

Petrochemical Engineering Course

CHE471-4

Term: 20212, Academic Year: 2021-2022

SAUDI PETROCHEMICALS INDUSTRY

Instructor: Dr. Mohammad Ashraf Ali

Chemical Engineering Department

College of Engineering, Jazan University

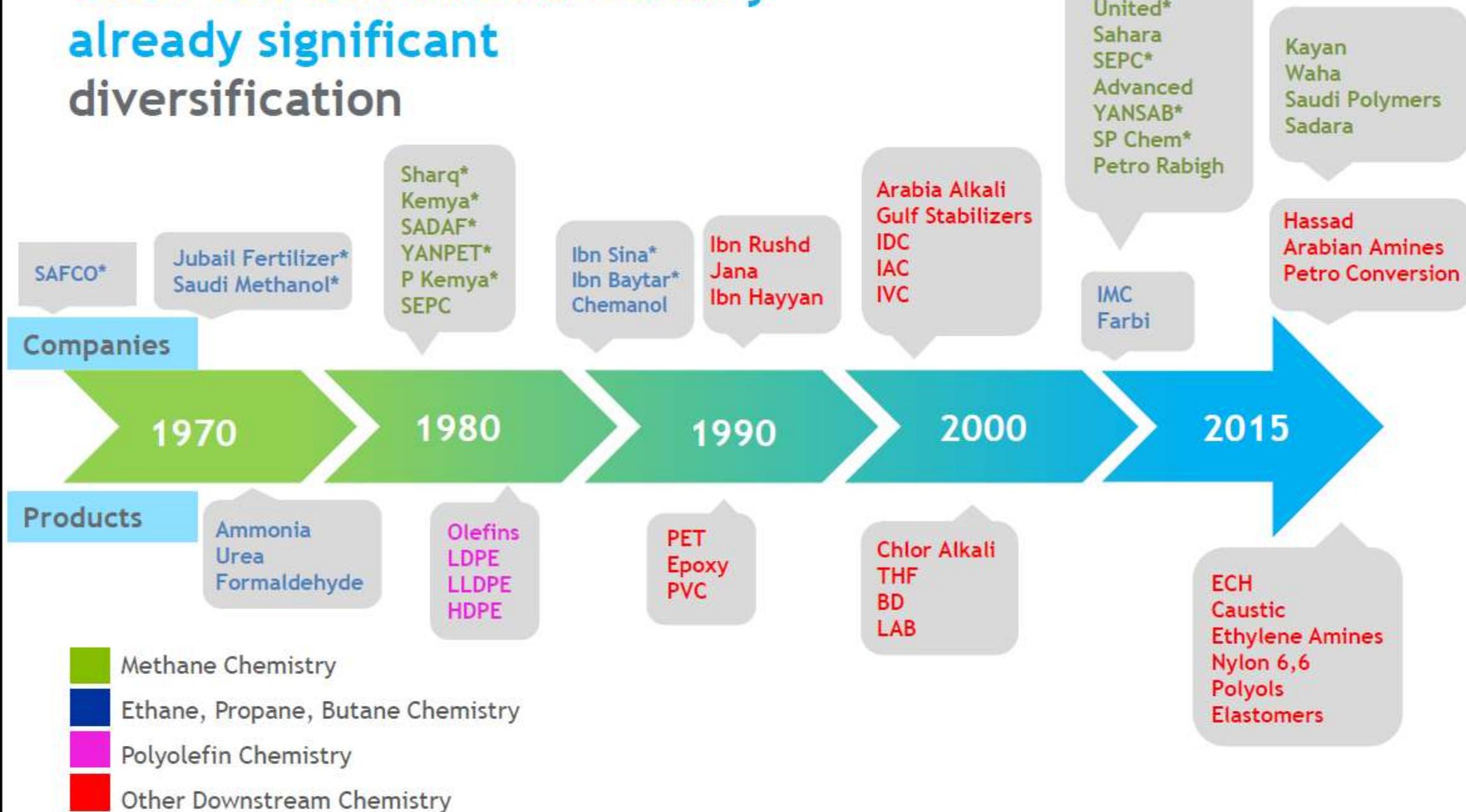
maali8000@gmail.com

already significant
diversification



Petrochemicals industry - foundation
for the new Saudi economy

already significant diversification



*SABIC Manufacturing affiliate or joint venture

Source : Saudi Arabia's Chemical Industry Continues to Grow - by Leonard Gerlowski and Ahmad M Othman, Saudi Aramco

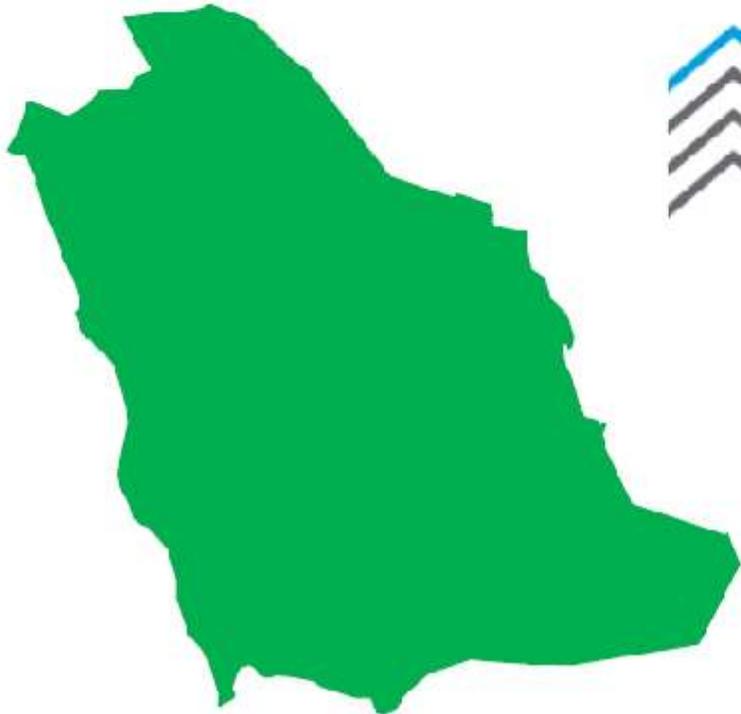
Saudi Petrochemicals Industry already significant size & importance



production capacity
89.2 MTA



\$68.3 billion
sales revenue



Up 154%
In ten years

10%
of all exports

2/3

of all non-oil exports



5th
largest chemical company
in the world, Sabic



34%
of manufacturing
value added

Saudi Petrochemicals Industry already significant employment



89,000
direct
employees
and

267,000
indirect
employees

9%

Annual employment growth rate
(2004 – 2014)

79%

Saudiization

Average Monthly Wage
for Saudis



Petrochem sector

\$4,500

Private sector

\$1,500

Public Sector

\$2,500

World's 10 largest petrochemicals companies

1. BASF (Germany - \$62.3 billion) 59.32 billion EUR in 2019
2. Dow Chemical (USA - \$57.5 billion) 42.95 billion dollars
3. ExxonMobil Chemical (USA - \$55.0 billion) 256 billion U.S. dollars
4. LyondellBasell Industries (Netherlands - \$51.0 billion) 34.48 billion USD
5. INEOS (UK - \$47.0 billion) 13.7 billion euros in 2019
6. Saudi Basic Industries Corporation (KSA- \$37.7 billion) 45 in 2019
7. Formosa Plastics Corporation (Taiwan - \$31.5 billion)
8. Sumitomo Chemical (Japan - \$16.7 billion)
9. DuPont (USA - \$31.8 billion)
10. Chevron Phillips (US - \$13.0 billion)

Figure 1: Saudi petrochemical capacity (2005-2020F)

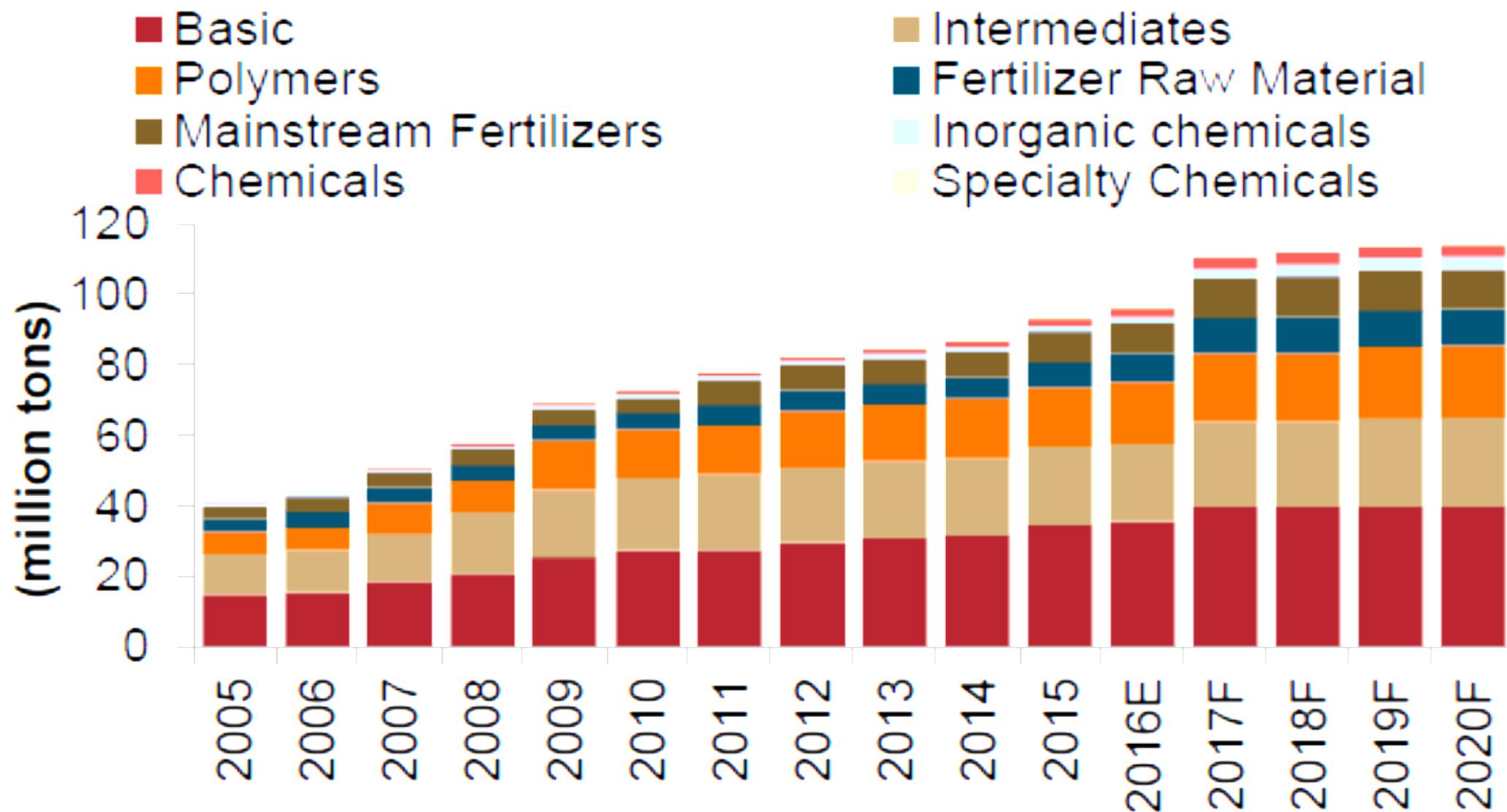


Figure 2: Saudi petrochemical feedstock usage (percent)

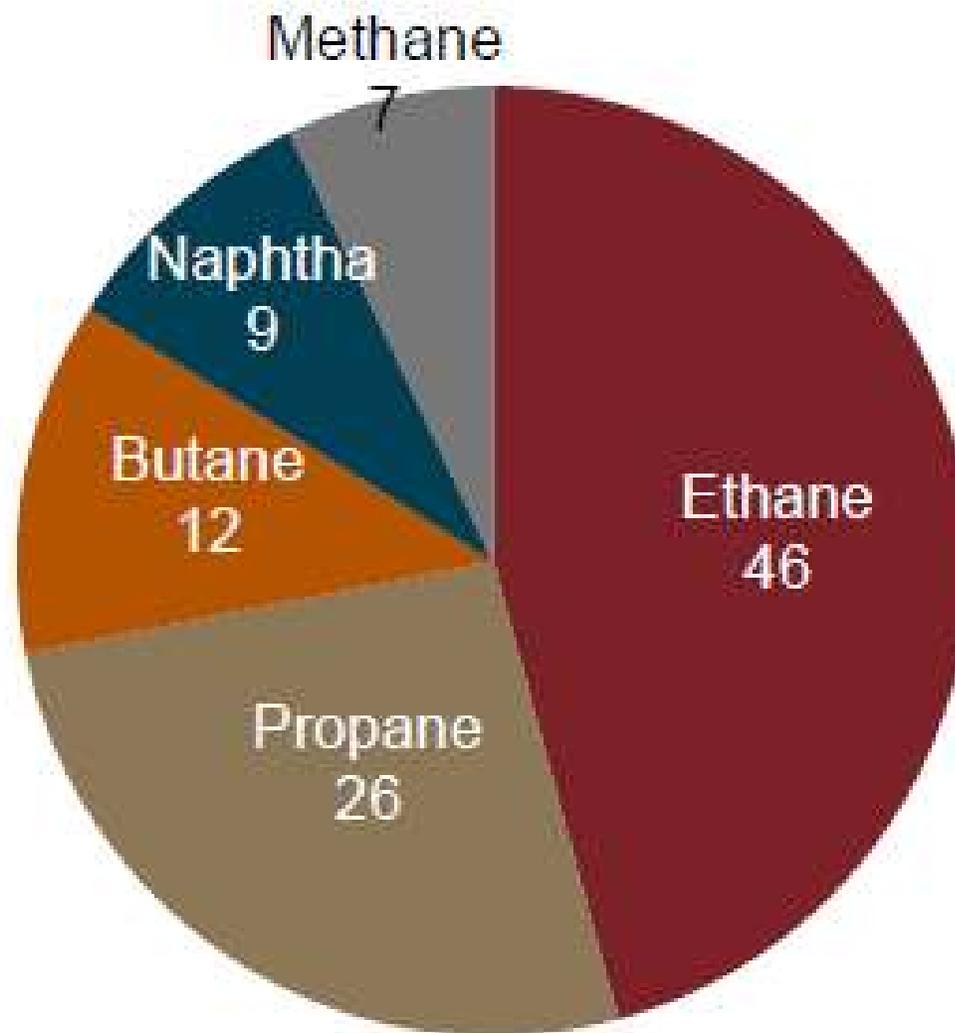
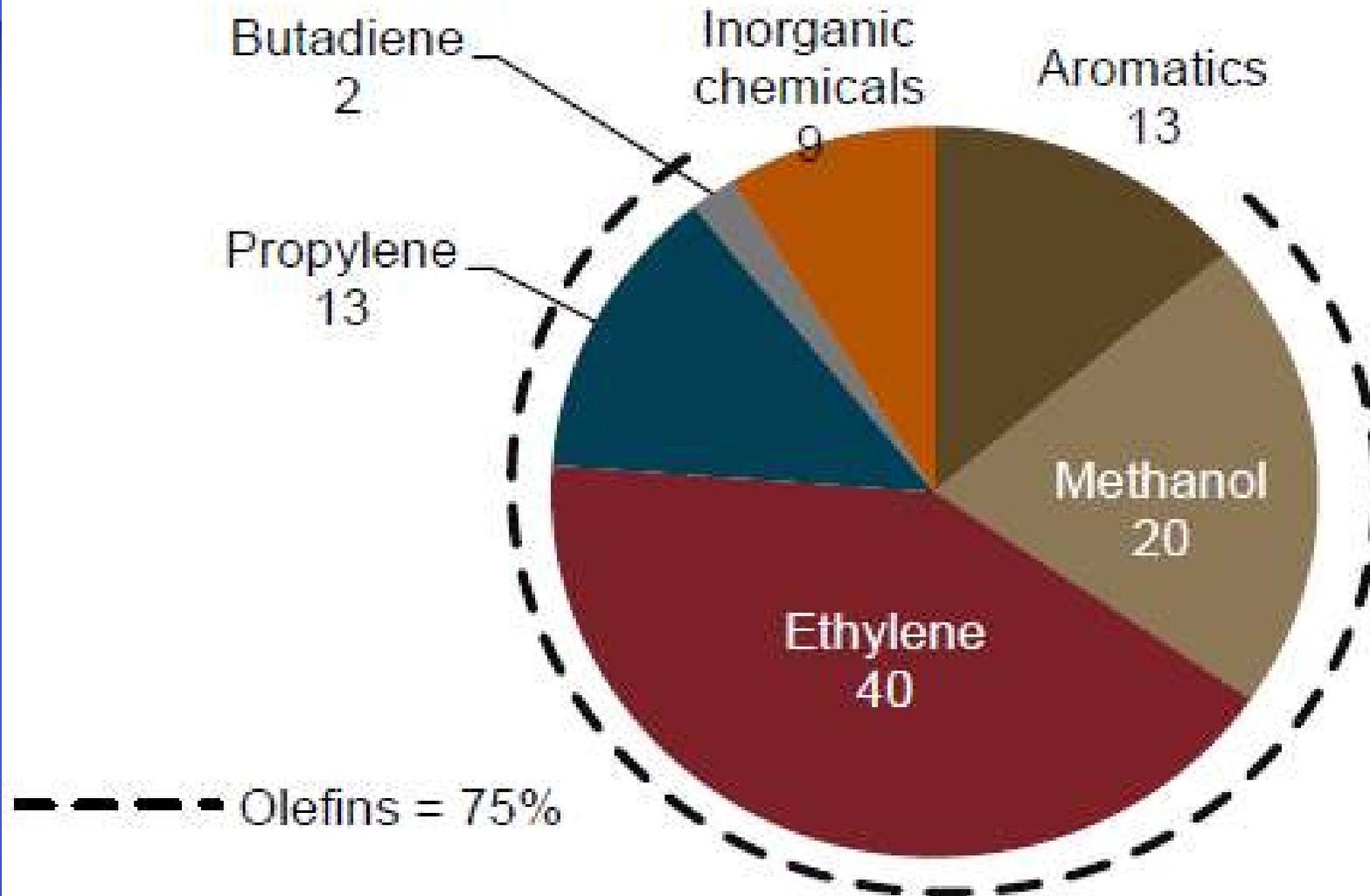


Figure 3: Saudi petrochemical capacity 2016
(percent)



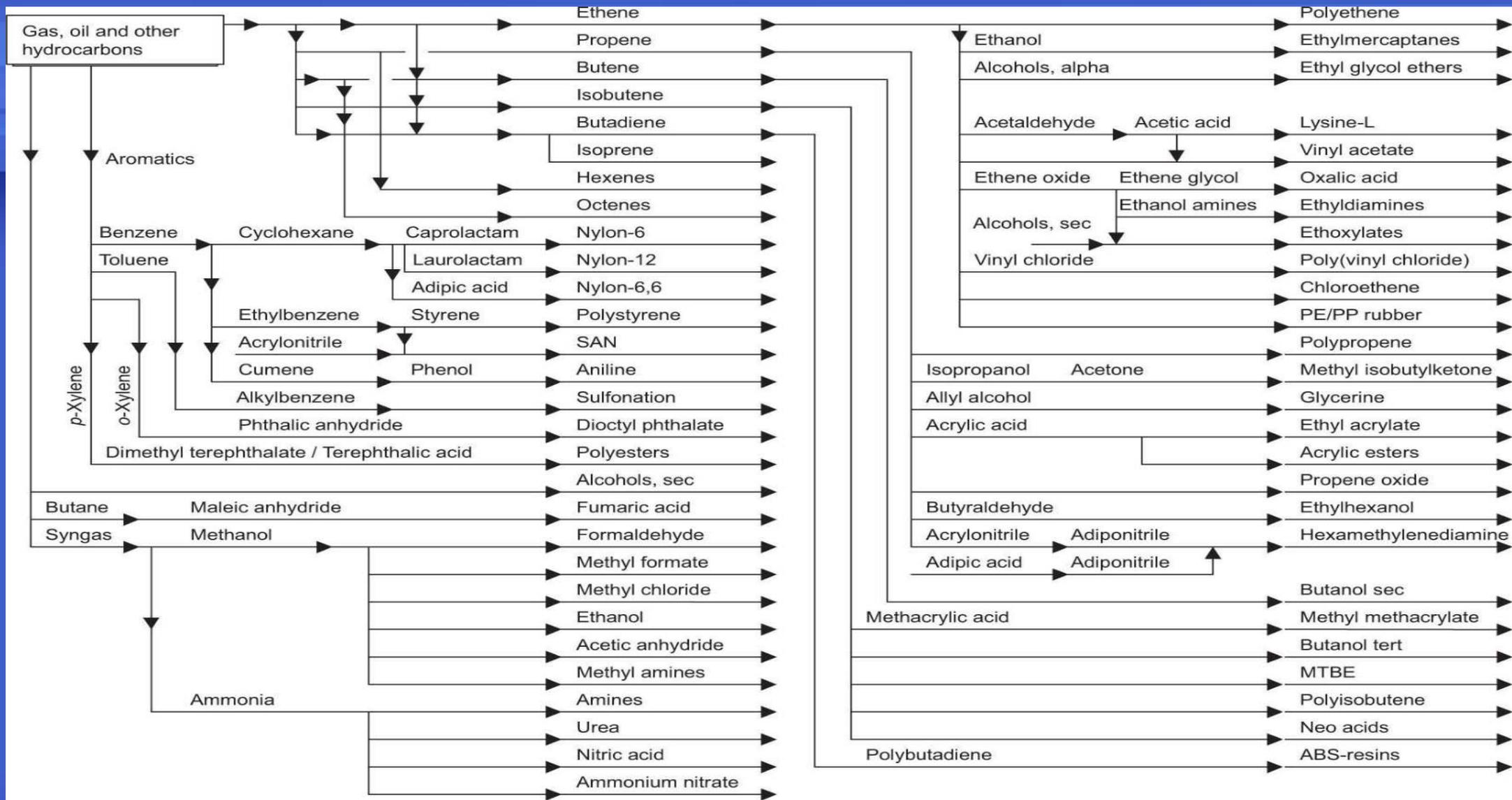
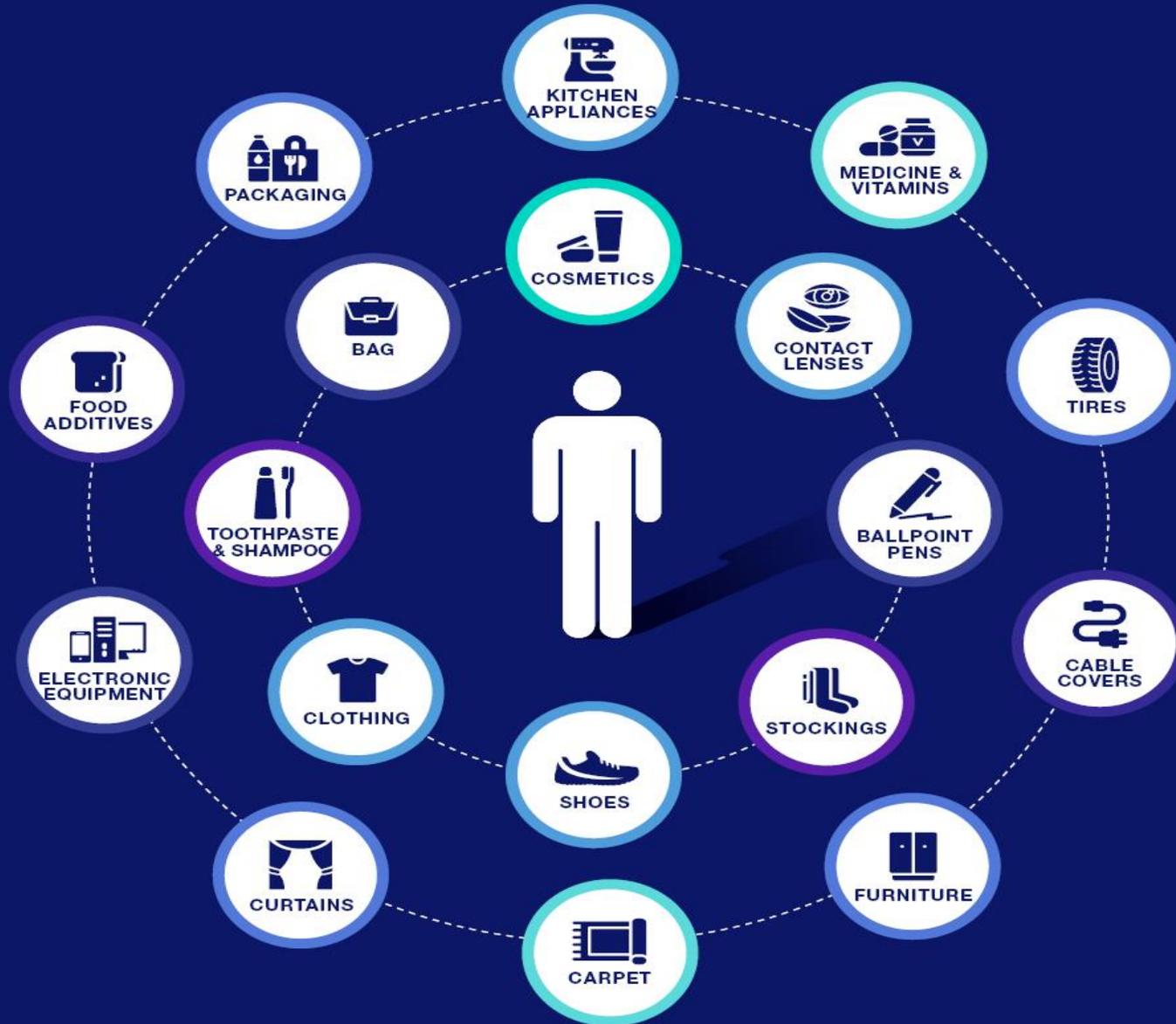


Figure 2.2 Survey of the petrochemical industry.

THE PETROCHEMICALS ALL AROUND US



MAJOR SABIC PRODUCTS (POLYMERS)

1. ACRYLONITRILE BUTADIENE STYRENE (ABS)
2. ACRYLONITRILE STYRENE ACRYLATE (ASA)
3. CARBON BLACK
4. METALLOCENE POLYETHYLENE (MPE)
5. POLYBUTYLENE TEREPHTHALATE (PBT)
6. POLYBUTYLENE TEREPHTHALATE (PBT)-POLYCARBONATE
7. POLYCARBONATE (PC)
8. POLYCARBONATE (PC)-ACRYLONITRILE BUTADIENE STYRENE
9. POLYETHYLENE (PE)
10. POLYETHYLENE TEREPHTHALATE (PET)
11. POLYMETHYL METHACRYLATE (PMMA)
12. POLYOXYMETHYLENE (POM)
13. POLYPROPYLENE (PP)
14. POLYSTYRENE (PS)
15. POLYVINYL CHLORIDE (PVC)
16. SYNTHETIC RUBBERS



MAJOR SABIC PRODUCTS (Petrochemicals and Chemicals)

1. AROMATICS
2. CHLOR-ALKALI
3. ETHANOLAMINES
4. GASES
5. GLYCOLS
6. LINEAR ALPHA OLEFINS
7. NATURAL DETERGENT ALCOHOL
8. OLEFINS & GASES
9. OXO ALCOHOLS & PERFORMANCE MONOMERS
10. OXYGENATES



SABIC Petrochemical Plants (Year 2015)

Company	Location	Feedstock	Product	Current Capacity (tpy)
Saudi Methanol Company (AR-RAZI)	Al-Jubail	Methane	- Chemical Grade Methanol	4,680,000
National Methanol Company (IBN SINA)	Al-Jubail	Methane Butane	- Methanol - MTBE	1,000,000 700,000
Saudi Petrochemical Company (SADAF)	Al-Jubail	Ethane Benzene	- Ethylene - Ethylene Dichloride - Styrene - Ethanol - Caustic Soda - MTBE	1,050,000 840,000 1,100,000 300,000 670,000 700,000
Al-Jubail Petrochemical Company (KEMYA)	Al-Jubail	Ethane Propane	-Ethylene -Propylene -LLDPE -LDPE -HDPE	700,000 200,000 850,000 218,000 130,000
Saudi Yanbu Petrochemical Company (YANPET)	Yanbu	Ethane Propane	- Ethylene - Propylene - Polypropylene - LLDPE & HDPE - Ethylene Glycol	1,480,000 250,000 260,000 1,015,000 755,000
Arabian Petrochemical Company (PETROKEMYA)	Al-Jubail	- Ethane - Styrene - Propane - Butane - Natural Gasoline	- Ethylene - Butene-1 - Polystyrene - Propylene - Butadiene - Benzene - Ethyl Benzene - Polyethylene - VCM -PVC	2,250,000 100,000 135,000 663,000 254,000 130,000 260,000 800,000 450,000 330,000
United Petrochemical company	Al-Jubail	Ethane Propane	-Ethylene -LAO -Ethylene Glycol	1,350,000 150,000 1,200,000

SABIC Petrochemical Plants (Contd.)

Company	Location	Feedstock	Product	Current Capacity (tpy)
Eastern Petrochemical Company (SHARQ)	Al-Jubail	- Ethane	- Ethylene	1,300,000
		- Ethylene	- LLDPE and HDPE	1,550,000
			- Ethylene Glycol	2,900,000
Saudi European Petrochemical Co. (IBN ZAHR)	Al-Jubail	-Methanol - Butane - Propylene	- MTBE - Polypropylene	1200,000 640,000
Saudi Arabian Fertilizer Company (SAFCO)	Al-Jubail	- Methane	- UREA - Sulphuric Acid - Melamine - Ammonia	1,540,000 100,000 20,000 1,200,000
Al-Jubail Fertilizer Company (Al Bayroni)	Al-Jubail	- Methane - Propylene	- UREA - Ammonia - 2-Ethyl Hexanol - DOP	700,000 380,000 150,000 50,000
National Chemical Fertilizer Company (IBN AL-BAYTAR)	Al-Jubail	- Methane - UREA - Sulphuric Acid	- Ammonia - Compound Fertilizers - Urea	500,000 1,000,000 500,000
Arabian Industrial Fibers Company (IBN RUSHD)	Yanbu	- LPG - Ethylene Glycol	- Benzene - P-xylene - O-xylene - M-xylene - PTA - Polyester Chips - Textile Staple - Bottle Grade Chips	350,000 375,000 45,000 35,000 350,000 200,000

SABIC Petrochemical Plants (Contd.)

Company	Location	Feedstock	Product	Current Capacity, Tons per year (tpy)
Kayan	Jubail		Ethylene	1,350,000
			Propylene	550,000
			HDPE	400,000
			LDPE	300,000
			Polypropylene	450,000
			EG	470,000
			Amines	210,000
			Phenolics	240,000
			Polycarbonate	260,000
			Cumene	290,000
Yansab	Yanbu	Ethane Propane	Ethylene	1,300,000
			Propylene	400,000
			HDPE	400,000
			LDPE	400,000
			Polypropylene	400,000
			EG	700,000
			BTX	250,000
			Butene-1	100,000

Other Saudi Petrochemical companies (Year 2015)

Company	Product	Capacity (tpy)
Chemanol	-Formaldehyde	147,000
	-Hexamine	5600
	-Paraformaldehyde	9000
	-Resins	8000
	-Superplasticizers	100,000
	-Methanol	500,000
Saudi Chevron	-Benzene	800,000
	-Cyclohexane	300,000
Jubail Chevron	-Styrene	730,000
	-Polypropylene	140,000
NPC	-Propylene	500,000
	-Polypropylene	450,000
Sahara	-Ethylene	1,000,000
	-Propylene	200,000
	-HDPE	400,000
	-LLDPE	400,000
	-Polypropylene	450,000

Other Saudi Petchem companies Cont.

Company	Product	Capacity (tpy)
PetroRabigh	PP	700, 000
	HDPE	300,000
	LLDPE	350,000
	EPPE	250,000
	PO	200,000
	MEG	600,000
Sadara	Ethylene	1,500,000
Sipchem	-Methanol	1,000,000
	-BDO	75,000
	-Acetic Acid	450,000
	-VAM	275,000
Nama	-Epichlorohydrin (ECH)	30,000
	-Epoxy Resin	20,000
Lujain	-Polypropylene	400,000