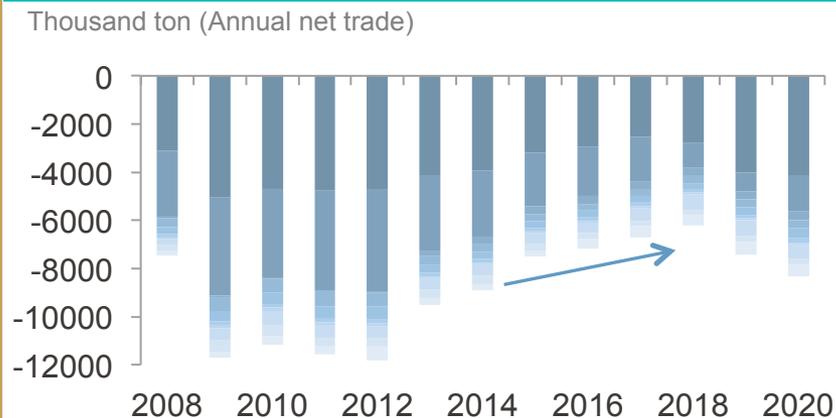
thus reduces net trade of ethylene and its derivatives



Likewise, China propylene capacity



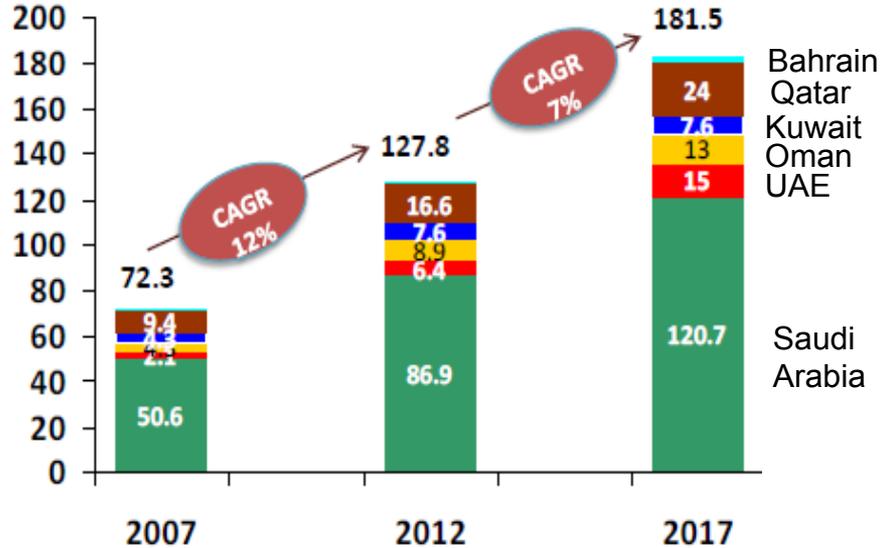
thus reduces net trade of propylene and its derivatives



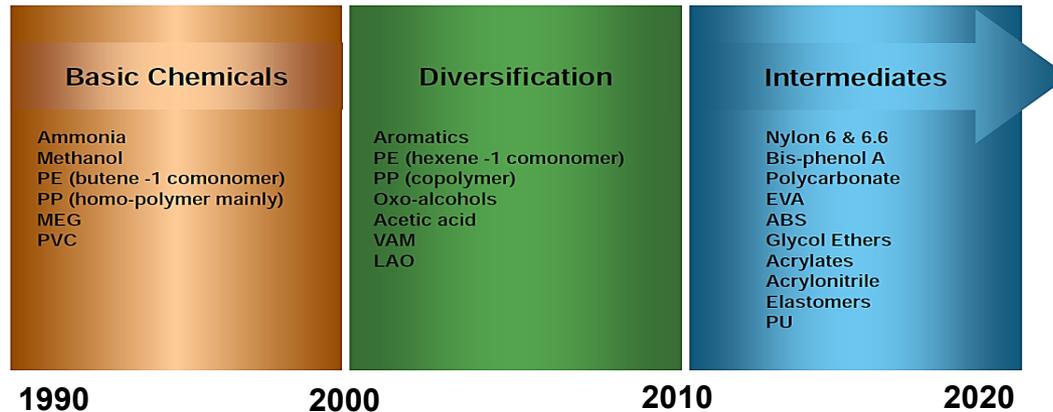
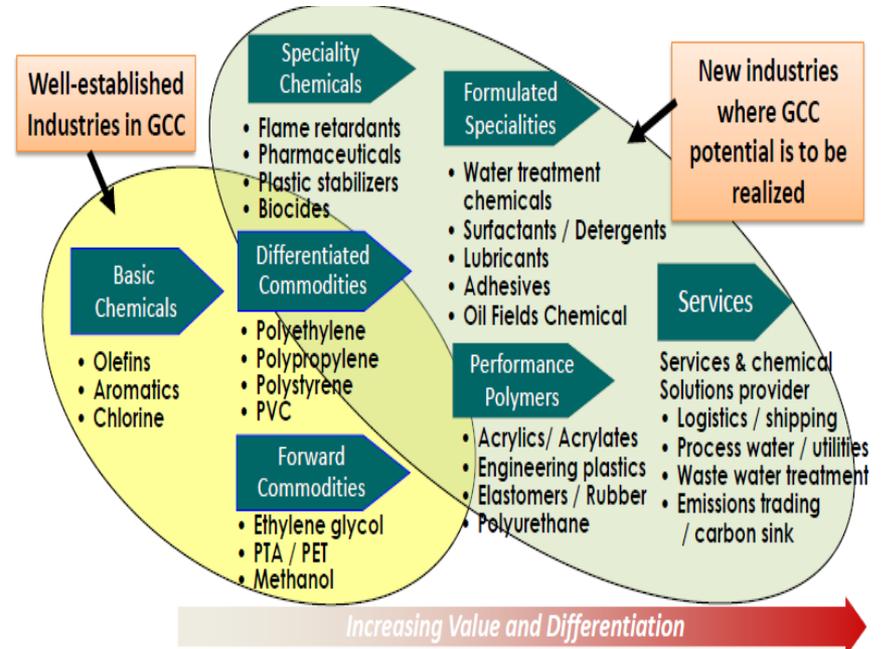
ME is positioning for differentiated and specialty chemicals

ME petrochemical industry growth continues....

Millions ton



..which will stimulate new set of downstream industries





General Information



Population
~625 million
~9% of world

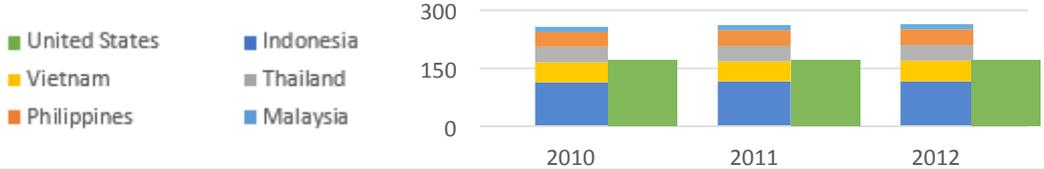
Population growth:
1.4% pa
(2013^f)

GDP
USD2.32 trillion
(2013^f)

Economic Indicators (2013^f)

Indicator	2010	2011	2012	2013
GDP Growth : 5.1%	7.8	4.9	5.8	5.1
FDI inflow : USD120 billion	100	98	114	120
Total export : USD1.27 trillion	1.05	1.24	1.25	1.27
Total import : RM1.24 trillion	0.96	1.15	1.22	1.24

Labour force : 298 million



Legend for Labour force:

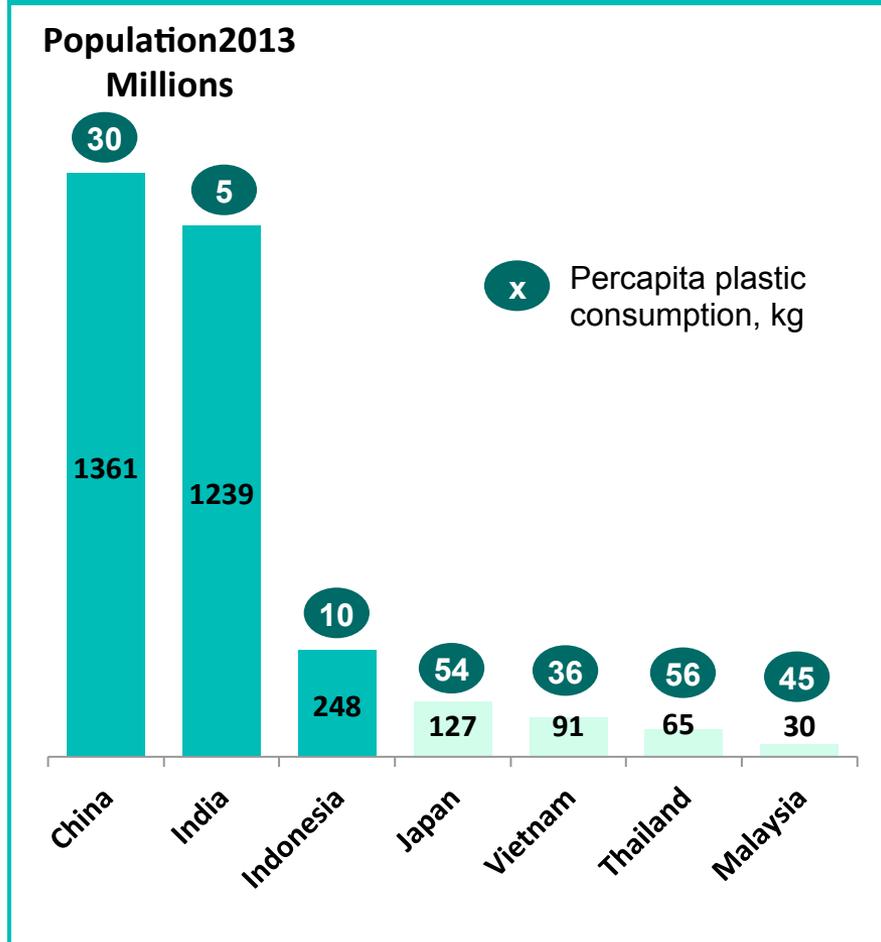
- United States (Green)
- Indonesia (Blue)
- Vietnam (Yellow)
- Philippines (Orange)
- Thailand (Grey)
- Malaysia (Light Blue)

Growth of ASEAN Petrochemical Industry

- ◆ With growing population and income, ASEAN's petrochemical consumption is poised for further growth
- ◆ Driven by an expansionary strategy by players in respective countries within ASEAN, there would be sizeable chemical capacity growths in ASEAN
- ◆ ASEAN petrochemical players' expansion and integration strategy will largely hinge upon domestic government's policies

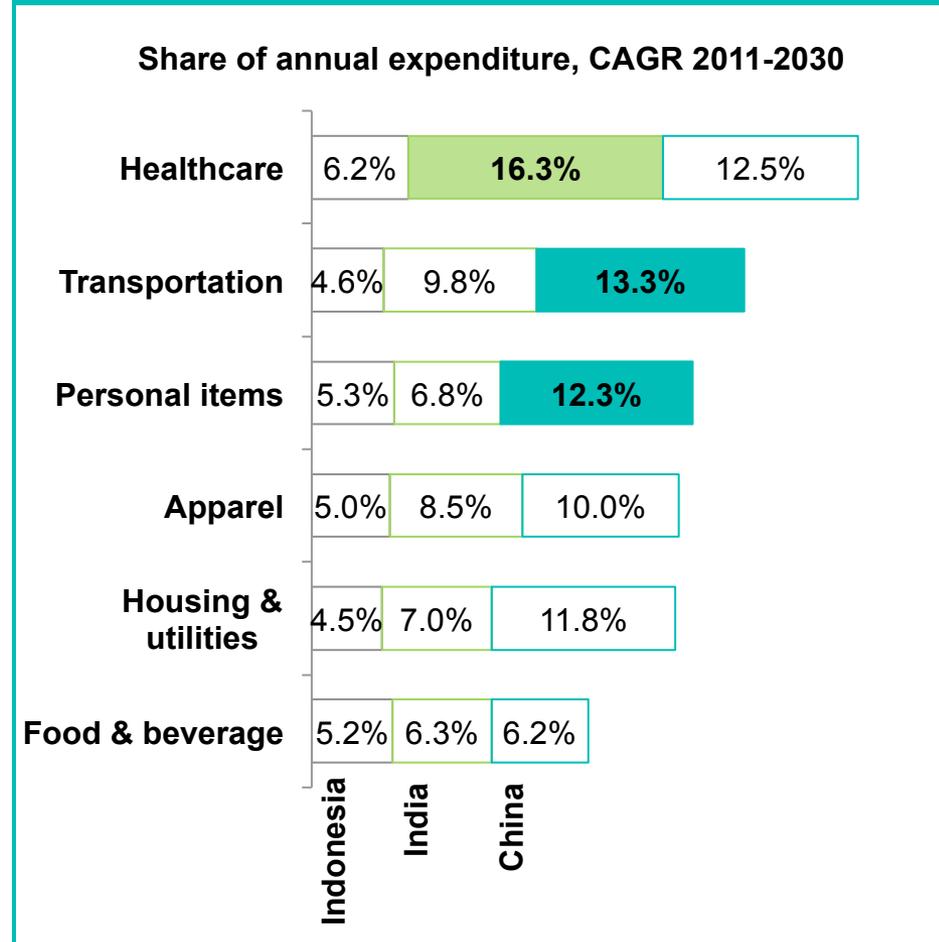
Per capita plastic consumption in ASEAN countries is still low

Ample room for growth in plastic consumption...



Source: PCG Team analysis, IMF 2013

...with promising growth expected in healthcare, transportation and personal items



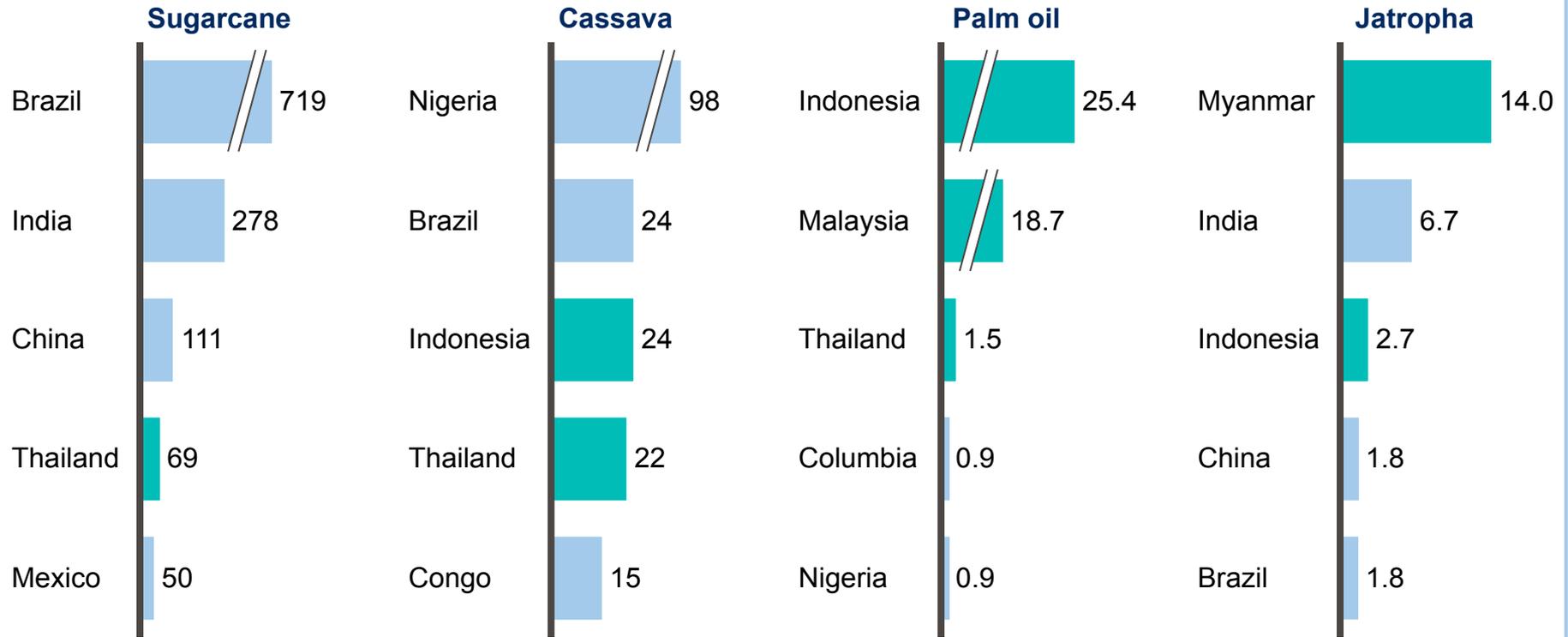
Source: PCG Team analysis, McKinsey

South East Asia offers the widest variety of bio-based feedstock

■ South East Asia

Top 5 global producers

2010 production, million tons per year



1 Assume yield of 7 tons of jatropha seeds per ha

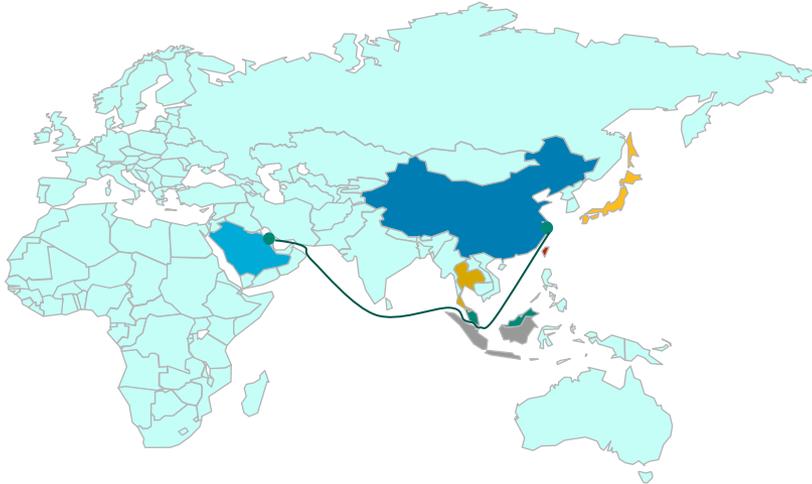
Source: FAOStat; GEXSI; Press; Team analysis

Key competitive edge

ASEAN is an ideal production base to export to the high growth Asia Pacific markets

ASEAN's strategic location allows for much shorter shipping times to key growth markets

Shipping Distances from Singapore vs. Middle East



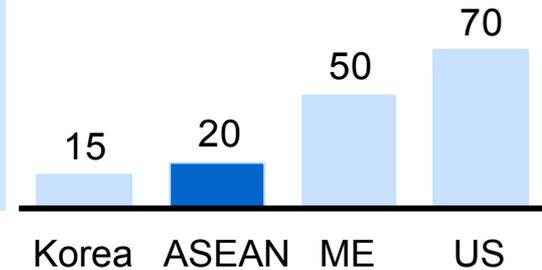
Shipping Days ⁽¹⁾	Singapore	Middle East (Jubail, Saudi Arabia)
China (Xiamen)	4 days	19 days
Japan (avg. Shimizu, Sakai, Kobe, Mizushima)	7 days	22 days
Taiwan (Kaohsiung)	4 days	18 days
Indonesia (avg. Surabaya, Semarang)	4 days	15 days
Thailand (Bangkok)	4 days	16 days
Shipping Considerations	<ul style="list-style-type: none"> Smaller ships and smaller loads economically viable Less crowded routes More frequent vessels 	<ul style="list-style-type: none"> Only large ships to maintain economies of scale Potential delay through crowded Straits of Malacca

Source World Ports Distances (www.distances.com) (1) Assuming 12 knots/hr average cruising speed

... and benefits from privileged market access to ASEAN countries and China

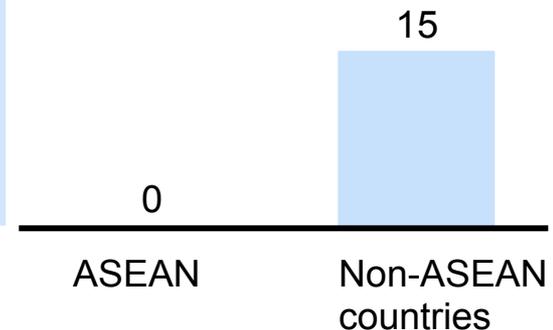
Example: Logistics cost for export to China, US\$/ton of PE

Low logistic cost for key markets



Import tariffs for petrochemical for ASEAN countries, %

No import tariffs to ASEAN & China



Opportunities for ASEAN petrochemical industry

Poised for future growth driven by chemical megatrends

Business Opportunities

Industry

Material science solutions

- 1 Plastics/elastomer for automotive
- 2 Composite materials for automotive
- 3 Plastics for consumer electronics
- 4 Plastics for food packaging
- 5 Bioplastics



Automotive



Consumer electronics



Food

Agriculture solutions

- 6 Agrochemicals
- 7 Seeds



Agriculture

Life Science solutions

- 8 Active pharmaceutical ingredients
- 9 Personal care chemicals
- 10 Food & feed additives



Pharma / Personal care



Food

Construction solutions

- 11 Concrete additives for construction
- 12 Paints & coatings



Construction

Stepping up the game

Asia Pacific market provides opportunity for ASEAN producers to expand

Countries



New projects



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- **SAMUR** project (Urea 1.2 mtpa) in Sipitang, Sabah
- **RAPID** Project (Integrated refinery and petrochemical complex)



- Feasibility study to set up **oil refinery integrated with petchem production** with total output of **10m tonne/year** in **Vietnam**



- Petrochemicals complex in Southern Vietnam with **QPI Vietnam, PetroVietnam & Vinachem** (1.4 mtpa of olefins), expected start-up by 2018.



- **Mitsui Chemicals, Idemitsu Kosan, Kuwait Petroleum International & PetroVietnam** signed a JV agreement to invest US\$ 9 Bil refinery and petrochemical complex in Nghi Son. Expected startup by 2017.



- JV with **PTTGC** to build world scale Petrochemical Complex worth US\$ 4-5 bil; start up by 2018



- **30%** acquisition by **SCG** to further drive performance and leverage potential synergies

ExxonMobil

- Planned **cracker expansion by 2015**
- **ExxonMobil** inaugurated the world's first facility that processes crude oil directly into petrochemical products at a facility in Singapore in January 2014.

ASEAN support for growth of Petrochemicals Industry

Economic Plan

Indonesia



- ◆ Indonesia's Master Plan for Economic Development 2011-2025

Malaysia



- ◆ The Government Transformation Programme (GTP) and the New Economic Model (NEM)

Thailand



- ◆ The 11th National Economic and Social Development Plan

Singapore



- ◆ The Singapore Economic Development Board (EDB)

Growth for Petrochemical

- ◆ Java prioritized for petrochemicals development as it has 3 new refinery projects in the next 5 years allowing for multiple expansion projects.

- ◆ Key drivers to become a developed nation include oil, gas and petrochemical

- ◆ Expansion of four newly established industries, specifically petroleum, electronics, automobiles and electrical appliances.

- ◆ Enhance infrastructure development, create competitive feedstock for petrochemicals, and move up the value chain with advanced materials as well as specialty chemicals.

Challenges ahead

1

Global capacity additions



2

Talent Shortage



4

Megatrends requiring higher product customization



3

Trade barriers



CONCLUSION

- ◆ **Ample room for growth of ASEAN petrochemical market and strategic collaboration opportunity amongst ASEAN petrochemical producers**
- ◆ **Asia Pacific remains the key growth market for ASEAN producers to expand market share and presence for select industry sectors**
- ◆ **In addition to proximity to petrochemical growth markets, key opportunities of ASEAN petrochemical players are access to natural oil and gas feedstock and support from the government i.e. infrastructure/ logistics system development and investment incentives**

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