India: Global Manufacturing Hub for Chemicals and Petrochemicals

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CHEMICALS & PETRO-CHEMICALS

सत्यमेव जयते

March 2021

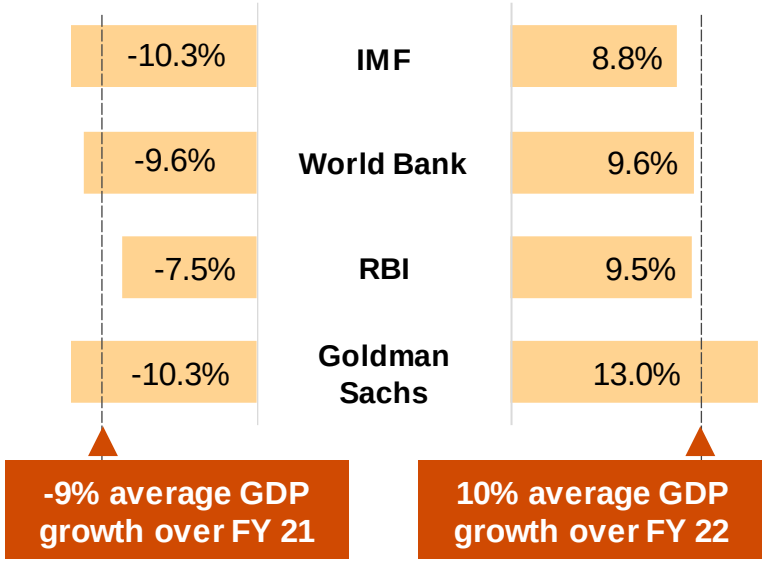
India- one of the fastest growing economies of the world

India GDP Growth Trends

FY99-00 —— **FY19-20** —— **FY20-21** ——→ **FY21-22**

An average **~7%** annual growth in GDP in the last 20 years

- Registered growth of **7.9%** in FY 2004 after dot-com crash
- Registered growth of **8.5%** in FY 2010 after global financial crises



- **India remains an oasis of growth amongst slowing global outlook and in the post pandemic world**

Real GDP Growth Forecast for Major Economies[1]

Country	2023	2025
India	7.6%	7.2%
China	5.7%	5.5%
France	2.3%	1.7%
United Kingdom	1.9%	1.6%
Germany	1.8%	1.2%
United States	2.3%	1.8%
Russia	2.1%	1.8%
Japan	1.2%	0.6%
World	3.8%	3.5%

Source: IMF, World Bank, RBI, Goldman Sachs

Note: 1- IMF estimates Oct 2020, calendar year basis

India is emerging as an attractive and durable investment destination

Advantage India

FDIs

- **100%** FDI automatic route in manufacturing
- **USD 473 billion** FDI since 2010, **60%** of which was since 2015

Ease of Doing Business

- Ease of Doing Business ranking has improved by **79 places** since 2014, ranked **63rd** in 2019
- Major **labor reforms** have been implemented to improve ease of doing business

Innovation

- Global Innovation Index improved by **9 places** since 2018, ranked **48th** in 2020

Start-up Culture

- **2nd** largest startup nation, **20,000+ startups**
- Large base of entrepreneurs- ranks **3rd** in the number of new firms created

Infrastructure & Logistics

- **USD 1.4 trillion** infrastructure project pipeline to be completed by 2025
- World Bank's Logistics Performance Index has improved by **10** places since 2014, ranked **44th** in 2018

Corporate Income Tax

- Aggressive corporate tax cuts and removal of dividend distribution tax
- **22%** for existing companies and **15%** for new manufacturing companies

Source: DIPP, Global Innovation Index, Invest India, World Bank, DCPC, CEFIC

Manufacturing is a major growth sector for Indian economy

India as a manufacturing destination

- **Top 10** FDI destinations in the world[1]
- **6th** among the **top manufacturing** countries[2]
- **1st** among **Greenfield FDI** destinations in the world[3]
- Over **63 million** registered MSMEs in India[4]
- **7th** most **valued national brand** in the world[5]
- **Most competitive economy** in South Asia[6]

Strong consumer market with a large working population[7]

- **Urbanization: Urban market shall account for 2/3rd of consumption growth by 2025**
- **Working population:**
  - **India's working age population will increase from to 1.03 billion (2030) from 0.86 billion (2015)**
  - **India's average median age shall be 37.3 years by 2050- amongst youngest nations**

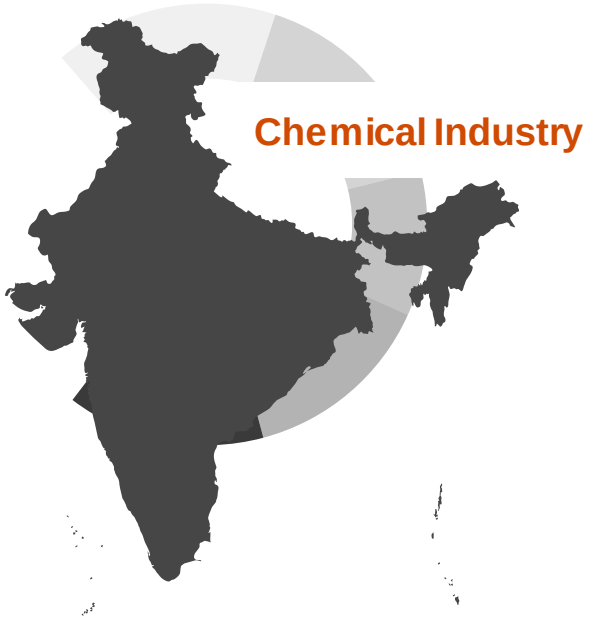
Manufacturing Sector Competency

2nd	**Largest steel producer**
3rd	**Largest producer of pharmaceuticals**
4th	**Largest producer of chemicals in Asia**
5th	**Largest producer of cars**
5th	**Largest exporter of textiles**

Source: 1- UNCTAD 2019, 2- UNIDO 2019, 3- Global Investment Trend Monitor, 4 Ministry of Micro, Small & Medium Enterprises, 5- Brand Finance, 6- WEF Global Competitiveness Index, 7- UNDP

Chemicals industry contributes 8.8% to the manufacturing GVA

Indian Chemical Industry



Covers **> 80,000 products**, inevitable part of daily life[1]

Employs **~2 million** people[1]

India contributes to ~**3%** of the **global chemical sales**[2]

Ranks **6th** in the World and **4th** in Asia for Chemicals sales[2]

3rd largest consumer of polymers globally[1]

4th largest producer of agrochemicals globally[1]

2nd largest manufacturer and exporter of **dyes**[1]

Weightage of **7.87% - IIP**[4]

Contributes **1.4%** to the **National GVA**[3]

Contributes **8.8%** to the **manufacturing GVA**[3]

Contributes **2.1%** to total **FDI Equity Inflows**[4]

Contributes **11.3%** in India's exports[5]

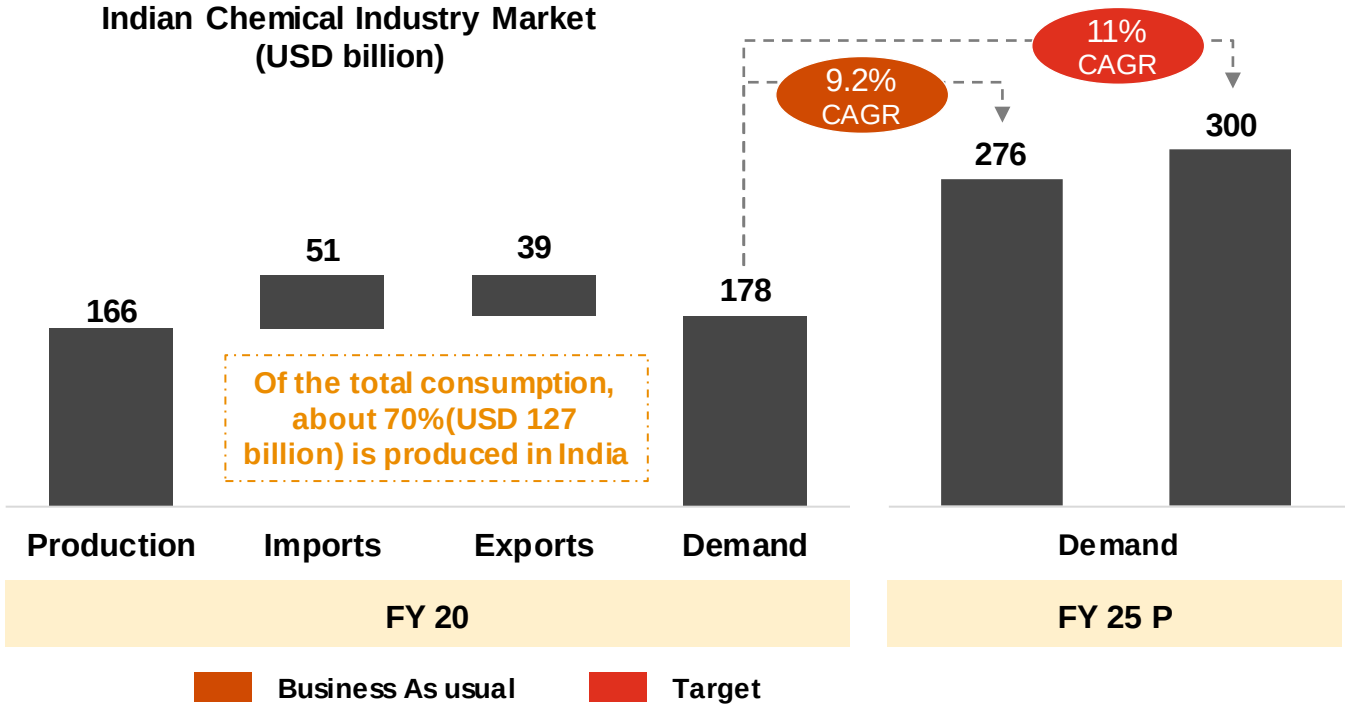
Source: 1-DCPC, 2-CEFIC 2020 Facts & Figures, 3- Ministry of Stats and Programme Implementation (At Current Prices, for FY 19), 4- Department for Promotion of Industry and Internal Trade , 5- Ministry of Commerce & Industry, PwC Analysis

Note: 2- Excludes Pharmaceutical industry

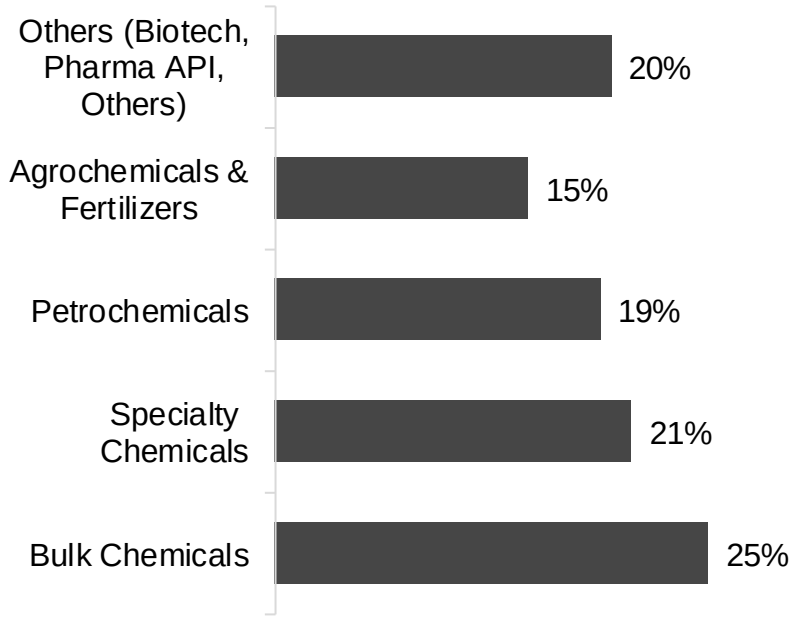
Indian Chemical Industry is poised to reach USD 300 billion by FY 25

Indian Chemical Industry

Indian Chemical Industry Market (USD billion)



Chemical Industry Market by Sub Segments, FY 20 (USD billion)

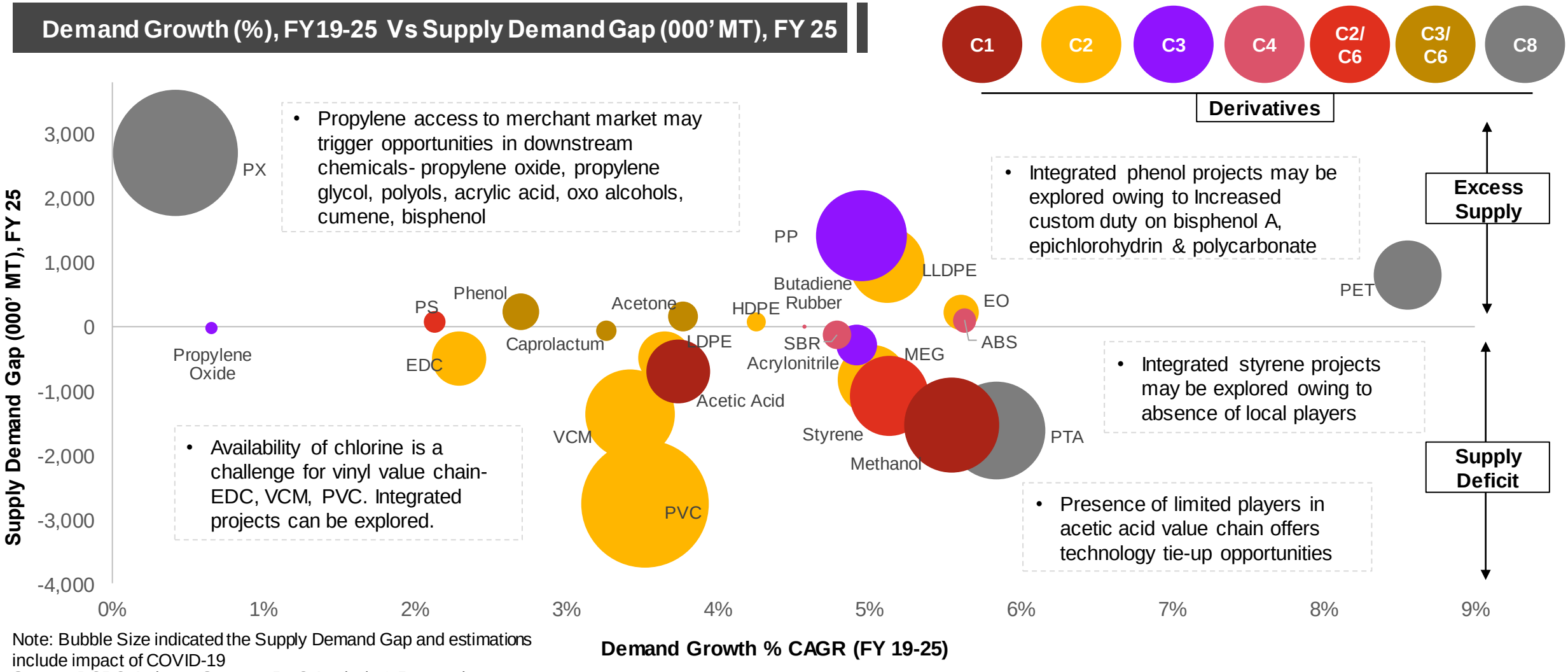


- **Demographic Dividends, Low per capita consumption, increasing export demand and enabling government initiatives are the key growth drivers for the chemicals industry**

Source: MOSPI, DCPC, Industry Sources, PwC Analysis

Supply demand gap provides attractive business opportunities in 2025

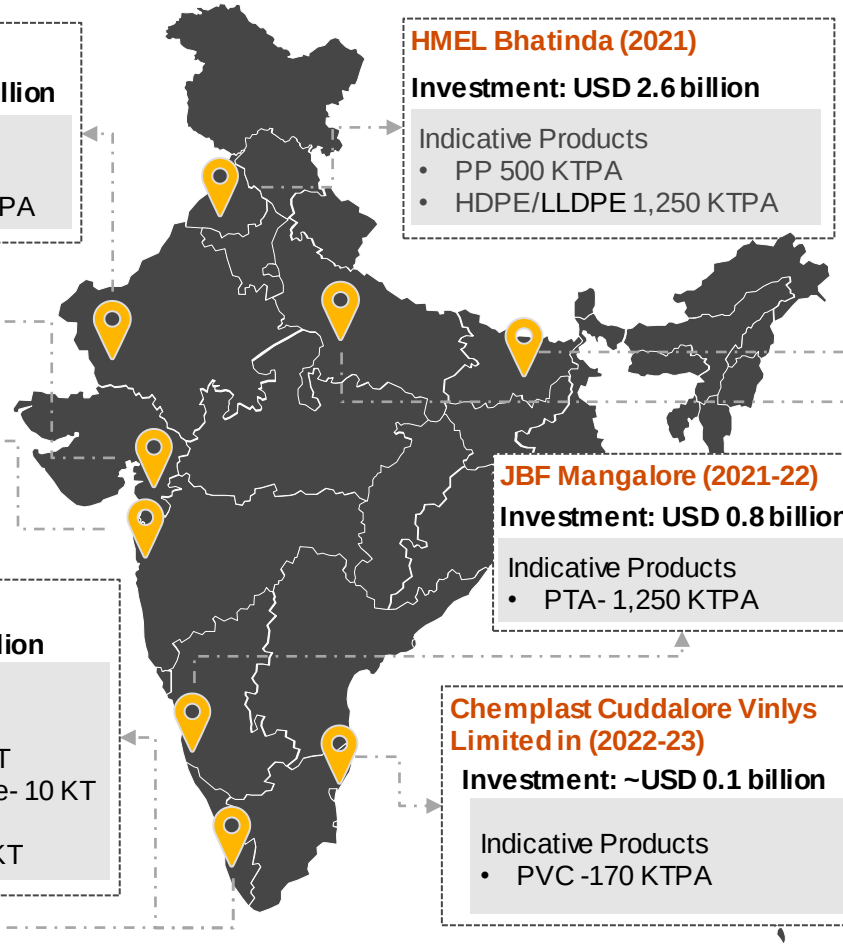
Demand Growth (%), FY19-25 Vs Supply Demand Gap (000' MT), FY 25



Note: Bubble Size indicated the Supply Demand Gap and estimations include impact of COVID-19

Source: DCPC, Industry Sources, PwC Analysis & Research

Major petrochemical projects under implementation



HPCL Barmer Refinery

Investment: ~USD 6.8 billion

Indicative Products
- PP 980 KTPA
- HDPE/LLDPE 832 KTPA

HMEL Bhatinda (2021)

Investment: USD 2.6 billion

Indicative Products
- PP 500 KTPA
- HDPE/LLDPE 1,250 KTPA

IOCL, Barauni (2023)

Indicative Products
- PP- 200 KT

IOCL, Dumad (2022-23)

Investment: USD 0.6 billion

Indicative Products
- Acrylic acid- 90 KT
- Butyl acrylate- 153 KT
- Butanol- 100 KT

GAIL Pata UP (2023)

Investment: USD 0.13 billion

Indicative Products
- PP- 60 KTPA

GAIL, Usar Maharashtra (2024)

Investment: USD 1.2 billion

Indicative Products
- PP- 500 KTPA

JBF Mangalore (2021-22)

Investment: USD 0.8 billion

Indicative Products
- PTA- 1,250 KTPA

IndianOil Corporation Ltd, Paradeep (2021-24)

Investment: USD 2.7 billion

Indicative Products
- Ethylene glycols- 350 KT
- PX- 800 KT
- PTA- 1,200 KT

BPCL, Kochi in (2021)#

Investment: USD 0.7 billion

Indicative Products
- Acrylic acid- 47 KT
- Butyl acrylate- 180 KT
- 2-Ethyl Hexyl Acrylate- 10 KT
- Butanol- 45 KT
- 2 Ethyl-Hexanol- 47 KT

BPCL Kochi in (2022-23)

Investment: USD 1.5 billion

Indicative Products
- Polyols- 250 KT
- MEG- 110 KT
- Propylene Glycol- 110 KT

Chemplast Cuddalore Vinlys Limited in (2022-23)

Investment: ~USD 0.1 billion

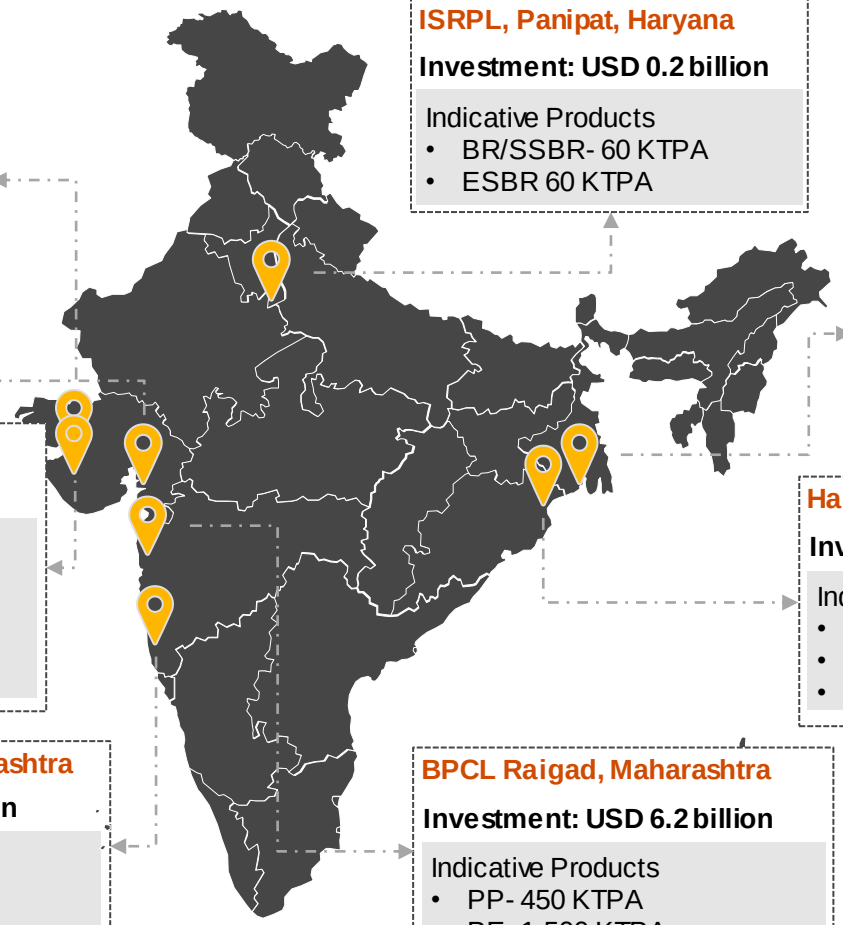
Indicative Products
- PVC -170 KTPA

Total Investment: USD ~17.1 billion

Source: CPMA, Industry Sources

Note: #- the complex is mechanically completed and is under commissioning

Major petrochemical projects under consideration



Nayara Energy, Vadinar, Gujarat under construction

Investment: USD 20 billion

Indicative Products
- Petroleum products
- Petrochemicals- PP, HDPE, LLDPE, LDPE/ EVA, Benzene, Cumene, MEG, LAB, C2, C3

ISRPL, Panipat, Haryana

Investment: USD 0.2 billion

Indicative Products
- BR/SSBR- 60 KTPA
- ESBR 60 KTPA

Haldia Petrochemicals, Haldia, West Bengal

Investment: ~USD 0.35 billion

Indicative Products
- PBR/ SBR- 100-123 KTPA

GAIL/OPaL, Dahej, Gujarat

Investment: ~USD 0.15 billion

Indicative Products
- PBR- 110 KTPA

Reliance Jamnagar, Gujarat

Investment: USD 10 billion

Indicative Products
- PE 3.5 MMTPA
- PP 5.2 MMTPA
- PVC 4.5 MMTPA
- Synthetic rubber

Haldia Petrochemicals, Balasore, Orissa

Investment: USD 10.5 billion

Indicative Products
- PE 1,080 KTPA
- PX 1,600 KTPA
- PTA 1,250 KTPA

RRPCL, Ratnagiri, Maharashtra

Investment: USD 40 billion

Indicative Products
- Petroleum products
- Petrochemicals

BPCL Raigad, Maharashtra

Investment: USD 6.2 billion

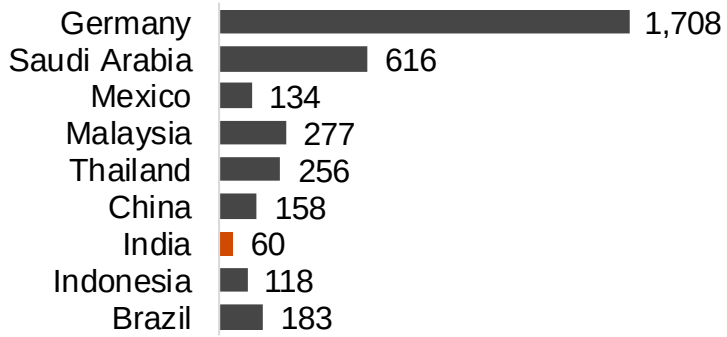
Indicative Products
- PP- 450 KTPA
- PE- 1,500 KTPA

Total Investment: USD 87.4 billion

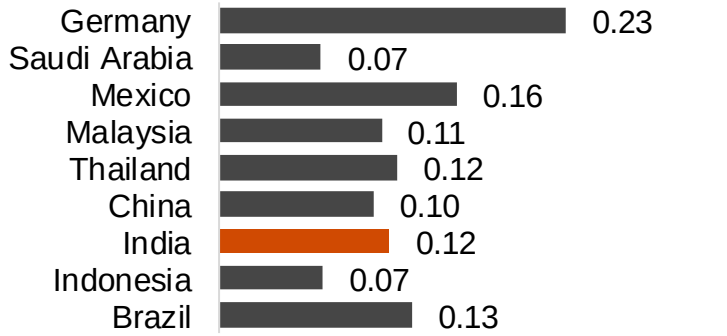
Source: CPMA, Industry Sources

Competitiveness of India w.r.t. global petrochemicals hub

Minimum Labor Rates (USD/ month)



Power Rates (USD/ kWh)



	Feedstock Access[1]	Market Access[2]	Capital Cost[3]	Operating Cost[4]	Commissioning period[5]	Overall
Middle East						
US						
Europe						
India						
China						
South East Asia						

(1) Based on the local availability of petrochemical feedstocks
(2) Based on average demand growth rate of major petrochemicals for 2019-2030
(3) Based on location factor, pre fabrication and construction costs
(4) Based on average monthly salary of employee, electricity costs, etc.
(5) Commissioning period based on examples of large petrochemical projects

Unattractive

Highly attractive

Source: Data on minimum monthly wages was collected from various sources including: India (Nagaland - Dept of Labour, Delhi - Govt of NCT of Delhi State Govt), Asean Briefing, Nov 2019 (Indonesia, Central Java, DKI Jakarta), Vietnam Briefing, Nov 2019 (Vietnam, Region IV, Region I), Reuters, Dec 2019 (Mexico, Non-border, Border Zone), MOHRSS, Jun 2018 (China, Liaoning, Shanghai), Bangkok Post, Dec 2019 (Thailand, Yala, Chon Buri and Phuket), Bloomberg, Jan 2020 (Brazil, National), Asean Briefing, Feb 2020 (Malaysia, National), US Dept. of Labor, Wage Indicator Foundation, World Bank, GlobalPetrolPrices
Data on electricity charges was sourced from GlobalPetrolPrices.com as accessed on 20 Feb, 2021

Factors promoting India's manufacturing competitiveness

Key Investor Expectations	Factors Promoting India's Manufacturing Competitiveness	
Good Governance	• **Politically stable** with **good political and trade relations** with leading markets	• **Development Council and Advisory Forum**- Redressal of Public Grievances & Challenges
High Quality Infrastructure	• Development of **5 industrial corridors** for integrated industrial development • Commitment of **USD 1.5 trillion** as part of **NIP**	• **3,382 industrial parks** spread across **0.475 million hectare land** • Development of **PCPIRs**
Robust Investment Policy	• Make in India: **USD 357 billion** in **FDI** till FY 20 since launch in FY 14 • **100% FDI** permitted through **Automatic Route**	• **PLI scheme** for total 12 sectors – attractive incentives and cash back benefits
Strong Regulatory & Tax Framework	• **Industrial licensing** has been **abolished** for most sub-sectors except in hazardous chemicals	• Corporate tax rate: **22% for existing companies** and **15%** for **new manufacturing companies**
Quality Labor at Competitive Cost	• Sector-specific **Skills Development programme** supported by NSDC schemes • Competitive **labor wages 60-258 USD/ month**	• **Standardized wages, bonus, trainings, social security benefits** for workers
Robust Domestic demand	• The **large** and **aspirational** Indian **middle class** provides a readily available market • India to become **3rd** largest **consumer market** by FY 25	• **25 cities** in India are among the world's top **100 fastest growing cities**

Source: PwC Worldwide Tax Summaries Corporate Taxes 2018/19, MOSPI, Centre for Economics and Business Research, UK, Department of Economic Affairs, Invest India, Note: NIP- National Infrastructure Pipeline, FTA- Free Trade Agreement, PTA- Preferential Trade Agreement, FDI- Foreign Direct Investment, NSDC- National Skill Development Corporation

Policy initiatives acting as "Game Changers" for Indian Chemical Industry

Local Manufacturing, Exports & Innovation	Skilled Man Power & Labor Laws	Industrial Infrastructure	Governance and Clearances	Availability of Feedstock	Regulations and Quality Standards
Revised custom duties on chemicals & petrochemicals, (Budget 2021-22)	Sector-specific **Skills Development Programme** (NSDC Scheme)	Scheme for **Setting up Plastic Parks** *(funding up to 50% of cost of project*)*	**Reduced paper work** & **faster clearance** for project proposals, IP applications, port jobs	Reduction in **Basic Custom Duty** on **naphtha** (Budget 2021-22)	**BIS Standards** for imported & locally produced chemicals & petrochemicals
Public procurement policy for a total 28 Chemicals and Petrochemicals	New Codes on **Wages**, **Occupational Safety, Health & Working Conditions, Social Security**, **Industrial Relations**	National **Infrastructure** Pipeline (NIP)- **Proposed PCPIR Projects** *(Odisha & Gujarat)*	Development Council and Advisory Forum for **redressal of public grievances** & **challenges**	New addition- **Barmer Petrochemical Cluster**	
Export Promotion Schemes and **FTAs**	**Compensation** on Accidents	Scheme for **Setting up Mega Textile Parks**	Better **Trade Intelligence** *(New 8 digit HS Codes)*		
Global Intellectual Property Treaties					
Centers of Excellence and **National Awards**					

Note: NIP- National Infrastructure Pipeline, BIS- Bureau of Indian Standards, NSDC- National Skill Development Corporation, IP- Intellectual Property, *Ceiling at USD 5.6 mil

Source: DCPC, Ministry of Labor & Employment, Union Budget 2021-22, Industry Sources, WIPO, Chemexcil, PwC Analysis

Note: NIP- National Infrastructure Pipeline, BIS- Bureau of Indian Standards, NSDC- National Skill Development Corporation, IP- Intellectual Property, FTA- Free Trade Agreement, *Scheme criteria

Production Linked Incentive Scheme for manufacturing sector

Objective of the PLI scheme

1. Competitive & efficient domestic manufacturing
2. Attract investment in core sectors & cutting edge technologies
3. Enable economies of scale and exports
4. Make India part of global supply chain

Impact and benefits of scheme

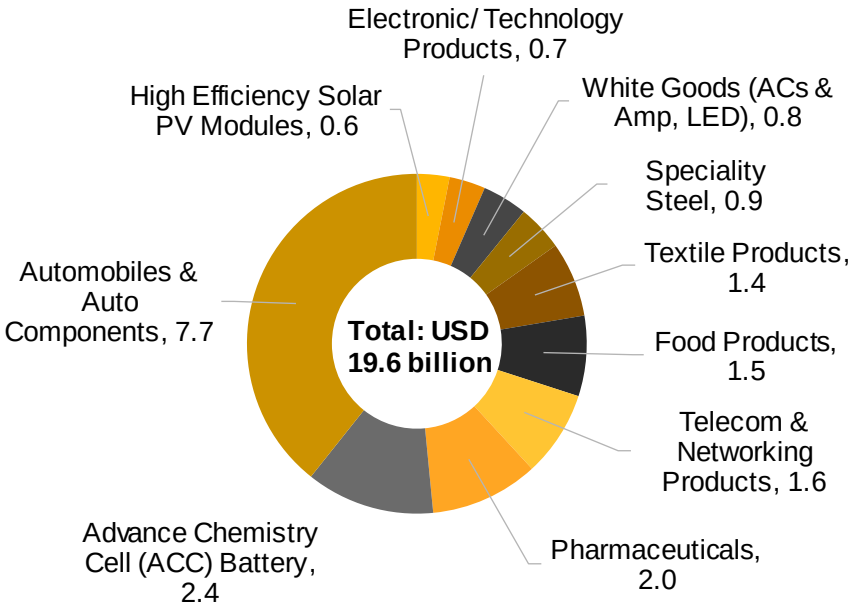
- The minimum production in the country as an outcome of the PLI scheme stands to be around **USD 56 billion** in the next **5** years
- Cashback and incentives between **2% and 20%** of the incremental sales revenue (over the base year) and incremental exports revenue depending on the sector
- Potential to create **~14 million man-months'** worth of jobs directly from 2021-22

Increase in demand for Chemicals & Petrochemicals

Polymers, resins, fibres, APIs, bulk chemicals, paints, pigments, food additives, etc.

Source: Government of India, PwC Analysis

PLI Scheme Outlay for 10 Sectors (USD billion)



PLI Scheme previously announced for Domestic manufacturing of Key Starting Materials (KSMs), Drug Intermediates (DIs) and Active Pharmaceutical Ingredients (APIs) and Medical Devices

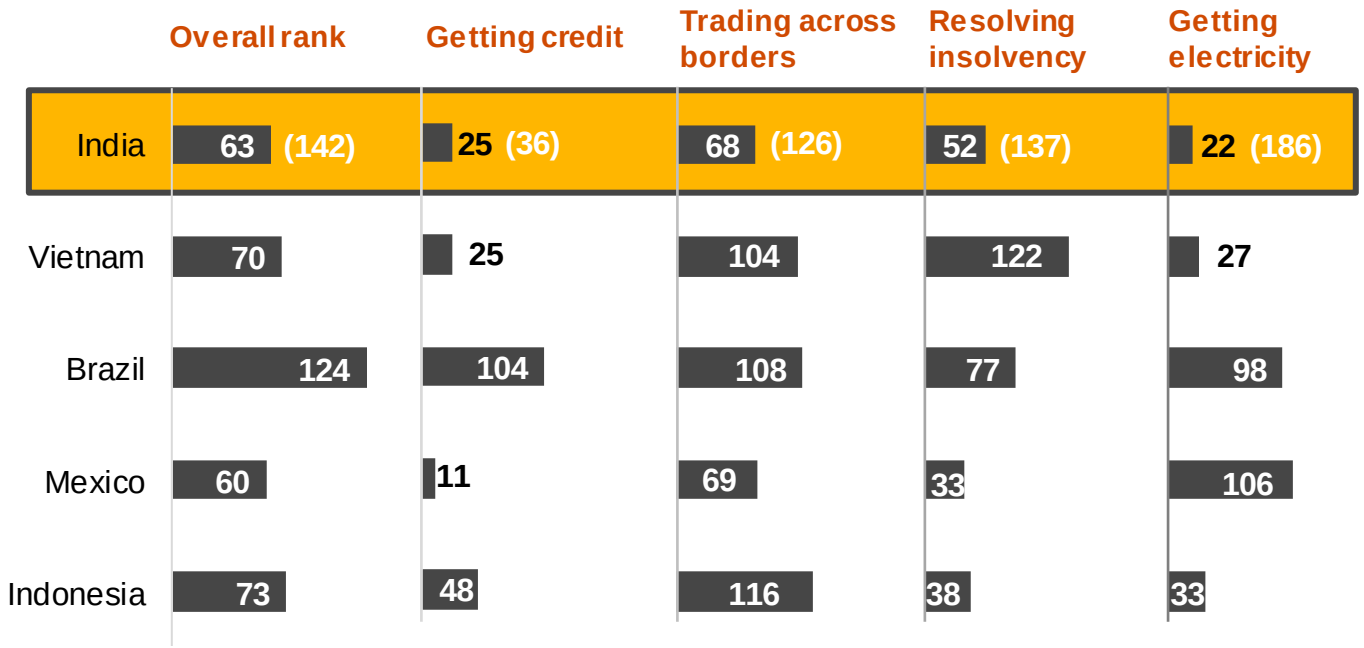
India's Ease of Doing Business ranking

Key initiatives which helped achieve 63 rank:

Process	Single form for company formation
Time	Fast track approval for construction permits
Trade	Indian Customs Single Window Project implemented
Legal	Commercial Courts and Appellate Division of High Courts established
Exit	Insolvency and Bankruptcy Code 2016 for resolving insolvency

Ease of Doing Business: Top parameter-wise rankings*

For India #, 2019; (#), 2014



*** Lower rank in a given parameter represents better positioning of the respective country**

Source: World Bank, Industry Sources, PwC Analysis

It is the right time to invest in INDIA

Vision of Department of Chemicals and Petrochemicals

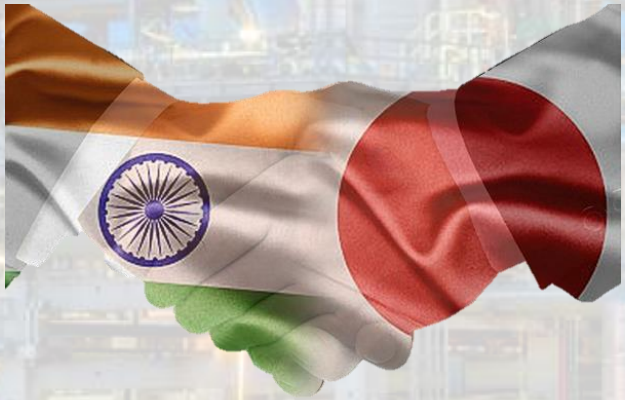
To seize the opportunity to establish India as a leading chemicals & petrochemicals manufacturing hub,

- with a thrust on reduction in import dependency
- by attracting investments for manufacturing quality products
- using cutting-edge technologies
- in specified clusters
- with focus on sustainability

...contribute to manufacturing sector of USD 5 Trillion Indian Economy

India-Japan Chemicals and Petrochemicals Forum

India Chem 2021



Mr. Ramkumar Shankar

Agenda

- **Indo-Japan relationship – a history**
- **Japanese investments in India**
- **Bilateral trade**
- **India-Japan trade : Chemicals and Petrochemicals**
- **Indian Chemical & Petrochemical sector**
- **Opportunities in India**

Indo-Japan Relationship
Long-standing & very special

- Cultural exchange dates back to the 6th century –introduction of Buddhism into Japan
- Diplomatic relations established in 1952 – post WW2 reconstruction in Japan greatly aided by iron ore from India
- First yen loan by Japan, was to India in 1958
- Japan-India annual summit meetings from 2005
- December 2006, relationship elevated to Global and Strategic Partnership
- India-Japan Comprehensive Economic Partnership Agreement (CEPA) 2011
- Sept 2014, upgraded to Special Strategic and Global Partnership – doubling Japan's investment and the number of Japanese companies by 2019

Indo-Japan Relationship
Long-standing & very special

- December 2015, Japan and India Vision 2025 announced
- Greater cooperation and coordination in security
- Japanese industrial townships to be established around DMIC and CBIC
- Shinkansen (Bullet Train) project launched
- India – the largest recipient of Official Development Assistance (ODA) from Japan
- October 29, 2018, Japan and India Vision 2025 announced
- "India-Japan Digital Partnership" (I-JDP) was launched during the visit of PM Modi to Japan in October 2018 with new initiatives in S&T/ICT, focusing more on "Digital ICT Technologies"

Indo-Japan Relationship Long-standing & very special

- MeitY Startup Hub & JETRO signed a partnership agreement to strengthen the Indian & Japanese tech startup ecosystem on 20 January 2020
- Approximately 38,000 Indians live in Japan including IT professionals and engineers working for Indian and Japanese firms as well as professionals in management, finance, education, and S&T research
- In Jan 2021, The Union Cabinet, chaired by Prime Minister Shri Narendra Modi, has approved the signing of a Memorandum of Cooperation between the Government of India and Government of Japan, on a Basic Framework for Partnership for Proper Operation of the System Pertaining to "Specified Skilled Worker"

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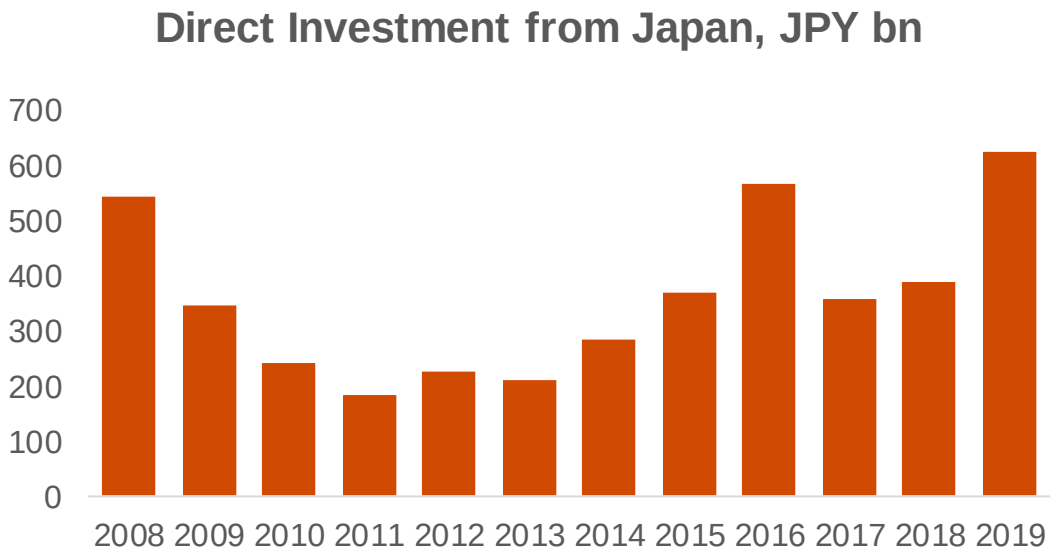
Japanese investment in India

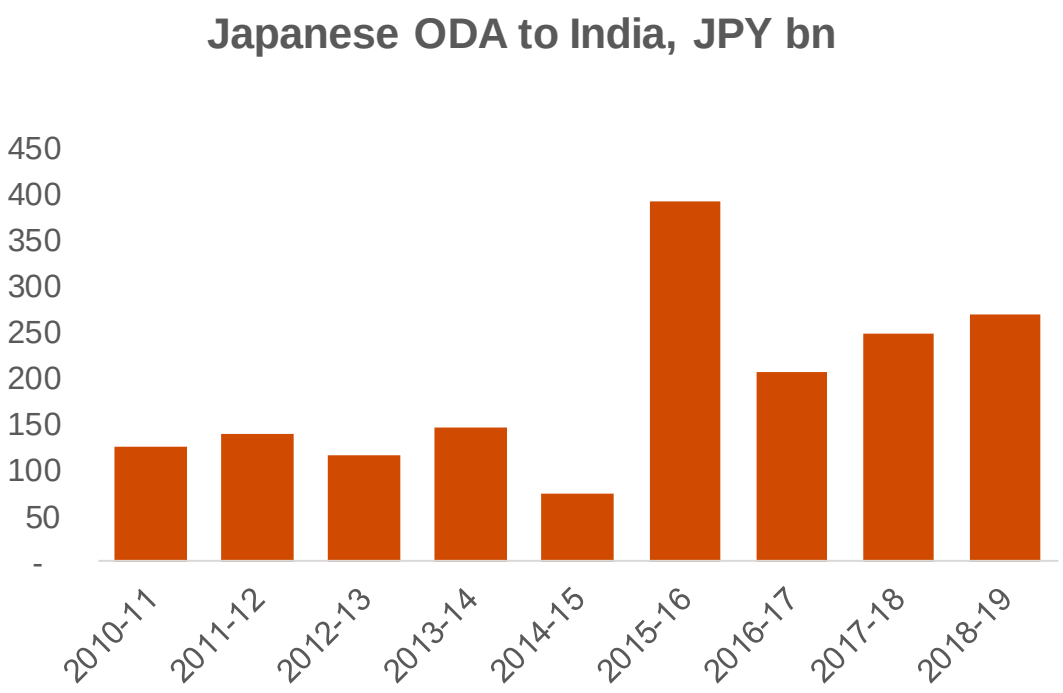


- **Japan is the 5th largest investor in the Indian economy with cumulative FDI inflows of USD 34.15 bn during April 2000 and Sept 2020, contributing 7% to India's total FDI inflows during the same period**

- **India rated the most attractive investment destination, by Japanese manufacturing companies, in survey conducted by Japan Bank for International Cooperation**
- **The number of Japanese companies registered in India is 1,441 as of October 2018, 5% increase compared to previous year**

Source: MOFA, Japan, Invest India

Japanese Official Development Assistance (ODA)



- **Japan – largest bilateral donor to India**

Areas of assistance : Power, transportation, environment, projects related to basic human needs

Source: Embassy of India

Specific Projects and Industrial Corridors

- **Delhi Mumbai Industrial Corridor (DMIC)- Implementation in progress**
  - Flagship project of Indo-Japanese cooperation.
  - $90bn investment, initially
  - Industrial infrastructure development & creation of new smart cities across six Indian States
  - 24 industrial regions, 8 smart cities, 2 international airports, 5 power projects, 2 MRTS, 2 logistical hubs over 1500km
  - Master planning by world class intl. consultants. EPC contracts for approx Rs. 3200 crore awarded in Dholera (GJ), Shendra (MH), Vikram Udyogpuri (MP) & G. Noida.
  - DMICDC has commissioned a 5MW Model Solar Power Project at Neemrana, RJ
  - Approval obtained for Greenfield Intl Airport at Dholera(GJ) at Kotkasim (Rajasthan)

The project is executed through JICA funding of JPY 550 billion. Total disbursement of loan till July 2018 is JPY 443 billion

- **High speed rail corridor (Bullet Train)**
  - Mumbai – Ahmedabad
  - Rs. 1.10 lakh crore (around $15bn)

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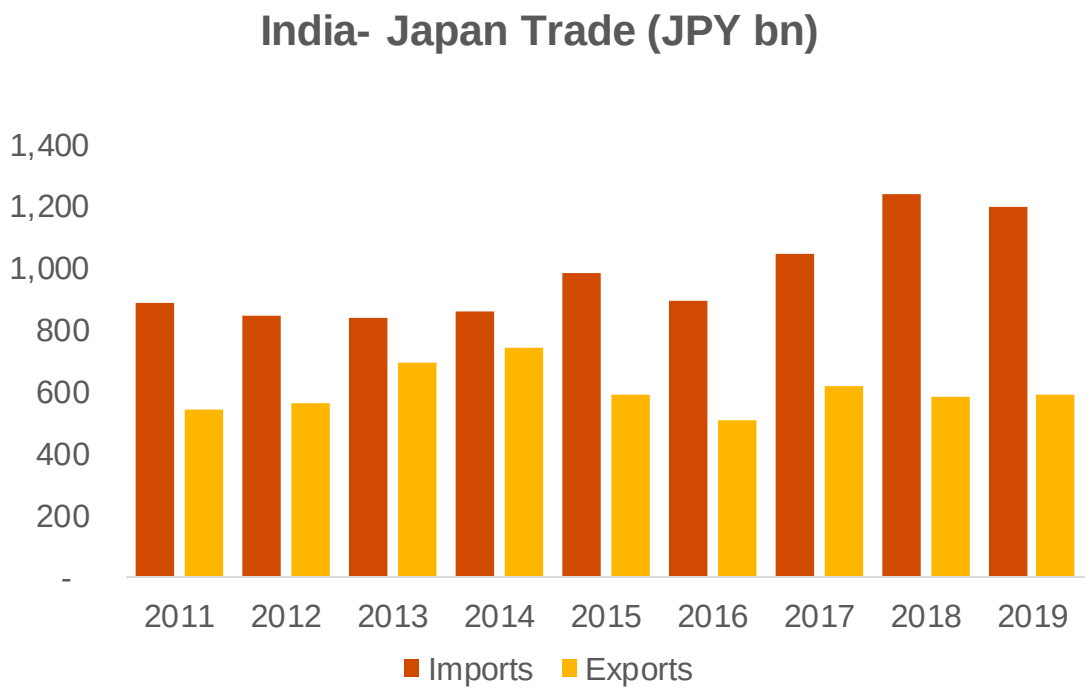
BILATERAL TRADE HIGHLIGHTS



- **Japan is…**
  - **19th** largest export partner
  - **14th** largest import partner
- India's imports showed a growth of **102.7%** whereas, exports showed a growth of **26.2%** in a span of 12 years

- **India's primary exports to Japan**: Petroleum products, metalliferous ores & scrap, clothing, iron & steel products, textile yarn/fabrics, machinery etc.
- **Japan's primary exports to India**: Chemicals, plastics, machinery etc.

Source: Ministry of Foreign Affairs of Japan

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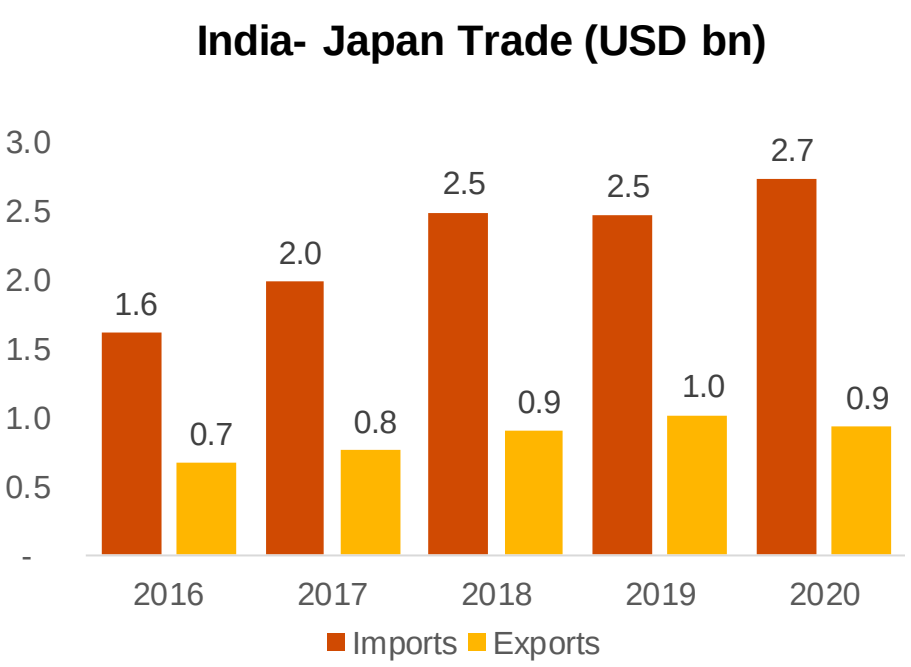
BILATERAL TRADE
Chemicals & Petrochemicals



- **India's primary exports to Japan**: Cyanuric acid, Caprolactum, Salts of nucleic acids, Pyridine derivatives, PET, Carbon black
- **Japan's primary exports to India**: PVC, VCM, Caustic Soda, Superabsorbent polymer, MDI, PE

Source: UN Comtrade (HS Code- 28, 29, 32, 38, 39, 4002, 54, 55)

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Indian Chemical & Petrochemical Sector

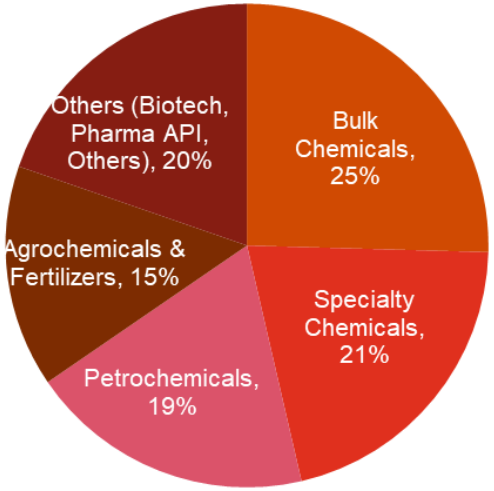
Highly diversified

- Over 80,000 products
- Employs 2 mn people
- Main hubs Gujarat & Maharashtra

Indian Chemical Industry

- USD 178 bn in 2020 – 2.5% of global chemical industry
- Expected to cross USD 300 bn by 2025
- Contributes 7.8% to manufacturing GVA and 1.2% of National GVA

Indian Chemical Industry: Segment Split (FY 20)



Total: USD 178 bn

Global Chemical Industry: USD 5 tn in 2018, expected to grow at 5.5% till 2025

Agenda

- Indo-Japan relationship – a history
- Japanese investments in India
- Bilateral trade
- India-Japan trade : Chemicals and Petrochemicals
- Indian Chemical & Petrochemical sector
- Opportunities in India

MAKE IN INDIA

- India - One of the fastest-growing countries globally- **average GDP growth** of **7%** in last 20 years
- **India's National Income** is growing at a **CAGR of 11%**, Will be among the **5 largest world economies** by 2025
- **India** will surpass **China** and become the most populous country by 2023
- Favorable demographics – **world's largest youth population**
- India is on the move: **Cities** are likely to house **42.5%** of Indian Population by 2025
- **Huge domestic market** : Urban market shall account for **2/3rd of consumption** growth by 2025
- Produce closer to market
- Significant **improvements in infrastructure** – ports, roads, airports, railways, telecom
- The Ease of Doing Business ranking of India has improved from **142 in 2014** to **63 in 2019**

Thank you

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Part of the PwC network

Investment and Collaboration Opportunities between India and EU

Iris Herrmann, Partner, Strategy&
IndiaChem 2021
March 19, 2021

2020 lead to dramatic GDP drops, especially in India – 2021 and 2022 pave the way for economic recovery

Scenario evaluation (GDP focus) - our synthesis of market views

		Actual	Base (no COVID-19)			Effective vaccine			Mutations and measures		
		2020	2021	2022	2023	2021	2022	2023	2021	2022	2023
China	GDP Growth (%)	2.3	5.5	5.4	6.2	7.4	8.3	4.9	5.5	6.0	1.9
EU[1)]	GDP Growth (%)	-6.8	1.3	1.3	1.2	3.9	5.0	2.1	2.5	3.6	1.1
Germany	GDP Growth (%)	-5.0	1.6	1.6	1.5	4.0	4.2	3.1	2.0	2.8	1.9
India	GDP Growth (%)	-10.2	7.3	7.3	6.9	7.2	8.3	4.1	6.5	7.1	2.4
KSA	GDP Growth (%)	-1.8	1.7	1.8	2.0	3.2	3.5	1.0	2.1	2.4	0.8
UK	GDP Growth (%)	-9.8	1.8	1.5	1.9	4.3	5.0	2.3	3.6	4.1	2.0
USA	GDP Growth (%)	-6.3	1.9	1.8	1.6	4.5	4.7	2.1	3.0	3.9	1.5

Sources (excerpt)

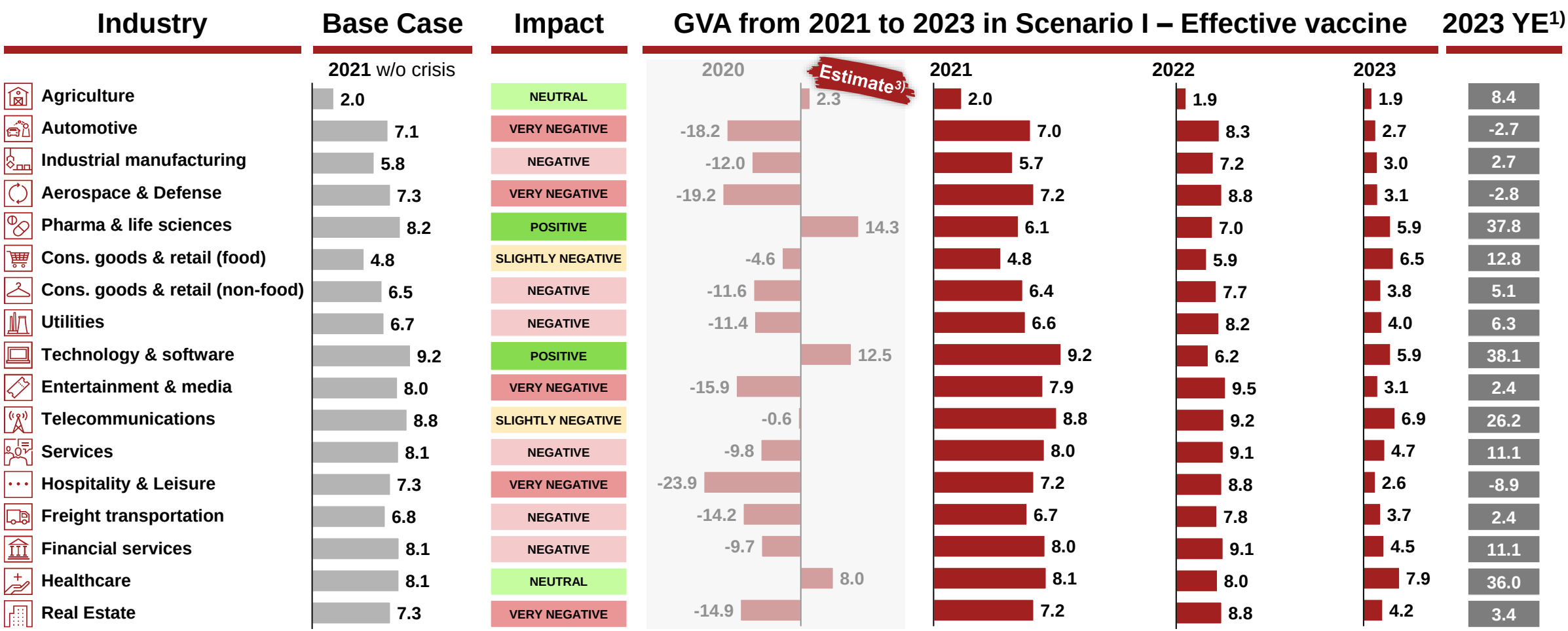
Further Parameters: Unemployment rate, Consumer Price Index, USD Exchange Rate, Long-Term Bond Yields, National Stock Index, Oil Price, Gold Price

1) AT, DE, FR, IT, NL, PG, GR, SP
Source: Economist Intelligence Unit (Base scenario); Strategy& analysis

Pre-COVID output levels of over 4/5 of industries likely to be restored in India by 2023

Impact on industries (Gross Value Added %)

India

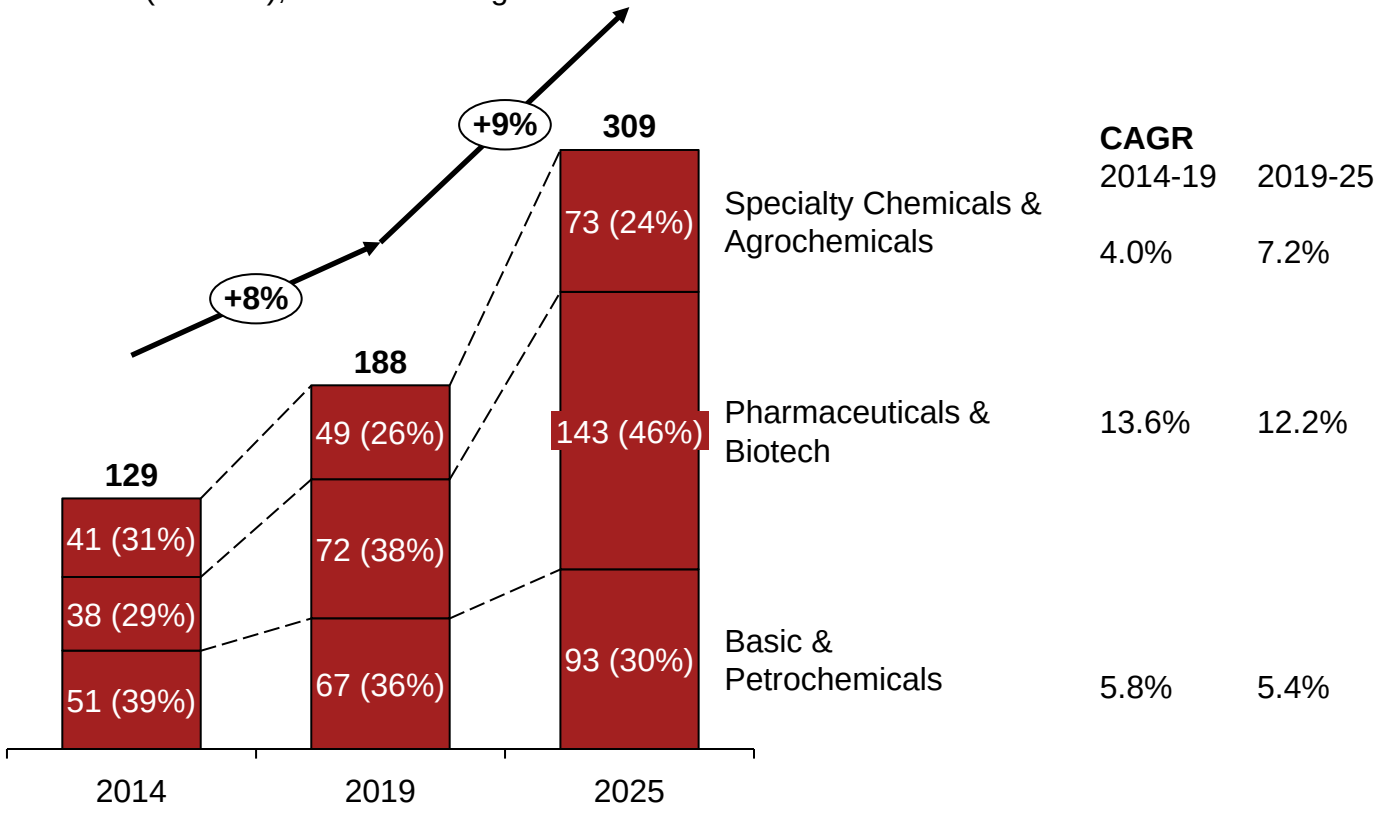


1) Comparison of YE 2019 to YE 20223 GVA (in %); 2) Based on 2020 GDP growth rate
Source: Strategy& analysis, IHS Markit

Growth is expected to remain strong going forward across the entire chemicals value chain

Indian Chemical Industry Outlook

Indian Chemical Industry 2014-2025
Turnover (bn USD), % share of segments



	CAGR 2014-19	CAGR 2019-25
Specialty Chemicals & Agrochemicals	4.0%	7.2%
Pharmaceuticals & Biotech	13.6%	12.2%
Basic & Petrochemicals	5.8%	5.4%

- Indian chemical industry, as well as key segments relevant for chemicals, delivered **steady growth** and are expected to continue growing (post-COVID) long-term

Investment and growth opportunities

- Today's trade deficit in chemicals calls for investments into **self-sufficiency** in petrochemical intermediates
- Accelerate building at scale production plants, e.g. forming strategic partnerships with local refineries to **secure feedstock**
- Ramping up **exports of specialty chemicals** to increase India's global share of value
- Partner with major chemical MNCs or technology licensors for **access to technology**
- Enhance capabilities to offer tailored product **applications and solutions**, such as compounding (partnering, M&A)

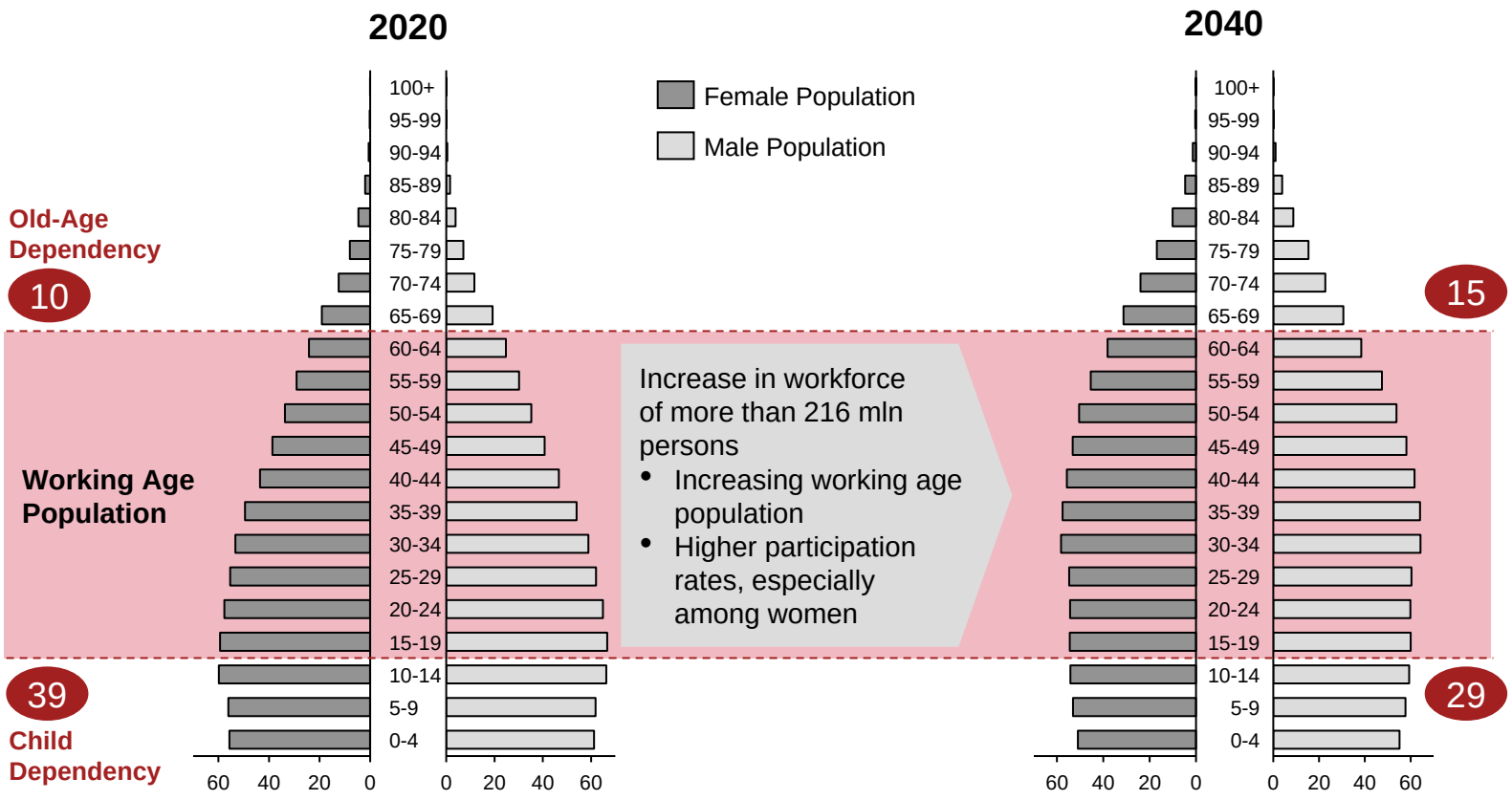
Source: IHS Connect, PwC Strategy&

Global chemical industry trends translate into opportunities for India

Global Chemicals Trends	Opportunities for India
Accelerating commoditization Consolidation for greater scale, portfolio prioritization downstream	O&G players exploring petrochemicals and downstream opportunities; ease feedstock challenges, achieve scale to fortify competitiveness
Deglobalization Trade conflicts cause uncertainty and shift in global supply chains	Supplement chemicals supply for downstream players reducing dependence from China, offering an accessible market
Sustainability ESG impact becomes management imperative, stricter regulations	Sourcing from China under scrutiny following disruptions due to stricter EHS norms; opening chances for Indian players in certain segments short-term
Digitization Technology as lever for efficiency and productivity	Expand profit margins through enhancing digital and analytics capabilities, access to young and skilled workforce
Shift of economic power Emerging players drive consolidation and strive for self-sufficiency	Benefit from rising domestic demand in chemical end-use sectors and improved ease of doing business

India can use its demographic dynamics as a basis for further growth

India Age Structure, Population in Mio per age group[1]



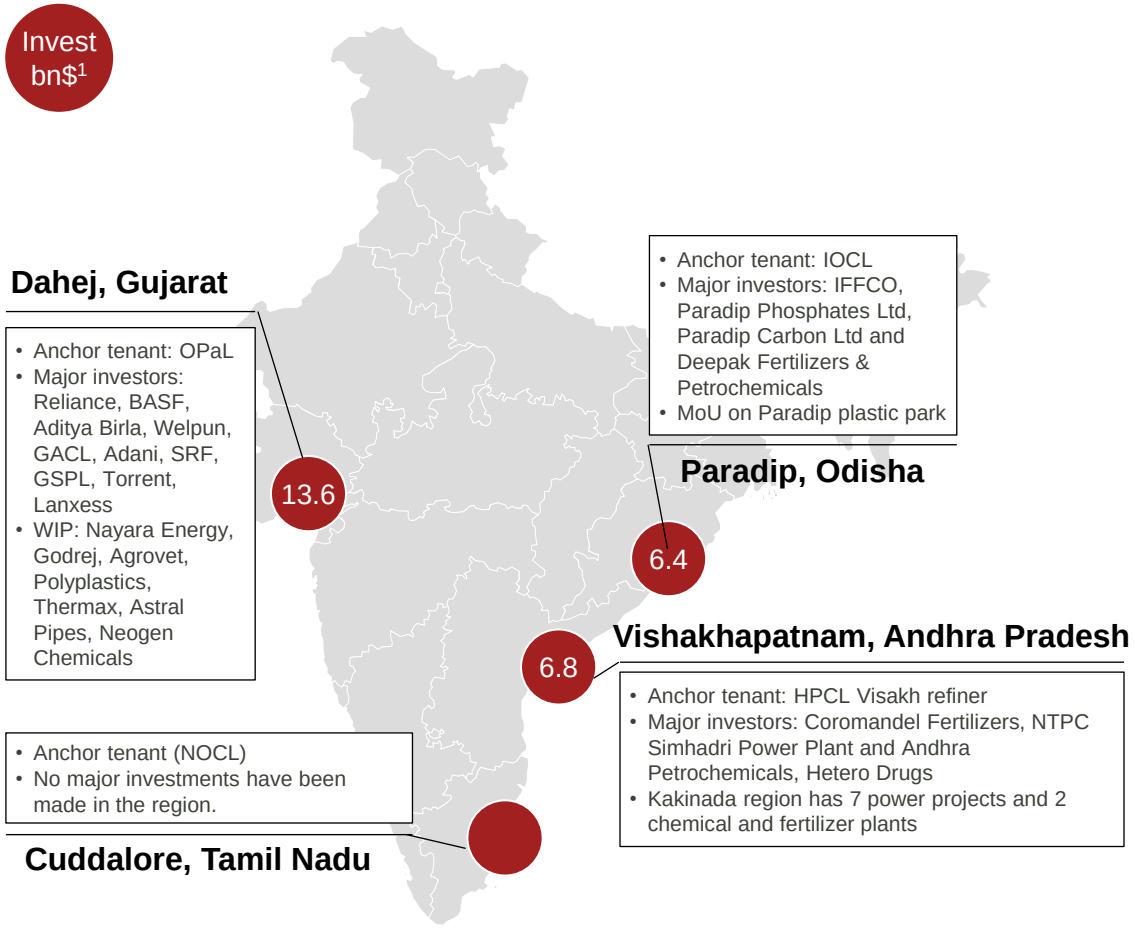
Realizing the Demographic Dividend

- India's population is amongst the youngest in the ageing world, yet with great heterogeneity across the states (e.g. relation working-age/ non-working age population)
- Harnessing the demographic dividend depends upon employability of working-age population, i.e. health, education, vocational training and skills, as well as appropriate land and labor policies, as well as good governance
- India spends 4.6 per cent[2] of its total GDP on education, and ranks 62nd in total public expenditure on education per student
- Expanding quality of education to increase number of highly qualified employees and greater female participation in workforce on governmental agenda
- Increasing wealth and domestic consumption, i.e. move up the income ladder from bottom of pyramid to emerging middle class expected for large parts of population and shift consumption beyond food towards consumer goods

Note: Dependency refers to the number of dependants per 100 persons of working age (15-64). The child dependency ratio is the ratio of the population aged 0-14 to the population aged 15-64. The old-age dependency ratio is the ratio of the population aged 65 years or over to the population aged 15-64
Source: 1) UN World Population Prospects 2019 Edition (Medium Variant); 2) IMD, Strategy& analysis

Key to foster growth are the PCPIR clusters which are being refocused for attracting investments

PCPIR manufacturing hubs



2007

- Petroleum, Chemical and Petrochemical Investment Region (PCPIR) set up to
  - Attract (FDI) investment to reach world scale
  - Enable downstream integration
  - Cluster knowledge and competencies in one area

2019

- Except for Dahej, PCPIRs have not been able to attract desired investment and growth due to issues ranging from overall infrastructure development to project financing

2020

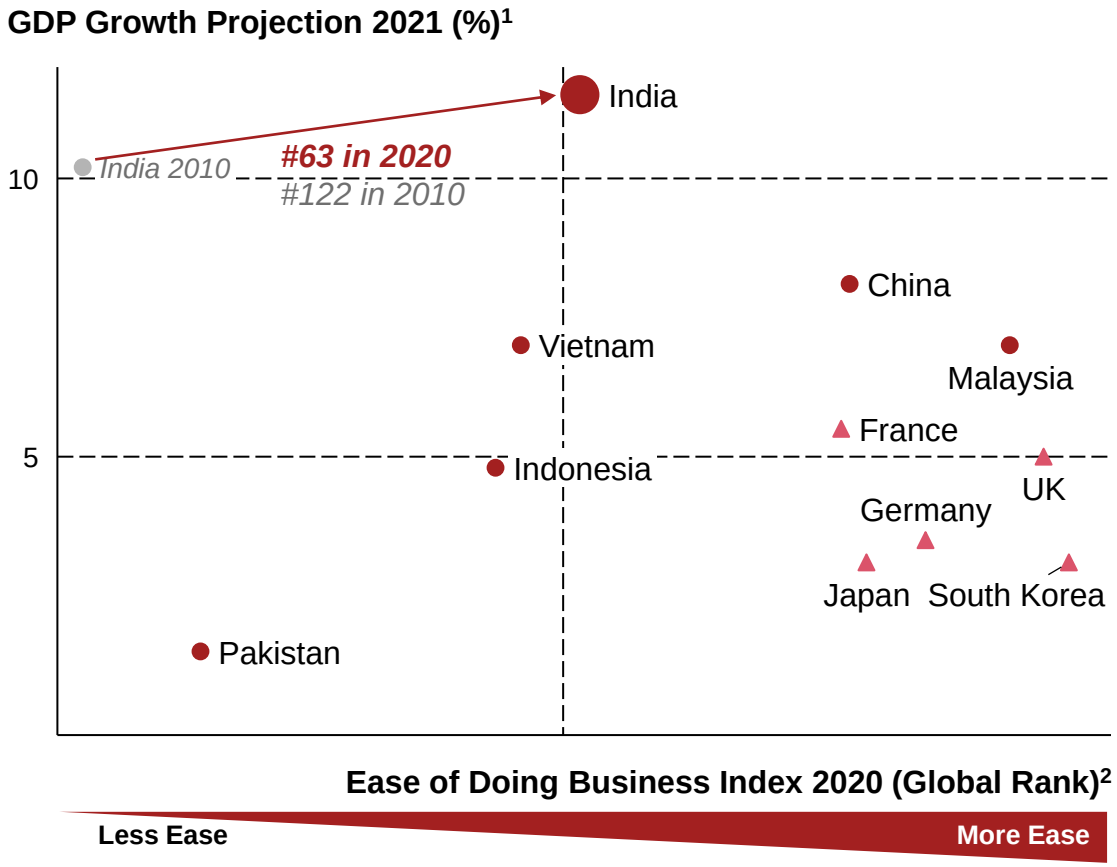
- New policy 2020-35 revising the concept[2]
  - Size of each investment region cut down from 250 sq km to 50 sq km, with a specific cluster integration strategy
  - Dovetailing the PCPIRs with the National Infrastructure Pipeline could give a major push to overcome upfront capital investment needs (viability gap funding)

2035

1) FY2019 committed and actual investments
2) Source: FICCI Whitepaper PCPIR Policy Review 2019, India Business Review

India remains an attractive investment hub for chemical companies

Success drivers for India



Ease of doing business	• Increasingly liberal regulatory frameworks in line with international practices, relaxation of FDI norms • Recent changes to corporate tax rates that have shaped a more supportive ecosystem
Rising domestic demand	• End-use sectors (agro, consumer, retail, auto, health, infrastructure,…) spur ~50% of incremental growth • Expected to drive chemical demand, creating lucrative value pools across chemical subsegments
Competitive cost and capabilities	• Attractiveness as a manufacturing destination due to competitive labor costs and plant building cost • Specialty players with distinctive capabilities and established supply relationships with global networks
Accessibility and Infrastructure	• Overcome lack of well-developed infrastructure with global standard, incl availability of reliable utilities • Enhance partnering with international companies for access to advanced process technologies

1) IMF World Economic Outlook Database 2020/ 2021
2) World Bank's ease of doing business index

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Feedstocks & Petrochemicals
India in a Global Context

ICIS Consulting

March 2021

A presentation at India Chem 2021, “India: Global Manufacturing Hub for Chemicals and Petrochemicals”

Today’s Agenda

Global Trends in Oil Demand

The Energy Transition and the growing role of petrochemical Feedstocks

Global Refining Capacity

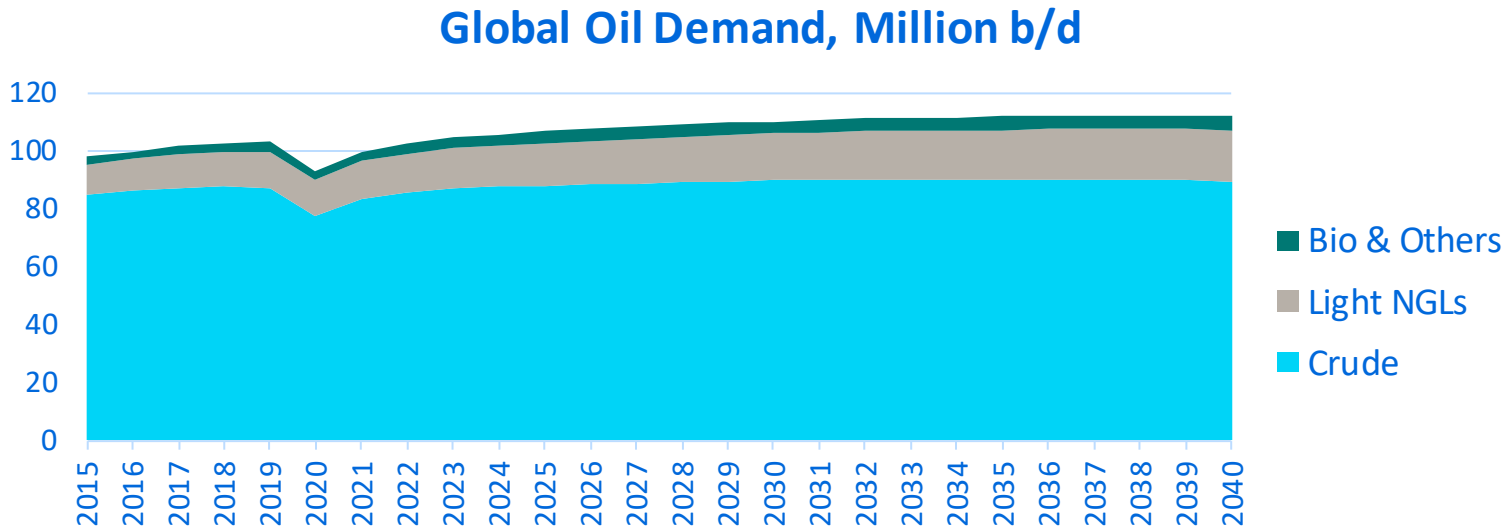
An growing excess is materializing

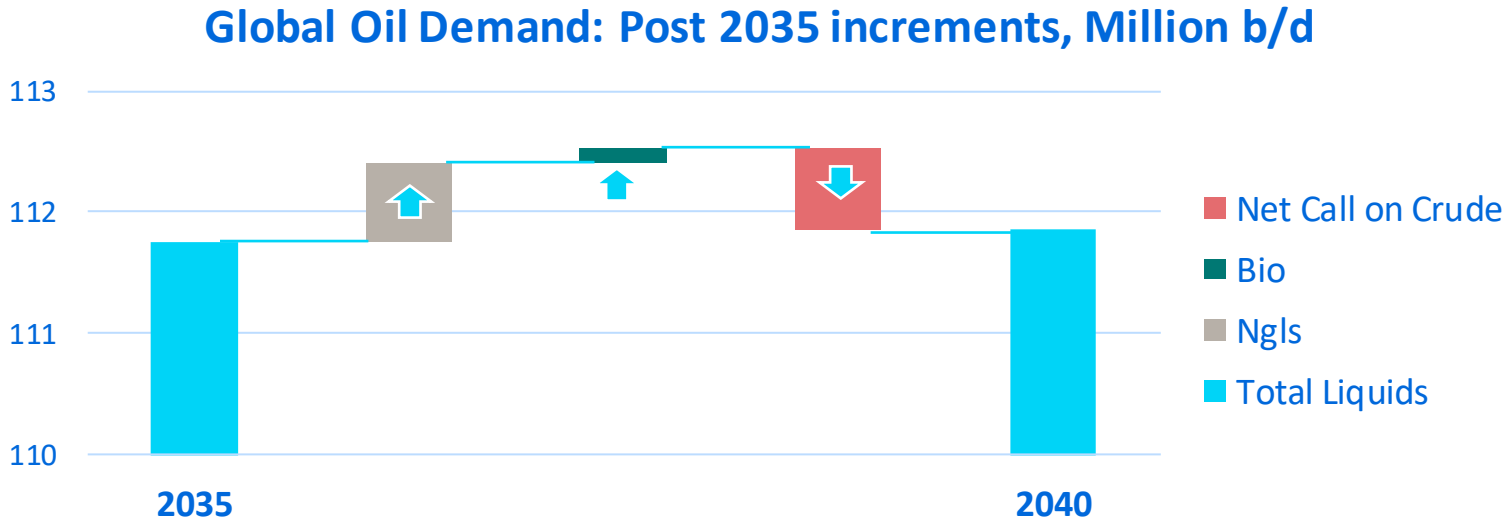
India Dimensions

The Role of Domestic Refining in supporting petrochemical investments

Q&A and Conclusion

Crude Oil Requirements will peak before Oil Demand





2.5Mb/d

Crude Oil net demand increase from 2019 levels, once other liquids are excluded

2035

Global Oil Refining input requirements for Crude Oil start dwindling

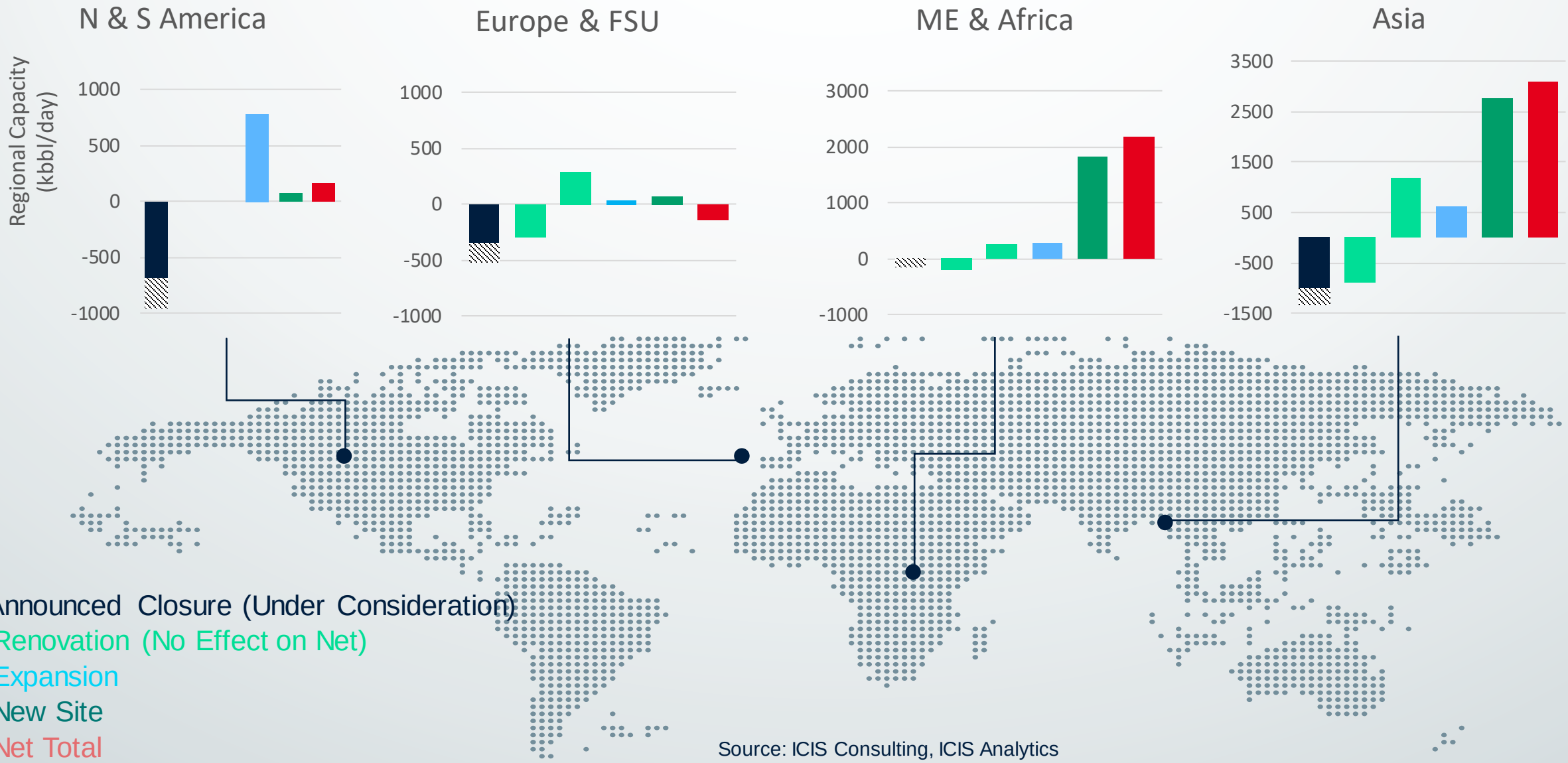
Source: ICIS Consulting, ICIS Analytics

Global Refining Capacity Grows Despite The Energy Transition and Coronavirus

Refining capacity is expected to grow 4.5 Mbbl/day by 2025, despite the announcement of almost 2 Mbbl/day closures since 2020. This is unsupported by demand and further closures are expected

ICIS Supply and Demand Database

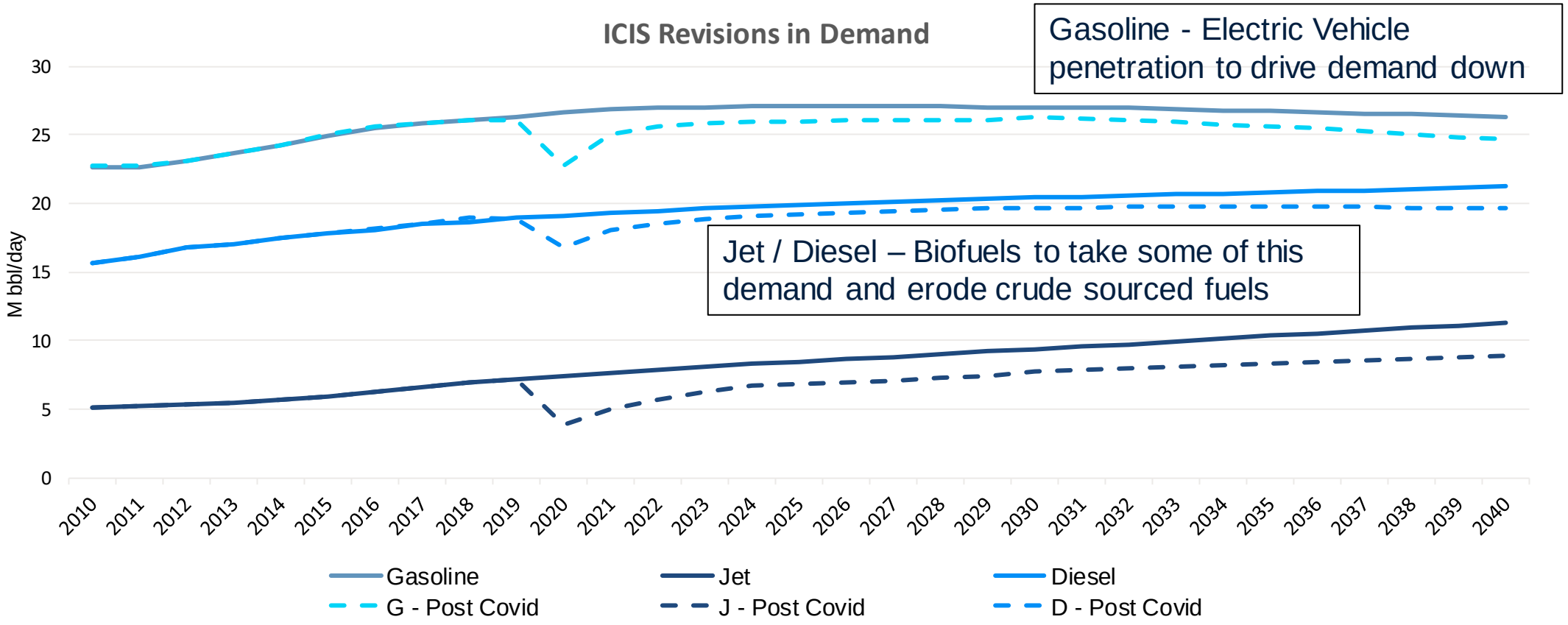
Refinery Capacity Evolution to 2025



Source: ICIS Consulting, ICIS Analytics

COVID-19 has not only affected the short term demand but will impact the long term too

A combination of behavioural change and stimulus packages will help drive the energy transition.



Source: ICIS Consulting, ICIS Analytics

Petrochemicals represent stronger demand growth

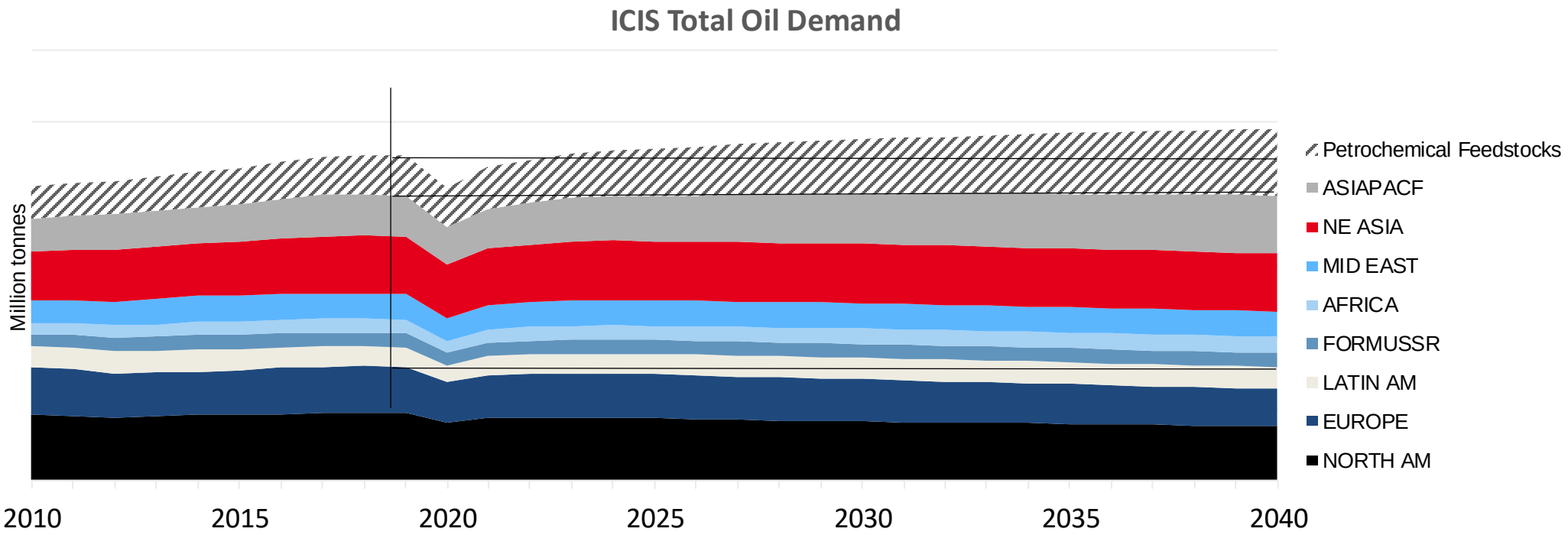
The pace of oil product growth in Asia offsets the loss of demand in NAM/Europe, resulting in a net flat position. Incremental growth in petrochemicals add the only growth to the total demand.

ICIS Supply and Demand Database

COVID-19 has not only affected the short term demand but will impact the long term too

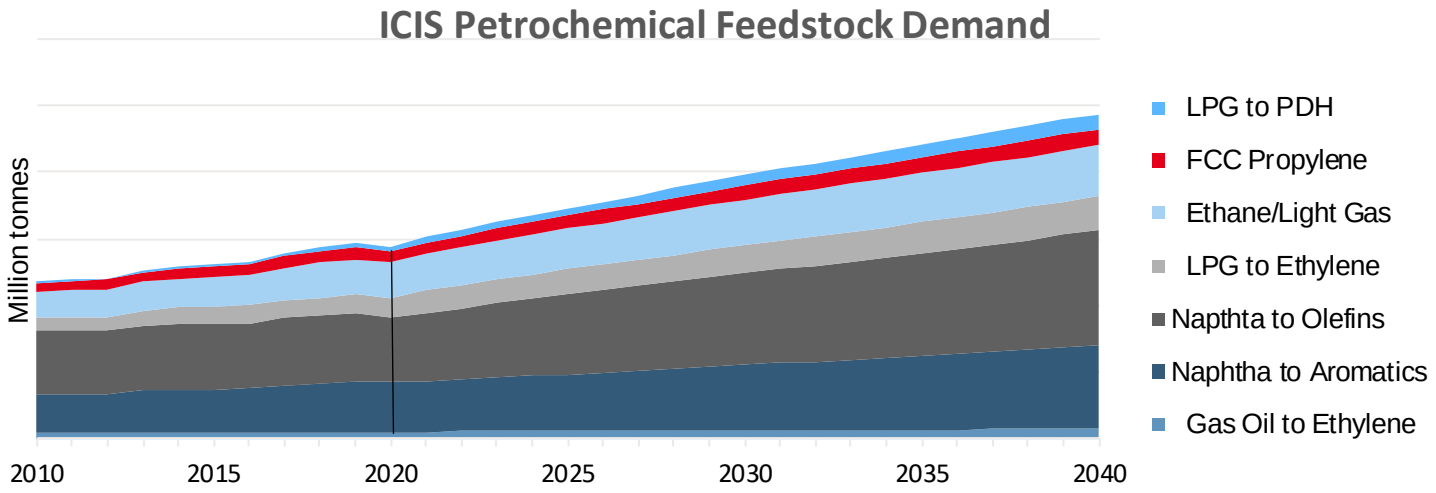
A combination of behavioural change and stimulus packages will help drive the energy transition.

Whilst mature markets are declining, Asia & Pacific, with India at centre stage, will drive most of longer term demand increase

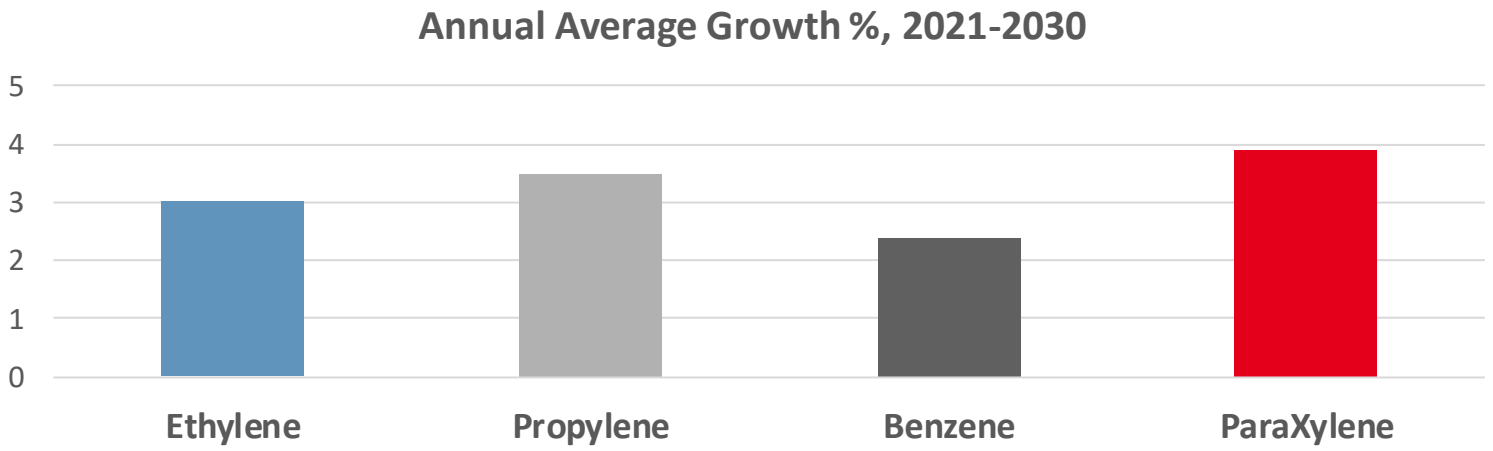


Source: ICIS Consulting, ICIS Analytics

Global Petrochemicals & Feedstocks Growth



An across the board increase results in a 66% increase from 2019 levels…



Ethylene demand in the long term will be driven primarily by polymers-LLDPE, HDPE, PVC (via EDC-VCM) and Polyester (via Ethylene glycolsPropylene demand in the long term will be driven by PP contributing to over 75% . Other fast-growing derivatives are Polyols, EPDM and Acrylonitrile

Paraxylene demand is driven by the polymer polyester, textile industry is expected to drive the demand into the future.

Benzene is expected to be the slowest growing building block.

Source: ICIS Consulting, ICIS Analytics

Integrated Feedstocks

New petrochemical additions are increasingly integrated with feedstock source
Ample Hydrocarbons Availability for Petrochemicals…

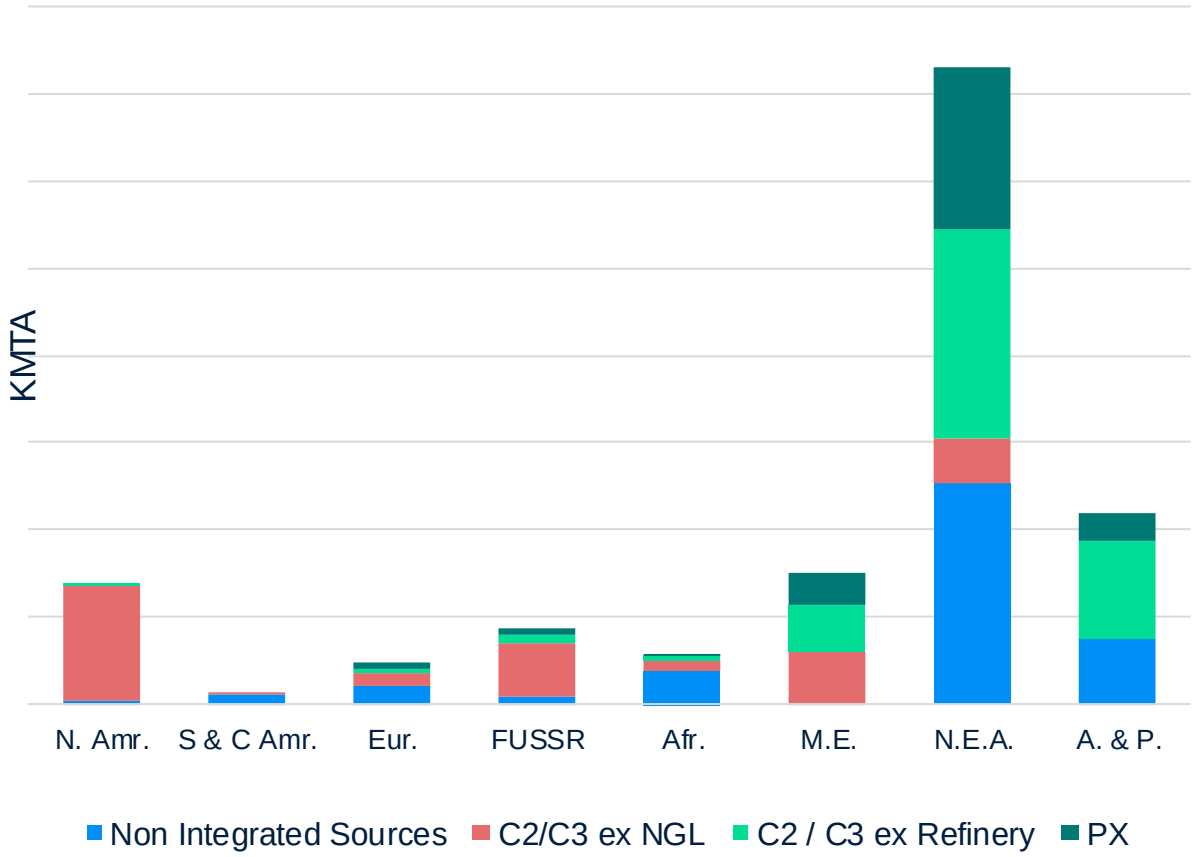
Petrochemicals are still a **growth area**, despite the downside risk of recycling, and provide some alternative for the crude sourced markets being eroded.

75% of the **feedstock** to **new petrochemicals projects** are **integrated** with the feedstock source (either refinery or NGL field). The majority of the remaining standalone units are naphtha crackers in Asia.

A refiner can't just look to switch from transportation fuels to petrochemical feedstocks as a growth market, because the feedstock for ¾ of new capacity is already tied up. A refiner needs to directly participate to take advantage of petrochemicals relative growth.

The Energy Transition is also pushing refiners towards more renewables…

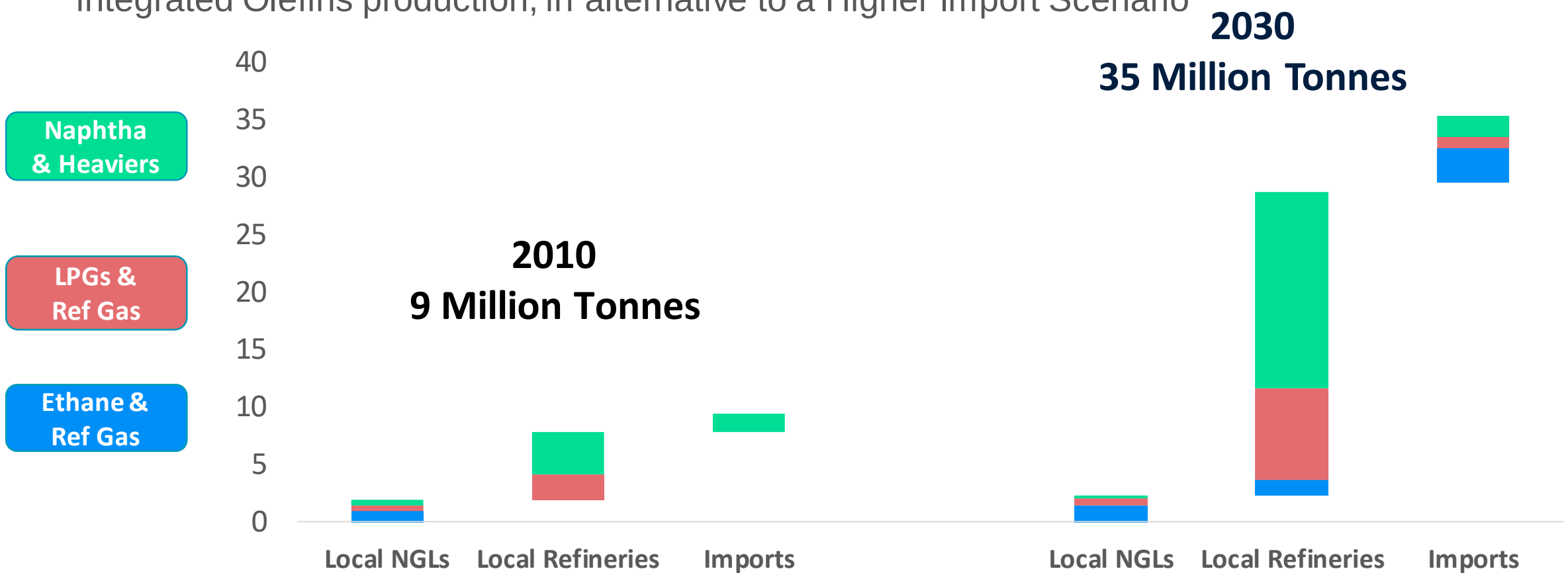
Refiner Involvement in New Petrochemical Capacity Additions



Source: ICIS Consulting, ICIS Analytics

India Petrochemical Feedstocks Picture: A Scenario Maximizing Integrated Ethylene & Propylene

Domestic Refineries will have great opportunities to release feedstocks for integrated Olefins production, in alternative to a Higher Import Scenario



Source: ICIS Consulting, ICIS Analytics

Conclusions

- Globally, oil products demand is flat at best, whilst petrochemical feedstock demand is the only growth driver in oil demand in the long term. By contrast, India still has the potential for a more prolonged fuel demand, on top of fast growing petrochemical requirements.

- The Oil refining business is turning increasingly competitive. Refining capacity is shifting into Asia / ME where there are advantages, driving closures in other parts of the world. New and existing refineries in India will also need to increase integrated petrochemical production.

- Focusing on Olefins, the opportunity to leverage on domestic Refineries does not exclude options for accessing incremental light NGLs when competitively priced. A competitive positioning will secure feedstocks to domestic petrochemicals, and open opportunities for selected incremental exports.

Get in touch with us…

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ICIS

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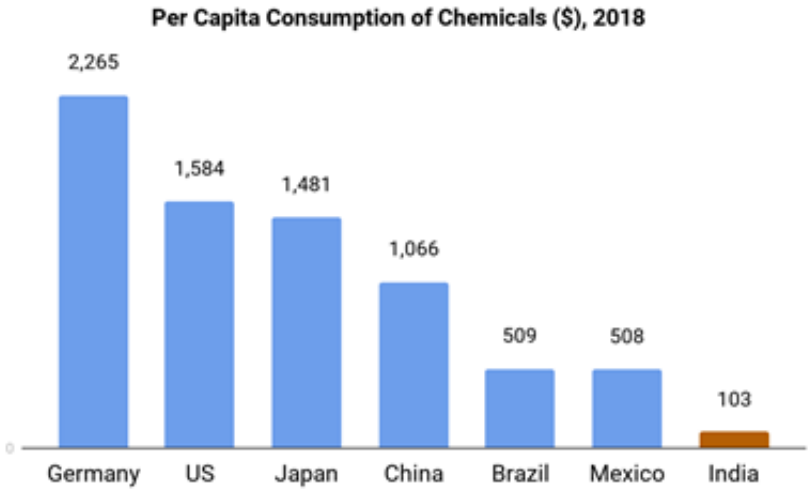
2020's: Catalyzing Indian Specialty Chemical Industry to emerge as a Global Powerhouse

Rajendra Gogri
Chairman & Managing Director, **Aarti Industries Limited**

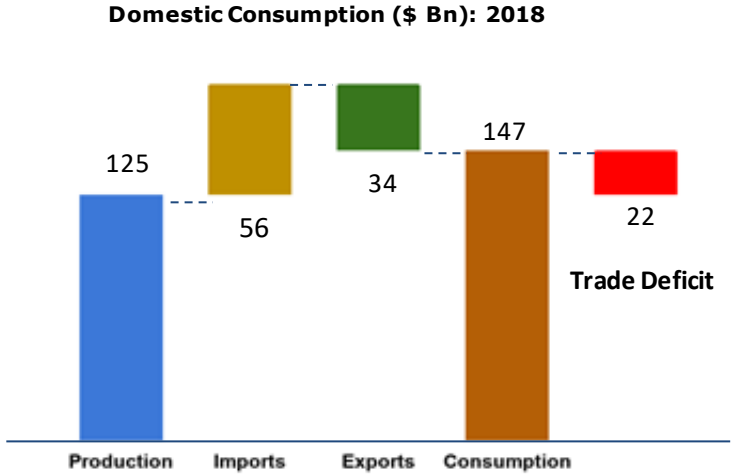
17 March 2021

AARTI INDUSTRIES

Chemical Industry will become a major driver towards $5 Trillion Economy



- India's per capita chemical consumption is very low compared to ROW
- Increased urbanization will lead to significant increase in domestic consumption in the next 10 years



- In addition to domestic market, India has a huge potential to increase exports
- Significant opportunity for Import Substitution

Source: ICCA Report, The Global Chemical Industry, March 2019. BCG Analysis

The Indian Chemical Industry has Triple Growth Drivers

	Domestic Demand Growth	Export Potential	Import Substitution
Textiles	✓	✓	
Automobiles	✓	✓	
Information Technology	✓	✓	
Defence	✓		✓
Construction	✓		
Chemicals	✓	✓	✓

Easternization and significant Demand Pull for Indian Chemical Industry

01 1980's: Easternization

- Easternization led to the Ecosystem of MSME/Large Players only in India and China
- No such ecosystem in Thailand, Malaysia or other SE Asian countries

02 2020: China + 1 Strategy for Supply Security

- Pre 2015: China got disproportionate growth share
- Chinese currency appreciation and rising labour cost increased the Cost in International markets
- Global Supply chain decoupling

03 India as the best and the only Alternate Location

- Due to available ecosystem, India becomes a natural partner of choice
- Unlike textiles, at present no inroads by Vietnam, Bangladesh

AIL attracted Long Term Contracts with Global Majors with locally sourced RM's because of

- **Supply Chain independent of China**
- **Capex/ Opex Advantage**
- **Better IP Protection**

2017

Contract 1: 10 Yr Supply Contract with a Top Agrochemical MNC

- Total Contract Value: $ 620 Million

2019

Contract 2: 10 Yr Supply Contract with a Top Chemical MNC

- Total Contract Value: $ 125 Million

India has the potential to emerge as global specialty chemical manufacturing hub

Competitive Cost Position

- Due to lower component of imported equipments, Capex in India is 40-60% lower than the West

Competitiveness comparison	USA/ Europe	China	India
Labour cost			
Plant Capital Expenditure			

- Most Competitive place to manufacture if RM is available at global prices

Govt and Industry association should collaborate to obtain FDI in India

AIL signed a **20-year** supply contract with a specialty chemicals conglomerate

- **Contract Value $ 1540 Million**
- **Customer Funding:** Capital Outlay of **$40m** fully funded by the customer
- **Technology Supply:** Proprietary technology being shared by the partner
- **Market Access:** 100% of the product will be bought

Current focus of Industry and Government

Industry Focus

Focus on Safety

- Institutionalize Process Safety and Employee Training
- Obtain "Responsible Care"

Pursue Cost Competitiveness

- Economies of Scale, Continual Process Optimization
- Invest in Energy- Efficient Technologies

Invest in R&D

- Increase **R&D Spend to 3-5%** of Revenue
- Collaborate with Research Institutes

Local Sourcing

- Support **"Atma Nirbhar Bharat"** campaign to become self-reliant
- Promote **"Make in India"** boosting domestic demand

Government Actions

Recent Proactive Actions benefiting the Industry

- **Corporate Tax rates of 17% for New manufacturing firms** (need to extend time period due to Covid) incentivizing industries to invest immediately in manufacturing
- **Validity of Environment Permits for Product Mix changes** as long as Environmental load remains un-changed.

Potential Government Policies to further catalyze Investment

PLI Scheme & First in India

Accelerate Commercialization and Boost Innovation

- **PLI (Production Linked Incentive) scheme** for select Specialty Chemicals which is in the making similar to announced Pharma PLI scheme. This scheme will have a multiplier effect in the Value chain, generating significant investment
- For other novel products, encourage Firms to introduce new products or products not made in India in last 10 yrs **by offering incentives for first 5 years** which will help during Process stabilization and ramp up period

Duty Drawback

Remove anomaly in current Duty Drawback structure

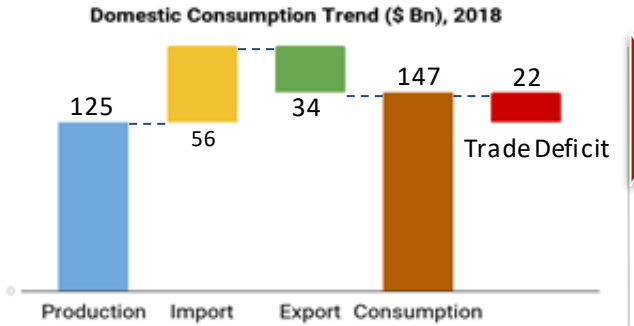
- Exporters import RM under Advance License even if RM is locally available, because of **lower duty drawback rates against Advance License**
- RM supplier cannot seek duty-drawback increase for downstream product
- This leads to **trade deficit, less "Make in India"** and affecting economies of scale for supplier
- Level playing field with **Duty drawback rates equivalent to Advance License**

Environmental

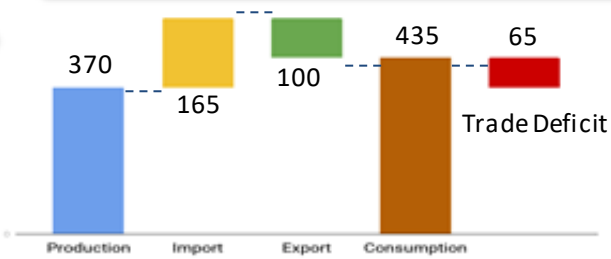
Smoother Environment Clearances

- For units in Industrial parks,
  - provide **freedom for capacity expansion for ZLD units**
  - **Allow construction post filing of EC application**
- **Allow Marine Discharge** to designated points instead of TDS reduction which will reduce Carbon Footprint

Scenario 2030: Opportunity to become the next IT



Status Quo



Trade Deficit: $65 billion

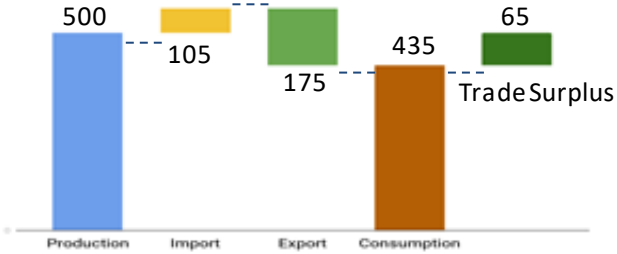
>CAGR ~ 9.5% for Exports & Consumption

>> Import: ~ 38% of Consumption

Key Policy Initiatives + Execution Focus

Proactive Thrust

- **Significant Investment**
- **Higher Tax Revenue**



Trade Surplus: $65 billion

>CAGR: ~ 15% Exports, 9.5% Consumption

>> Import: ~ 24% of Consumption

- **Trade Deficit to Trade Surplus**
- **Significant Jobs Creation**


PRODUCTIVITY WITH SAFETY IS OUR MOTTO
उत्पादकता के साथ सुरक्षा हमारा लक्ष्य है

Thank You!

Top Trends, Challenges and Issues for the AgChem Industry

Issues Tracking & Stakeholder Research

Winter 2021

The environment today

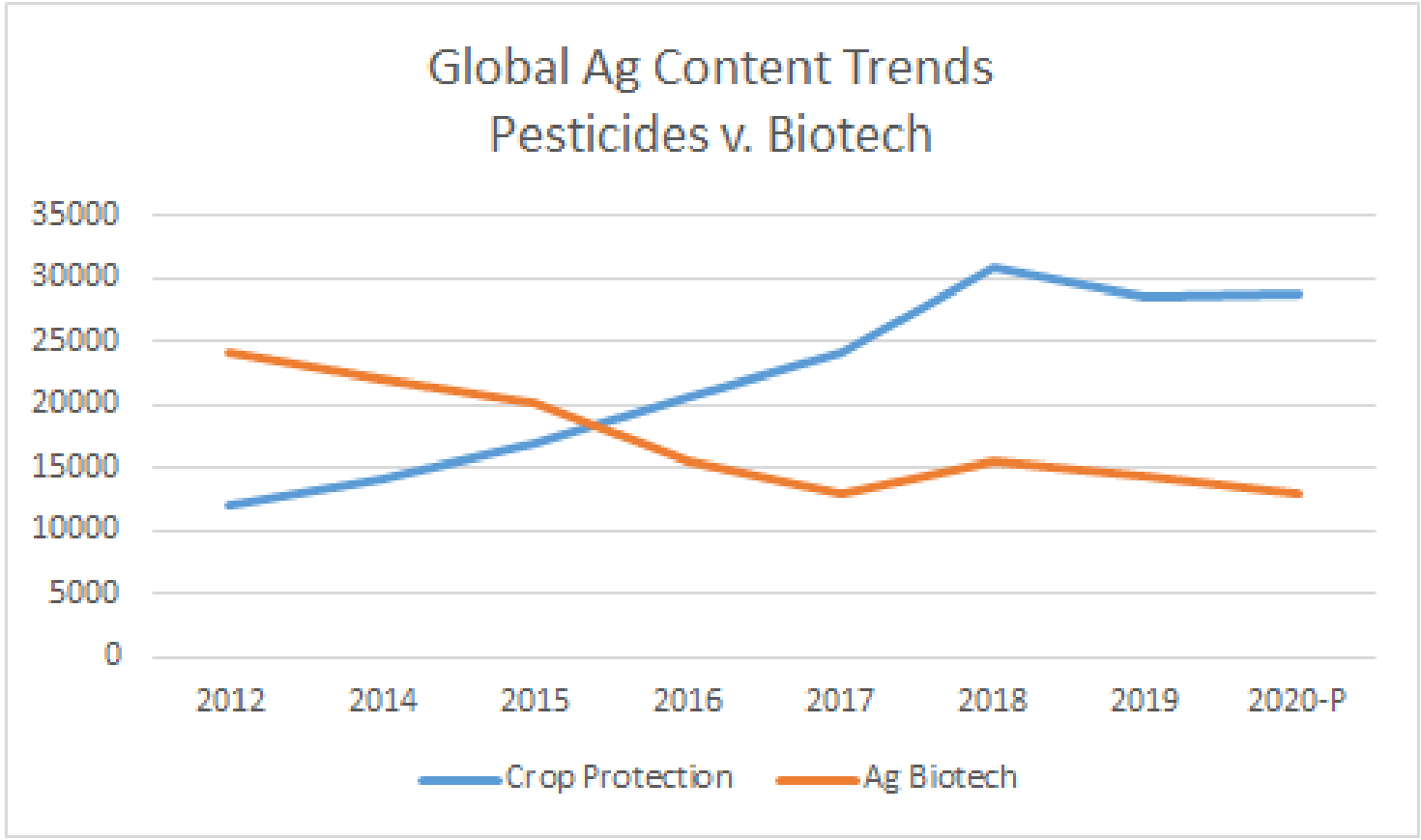
- Globally coordinated, well-funded **anti-conventional agriculture campaign** seeded in 2008-2009, **launched in 2012** and which has **extended to 2020+** merging with growing anti-US and anti-capitalism sentiments to disparage non-organic, 'big ag' and technology-linked production systems

- **Initial invidivual focus on GMOs**, **antibiotics and pesticides** integrated with **broader anti-ag and anti-corporate themes** – **most intense global advocacy levels in 20+ years**

- Emerging "agroecology" and "regenerative" advocacy models **opportunistically partnering with political (Europe-driven) and business (organic) stakeholders** who profit or benefit from disruptions in food security

Issue tracking trends reveals an existential threat to ag chem

- **Clean Food, Political Food** movements pushing input/chemical-free farming (agroecology, regenerative, zero-budget)
- Power, profit & political **sources** driving conversations:
  - **Power**: Anti-corporate, eco & alt-farming **NGOs** ($500M)
  - **Profit**: Organic, natural product **industries** and **litigators** ($100B)
  - **Politics**: **Disruptors** using food as a weapon (**Russia**, EU Green parties, **Qanon** US, far-right/far-left shared conspiracy claims, etc.)

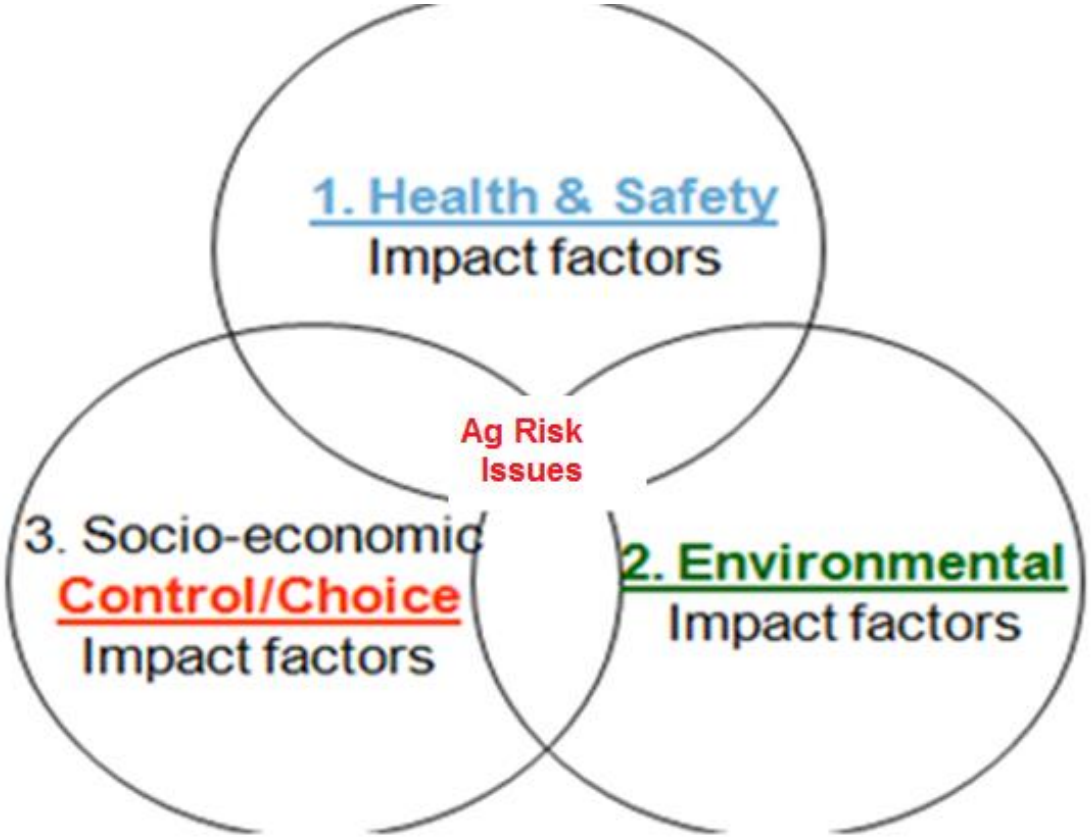


The combined top ag-issue global topic trends

- **#1 Crop protection**
  - **Human health** (glyphosate, herbicides & **EDCs**)
  - Pollinators (e.g., neonics, bees, **biodiversity**)
  - Note: **34% CP reports intersect with water quality**
- **#2 Biotechnology and NBTs (plant and animal – 10% incl. water)**
  - **Conflation with pesticides** (glyphosate) 35%+ globally (15% in Africa)
  - **Non-GMO** marketing trends
  - NBTs, gene editing and synbio
- **#3 Animal health and productivity (12% incl. water – not a major advocacy focal point in Africa)**
  - Alleged contributions to **climate change** top issue followed by antibiotic use
  - Trade challenges on hormones, chlorine, **GM feed** on the rise
  - Animal care mostly opportunistic and temporal
  - **Animal biotech** (gene editing)
- Other **intersecting trends:**
  - **Water quality** – 3,500+ percent increase in volume since 2015
  - **Clean food** (organic) – completed shift from niche to mainstream, organic **evolving to *regenerative* advocacy**
  - **Political food** (**agroecology** / **regenerative ag** and trade) – growing influence – particularly via IGOs, EU gov’ts
  - Adoption of anti-pesticide, anti-GMO claims in broader anti-vaccine, 5G, and **anti-corporate/Qanon conspiracy** claims

Themes

- Human Safety
- Environmental Risks
- Socio-economic harm



Traditional science & regulatory support only covers the health and environmental areas - socio/econ challenges require political cover support. In current anti-corporate, conspiracy environment independent, diverse third parties required for all

Tactics: Villains, Victims & Heroes + Urgency

Villain: pesticides & industrial ag
Victim: humanity (extinction)
Heroes: politicians who ban pesticides

THE STRAITS TIMES

OPINION

SINGAPORE

OPINION › ST Editorial Cartoons

PREMIUM

An insect apocalypse will be everyone's apocalypse

Michael S. Engel

PUBLISHED MAR 4, 2

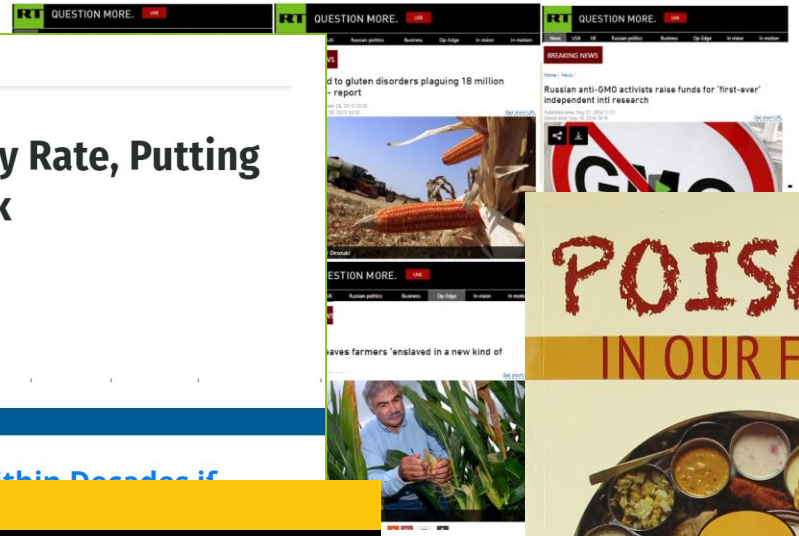
The National Butte
bush land along the
pollinating butterfli
countless other inse

The Trump admini
destroy it. But such
seem almost a luxu

THE WALL STREET JOURNAL.

Putin's Disinformation Matrix

The Kremlin's English-language TV organ offers Britain its signature blend of propagand
and tinfoil-hat conspiracy theorizing.



More than 1,000 anti-GMO stories published in RT Russian state sponsored

rs

FORTUNE

HEALTH • ENVIRONMENT

nsects Are Dying Off at a Scary Rate, Putting Humanity at Risk

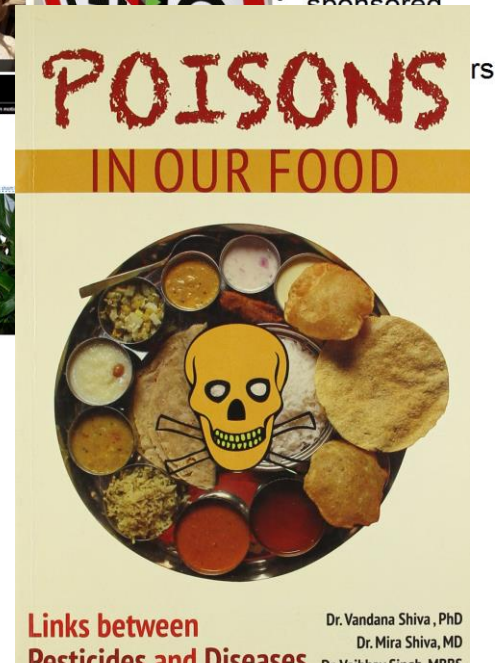
BEYOND PESTICIDES

EURACTIV

Agrifood Digital Economy & Jobs Energy & Environment Global Europe

Environmentalists call for pesticide ban as study shows extent of insect decline

By Samuel White | EURACTIV.com



Global advocacy intersecting with India chemical industry freedom to operate

- Russian disinformation sources
- European Green advocacy
- North American anti-trade interests
- Other foreign NGOs
  - Pesticide Action Network
  - Greenpeace
  - La Via Campesina
  - Third World Networt

PAN ASIA PACIFIC

Stop persecution of Indian farmers, activists opposed to ecologically destructive Farm Laws

Global Day of Solidarity with the Indian Peoples

Common Dreams

Published on Friday, February 19, 2021 by Common Dreams

US Farmers and Food Justice Groups Declare 'Solidarity' With Indian Farmer Protests

Near term urgent challenges

- **Ongoing IARC monographs 2020-2025 cycle**
  - Current round of prioritized agents/issues includes: atrazine, chlorpyrifos, pyrethroids, alacholor, mancozeb, terbofos, chlordecone - to extend to 2024
  - Lack of effective member state involvement and challenges
- **Expansion of U.S. toxic tort litigation model (global tribunals)**
- **EU gov't exporting GREEN DEAL, agroecology and precautionary principle** –based trade agreements and IGO convention policies which exclude pesticides, modern crop protection and seed breeding techniques from multinational policy making
- **U.S. political transition** - shift of power in U.S. executive and legislative branches may elevate previously fringe-left anti-pesticide/anti-corporate agribusiness policy agenda and legislative items; defining ag role in climate (pos/neg) on agenda while Qanon, Alt-right claims open alternative front risks
- EU, US and IGO progression with advocacy and marketing interests on defining and implementing regulations on **endocrine disrupting chemicals** and "chemical cocktail" exposures (Endocrine Society, Ramazzini, NIEHS funded EU research, et al)
- EU **maximum residue limits (MRLs)** for pesticides (major growth in testing for residues in foods, animals, water and people) (banning exports of chemicals and imports of foods grown with chemicals)
- Growing **anti-corporate** allegations of corruption and **"greenwashing"** claims around risks **"green chemistry"** solutions involving biological alternatives coming from corporate-driven gene editing, biocides. Indigenous owned resource exploitation, etc.
  - Merged with growing allegations of "**human rights abuses**" by private sector
  - Criminal and conspiracy claims amplified by Russia and other political sources
  - NGO and socio-political groups calling for multi-national agribusiness break-ups

Thank you

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Access our issues intelligence, stakeholder research & related resources:

http://community.bonuseventus.org

Bonus Eventus
Favorable outcomes in food and agriculture

Chemigress to 100

Advancing to our 100th birthday in 2020

Industry Interaction on Conclave
Indian Agrochemical Industry
Registration System of India & Japan

NISSO CHEMICAL INDIA LLP

HIROYUKI KANAMORI

NIPPON SODA CO., LTD.

Chemigress to 100
Advancing to our 100th birthday in 2020

- H.Q.: Tokyo, Japan

- Year of Foundation: Feb, 1920
- T/O(Mar'20): J.Yen 144,739M(US$1,378M @105)

- No. of Employee(Mar'20): 1,313
- Line of Business

Agri-Business, Pharmaceuticals, Specialty Chemicals, Eco & Consumer Chemicals, Chlor-Alkali, etc.

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Manufacturing sites in Japan

Takaoka Plant (1934 -)

Nihongi Plant (1920 -)

Mizushima Plant (1969 -)

Chiba Plant (1969 -)

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R&D centers in Japan

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Bandai FRS

Chiba RC

Nihongi Lab

Takaoka Lab

Haibara FRC

Odawara RC

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Global Network

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Main products

TOPSIN-M®

Thiophanate methyl
Broad spectrum fungicide

Mospilan®

Acetamiprid
Safest among other neonicotinoids

NISSORUN®

Hexythiazox
Acaricide with residual effect

Bellkute®

Iminoctadine
Unique contact fungicide

Romdan®

Tebufenozide
IGR with different mode of action

Cyflamid®

Cyflufenamid
Specialty against P.mildew fungi

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New products under development

Chemigress to 100
Advancing to our 100th birthday in 2020

■ NF-171 (Picarbtrazox)

Novel fungicide against Oomycetes fungi

■ NA-89 (Acynonapyr)

Novel acaricide against all stages (egg to adult)

■ NF-180 (Ipflufenoquin)

Novel fungicide with broad spectrum including Rice Blast

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Evolution of products development

Chemigress to 100
Advancing to our 100th birthday in 2020

1970 1980 1990 2000 2010 2020

(I) 

Nissorun Mospilan Romdan **NA-89 (Acynonapyr)**

(F) 

Topsin-M Trifmine Cyflamid **NF-171 (Picarbutrazox)**

Bellkute **NF-180 (Influfenoquin)**

(H) 

Nabu

New products

Other new products in pipeline and coming out 2020 onward.....

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New insecticide, Acaricide, Herbicide coming up

Major difference in registration System between India & Japan

	India	Japan
Scope of registration	TG/FG	FG only
Mixture between Insecticide+Fungicide, Herbicides	Rare	Common (3-4 ways)
Data protection system	Non	15 years

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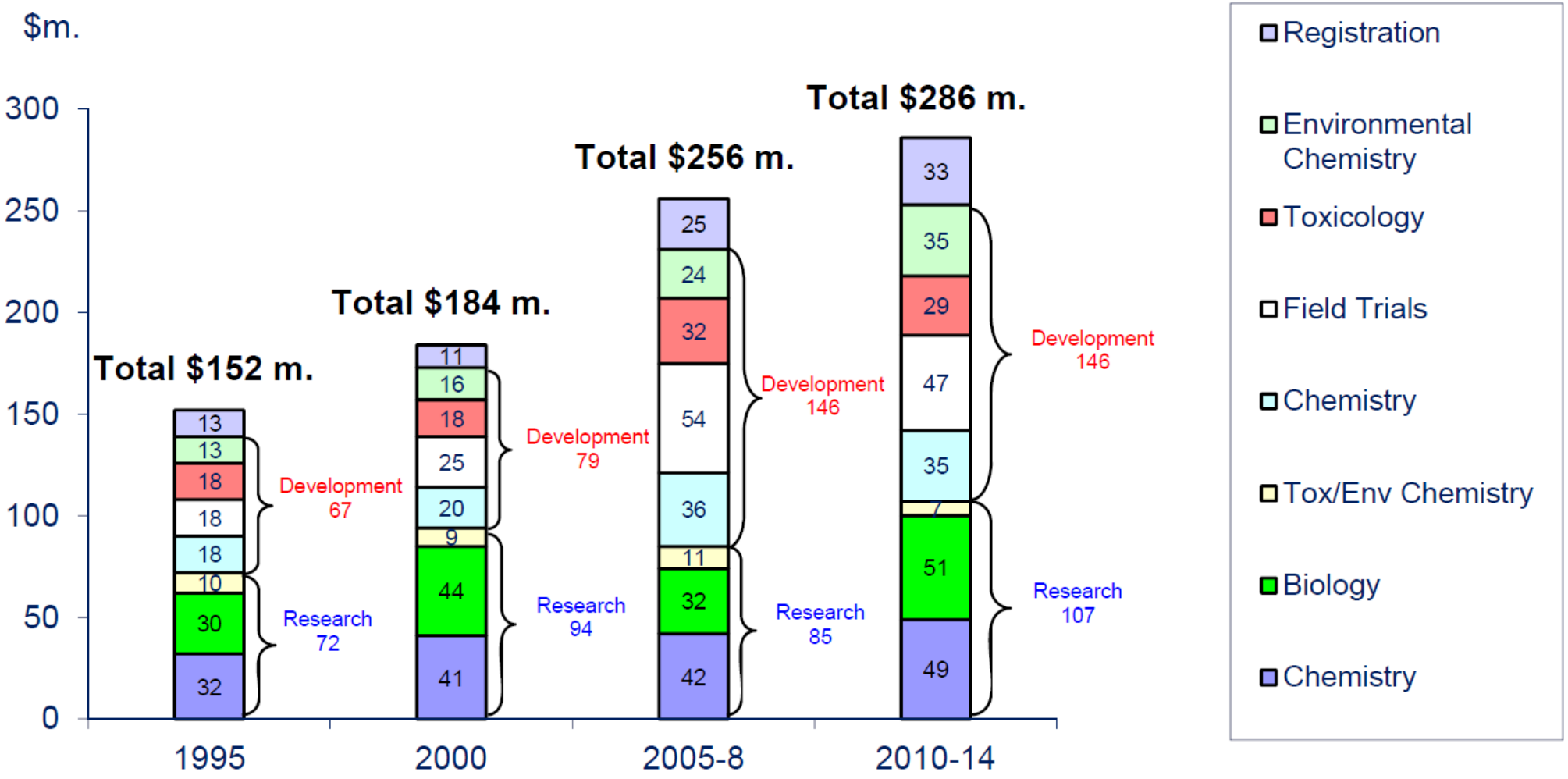
Discovery and Development Costs of a New Crop Protection Product



The overall costs of discovery and development of a new crop protection product increased by 21.1% from $152 m. (€115m.) in 1995, to reach $184 m. (€140m.) in 2000. From 2000 to the 2005-8 period, costs increased by 39.1% to $256 m. (€189 million). From 2005-8 to the 2010-14 period, costs increased by 11.7% to $286 m. (€215 million)

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Phillips McDougall (2017)

Number of Products Processed leading to a Successful Product launch

		1995	2000	2005-8	2010-14
Research	Synthesis	52500	139429	140000	159574
Development		4	2	1.3	1.5
Registration		1	1	1	1

Crop Protection Product Discovery and Development Lead Time

	1995	2000	2005-8	2010-14
Number of years between the first synthesis and the first sale of the product	8.3	9.1	9.8	11.3

Phillips McDougall (2017)

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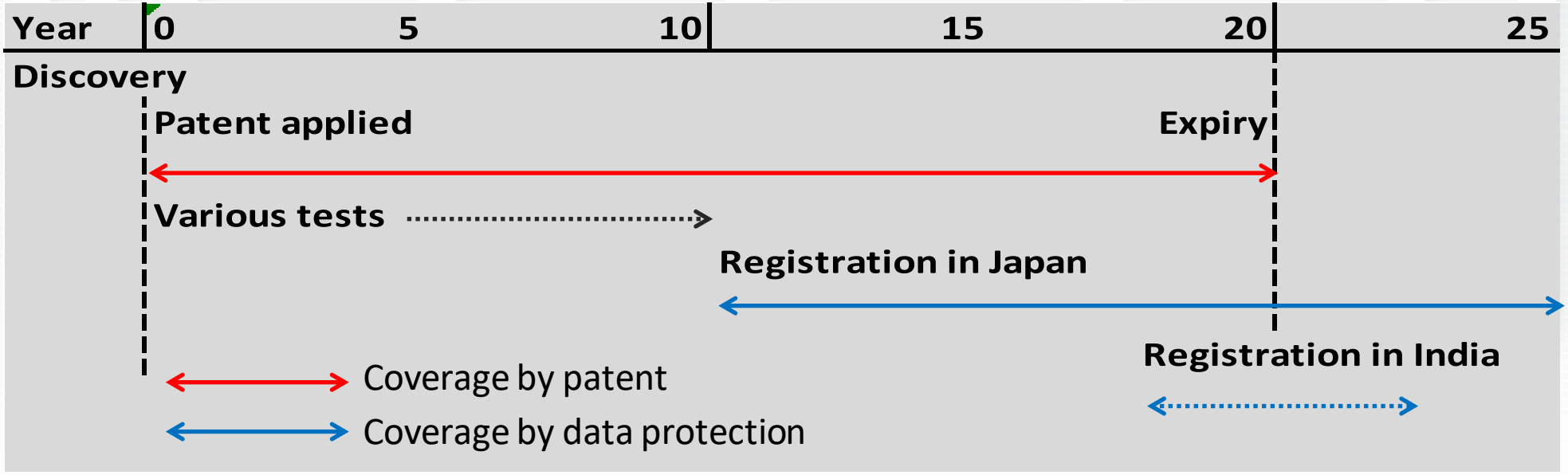
Data protection system

In general, pesticide is patentable in the scope of invention chemistry for a certain period as per patent law in a country or treaty across nations.

Pesticide must undergo various tests to ensure safety against human health and environment in addition to efficacy to protect crop from pest damage and obtain registration in respective country. It takes long years of time and immense amount of development cost.

Usually patent will remain for only a few years or have already expired till grant of registration and commercialization.



Data protection system…cont.

Chemigress to 100
Advancing to our 100th birthday in 2020

Therefore, data protection system, a provision incorporated in pesticide management law is introduced to protect the right of exclusive use of developed data generated by inventor for their legitimate sales and recovery of development cost during the protection period, while preventing others from registering the same without own data.

If no data protection system was provided, others could get the registration in much shorter time at much lower cost and cause unhealthy competition which would discourage inventor to capitalize on long-term business in such a place.

	Japan	US	EU	Brazil
Patent	20 years	20 years	20 years	20 years
Data protection (Post grant of registration)	15 years	10 years	10 years	10 years

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Merits by data protection

Motivation in Japanese agrochemical companies	Benefits to Indian farm society and/or agrochemical Industry
Increase development of new pesticide at early stage even before registration in origin Country	Provide farm society with more choice of pesticide to improve quality and value of crop along with yield and at the end increase farmer's income
Shift manufacturing site to India to deal with increased market demand and save manufacturing cost	Provide agrochemical industry with more business opportunity for contract manufacturing in addition to sales and distribution.

Introduction of data protection will make win-win situation and Indian farmer/industry happy with access to innovative technologies.

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Nisso will contribute to Indian society by providing innovative technologies.

Thank you for your attention !

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Global Trade Shifts:
The India opportunity

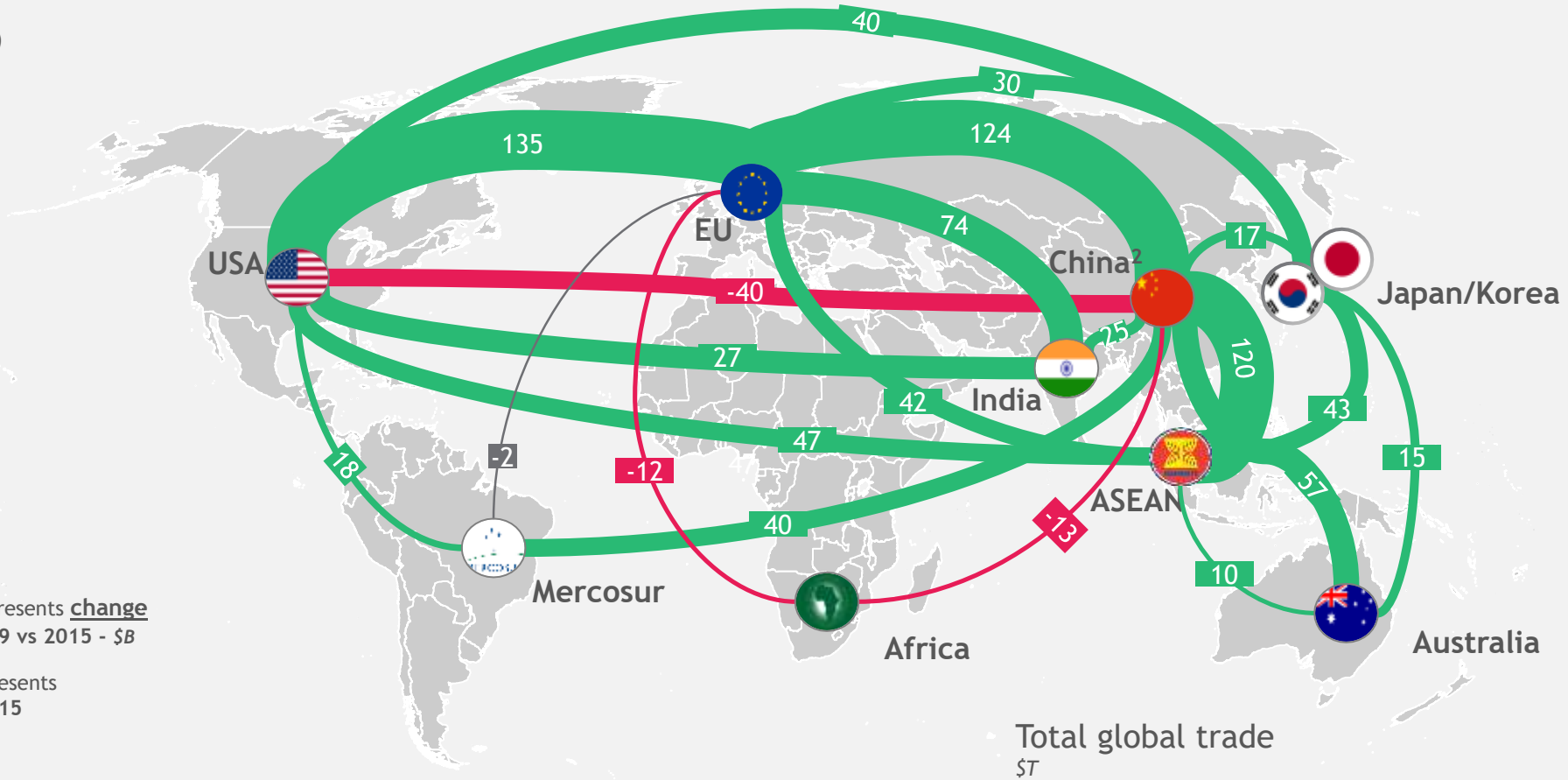
MARCH 2021

Three areas

- Does intent match messaging?
- How does ~$18T of trade change?
- What imperatives for Indian cos?

The context: Global trade expanded over 2015-2019, with US-China being an exception

Change in trade of goods
(major corridors[1], 2019 vs 2015, $B)



~$18T
Global trade 2019

Legend

Width of arrow represents **change in trade flows 2019 vs 2015 - *$B***

<-3% | -3%> <+3 % | >3%

Color of arrow represents **change 2019 vs 2015**

Total global trade
$T

15.7 → +2.5 (Δ) → 18.2
2015 — 2019

1. Corridors in the map above represent ~30% of global trade – missing: Intra EU=~20%, NAFTA=~8%, Mainland China/Hong Kong/Taiwan=4%, ASEAN=3%, RoW=~35%; 2. Mainland China
Source: UN Contrade, OECD, WEF, IHS, TradeAlert, BCG Analysis

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Trend visible pre-COVID: 2019 drop in US-China imports

% change in US goods imports ('18-'19)		ASEAN	India	China	JP/KR[1]	EU	Mexico	Brazil	Turkey	RoW[3]	World
Health Care	Biopharma	-19%	19%	-14%	10%	17%	-6%	-7%	1%	2%	10%
	MedTech	23%	9%	-2%	-2%	5%	11%	31%	-13%	5%	6%
Consumer Goods	Consumer Durables	33%	10%	-19%	6%	3%	1%	26%	1%	5%	-4%
	Fashion & Luxury	12%	5%	-11%	2%	3%	-6%	-3%	8%	5%	0%
	Packaged Food	6%	15%	-36%	11%	6%	10%	-8%	13%	4%	4%
Tech, Media & Telco	Consumer Electronics	24%	100%[2]	-13%	-25%	9%	14%	108%[2]	138%[2]	15%	-8%
	Equip. & Data Center Solutions	-2%	-12%	-31%	-19%	-2%	-4%	23%	-45%	69%	-13%
	Semiconductor & Materials	14%	36%	-53%	-3%	-7%	-14%	-41%	33%	-3%	0%
Energy	Energy	-40%	18%	-68%	34%	3%	-19%	-2%	10%	-14%	-13%
Industrial Goods	Aerospace	-14%	39%	-9%	3%	18%	21%	31%	21%	12%	13%
	Agribusiness	-8%	0%	-23%	9%	3%	10%	6%	-13%	1%	1%
	Automotive - Components	24%	1%	-17%	1%	-1%	2%	-4%	10%	0%	-2%
	Automotive - Vehicles	12%	4%	-19%	1%	-2%	11%	-36%	-12%	1%	3%
	Chemicals	11%	10%	-16%	4%	-1%	5%	0%	7%	-7%	-4%
	Electrical machinery	10%	21%	-18%	1%	3%	7%	14%	11%	7%	-3%
	Mechanical machinery	13%	6%	-37%	3%	2%	5%	9%	22%	10%	-7%
	Metals	2%	-1%	-15%	-1%	-4%	-2%	-12%	-31%	-8%	-7%
	Mining	-38%	5%	-22%	10%	-27%	30%	16%	-2%	2%	2%
	Non-metal building materials	45%	38%	-29%	6%	0%	6%	3%	21%	0%	-4%

Source: IHS Markit Global Trade Atlas; BCG analysis

2020 has accelerated this: at company level, "exit China" now top-of-mind …

Which of the following statements best describes your strategy of moving production out of China?

1. 450 senior executives surveyed Dec'19-Jan'20. 2.150 executives from S. Korea, Japan, and Taiwan surveyed in Mar'20. 3. 542 executives surveyed in Mar'20.
Source: UBS Global Research; BCG analysis

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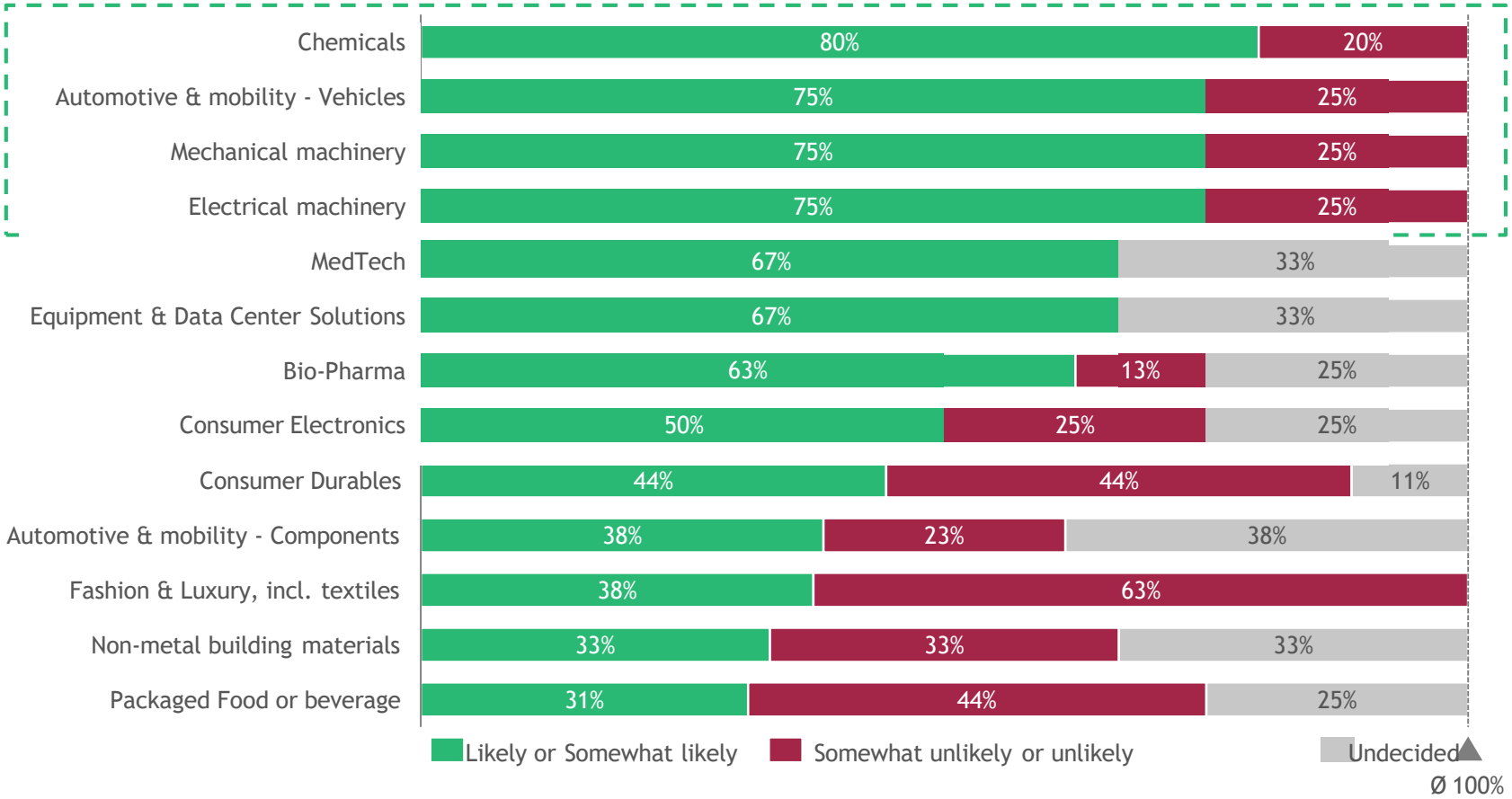
… with stated intent highest in the Chemicals sector

Survey question | How likely is your company to shift some or all of the international manufacturing supply chain operations out in the next 3 years?[1]

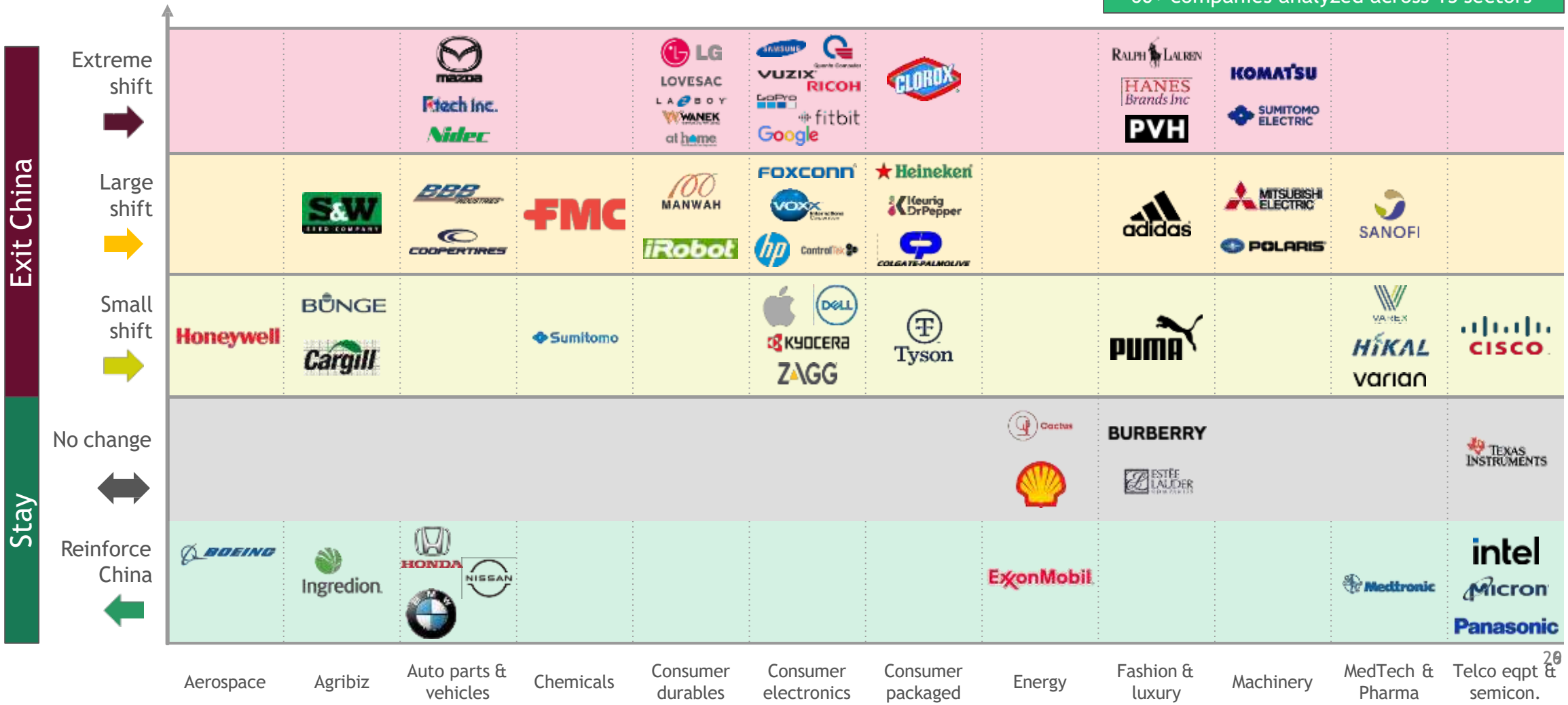


1. Semiconductors, Metals and Aerospace not included due to low N

Source: Manufacturing field survey; N = 100; Due to limitations in sampling, some industry responses include only low N.

Action is matching intent – China shift is real (across sectors)

60+ companies analyzed across 15 sectors



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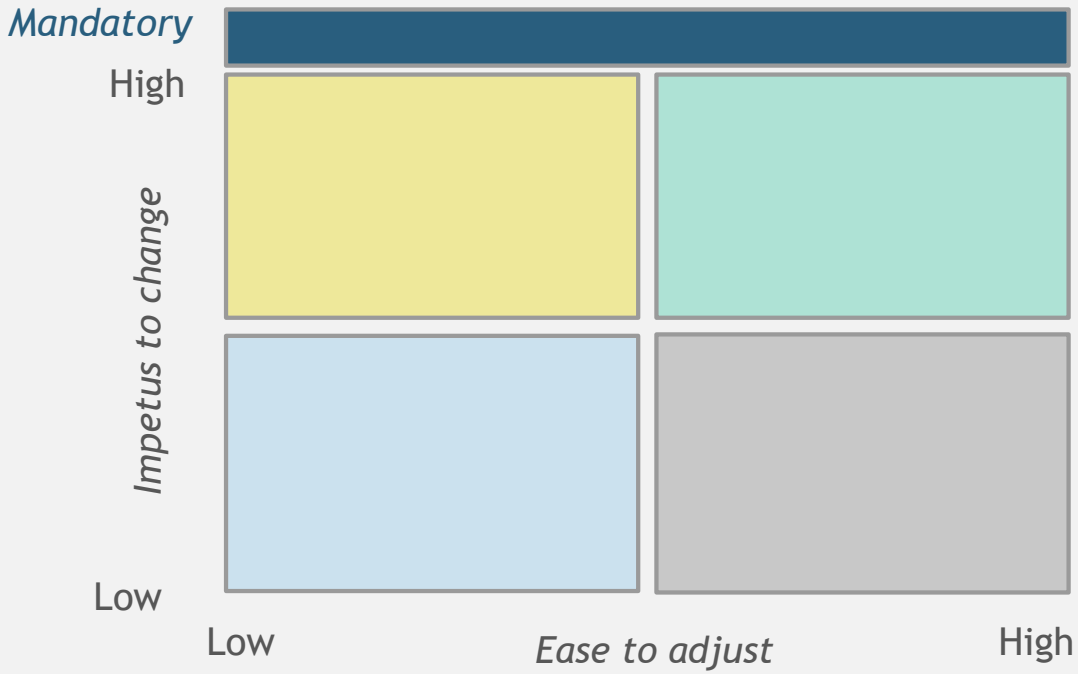
Assessing future evolution: Sector response driven by two key factors

Impetus to change vs ease to adjust matrix



Impetus to change

Magnitude of SC at risk, leading to greater willingness to adapt supply chain

- Import dependency & partner reliability
- Supply chain structural risk
- Potential increase of protectionist measures

Ease to adjust

Effort to update companies' supply chain

- Cost/capital required
- Ecosystem relevance
- Regulatory requirements

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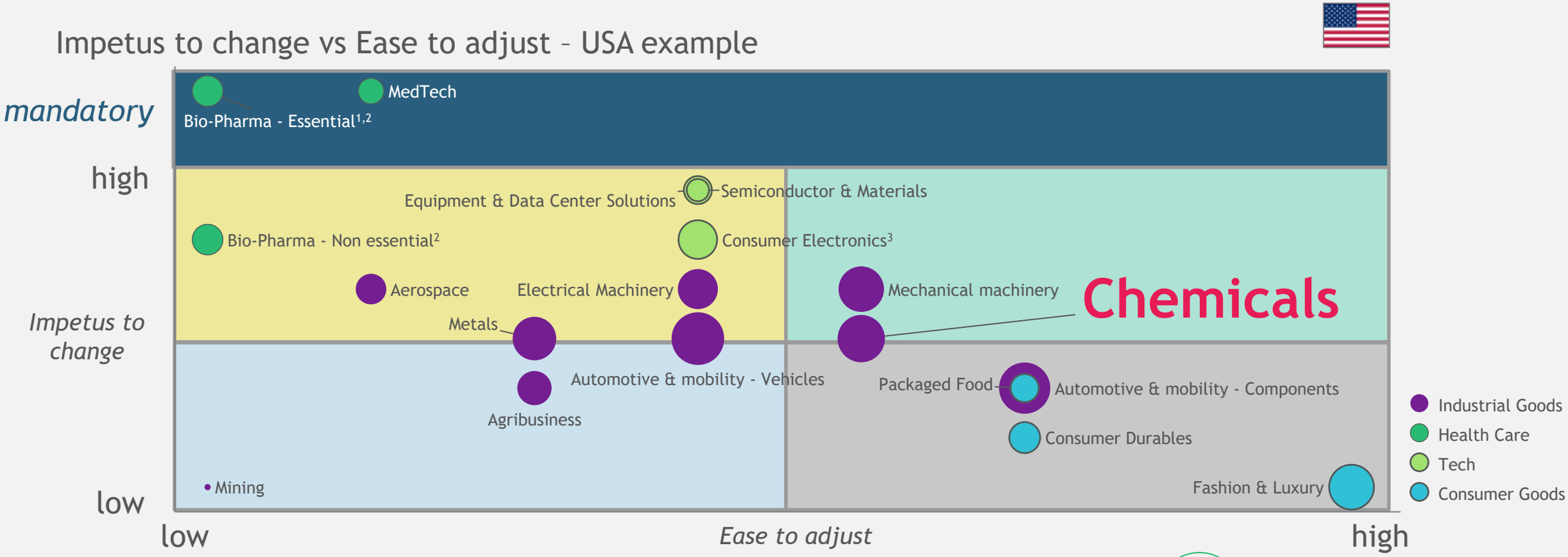
USA view: Chemicals clearly a priority sector for readjustment; similar for EU



1. Considers meds for public health (vaccines, antibiotics, antivirals) 2. Total imports distributed 50/50 for essential and non essential Bio-pharma given data limitations 3. Cell phones included Note: Drivers of Impetus to change include imports dependency, supplier country risk, SC structural risk and potential increase of nationalism; Drivers of Ease to adjust include capital intensity, access dependency and regulatory requirements; Source: WTO; OECD; Oxford economics, BCG Analysis

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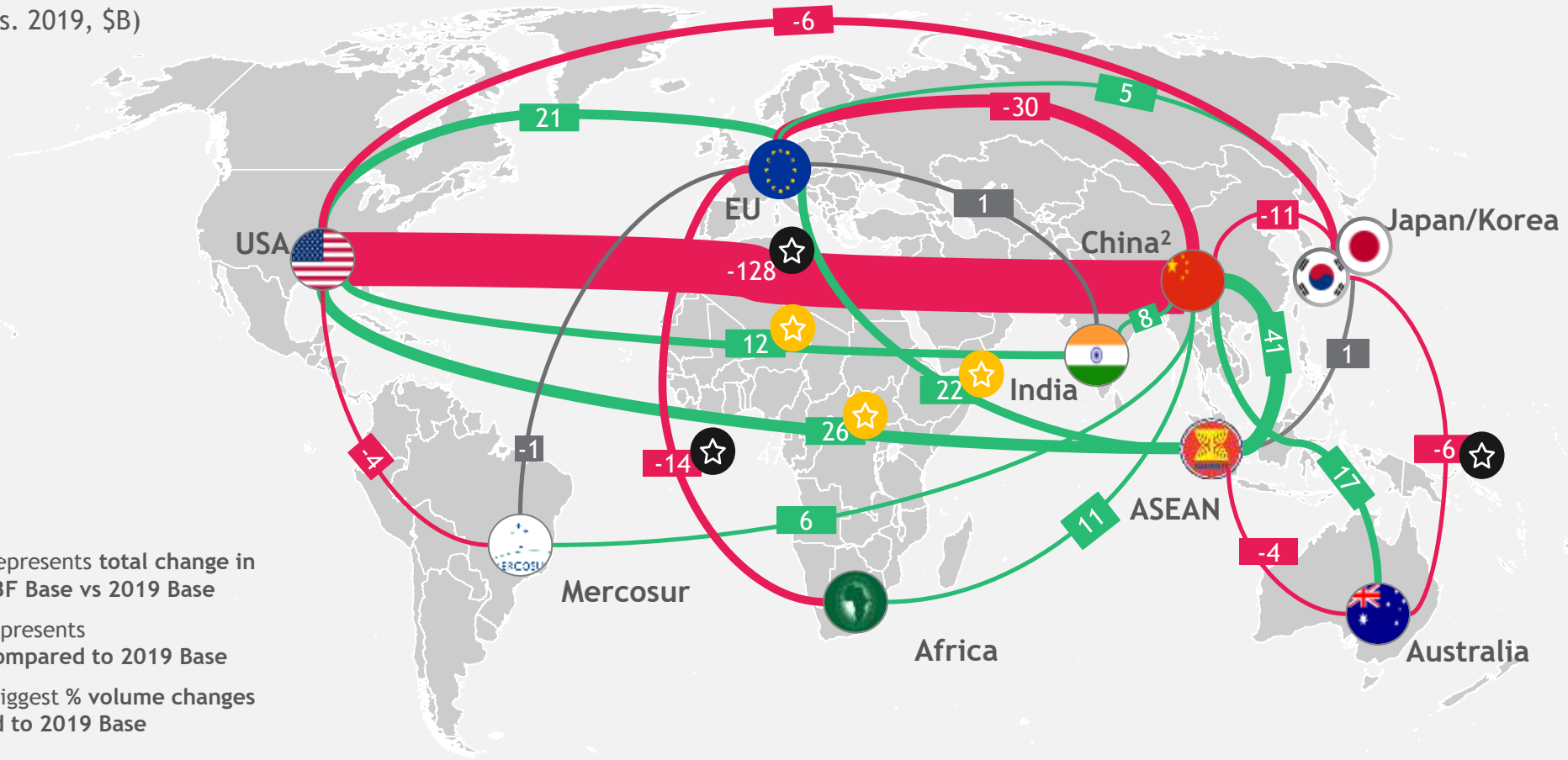
Overall: Trade expected to bounce back by 2023F, with large trade shift mix

Change in trade of goods
(Major corridors[1] , base case, 2023F vs. 2019, $B)



~$18T
Global trade 2023F

Legend

Width of arrow represents **total change in trade flows 2023F Base vs 2019 Base**

<-3% | -3%> <+3 % | > +3%

Color of arrow represents **change 2023F compared to 2019 Base**

Biggest losers | Biggest winners

Star represents biggest **% volume changes 2023F compared to 2019 Base**

1. Corridors in the map above represent ~32% of global trade. Intra EU=~20%; NAFTA=~8%; Mainland China/Hong Kong/Taiwan=4%; ASEAN=3%, RoW=~32%
2. Mainland China

Source: BCG Trade Finance Model 2020, UN Contrade, OECD, WEF, IHS, TradeAlert, BCG Analysis

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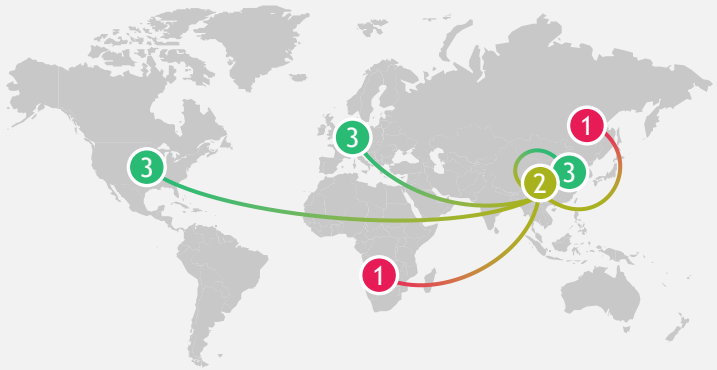
New supply chain models will emerge | Creating opportunities for India

Illustrative example for a firm traditionally manufacturing in China and selling globally

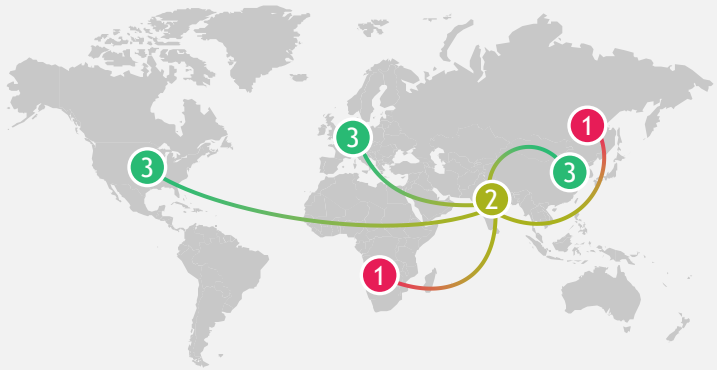
Global supply chains

Global supply chains with added redundancy, but limited footprint changes due to cost & access



Migrated supply chains

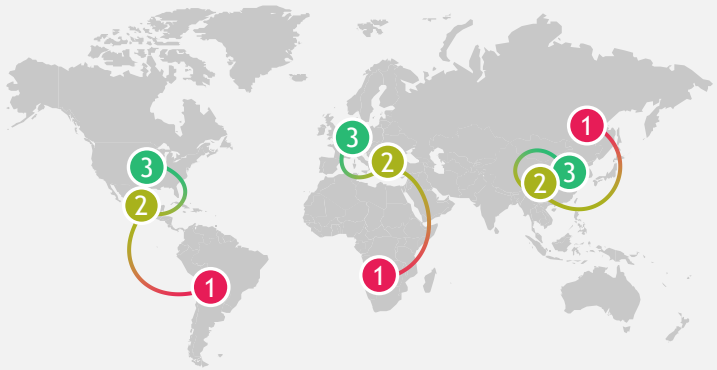
Global supply chains shifting to new geographies to reduce geopolitical risk exposure



1 Sourcing 2 Manufacturing 3 Distribution

Regionalized supply chains

Supply chains moving closer to end-markets, due to gov't incentives and/or risk mitigation



Opportunities for Indian ChemCos

\- +

Degree of change

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Imperatives: The call to action

Trade flow changes are real – intent will match sentiment

Competition for this trade will be intense – Indian companies not necessarily the "automatic" choice

Winning will require proactive outreach in roadshows ; early enough in the process to be "selected"

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Specialties Chemicals Industry Overview

Winners and losers in the Covid world

Tony Potter
Vice President, Specialty Chemicals – IHS Markit

Tony.Potter@ihsmarkit.com

IHS Markit®

What we'll cover today

- Specialty chemicals markets
- Impact of COVID-19
- Post COVID-19 recovery and the New Normal

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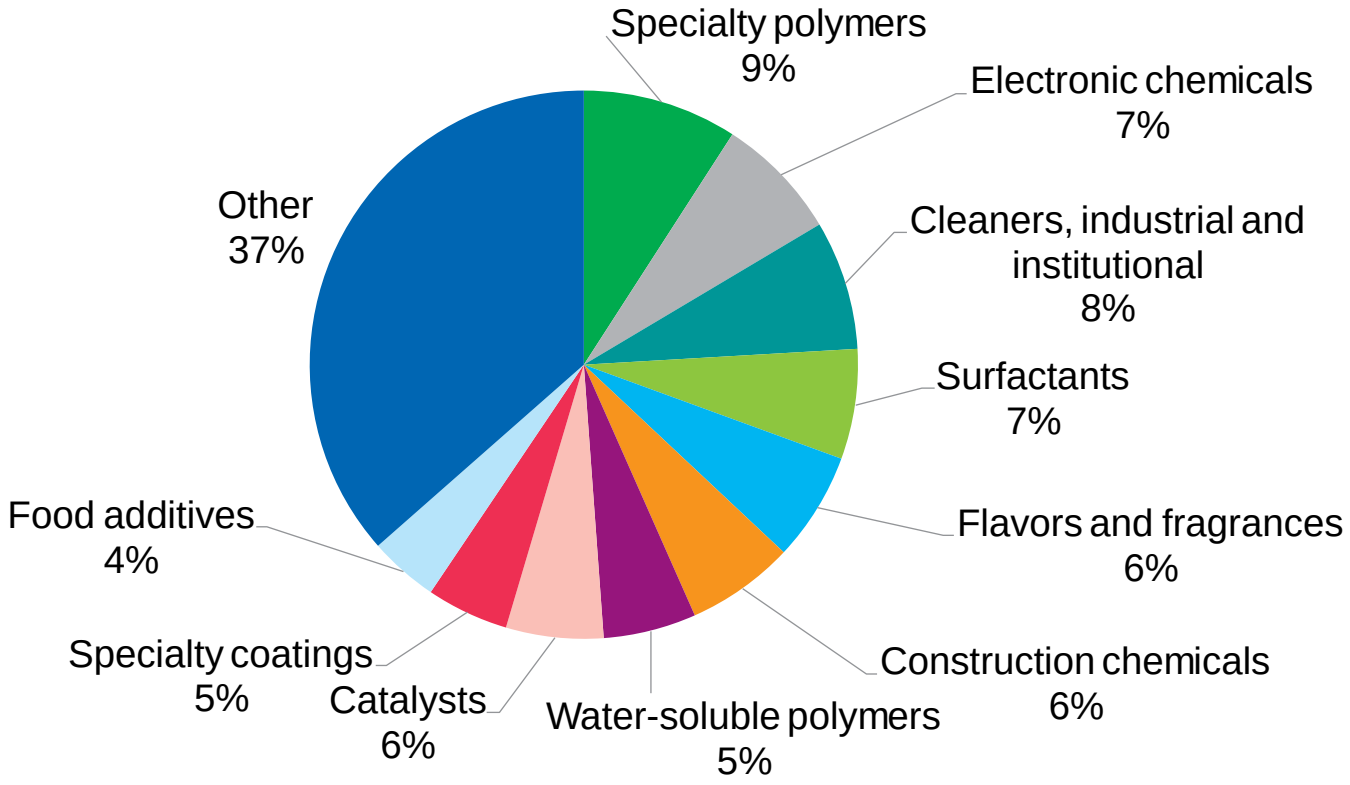
Specialty chemicals markets

Global specialty chemicals market reached $615bn in 2019

World specialty chemicals segments—2019



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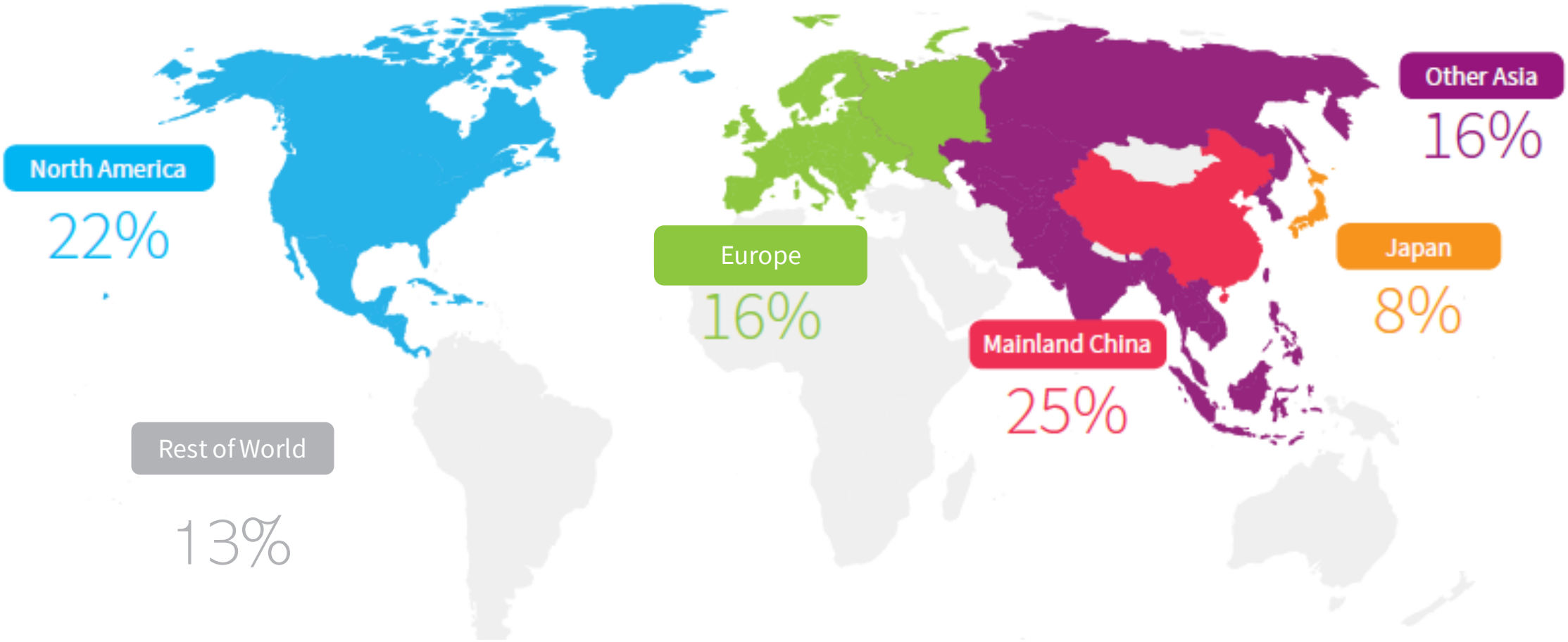
China is now the largest specialty chemicals market



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Mainland China is world's largest consumer

Antioxidants	Catalysts	Construction chemicals	Feed additives
PCB and semiconductor packaging chemicals	Plastics additives	Rubber-processing chemicals	Specialty coatings
Specialty polymers	Textile chemicals	Water management chemicals	

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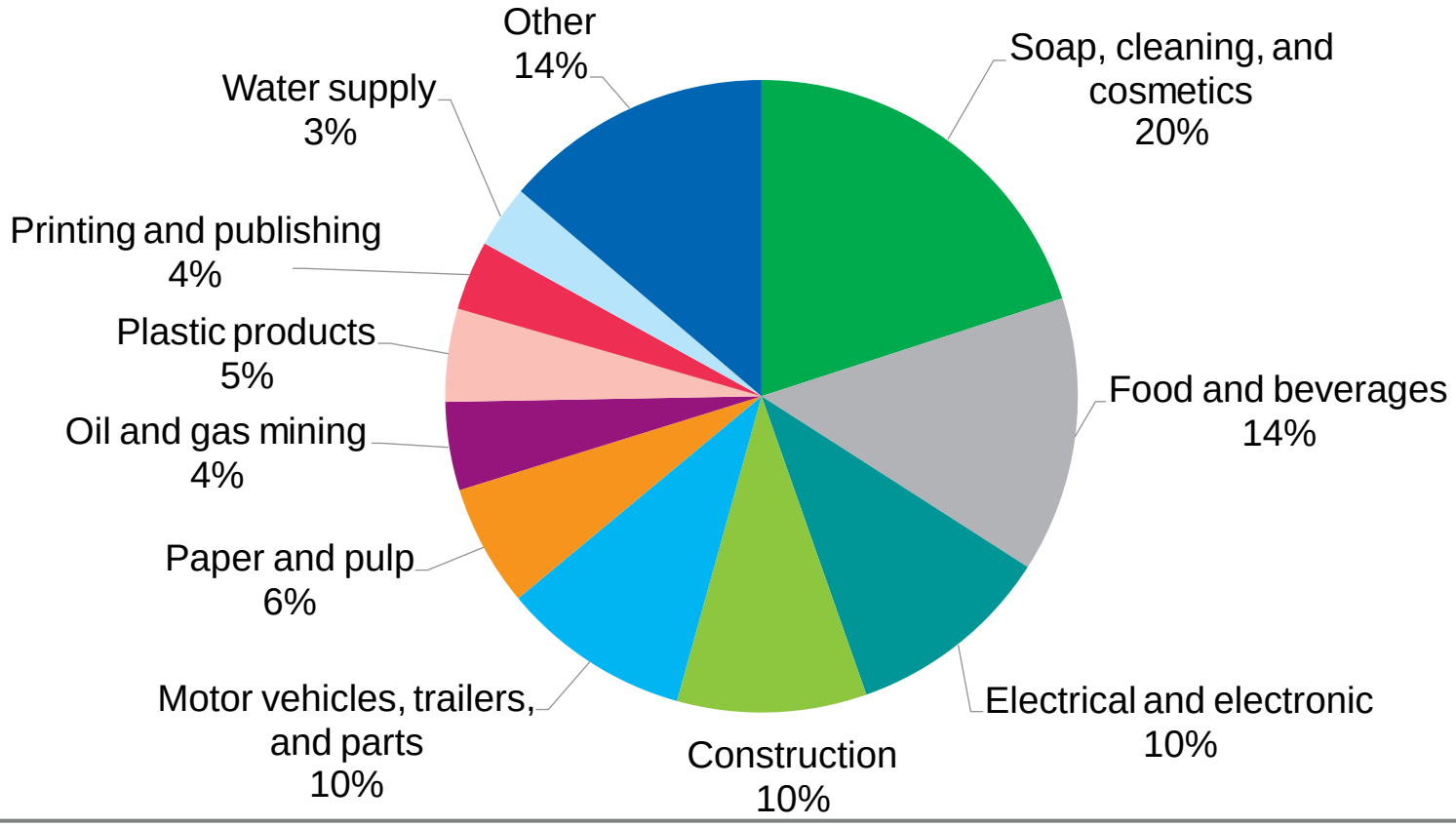
Many industrial and consumer markets rely on specialty chemicals

Global specialty chemicals consumption by end-use industry, 2019 = $615 billion



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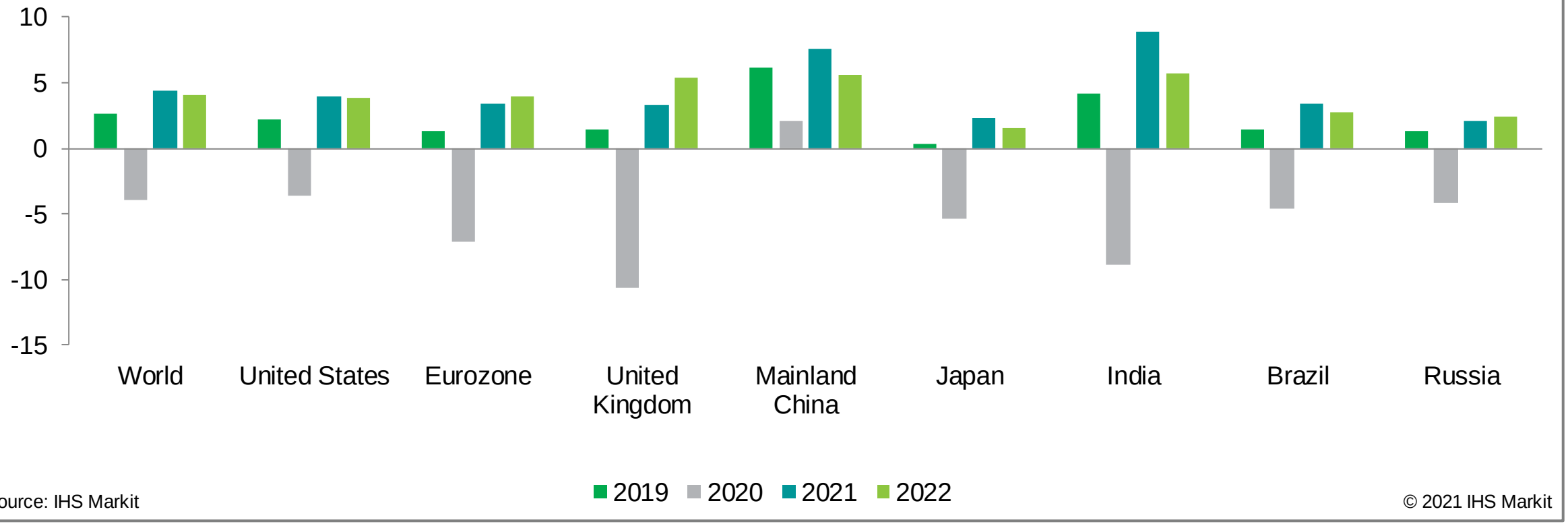
Impact of COVID-19

Comparison of real GDP 2019 - 2022

Real GDP development 2019-2022



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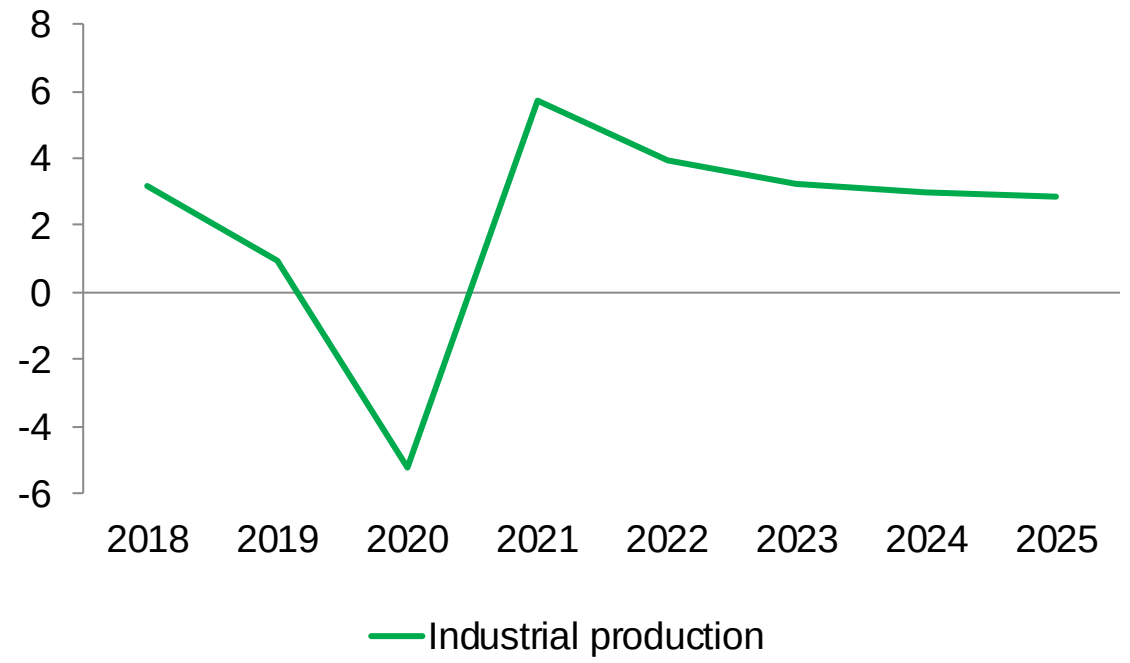
Industrial production will rebound in 2021

Global industrial production (percentage change)



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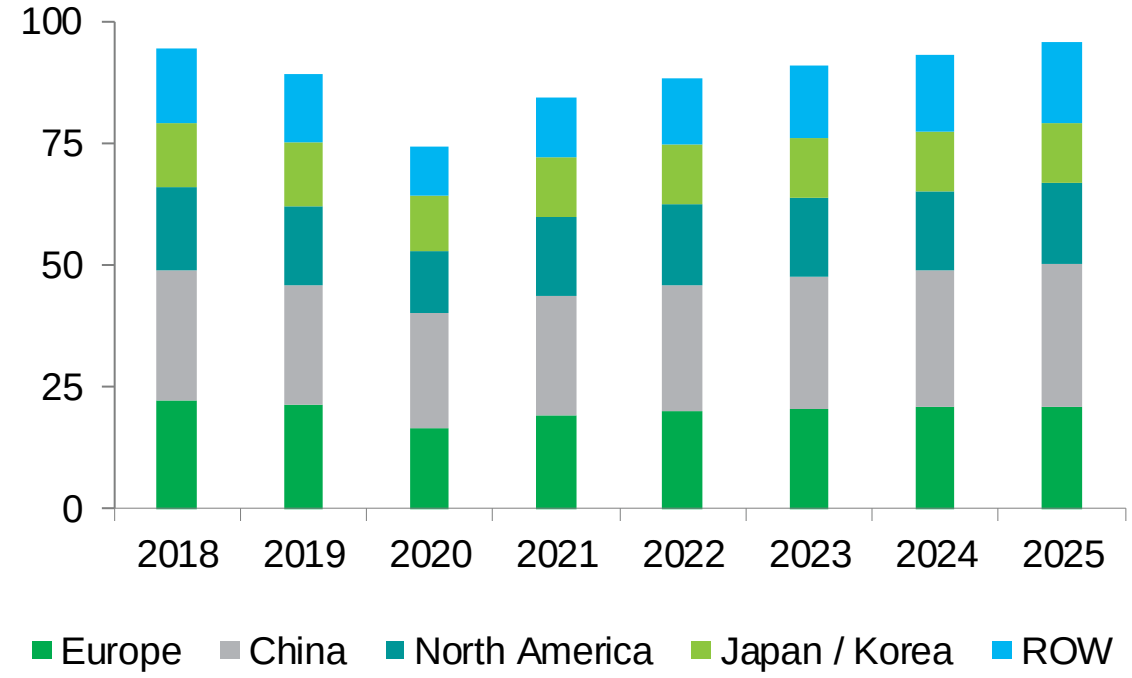
Light vehicle production (millions of units)



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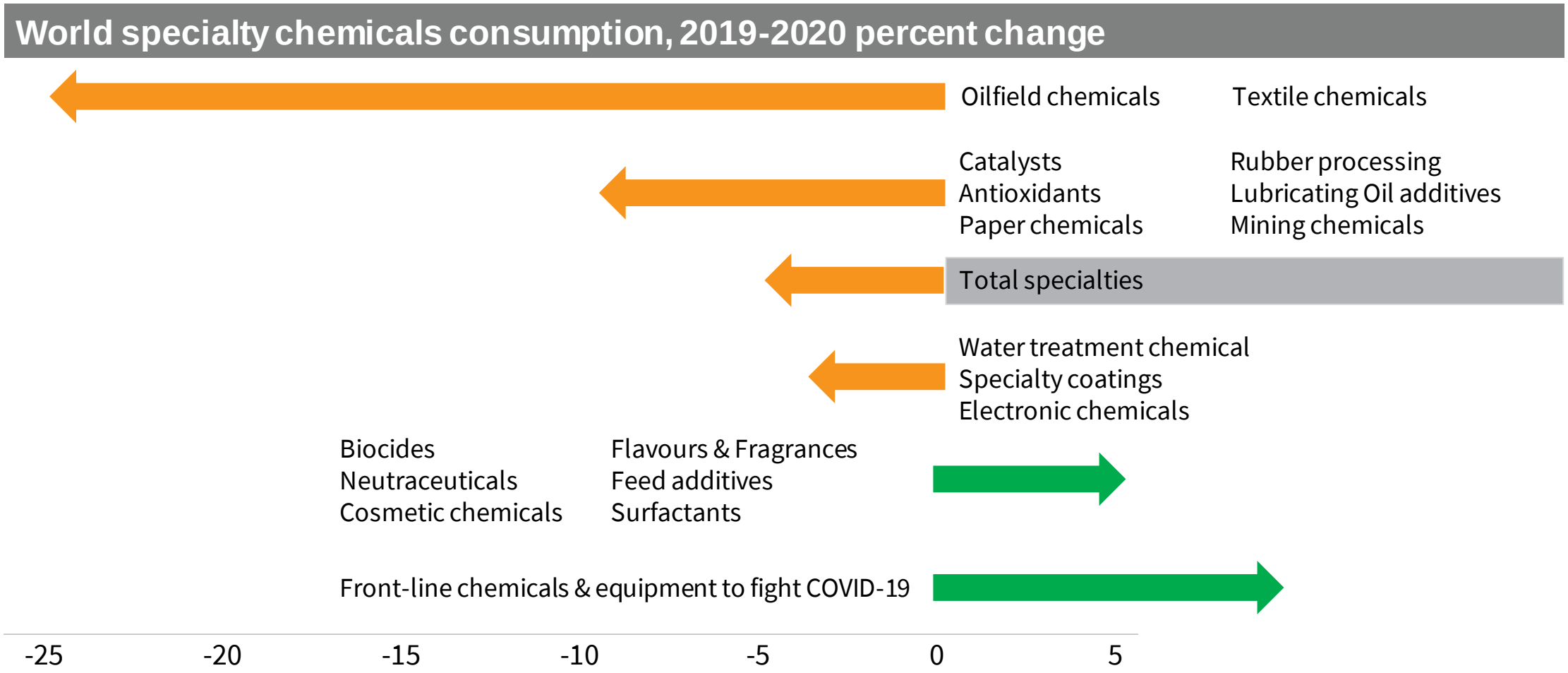
There will be winners and losers as a consequence of COVID-19



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Specialty chemicals on the front-line

- Sanitization
- Personal protective equipment
- Medical devices
- Track and tracing
- Health & well-being
- Plastics “Satan to Saviour”

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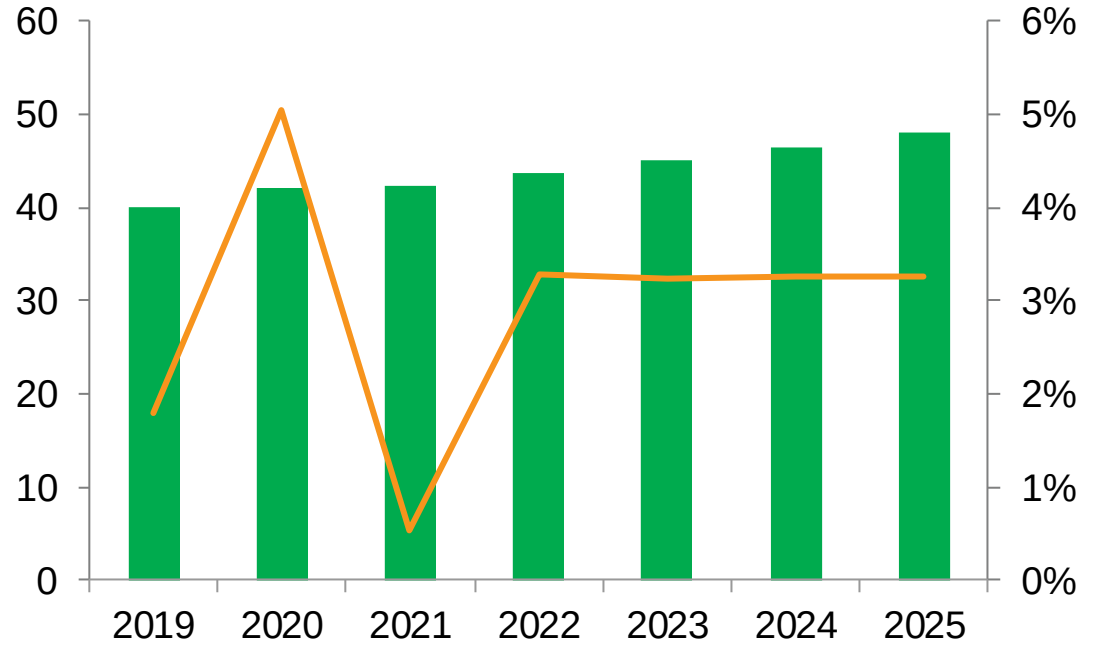
Front-line chemicals have seen a spike in demand in 2020

Global surfactant market (billion USD / YOY growth %)



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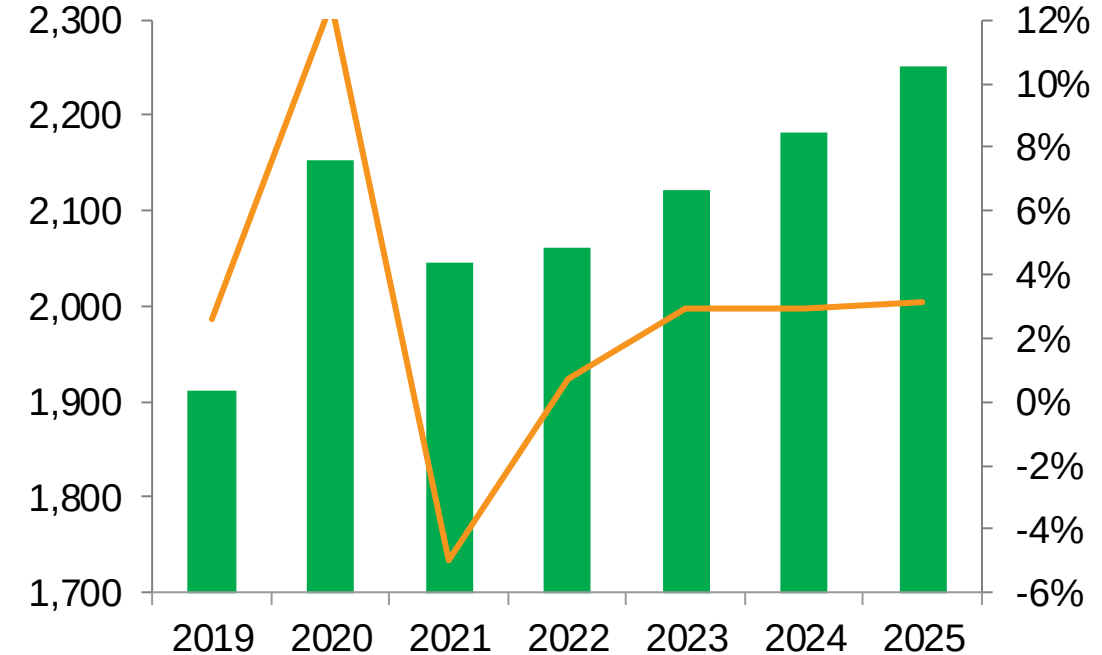
Global isopropanol market (1,000 mt / YOY growth %)



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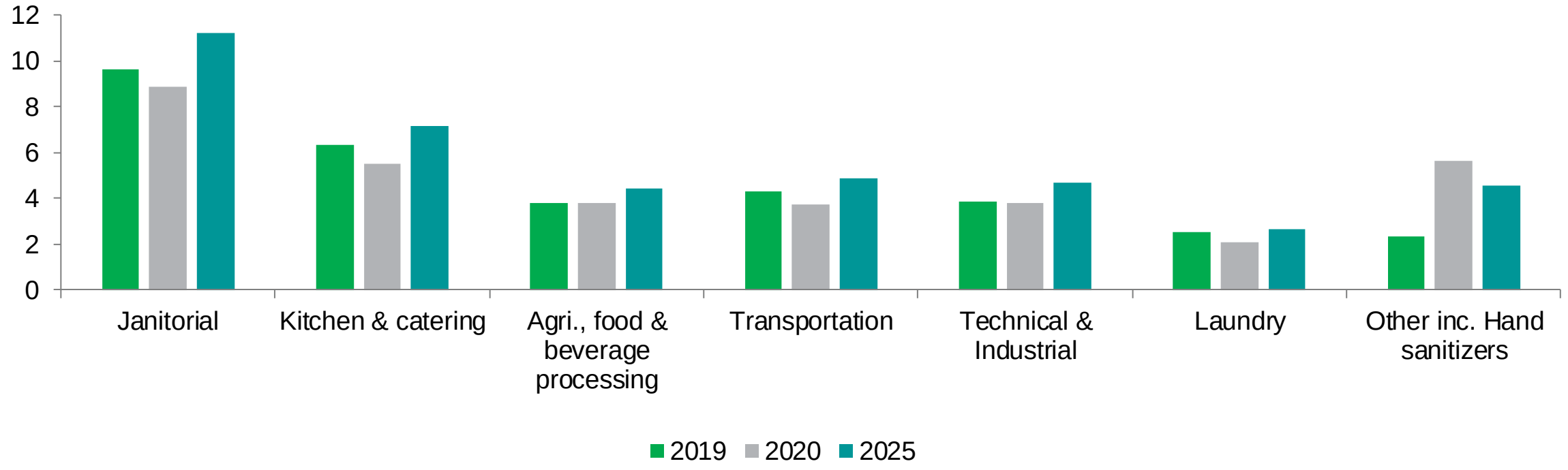
Industrial & Institutional Cleaning

Industrial & institutional cleaning market (billion USD)



Notes: Includes N America, W Europe, Mainland China, Japan
Source: IHS Markit Specialty Chemicals Update Program.

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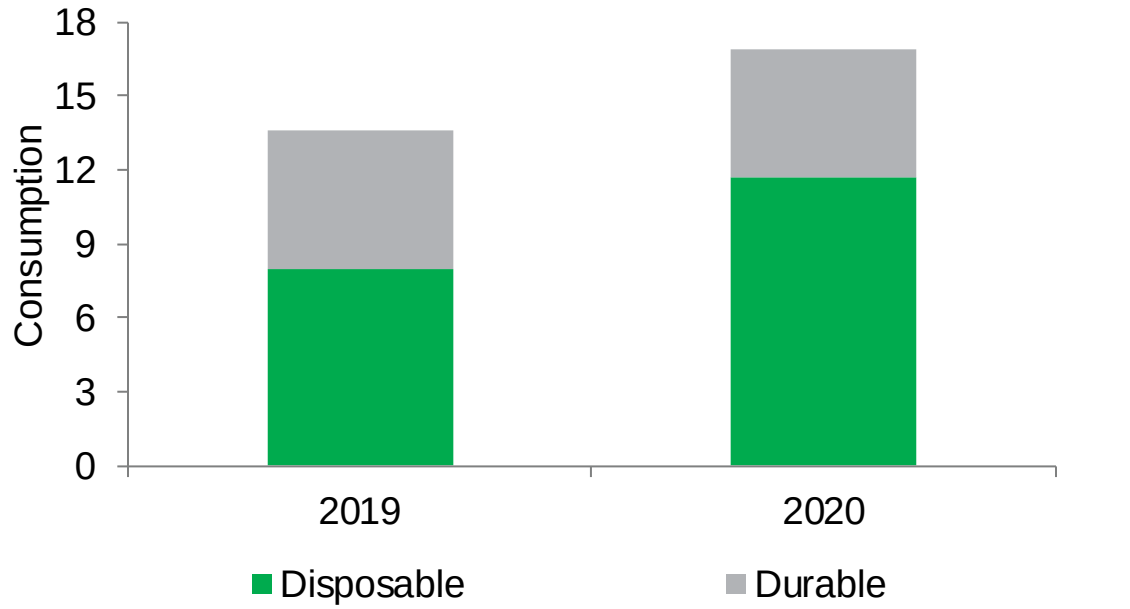
Consumption of nonwoven fabric in 2020 increased 24% from 2019

Nonwoven Fabric Consumption (Million Tons)



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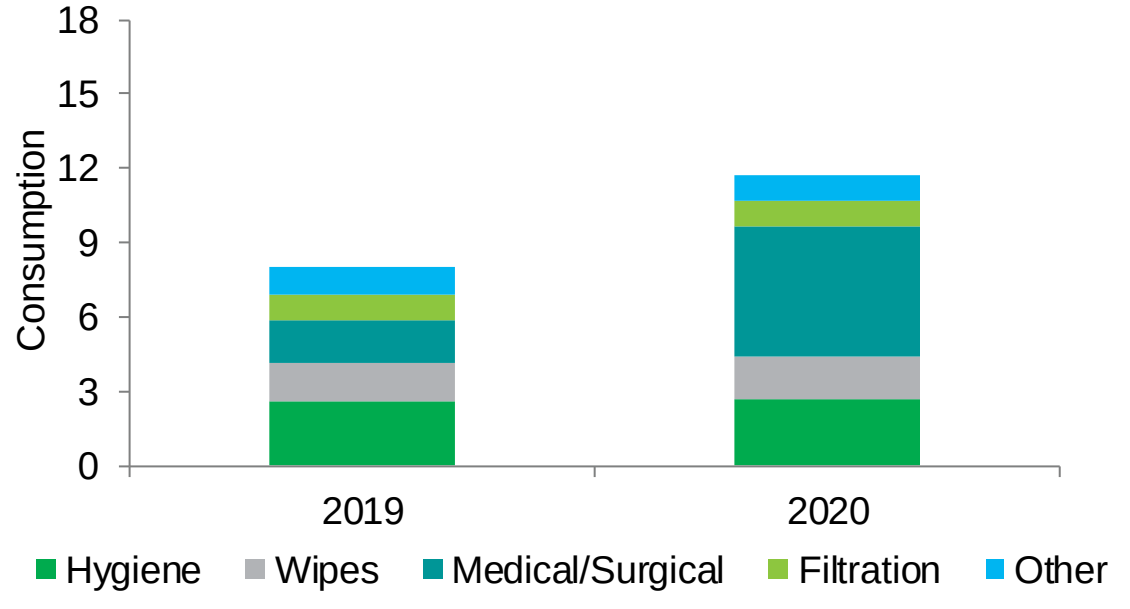
Disposable Nonwoven Fabric Consumption



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Post COVID-19 recovery and the “New Normal”

When will the industry recover ?

- State of global economy will be main indicator of performance
- Factors influencing economy
  - > Availability of vaccine to combat COVID-19
  - > Social & political changes
  - > US/Mainland China trade issues

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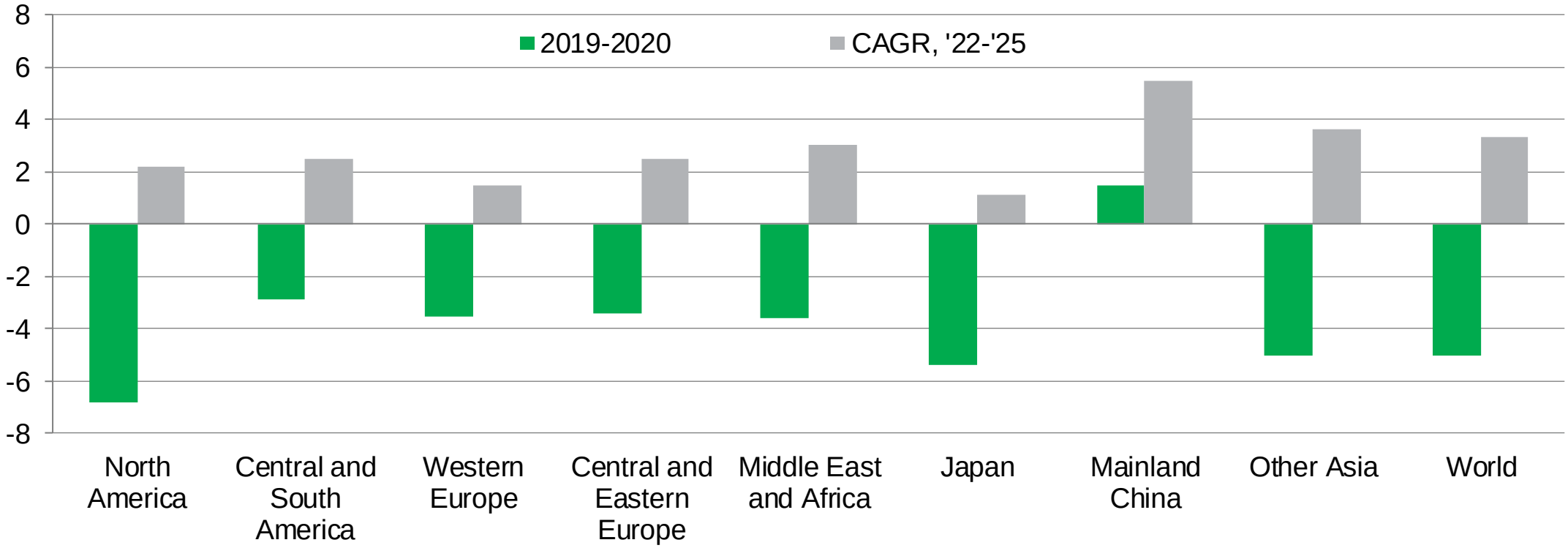
Post COVID specialty chemicals will grow above GDP

Regional consumption growth (percent)



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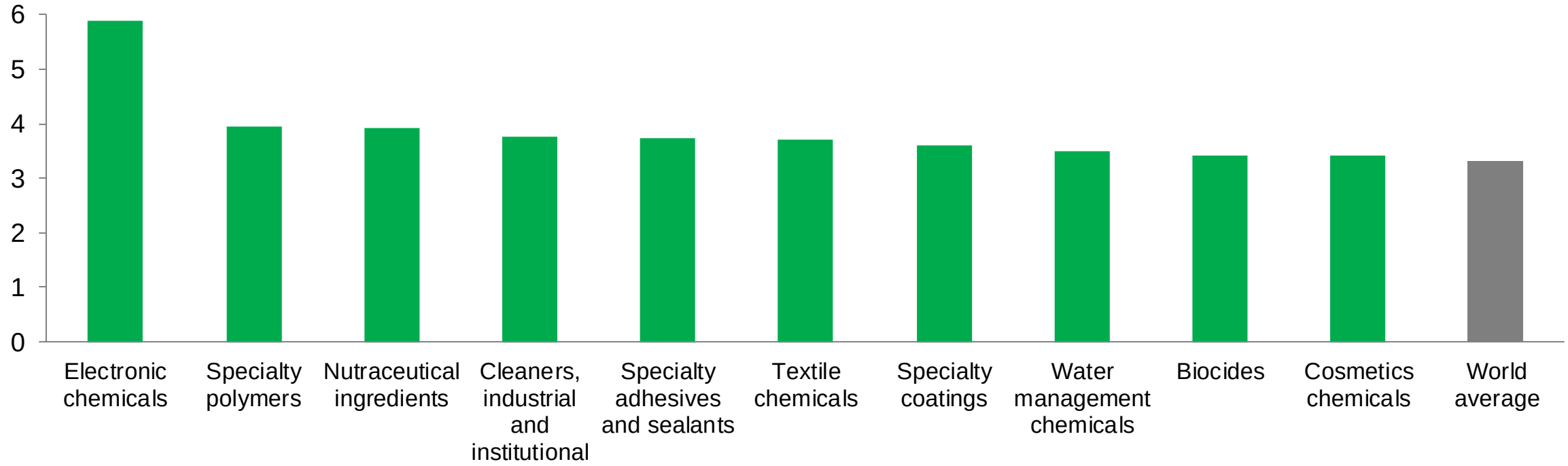
Electronic chemicals will be the fastest growing sector through 2025

Fastest growing specialty chemical segments—2022-25 (CAGR, percent)



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COVID crisis has adjusted our vision of new normal

- Highlighted vulnerabilities, exacerbated inequalities
- Affected
  - > How we work
  - > How we interact with one another
  - > Leisure activities
- Adjusted priorities
- New normal will present areas of opportunity for growth
- Climate change, sustainability and waste management will continue to gain momentum
- Specialty chemicals allow us to achieve more for less

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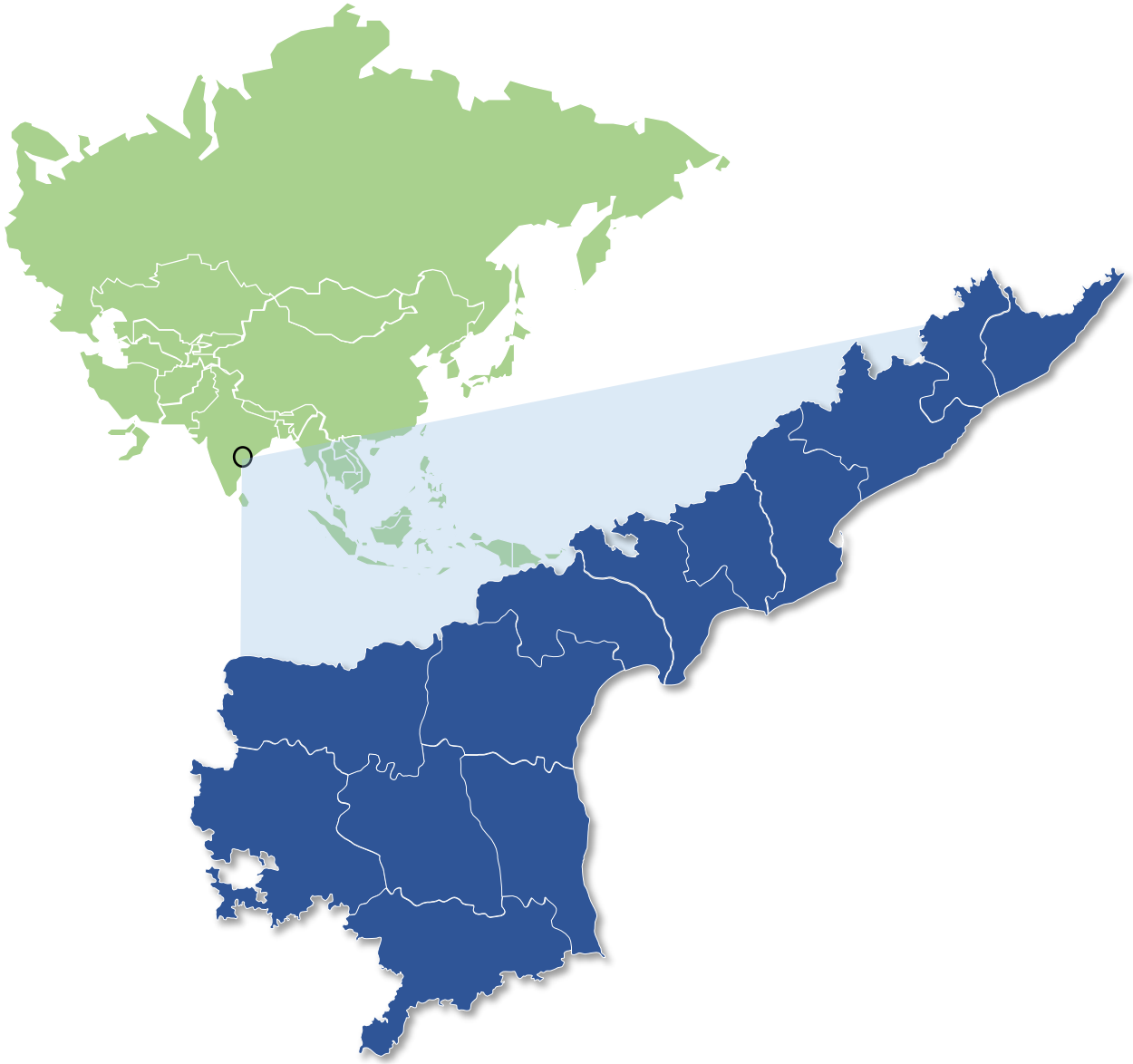
EDB
ANDHRA PRADESH
ECONOMIC
DEVELOPMENT
BOARD

Govt of Andhra Pradesh

Overview of Chemicals & Petrochemicals Ecosystem, Ease of Doing Business and Opportunities

Andhra Pradesh – Driving India's Transformation

Gateway to the East *with access to 6 Seaports, 6 Airports (3 international) and Domestic demand centers*



- **8th** — Largest state in India spread across 162,968 sq km
- **138** — Billion USD GSDP (current price) in 2019-20
- **974 Km** — Second longest coastline with 4 large ports for Indo-pacific trade
- **27%** — Higher per capita income than national average
- **50%** — Targeted increase in urbanization from 35%
- **400** — Industrial parks with pre-cleared land parcels, Plug and Play facilities

Overview of Chemicals and Petrochemicals Sector in Andhra Pradesh

*Ideal destination to tap the **USD 11 Bn worth India Opportunity** in Petrochemicals and drive exports in Chemicals sectors*

8%
India's production value as on FY 2019-20 i.e., USD 11.9 bn

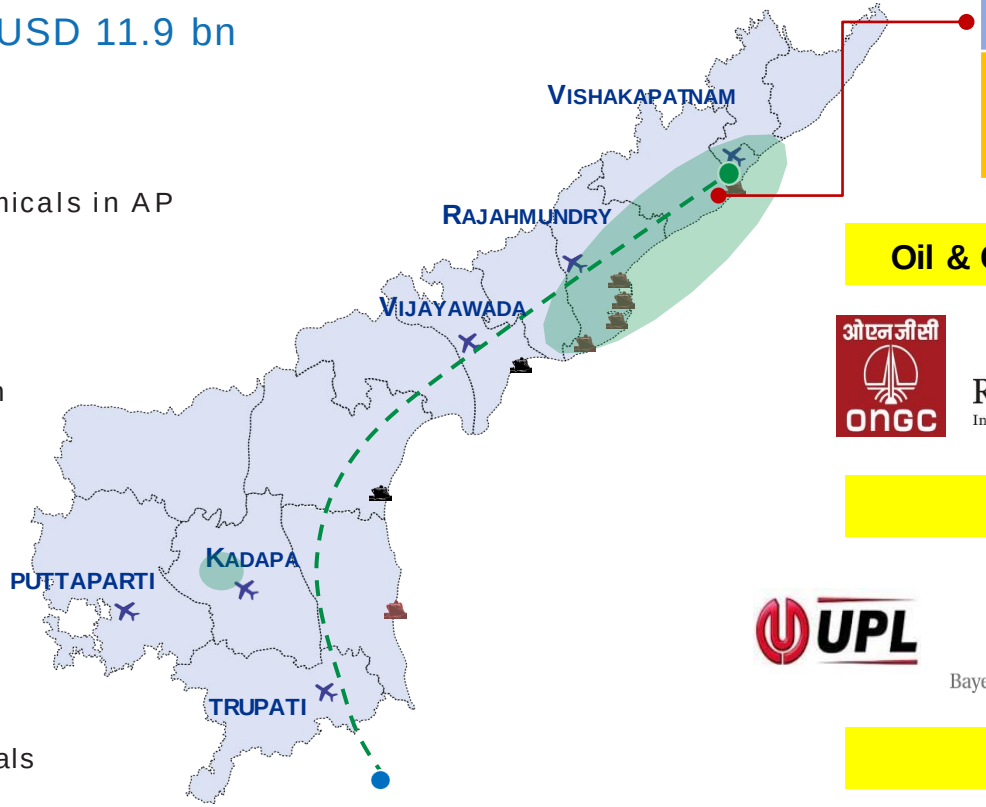
USD 2.4 Billion
Worth investments in Chemicals & Petrochemicals in AP

22%
Growth in AP Exports with USD 2.1 bn as on FY 2019-20

1,130 MMTPA
Home to maximum oil and gas reserves

640 Sq.km
Largest Petroleum, Chemicals and Petrochemicals Investment Region in India

5,100+
Mega and MSMEs employing 1.2 lakh workforce



Largest PCPIR in the nation spread across 640 sq.km between Vishakapatnam and Kakinada

Companies covering Pharma, Organic and Inorganic chemicals, Specialty Chemicals, Industrial Gases, Agro-chemicals and Fertilisers

Oil & Gas Exploration and Refinery Companies

ONGC, Reliance Industries Limited, HP, CAIRN Energy for India, IndianOil, GAIL

Major Agro-Chemical Companies

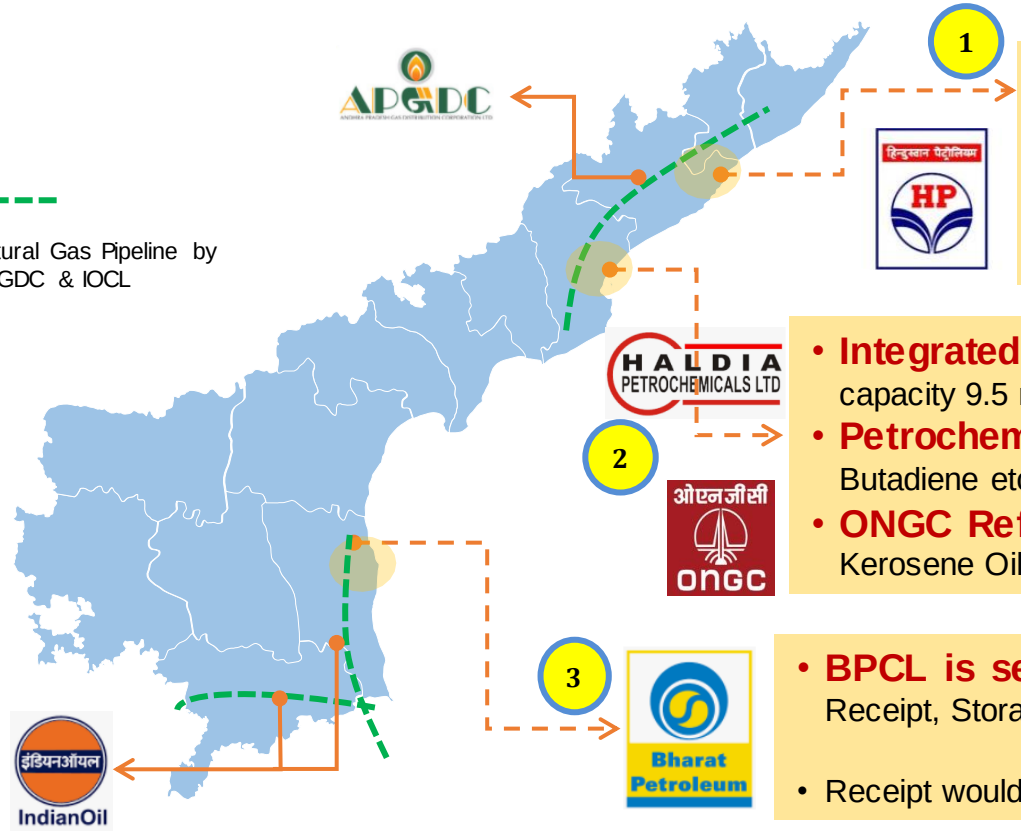
UPL, Bayer CropScience, EXCEL, MOL Meghmani Organics Limited, insecticides (India) Limited

Major Chemical Companies

Galaxy, Pidilite, Berger, Aditya Birla Chemicals, covestro, PRAXAIR, asianpaints, The Linde Group, BASF

Presence of Refineries and Availability of Feedstock

Opportunity to build ***Self-sufficiency*** *in Petrochemical Intermediates and drive downstream industries*



- **Brownfield expansion of HPCL** refinery from current 8.33 MMTPA to 15 MMTPA
- Hydrocracker unit (FCHCU) with a capacity of 3.053 MMTPA as part of **Visakh Refinery Modernization Project (VRMP)**
- **JV of HPCL & Total of France** - LPG cavern at Visakhapatnam Port for 60,000 MT and Crude Storage of 1.2 MMT

- **Integrated "Crude to Chemicals" Complex** by Haldia Petrochemicals Ltd with capacities of – Refining capacity 9.5 mmTPA, Ethylene Cracker Complex 1.5 mmTPA and Aromatics (PX) 1.6 mmTPA
- **Petrochemical production** of Polymers (HDPE, LLDPE, PP), Chemicals (MEG, Paraxylene, Benzene, Butadiene etc)
- **ONGC Refinery of 0.1 MMTPA crude oil** at Tatipaka, producing Naptha, High Speed Diesel, Superior Kerosene Oil, Reduced Crude Oil

- **BPCL is setting up new Petroleum Oil (POL) Terminal** with capacity of 1.61 lakh cubic meter for Receipt, Storage and Dispatch of Petroleum Products - Motor Spirit, Ethanol, High Speed Diesel and Bio-Diesel
- Receipt would come from BPCL Cochin crude oil refinery of 9.5 MMTPA

Opportunities across end-user industries in Andhra Pradesh

12.4% Growth in **Specialty Chemicals** segment

- 2400+ units invested in Plastics, Polymers and Allied
- 4700+ Textiles unit invested within Artificial, Synthetic, Man Made Fiber, Grey Fabric, Polyester fabric, Agro-textiles

12% Growth in **Agro Chemicals & Fertilizers**

- Ranked #1 in Horticulture - Chillies, Cocoa, Lime, Papaya, and Tomato, Banana, Mango
- Ranked #2 in Agriculture in India, with16000 FPUs

7.5% Growth in **Petrochemical products**

- 3 MTPA Integrated steel plant, *downstream industries*
- Sector-specific parks – *Pharma, Electronics, Furniture*
- 10,641 RBKs planned to supply seed, fertilizers & seedling to agriculture, Aquaculture and Horticulture

Strong Port Infrastructure and Port-led Development

With direct shipping calls from South East Asian economies to ports in Andhra Pradesh vis-à-vis ports on West coast, the transit time of around ***2-3 days*** *is saved*

#2 in Cargo handling capacity
150 MMT of Cargo per annum as on FY 2018-19, targeted to 326 MMT

A New Ports Planned

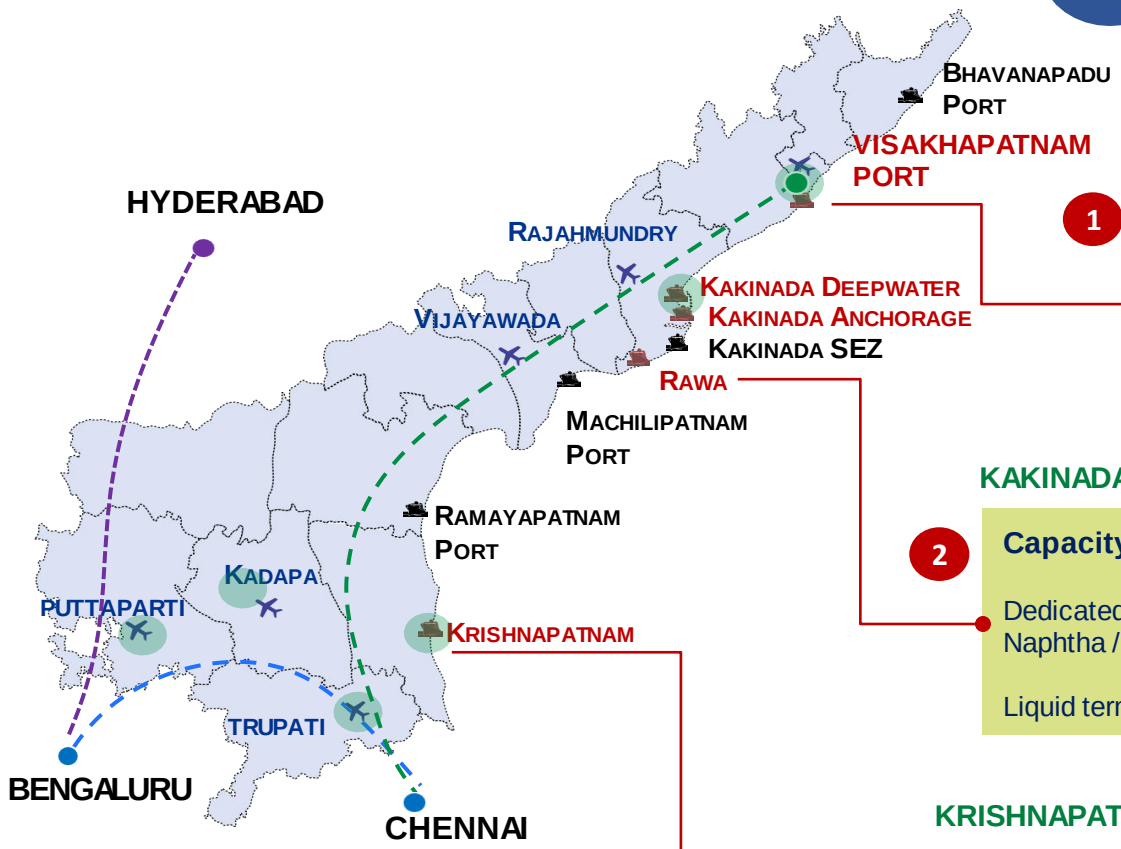
- Machilipatnam
- Ramayapatnam
- Bhavanapadu
- Kakinada SEZ

B Institutional

- **AP Maritime Board** for Rapid Development

C Industrialization

- **Port Based Clusters**
- **Desalination Plants** for Assured Water Supply



Legend	
	Existing Ports
	Proposed Ports
	Airports

VISAKHAPATNAM PORT

1

Capacity: 125 MMT PA

Cargoes handled: Iron ore, Coal, Crude oil, Petroleum products, LPG, Fertilizers, Liquid cargoes

Connectivity: 4 lane 12 Km corridor between Visakhapatnam port to NH16 (golden quadrilateral)

KAKINADA PORT

2

Capacity: 14 MMT PA, upgradation to 27 MMT PA

Dedicated berths for Petrochemical complex and Crude Oil refinery, Naphtha / Ethane,etc

Liquid terminals to handle Very Large Crude & Ethane Carriers

KRISHNAPATNAM PORT

3

Capacity: 54 MMT PA

Two Dedicated Liquid Cargo Handling Berths of 17.5 meters for LPG/LNG Ships, POL, Chemicals, Speciality Chemical Ships

Dedicated Liquid Storage for LPG, LNG, POL Products, Petrochemical Products, Speciality Chemicals, Chemicals And Edible Oil

Industrial Corridors and Industrial Water Supply Projects

*Only state in India to have **3 National Industrial Corridors**, across 48,352 Acres of land bank*

Suitable Locations for Chemicals and Petrochemical Industry

Industrial Water Supply Co.
Industrial Node

KAKINADA

Kakinada SEZ: 10,000 Acs

Samarlakota Reservoir

200 MLD

HBIC approved in Aug 2020

Orvakal (9,300 Acs)
- NICDIT approved in Aug 2020

Orvakal Mega Industrial Hub

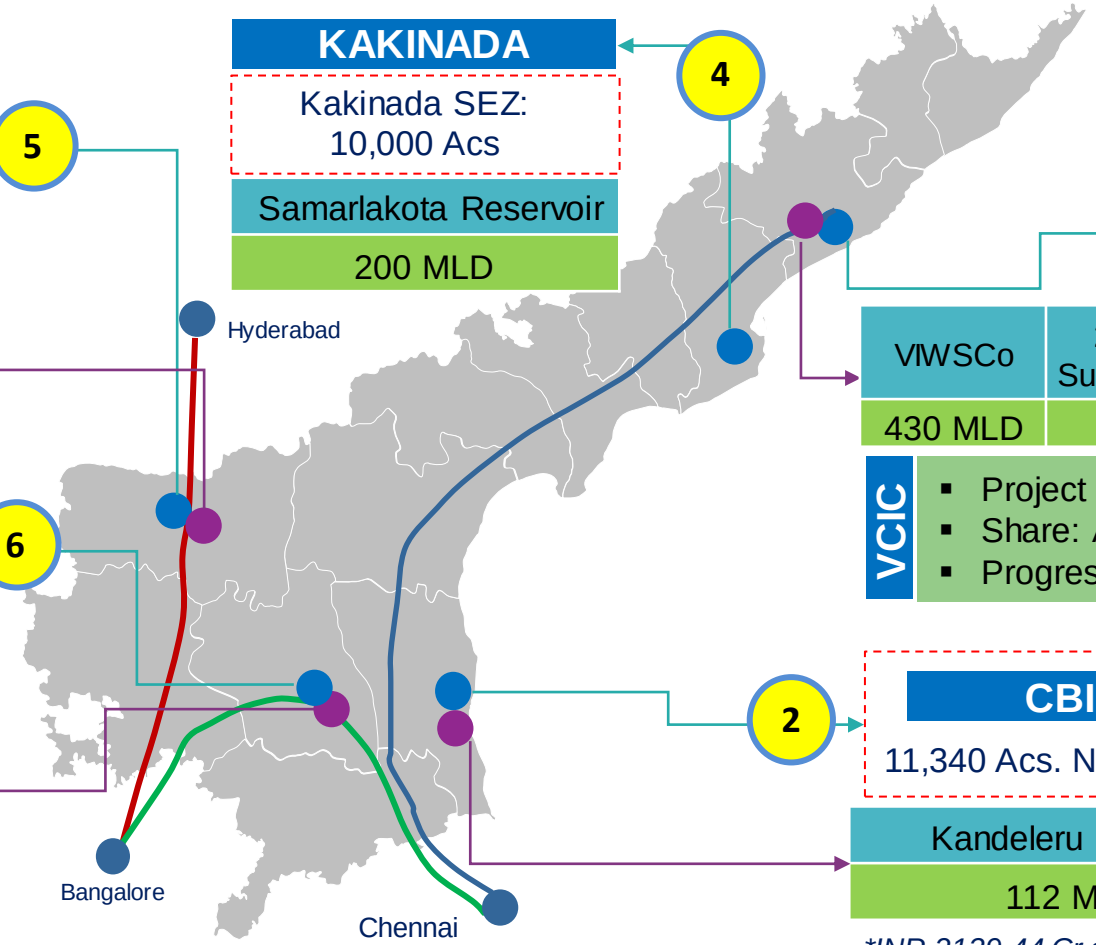
74 MLD

Mega Industrial Park, Kopparthy, KADAPA

6,914 Acs (NICDC – 4,085 Acs, APIIC – 2829 Acs)

Somersila reservoir

46 MLD



1 VCIC

Nakkapalli: 4,316 Acs
Rambilli: 2,532 Acs

VIWSCo	24x7 Water Supply to GVMC	Atchuthapuram	Nakapallie Start up
430 MLD	87 MLD	95 MLD	6 MLD

VCIC
- Project Cost: INR 5,544 Cr
- Share: ADB 74%, GoAP 26%
- Progress: 41% Physical; 29% Financial

2 CBIC: Krishnapatnam*

11,340 Acs. Nellore

3 KRIS CITY

Kris City: 2,500 Acs

Kandeleru reservoir	Naidupeta cluster
112 MLD	21 MLD

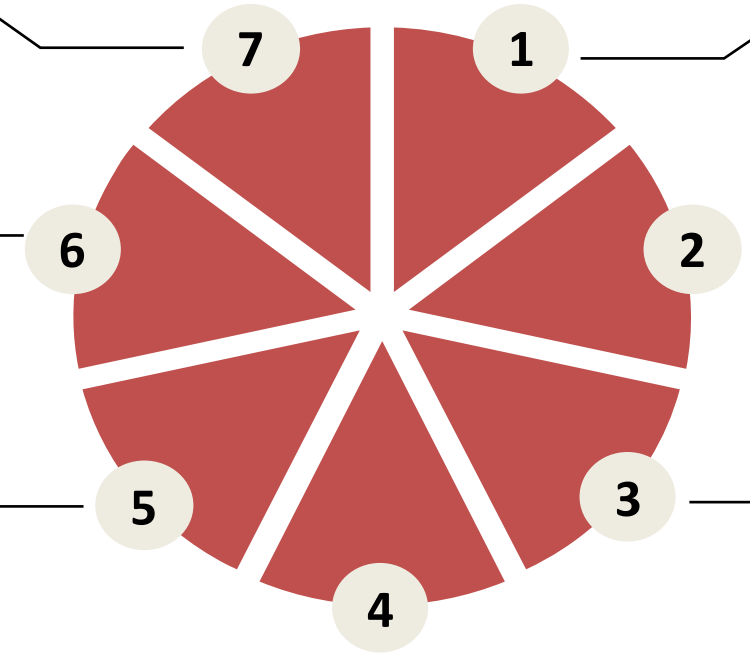
**INR 2139.44 Cr approved by Cabinet Committee on Economic Affairs, GOI under CBIC Development*

NICDC: National Industrial Corridor Development Corporation

- Vizag-Chennai Industrial Corridor (VCIC)
- Chennai-Bangalore Industrial Corridor (CBIC)
- Hyderabad-Bengaluru Industrial Corridor (HBIC)

- The National Industrial Corridor Development dovetails into the PCPIR development, improving the connectivity further
- Presence of CETP, Access for marine outfall, Well connected and established logistics, Proximity to ports offers distinct advantage

AP Industrial Policy 2020-23 & Special package of Incentives for Mega Industrial Hub at Kopparthy, YSR Kadapa District



1 INTEREST & LOGISTICS SUBSIDY

- 5% upto INR 1.5 cr per year, for 5 years
- 25% of cost on domestic transport, upto INR 50 lakhs PA for 5 years

2 POWER SUBSIDY

- Rs. 1/- per unit for 5 years

3 NET SGST

- 100% Reimbursement for 10 years, upto 100% of FCI

4 Composite Lease cum Buy Model to de-risk investments and reduce upfront costs

5 LAND CONVERSION

- 25% of Conversion charges

6 INVESTMENT SUBSIDY

- 15% FCI, upto INR. 20 lakhs
- 20% FCI, upto INR 10 Cr

7 STAMP DUTY/ TRANSFER DUTY

- 100% Reimbursement

About **4.9 Lakh** Semi-skilled, **3.1 Lakh** Skilled, and **12,000+** B.Pharm/ M.Pharm/ Chemical Engineers Talent pool is available around potential locations on annual basis

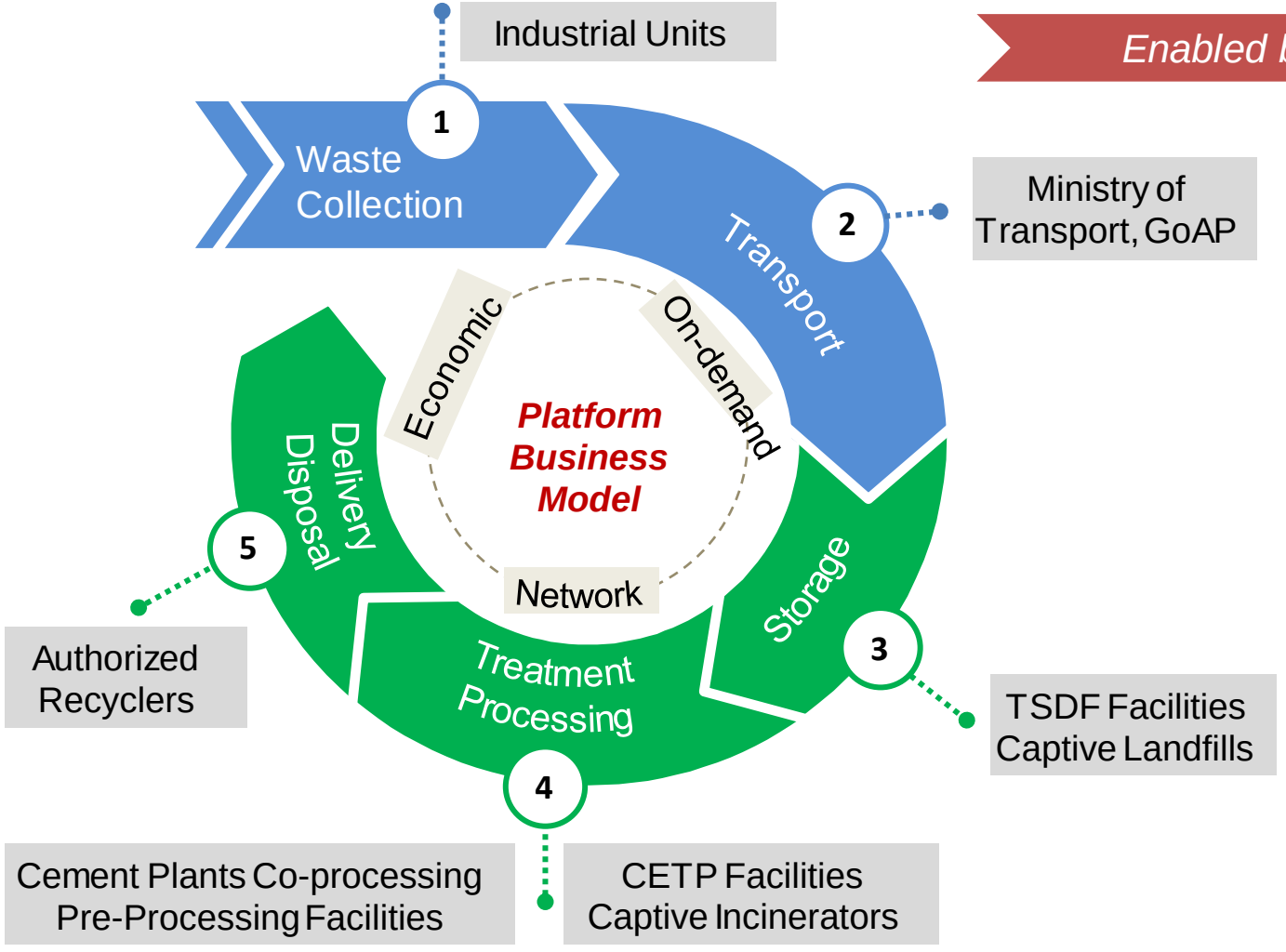
Tailor-made Incentives

For Investment proposals generating employment for more than 2,000 or investment of INR 500 cr

LAND PRICES	POWER COST	WATER COST	SKILL WAGE
INR 2,000-2,250 per sq.meter	INR 6-7 per KwH	INR 50-60 per KL	INR 8,000-10,000 per month
25-30% lower	33% lower	Abundance and 40% lower	15-20% lower

Effective – *Minimizing Cost of Doing Business*

First State to incorporate a government entity *to provide effective mechanism for collection, transportation, storage, treatment, processing, delivery and disposal of the industrial and other wastes by industries*



Enabled by

Online Waste Exchange Platform

2683 Waste Generators,

86 Waste Receivers

980 TPD Waste Generated and Disposed

Salient Features

- 100% tracking of waste generation and disposal
- GPS Vehicle tracking for movement of waste
- Scrutiny and audit of waste
- Safe disposal of toxic waste
- Promote usage of recycled waste
- Promoting 6 R's of waste management – Reduce, Reuse, Recycle, Refurbish, Redesign and Remanufacture to protect environment

Reduces operational cost of industries by 18-20% *and Cost of compliance towards Environmental, Social and Governance norms*

Waste and Manifest Management – *Service Charges for Waste Management*

With inputs and recommendations from BDMA, Cement Industries Association, CETPS, TSDFs, Pre-Processing units and Oil Reclamation (Recycling) units

Facilities Offered	Current Capacity	Planned Capacity
CETP	30.97 MLD	39.7 MLD
TSDF	10,25,000 MT	10,00,000 MT
Waste Pre-Processing Facility		50,000 MT *(APIIC Atchutapuram)*

#	Hazardous Waste	Service Charge (per Ton/ KL)
1	Utilizable Waste	INR. 100
2	Recyclable Waste	INR. 10
3	Incinerable waste	INR. 200
4	Landfillable Waste	INR. 50

#	Non-Hazardous Waste	Service Charge (per Ton/ KL)
1	Fly Ash	INR. 5
2	Domestic Solid Waste	INR. 1
3	Plastic, Glass	INR. 2

#	Liquid Waste	Service Charge (per Ton/ KL)
1	HTDS	INR. 50
2	LTDS	INR. 25
3	Marine Outfall	INR. 10

Pre-processing Facilities for sending pre-processed waste to cement industries for co-processing – **INR 25 per ton/KL**

Going beyond Ease of Doing Business

Vision

Andhra Pradesh to be the most preferred investment destination with sustainable growth

Beyond EoDB

EoDB + Perception

Ease of Doing Business (**EoDB**)

Minimizing Cost of Doing Business

Rationalization measures in fees charged, cost of compliances etc.
AP Environmental Management Corp Ltd, 'Platform-business model' for waste collection and disposal
Ready Built Factories/ Plug & Play Facilities
Skill Development

Implementation based rankings

Implementation of Business Reform Agenda shared by DPIIT,
Business Process Re-engineering,
Time bound service delivery,
Online payment & status tracking of application

Reducing Risk of Doing Business

Lease cum buy model to minimise risk of capital
"Industries Spandana" Query and Grievance
Centralized land encumbrance information systems
Alignment of Relationship Mangers to ensure setting up compliance with all requirements
Export Promotion Committees at district level
Reforms in compliance inspection to reduce risk of interruption in operations

EoDB | Ranked 1

Perception based rankings

Ensure reform implementation at ground level
Encourage usage of Single Window Portal
Building capacity of investors and staff on newly implemented systems and reforms
Kicked Off District Outreach workshop in Jan 2021 at Vizianagaram

Highest Rating in Business Reforms Action Plan (BRAP) 2019, by DPIIT

Sri R.Karikal Valaven, IAS
Special Chief Secretary to Govt. & CIP
Industries & Commerce Department
prlsecy_inds@ap.gov.in

Sri JVN Subramanyam, IAS
Chief Executive Officer, APEDB
Commissioner, Industries & Commerce
ceo@apedb.co.in

We Welcome you to Partner in Andhra Pradesh's Industrial Growth Story

MAGNETIC MAHARASHTRA 2.0

#MadeForBusiness

Maharashtra: Catalyzing Industrial Growth

India Chem 2021 – 11th Biennial International Exhibition & Conference

17th – 19th March 2021

Advantage Maharashtra

MAGNETIC MAHARASHTRA 2.0
#MadeForBusiness

Maharashtra's GDP size is **$402 billion**; accounting for **14%** of India's GDP.

Largest GDP in India

Attracted **$140 billion FDI** in 2000-2020; accounting for **30%** of India's share.

Largest share in FDI

Maharashtra contributes to **15%** of the Industrial output in India.

Leader in Manufacturing

Maharashtra has one of the highest Per Capita Income in India at **$3,190** in 2019-20

High Per capita Income State

Maharashtra has the highest value of exports; accounting for 21% of India's exports

Leader in Exports

Maharashtra has the **highest employable talent** in India at **68%**.

Best Quality Workforce

Largest base of Internet Subscribers in India at 87 million. 131 million telecom subscribers.

Growing Digitization

One of the leading state with **710** Engineering and Technology Colleges

Best Colleges in India

5 International & **13** domestic airports, **2** major & **53** minor ports, and largest power capacity.

Mature Infrastructure

Source: Economic Survey of Maharashtra 2021; RBI Handbook of Statistics 2020; NITI Aayog State Statistics; DGCIS Database; IBEF; India Energy Portal; India Skills Report 2020, AISHE 2019; All India Council For Technical Education *Faster Adoption and Manufacturing of Electric Vehicles in India Program

Maharashtra: Leading in Economic and Socioeconomic Indicators

MAGNETIC MAHARASHTRA 2.0
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- Maharashtra has been ranked as a top marquee state in India across different economic, socio-economic, and infrastructural indicators
- The rankings are prepared by key nodal agencies in India including NITI Aayog and Invest India

1st

Highest Employable Talent, India's Skill Report 2021

1st

Invest India's State IPA Ranking 2020

2nd

NITI Aayog's India Innovation Index 2020

1st

Good Governance Index and Composite Water Management Index 2020

2nd

NITI Aayog's Export Preparedness Index 2020

Infrastructure-led Growth

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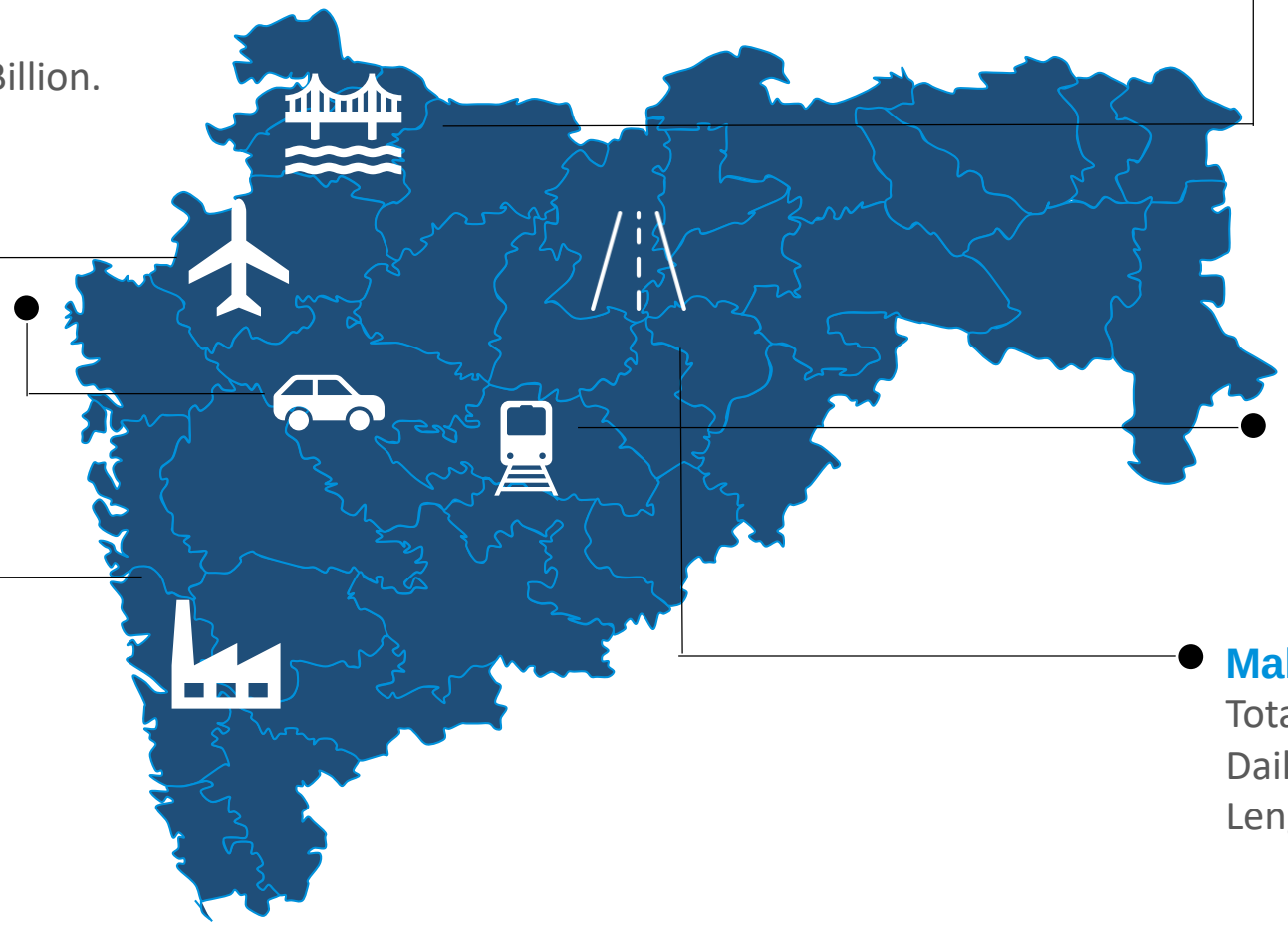
Navi Mumbai International Airport
Total cost: USD 2.6 Billion.
Passenger Capacity:
60 Million/Year

Mumbai Trans-Harbour Link
Total cost: USD 2.2 Billion
Yearly Ridership: 14 Million



The Great Mumbai Coastal Road
Total cost: USD 1.7 Billion.
Projected Use: 130,000 vehicles daily

Metro Projects in Pune, Mumbai and Nagpur
Total cost: $21.8 billion
Daily Ridership: 9 Million

Delhi – Mumbai Industrial Corridor
Total cost: USD 90 Billion
Two Industrial nodes in MH
- AURIC (Aurangabad)
- Dighi (Raigad)

Maharashtra Samruddhi Mahamarg
Total cost: $6.9 Billion
Daily Ridership: 11 Million
Length: 700 km (435 miles)

30+	Number of Mega Projects under development	$40 Bn	Total Investment in Transport Infrastructure	+48 Mn	Population Impacted

Source: Economic Survey of Maharashtra 2019-20; Brihanmumbai Municipal Corporation (BMC)

MIDC: Nodal Agency for all Investors

Maharashtra Industrial Development Corporation (MIDC) is the nodal Investment Promotion agency under the Government of Maharashtra. It provides businesses with infrastructure such as land, roads, water supply, drainage facilities and streetlights etc.

- Delhi Mumbai Industrial Corridor (DMIC)
- SUPA – Japanese Investment Zone

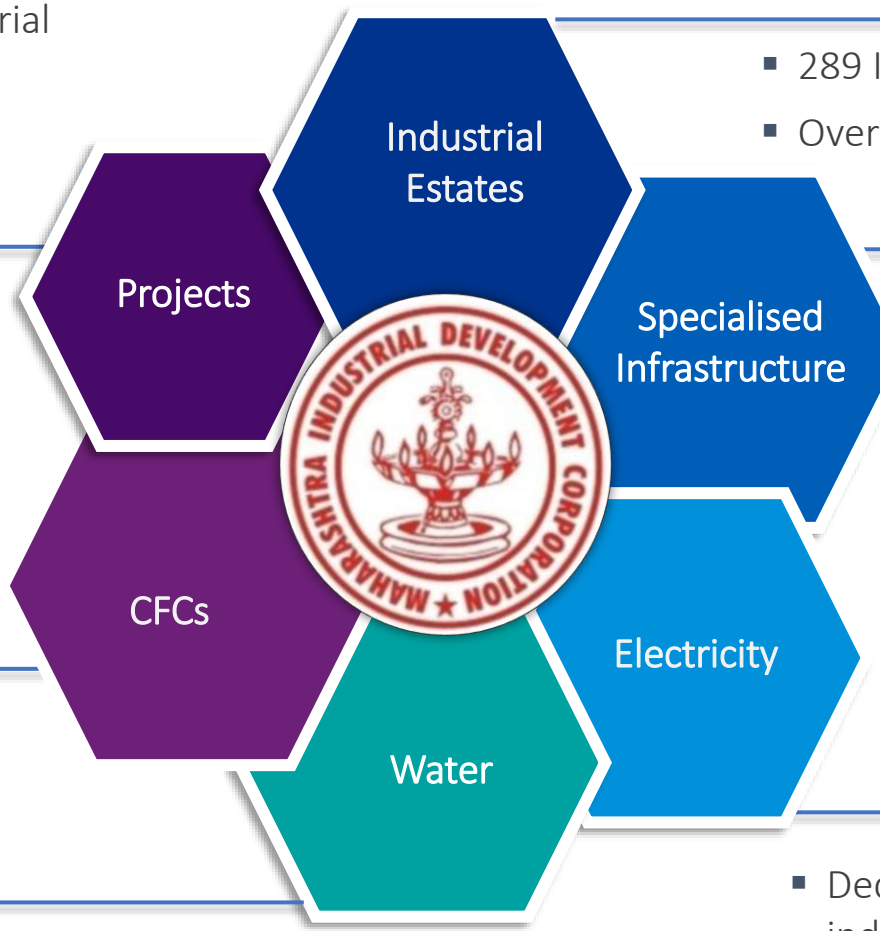
- 289 Industrial complexes
- Over 2.5 lakh acres of land

- 13 Chemical Zones
- 19 CETPs[1]
- 2 STPs[2]
- 4 CHWTSDF[3]

- Wine Parks
- Silver Parks
- Floriculture Park
- Food Parks
- Textile parks
- 27 IT Parks, 9 SEZs

- Largest water supply network in Asia
- 2500 MLD per day

- Dedicated feeders for industries



Key Activities

- Special planning authority
- Strong network of local authorities
- Link between Govt. and Industry
- Acquisition and disposal of land
- Providing support Infrastructure
- One-stop for Investors Relations

[1]Common Effluent Treatment Plants [2]Sewage Treatment Plants [3]Common Hazardous Waste Treatment, Storage & Disposal Facility

AURIC - Aurangabad Industrial City

MAGNETIC MAHARASHTRA 2.0
#MadeForBusiness

AURIC

Spread over 10,000 Acres and is being developed as one of **India's first Greenfield Smart Industrial Cities**

Managed by Aurangabad Industrial Township (AITL) - A notified Special Purpose Vehicle (SPV) has been formed by a joint venture between the DMIC trust and MIDC

AITL has its own set of DCR Rules and is the Single point contact for building permission, water permission etc.

GoI (DMICDC) 49%

GoM (MIDC) 51%

(Special Purpose Vehicle) **Aurangabad Industrial Township Ltd.**

New Jobs Created – 3Lakh
Resident Population – 2.8L

Export – USD 11.6 Billion
Industrial Output: USD 462 Bn

Major Investors in AURIC

HYOSUNG, oerlikon, Perkins, COATALL FILMS, FUJI SILVERTECH Building Smarter Infrastructure, ARROW HOW IT ALL COMES TOGETHER, Equinox Gauges, AIROX, ENDURANCE Complete Solutions, Meracus INDIA PVT LTD

- Reliable 24-Hours Power Supply
- Effluent Treatment Plants
- Well connected - Road - Rail - Air
- Walk to Work Concept
- Online Application
- Environment Clearance Obtained
- Single Window Clearance
- E – Land Management System
- AITL - Special Planning Authority

Chemicals Sector in India

MAGNETIC MAHARASHTRA 2.0
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Key Sector Highlights

- More than 80,000 Products
- 3% - India's contribution to total global chemical industry
- Contribution of 7% of India's GDP
- Employs more than 2 Million people
- 6th Ranked in the world in chemicals sale
- Projected to grow at CAGR of 9.3% till 2025

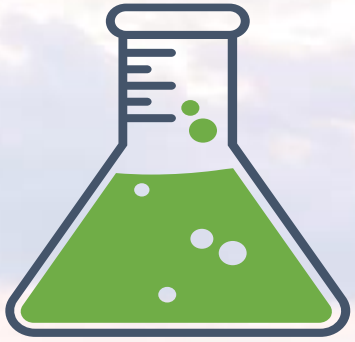
Sub Sector Highlights

Agro Chemicals

- India is the world's 4th largest producer of agrochemicals
- 13th largest exporter of pesticides and disinfectants
- Market size of approximately USD 6.3 Bn (2020)

Speciality Chemicals

- The specialty chemicals market has witnessed a growth of rate of 14% with an estimated market size of USD 70 Bn (2020).
- The specialty chemicals market is likely to clock a 12-13% compounded annual growth rate of over the next 5 years



Petrochemicals

- The petrochemical market in India is expected to grow at 10% CAGR to reach
- USD 100 Bn by 2022.
- Investment potential in petrochemicals for crackers is approximately USD 65 Bn

Source: Invest India

Chemicals Sector in Maharashtra

Maharashtra accounts for 18.2% of India's employment in chemical sector

Organic and Inorganic Chemicals comprise of 18% and 12% share respectively, in the total exports from India

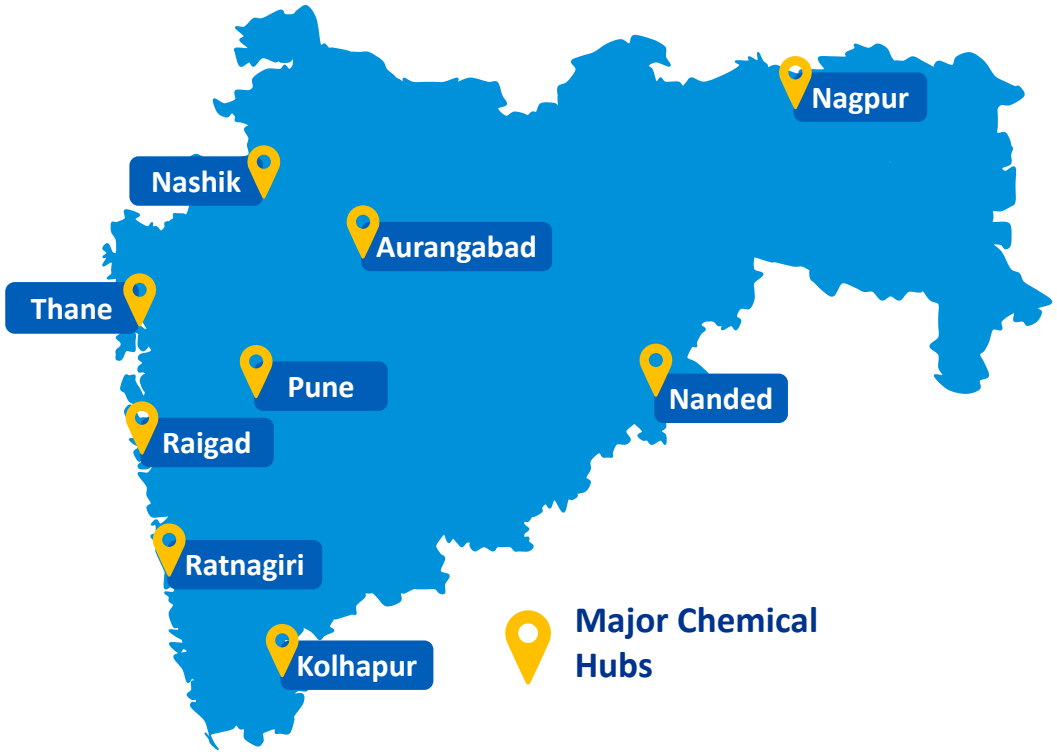
The state has 13 Chemical zones in MH - Ambernath, Badlapur, Butibori, Dombivali, Kalyan-Bhiwandi, Kurkumbh, Lote Parshuram, Mahad, Patalganga, Roha, Taloja, Tarapur, and TTC

Maharashtra houses 16% of the total number of chemical factories in India

Chemical Sector contributes 6.5% to state GSDP and 14.5% to industrial GSDP

A Treatment Facility has been set up at Sukhana and Kham river with help of bio-remedation technology

Major Chemical Clusters in Maharashtra



Dedicated Institutes for Courses in Chemicals:

- Indian Institute of Technology, Bombay
- Institute of Chemical Technology, Mumbai
- National Chemical Laboratories, Pune
- Visvesvaraya National Institute of Technology, Nagpur

Source: CMIE Database, DGCIS Database, MAITRI, *2017-18 – 2019-20; ^include Chemicals, Pharmaceuticals and Botanicals

Chemicals Players in Maharashtra

Magnetic Maharashtra 2.0: Key Reforms Launched

MAGNETIC MAHARASHTRA 2.0
#MadeForBusiness

1. Plug and Play Infrastructure

Allowing investors to utilize a ready to use infrastructure complete with affordable rental sheds, comprehensive utilities, expat housing, modular spaces in a 100% compliant ecosystem.

6 Regions | 250 Acres | 450 Sheds

2. Maha Parwana (Accelerating Permissions)

A single window clearance system for large investors that meet statutory norms to start operations within 48 hours

20+ Departments | 100+ Permissions

3. Maha Jobs

Dedicated industrial employment portal, launched in July 2020, aims to help new and potential investors employ the vast and skill rich local talent in Maharashtra on the portal across 17 sectors and 950+ job roles

2.94 L Applicants | 2,731 Employees | 38,042 Jobs

4. Investor First Programme

Relationship Managers (RMs) and Relationship Executives (REs) will be assigned to large investors for overall co- ordination and providing necessary support to the Investors on continuous basis.

Assigned to 54 MoU Partners | 10 Investment Fellows

Championed by a Relationship Manager/ Task Team

Thank You

Maharashtra Industrial Development Corporation

Udyog Sarathi, Mahakali caves road,

Andheri (E), Mumbai – 400 093

Board Number: 91-22-26870027/52/54/73

Fax: 91-22-26871587

Email: ceo@midcindia.org

Website: www.midcindia.org

MAGNETIC MAHARASHTRA 2.0

#MadeForBusiness

UPL Japan brief

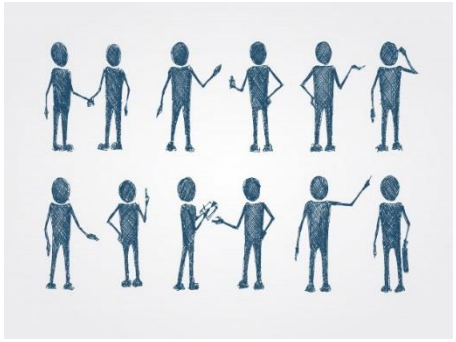
19 March 2021

Agenda

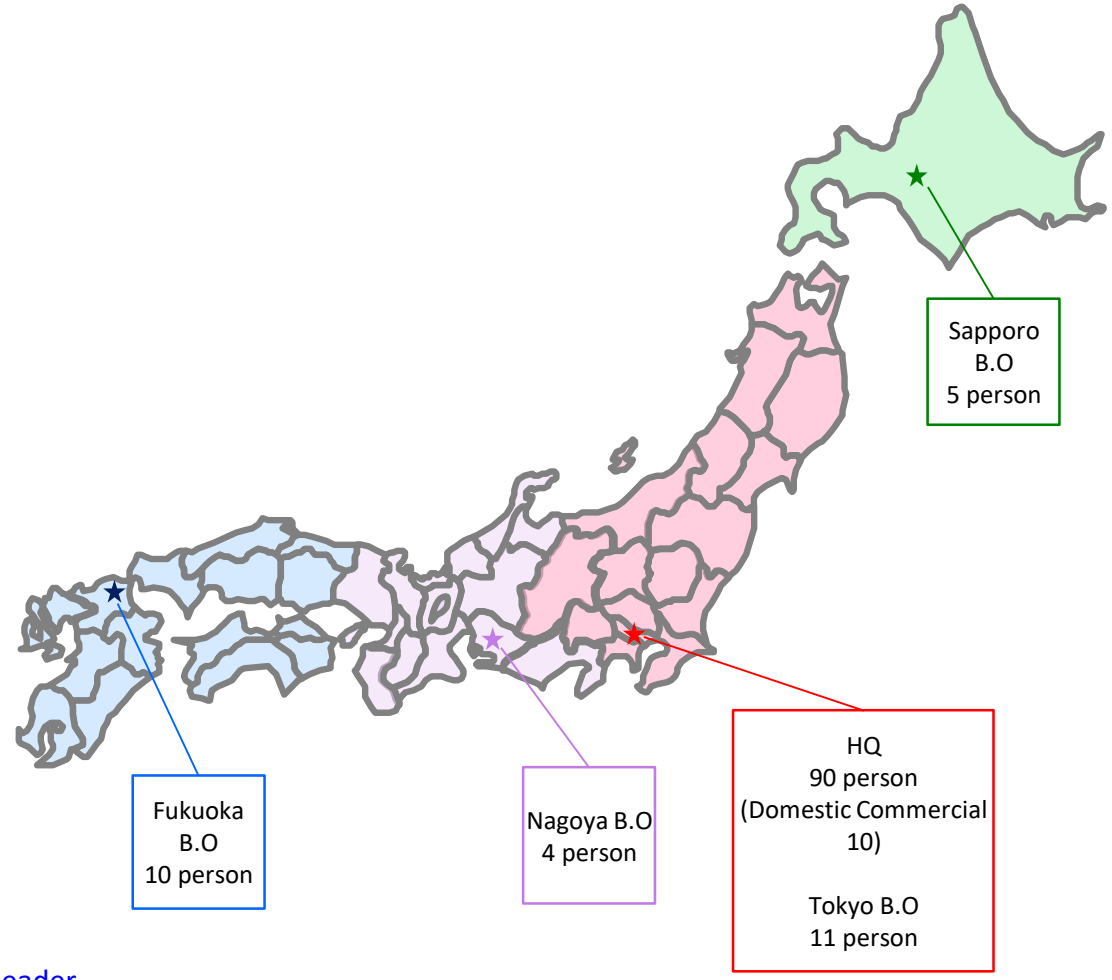
1. UPL Japan introduction
2. Recent progress in R&D in Japan
3. Collaboration with Japanese agrochemical firms

UPL in Japan

Sales Revenue
170M$



Permanent Employee
120 person



Japanese domestic ag business

Main target market
Fruits & Vegetables

Chemical	Bio-solutions	Bio Stimulant
 Ai number 32	  Product 28	  Product 4

Total portfolio number
64

Market leader

Other Business in Japan

International Business Operations (IBO)

UPL ⟷ Japanese AI Manufacturers

Co-develop / License-in innovative products
UPL promotes them worldwide

Health & Nutrition Sciences (H&NS)

H&NS ⟷ J-Producers

Provide various materials with J-Producers from around the world including Japan

Human Health & Cosmetics intermediate

Animal Health

UPL Japan Domestic Business Strategy

Introduce Integrated Crop Management (ICM) concept

- The history of transition to ICM from agrochemical : Agrochemical → + IPM → + BioStimulant
- We are the only company which has three pillars : Chemical, IPM and BioStimulant.
- We can propose total crop management to growers
- Farmers can receive various benefits and value

Chemical

Benefit
- Pest control
- Resistance management

+

IPM

Macrobials / Beneficial Insects
Bumble bee
Microbials

Benefit
- Labor saving
- Resistance management
- Less chemical

+

ICM

BioStimulant

Benefit
- Stress management
- Yield increase
- Improve quality

Solution providing

Recent progress in R&D in Japan

According to IHS Markit, of the 35 products in R&D currently, around half, at 16, have their origins in Japan. This highlights not only the focus that companies in this region place on R&D but also the high degree of innovation. The success of Japanese R&D can be attributed to a number of different factors:

- *Likely different decision criteria for placing a product into development compared to the rest of the world*
- *Japanese agriculture is highly protected*
  - *Higher food prices – Japanese consumer pay around 25% of their disposable income on food*
- *Products developed by western companies have to surmount higher financial hurdles to get into development, with minimum peak sales of several hundred $m*

PRODUCT INTRODUCTIONS AND R&D BY MAJOR COMPANY

Rank	Company	Introduced 1980-2020	Currently in R&D	Co- development / Licenced in
1	Bayer Crop Science	75	3	
2	Syngenta	62	3	
3	Corteva	62	2	1
4	BASF	40	2	1
5	Sumitomo Chemical	36	3	1
6	Nihon Nohyaku	15	1	
7	Kumiai	14	2	
8	Ishihara	14	1	
9	Mitsui Chemical	14	1	
10	Nissan Chemical	9	2	

- ❑ Japanese agrochemical firms are key source of new technology.
- ❑ Some of them have their own footprints in India. On the other hand, mid-small size companies including bio space need strategic partners like UPL.

UPL

Collaboration with Japanese agrochemical firms

- More than 10 firms distribute UPL's products in Japanese market
  - Revised pesticide law will facilitate generic registration and Technical sourcing change in Japan
  - Hold a joint venture company and invest in some firms as well

- For Indian market, various licensing deal with Japanese firms realized and many still under discussion
  - Japan's interest in India is increasing – India's large and growing market

- In India, UPL is manufacturing some products for Japanese agrochemical firms
  - "Make in India" initiative attract this opportunity

Appendix

UPL JAPAN unique portfolio

Concepts of the product and technical portfolio are;

- ✓ Product as macrobials, microbials and related items, advantage of the product portfolio with rich and unique product line-up, the largest product portfolio to lead the biological
- ✓ Technical as software application “Know-How”, advantage of the technical portfolio with own introduction techniques based on IPM program which UPL JAPAN has developed, effective and sustainable pest management
- ✓ Based on developing and managing both portfolio with own IPM program, UPL JAPAN is a company to lead the business with the cutting edge and unique portfolio

Product as
Macro/Microbials and related items

SPICAL, SPIDEX, SWIRSKI, LIMONICA, Horiver etc.

Technical as
Software Application

introduction program
“Know-How“
IPM Program, Manual,
Side-effect

Biological Protection Business in JAPAN :
PDCA- Recipe to Success – Bio-solutions!!

IPM Training
Spray calendar consulting

Training and consulting to local distributors and growers

P

Field work
Field inspection and installation

D

Checking IPM preparation, train the installation technics

A

Wrap up the field trials and evaluation, share the point of improvement and next step

Workshop, Evaluation and improvement

C

Checking the effect, train the evaluation skills

Field work
Management and evaluation

India-GCC Relations – Strengthening the bonds through petrochemicals

Dr. Abdulwahab Al Sadoun

Secretary General, **Gulf Petrochemicals & Chemicals Association**

Introduction to GPCA

GPCA was founded in 2006 and has been growing in both its reputation and influence to become the *voice* of the chemical industry in the Arabian Gulf

Key Roles

- Platform for knowledge sharing
- Advocating the industry's common position
- Trusted source of industry relevant information
- Driving EHS&S excellence
- Fostering the creation of innovation culture

Agenda

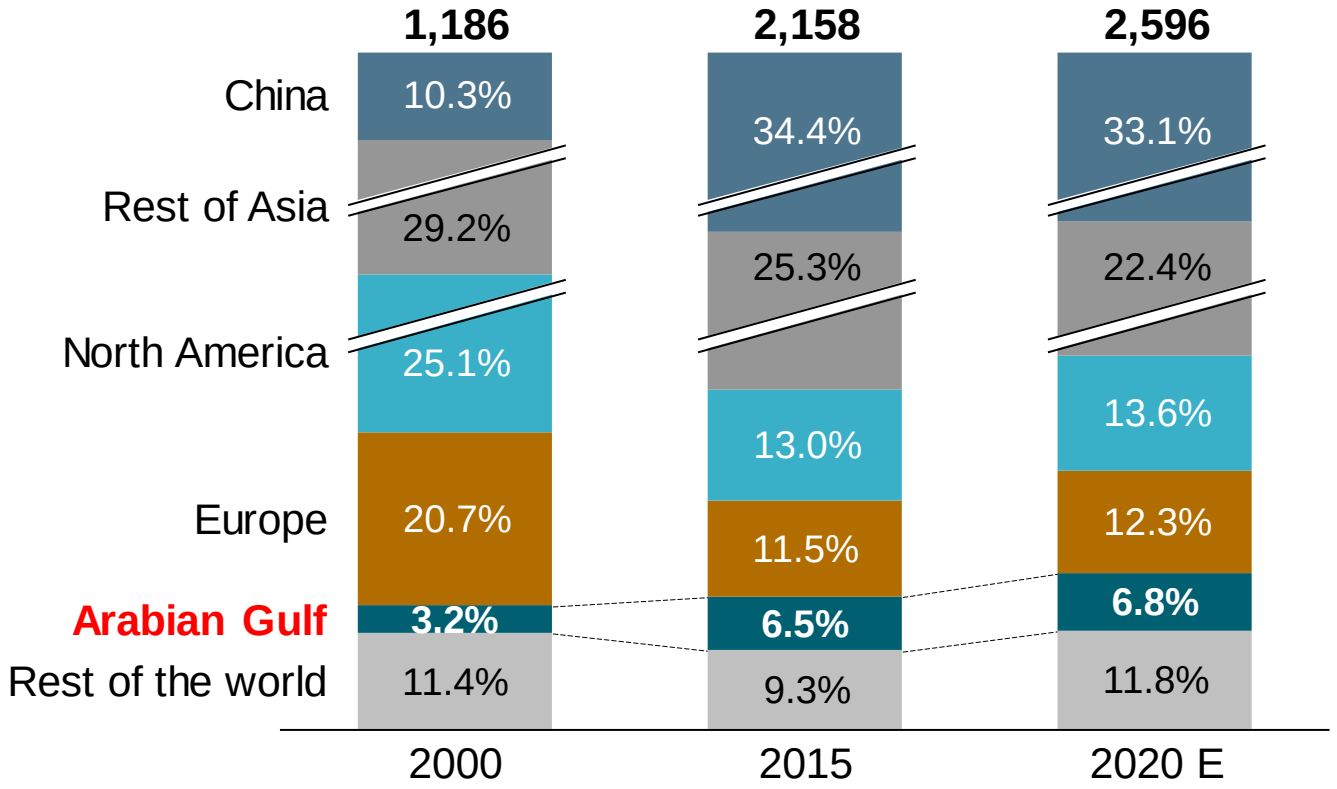
- **The GCC Chemical Industry @ a Glance**
  - GCC chemical industry global position
- **GCC – India Chemical Trade Pattern**
  - GCC Export to India
  - GCC Import from India
- **Future Outlook & Untapped Opportunities**
  - GCC Planned Investment in India
  - Indian Investments in the GCC Chemical sector
  - Exploring long term strategic partnerships opportunities

The GCC Chemical Industry @ a Glance

The GCC Chemical Industry Global Positioning (1/2)

The Arabian Gulf is a global hub for the commodity chemicals production and its global position is steadily rising, doubling over the past two decades

Production Capacity of the Global Chemical Industry by Region
(*Millions Tons and Market Share*)

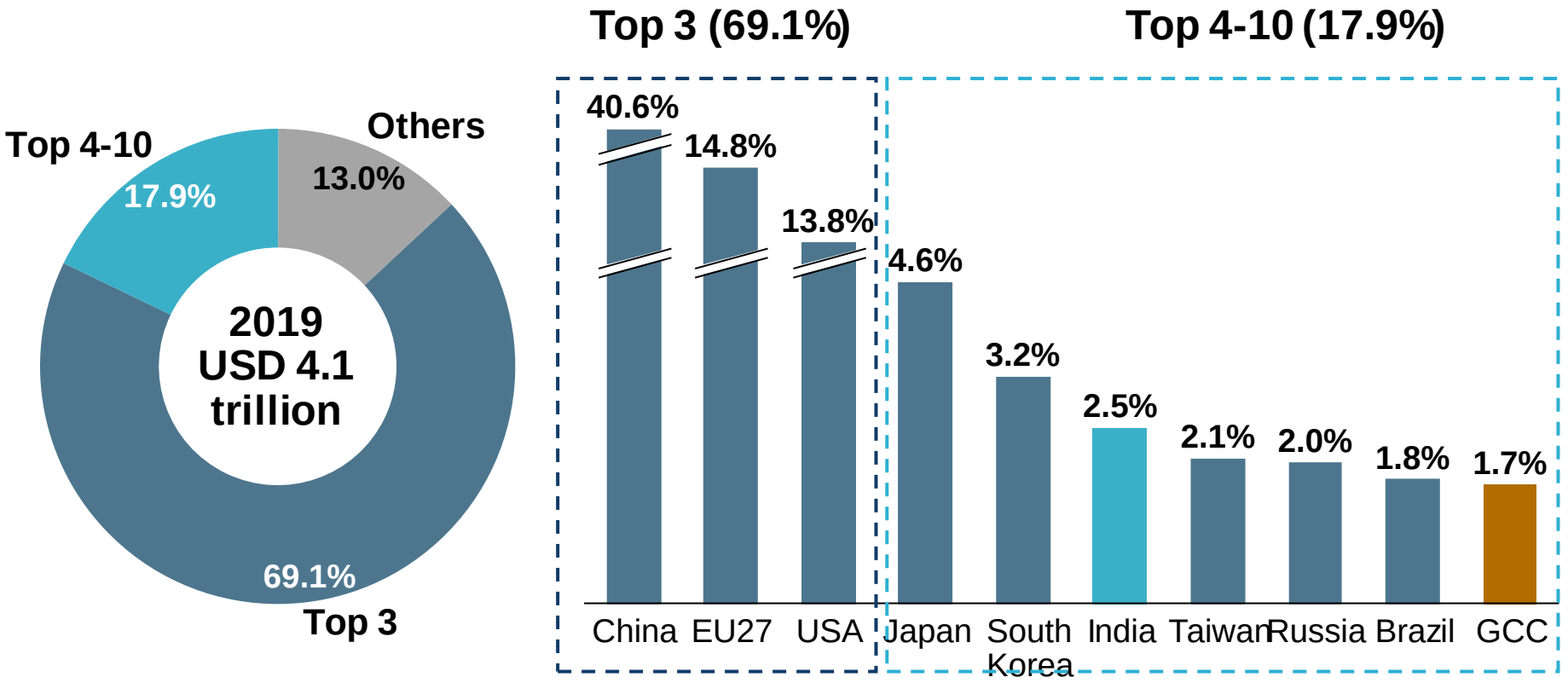


Source: ICIS and GPCA estimates, 2020
Note: 2020 global figures are estimated

The GCC Chemical Industry Global Positioning (2/2)

Being predominantly commodity producer, the GCC industry is ranked 10th globally in terms of chemical revenue generation

Top 10 Counties in Global Chemical Revenue (*2019 Market Share*)



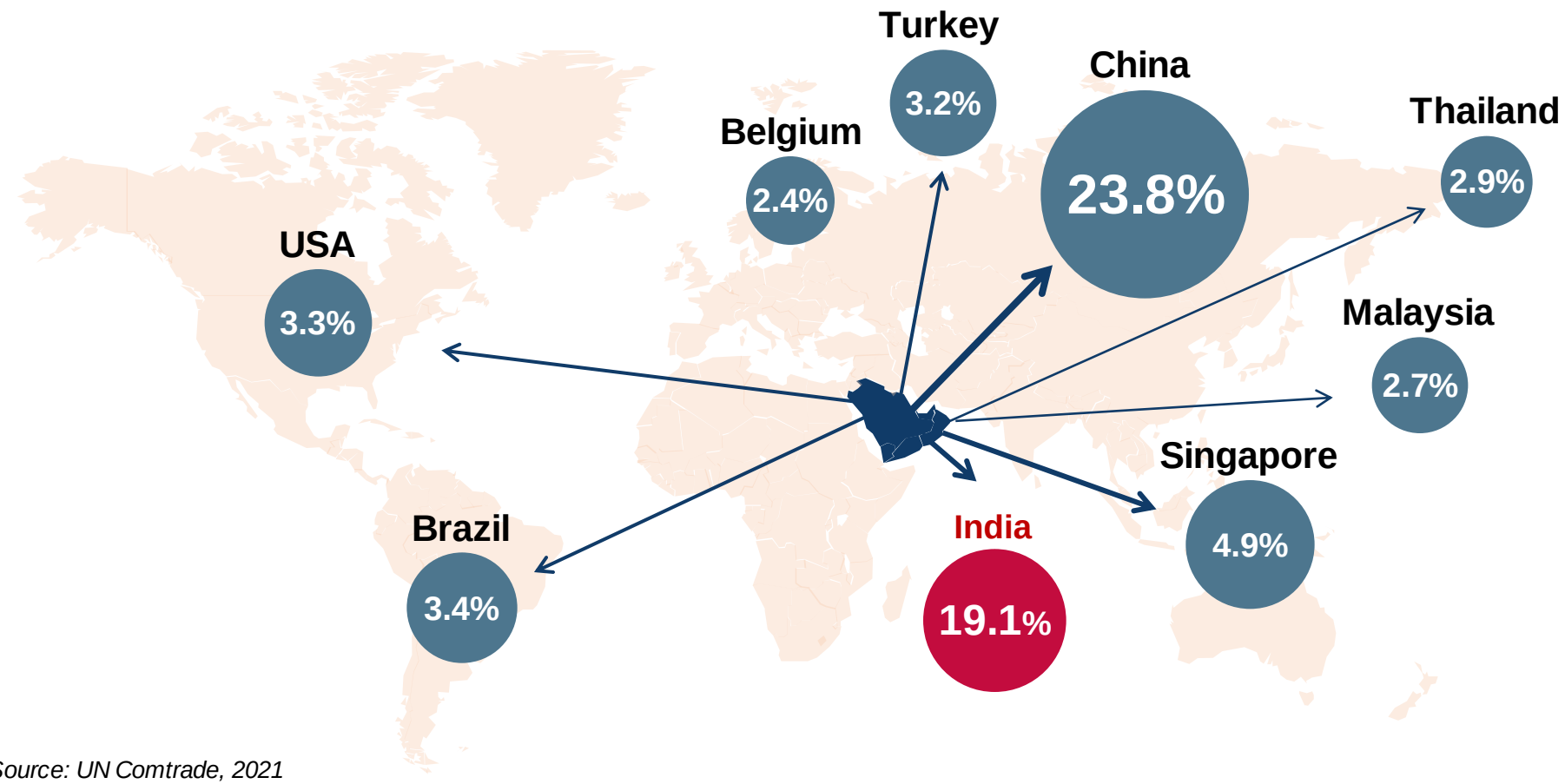
Source: Cefic Chemdata International, GPCA, 2020

GCC-India Chemical Trade Pattern

Chemical Trade Patterns – GCC Export to India

India is the 2nd largest trading partner for the GCC industry accounting for 19% of total exports, with Saudi Arabia and Oman accounting for 62.4% of total GCC exports to India

Top 10 Destinations for GCC Chemical Exports *(2019)*

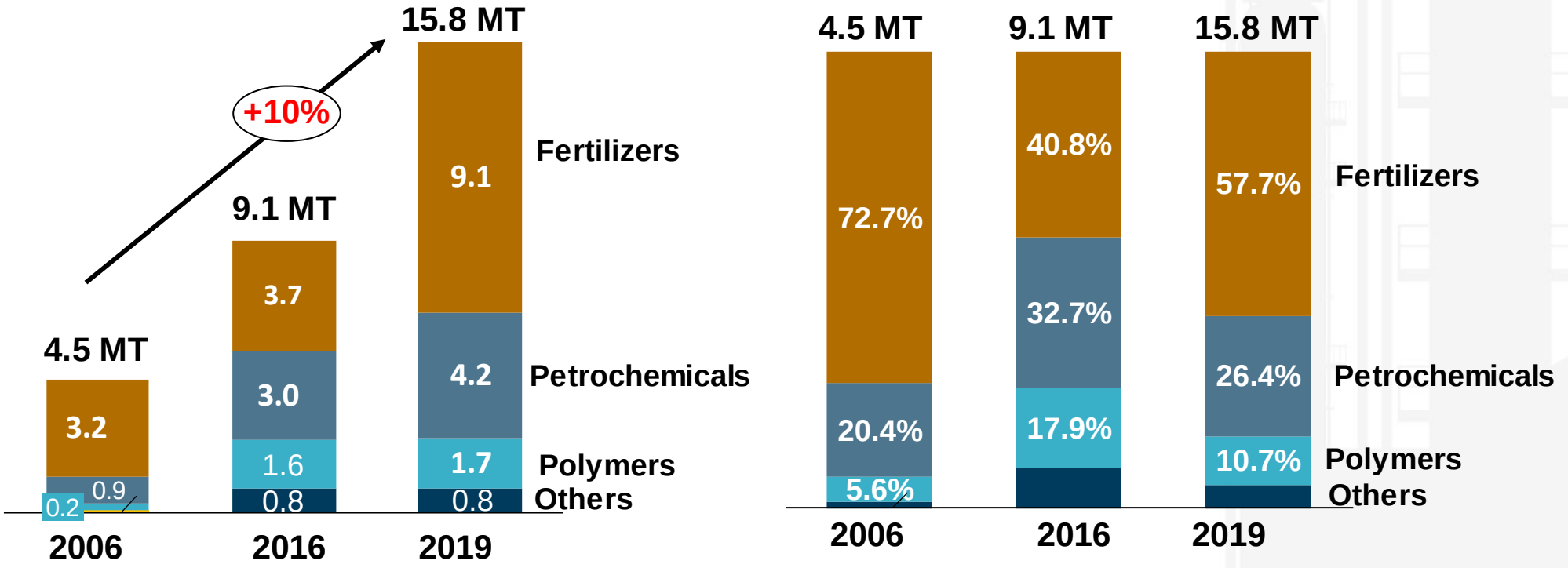


Source: UN Comtrade, 2021

Chemical Trade Patterns – GCC Export to India

GCC chemical export to India tripled over the Years 2006-2019 with Fertilizers retaining its lion share and export revenue reaching USD 7.2 Bn in 2019

GCC Chemical Exports Volume to India *(by product segment)*



Fast growing *trade between India and the GCC has cemented the* ***interdependence*** *of both countries/region, which will further intensify*

Source: UN Comtrade, 2021

Current Bilateral Relations: Imports from India

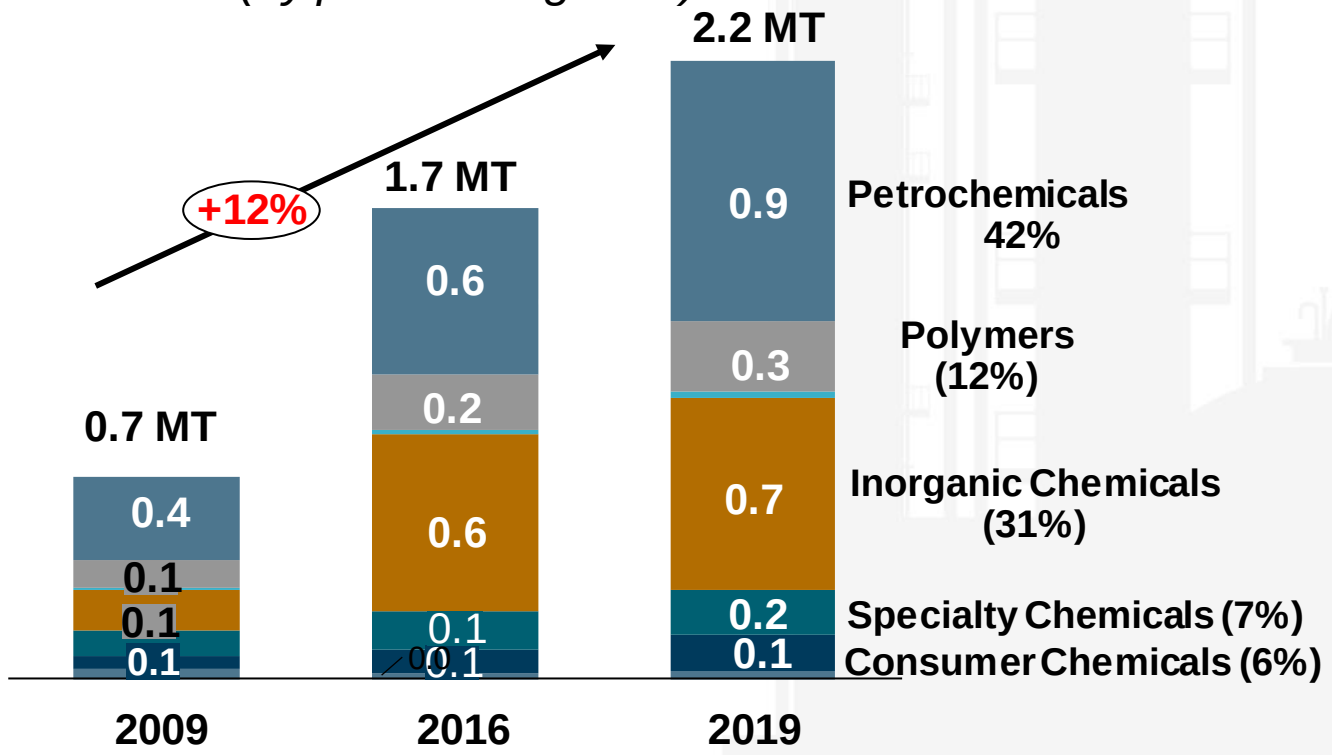
GCC chemical import from India has tripled over the past decade rising with petrochemicals and inorganic chemicals being the largest product segments

Over the past decade:

- GCC chemical import from India increased at a CAGR of 12%, tripling from 0.7 Million Tons to 2.2 Million Tons
- Petrochemicals and Inorganic Chemicals account joint for 73% of total import
- In 2019, Chemical import from India valued USD 2.1 Bn

GCC Chemical Import Volume from India

(by product segment)

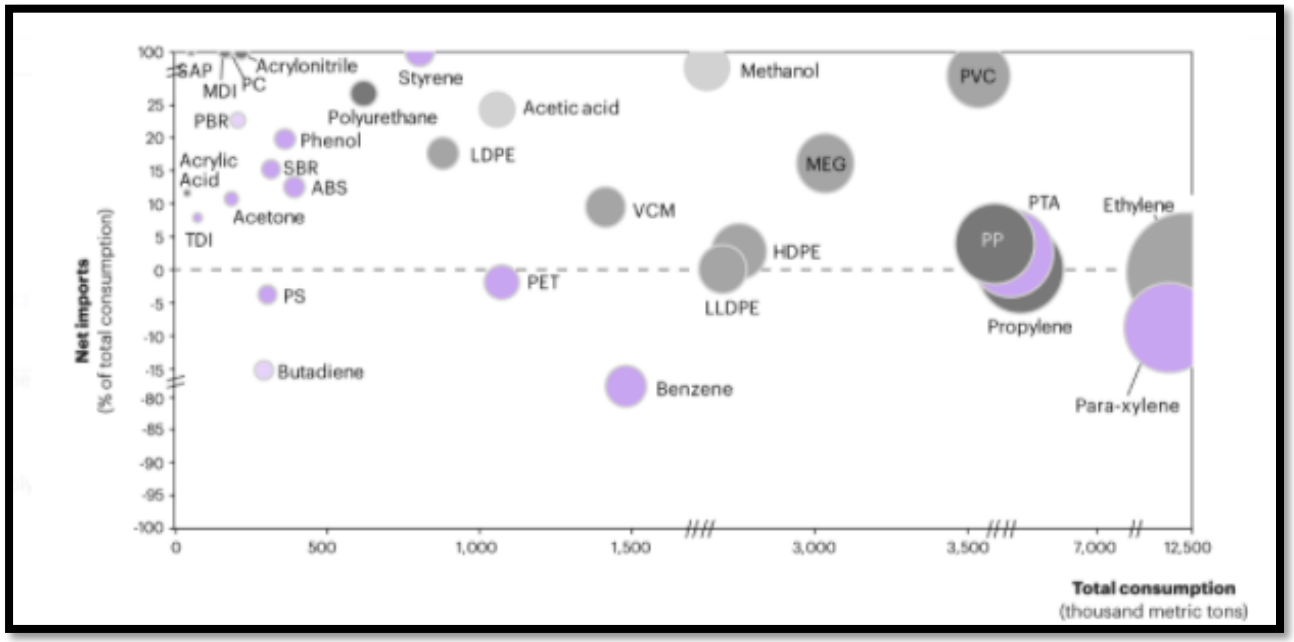


Source: UN Comtrade, 2021

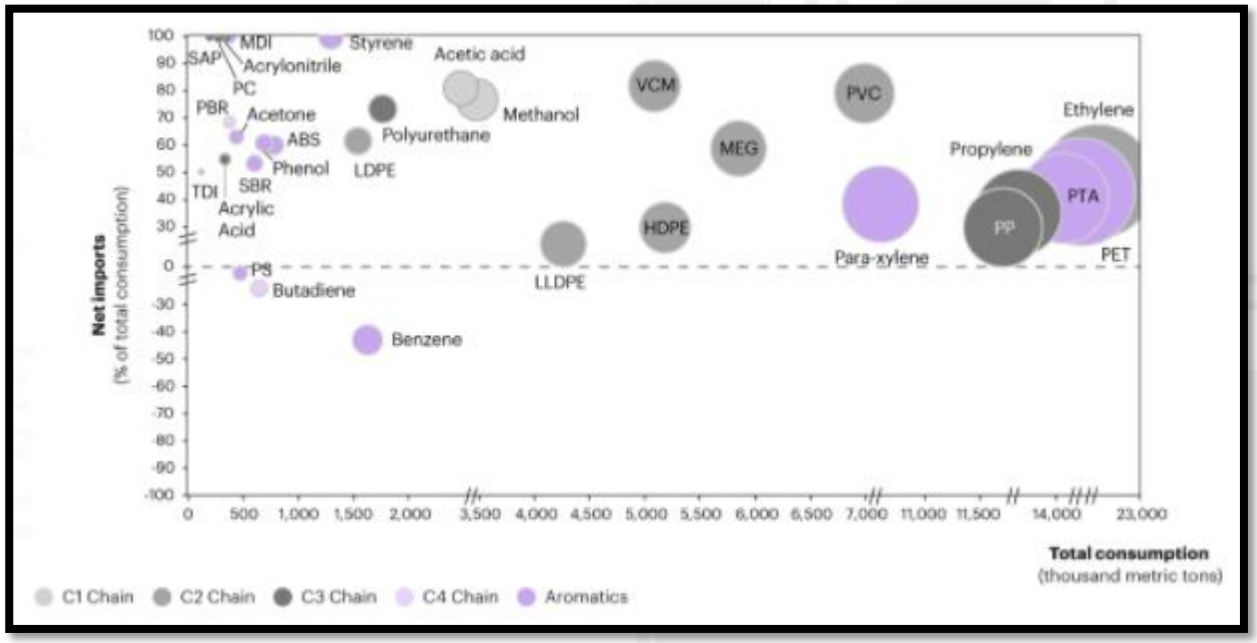
India's Chemical Consumption vs. Imports

India is highly dependent on import of key chemicals. Though in 2019 domestic production surpassed local demand, rising demand is projected to again outstrip local production for key input materials by 2030 (e.g. LLDPE, HDPE)

India Petrochemicals Import vs. Demand (*2019*)



India Petrochemicals Import vs. Demand (*2030*)

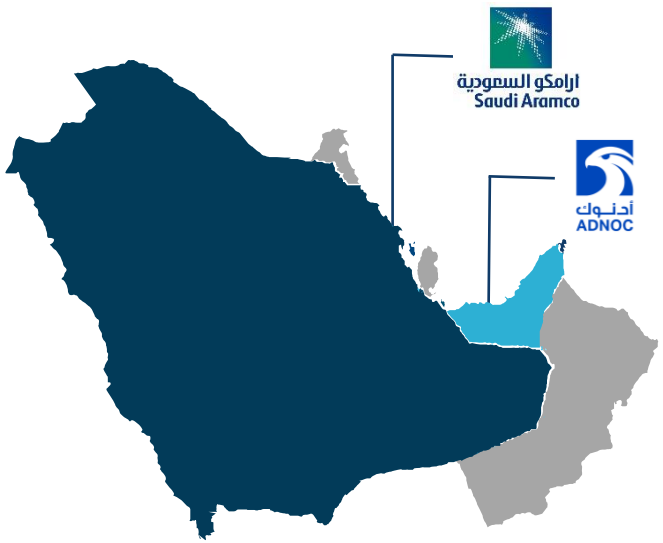


Source: AT. Kearney, GPCA Research, 2020

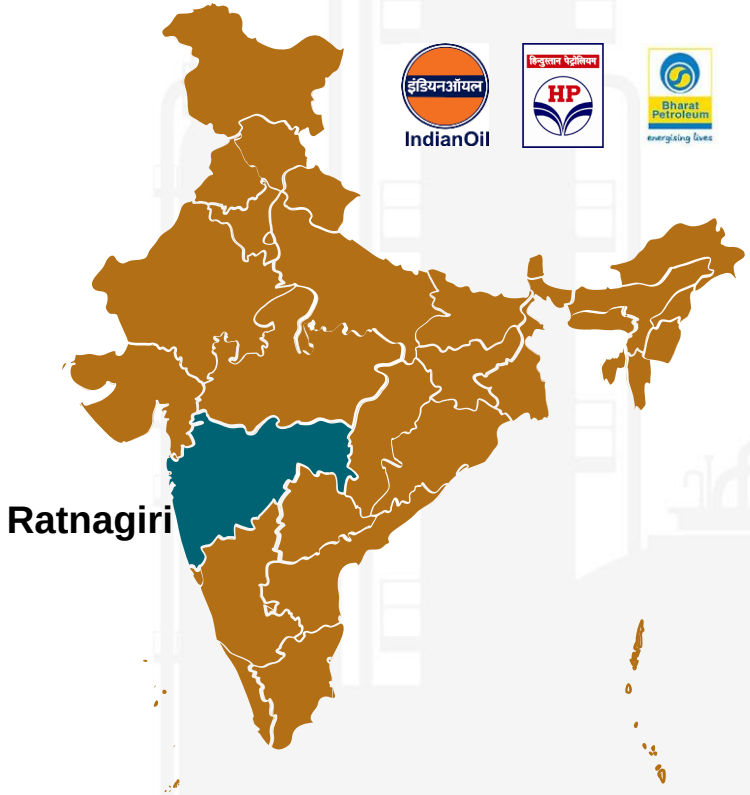
Future Outlook and Untapped Collaboration Potential

Future Outlook - The GCC Planned Investment in India

Saudi Aramco & ADNOC sign Framework Agreement and MoU with Indian Consortium RRPCL in 2018 to jointly pursue Ratnagiri Mega Refinery



- Saudi Aramco, ADNOC and consortium signed an **USD 44 billion investment** (final outlay estimated at USD 70 billion)
- Explore **strategic partnership and co-investment** in the development of a new mega refinery and petrochemical complex at Ratnagiri on India's west coast
- 1.2 million barrels per day integrated mega refinery and petrochemicals complex
- **Status**: Some delay



Saudi Aramco & ADNOC** will deepen their engagement in **India's** fast-growing oil and gas sector through this project. This will position all parties for **future collaboration** as a key element of the country's **global downstream industry

Source: GPCA Research, 2020

Future Outlook - The GCC Planned Investment in India

India's Reliance Industries is set to sell 20% stake in its oil to chemicals business to Saudi Aramco giving better access to a fast-growing market.

- Saudi Aramco offered the option to purchase a **USD 15 billion stake** in Reliance O2C
- Saudi Aramco to **supply 500,000 b/d** of crude to RIL's 1.35mn b/d Jamnagar Refining Complex (28% of the refinery's requirement)
- **Status**: Ongoing

*The agreement signed in 2019 defines the principles of strategic cooperation for **Saudi Aramco** with **Reliance Industries** to expand its refining and marketing footprint globally and see growth in chemicals as central to its downstream expansion strategy*

Source: GPCA Research, 2020

Indian Chemical Investments in the GCC

Though the Indian investment in the Arabian Gulf Region is limited to the OMIFCO JV in Oman, more recent downstream investment announced in KIZAD in the UAE

2005

***Investment value**: USD 968m JV (50% Oman Oil, 25% KRIBHCO, 25% IFFCO)*

***Location**: `Sur, Oman*

***Sector**: Fertilizers (**Urea, Ammonia**)*

***Production Capacity**: 1.65 Million Tons/Year (Urea)*

2020

***Investment value**: USD 55m*

***Location**: greenfield site at KIZAD's Polymer Parks, UAE*

***Sector**: Plastics (**packaging films**)*

***Production Capacity**: 30,000 MTY of plastic good*

Source: GPCA Research, 2020

GCC-India Strategic Partnerships

Several opportunities exist to transform the India-GCC relationship into strategic partnership to be captured

Areas of Impact	Strategic Implications
 **Trade**	**Free Trade Agreements** between India and the GCC including **preferential market access**, regulatory convergence (standards and technical regulations), more liberal trade remedy disciplines will positively impact the chemicals trade between both regions
 **Investment**	**GCC is moving from trade-focused relations to investment-focused relations with India**. Investment protection and lowering of barriers to investment will improve the transparency of foreign investment policies and ensure that foreign-invested enterprises participate in market competition on an equal basis and increase convergence and consolidation opportunities
 **Research & Innovation**	**Collaboration in research and innovation between the GCC and India** is increasing and will depend on the innovation ecosystem, IP protection, joint R&D programs. Collaboration will require participation from all parties: academia, industry and governments

There is a complementary partnership between the GCC and India, where the abundance of natural resources in the GCC fuels the growing downstream industry in India

Source: GPCA Research, 2020

Thank you!

www.gpca.org.ae

US-India Chemicals and Petrochemicals Forum

Investment and Collaborative Opportunities between the US and India

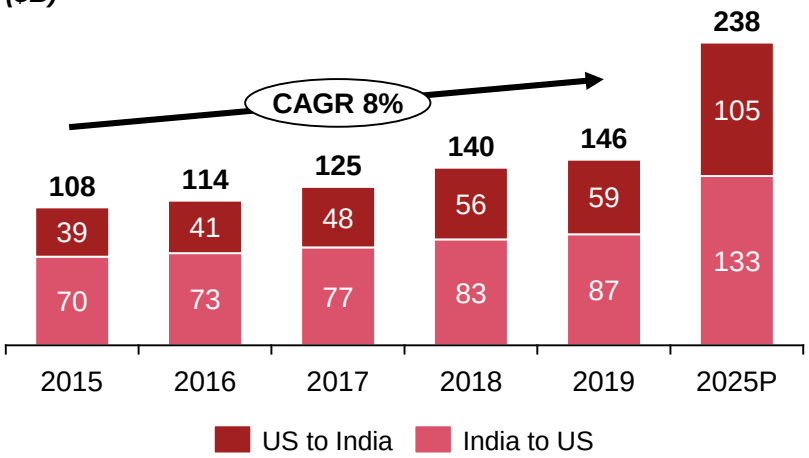
Mr. Mark Lustig
Chemicals Advisory Strategy Leader
March 2021

pwc

US and India have a strong bilateral trade relationship as a result of complementary policy and trade interests

In 2019, US-India Goods and Services trade totaled ~$146B[1]; bilateral trade is projected to exceed $238B in 2025[2] with an estimated annual growth rate of ~8-10% through 2025

US-India Goods and Services Trade from 2015-2025P *($B)*



1. Sourced from Office of US Trade Representative
2. Sourced from US-India Strategic Partnership Report

Source: Office of the US Trade Representatives, US-India Strategic Partnership Form

Key Drivers for the Successful Trade Relationship	Observations
India's rapid economic growth and diverse consumer base	• India is one of the fastest growing economies in the world with GDP growth rate of 7 - 8% prior to COVID impact in 2019
Continued trade tension between US and China	• India continues to be a key US regional trade partners as the new Biden administration has announced that it will not immediately remove the Trump Tariff on China
Shared approach on energy security and access	• US-India Strategy Energy Partnership was established in 2018 and has led to significant cooperation in key petroleum, renewable, and energy infrastructure partnerships

A combination of factors have impacted the strategic partnership between the US and India

Overall, the relationship between the US and India has been positive, with longstanding cooperation

Lasting Relationship	• Since ~2000, ongoing level of collaboration between the US and India that goes beyond a single administration or political entity
Foreign Direct Investments	• Foreign Direct Investment (FDI) has been increasing, and India allows FDI in the Chemicals Industry under the automatic route (no Government approval required[1])
US/India SEP	• US/India Strategic Energy Partnership (SEP), established in 2018, highlights the importance of energy to the US/India bilateral relationship; includes promotion of energy trade, investment and knowledge sharing
US GSP	• Efforts underway to reinstate India to the US Generalized System of Preferences (GSP) list to reduce overall tariff position

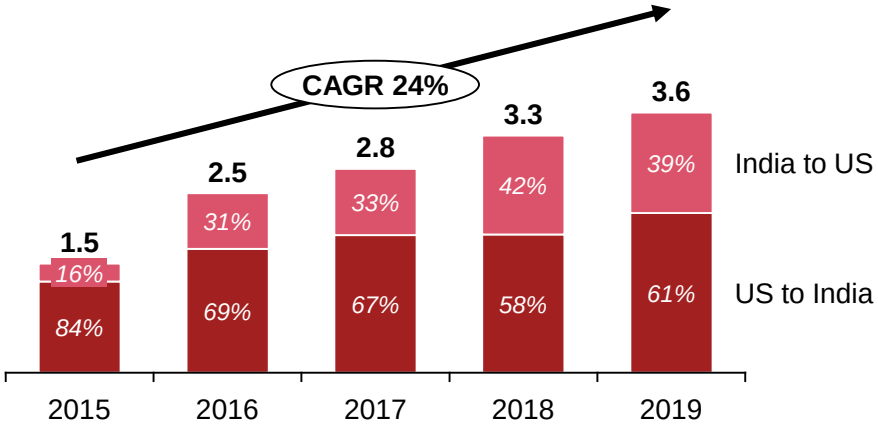
1. Except in the case of certain hazardous chemicals

Source: Congressional Research Service, FDI India, US DoE

Chemical Industry Foreign Direct Investments between the US and India have steadily risen since 2015

Chemical Investments between the US and India have become increasingly bi-lateral with India increasing FDI in the US

Balance of Payments and Direct Investment Position - Chemicals Industry *2015-2019[1] ($B)*



Investment Flow	Observations
India → US	• According to the FICCI, the largest share of investment capital from India has been allocated to industries associated with the knowledge economy. • This capital is helping the U.S. increase employment in high value-added industries, such as chemicals
India ← US	• Investment from US to India is largely focused on leveraging the end market access and growth for chemicals (both base and specialty) in the region

1. Sourced from Bureau of Economic Analysis

Source: BEA, Invest India, FICCI, Make in India

Major US chemical manufacturers have recently completed or have planned investments in India

Select investment projects include acquisitions, capacity expansions, greenfield manufacturing investments and R&D centers

- In 2017, H.B. Fuller opened a new Pune, India, business office and a new R&D center in its Shirwal, India manufacturing facility

- In 2018, Dow opened a Polyurethane site in Maharashtra, India to serve growing market segments such as consumer durables, infrastructure and automotive

- In 2019, Celanese acquired Next Polymers Ltd., one of India's largest engineering thermoplastics compounders

- In 2019, Ecolab, a provider of water, hygiene and energy technologies, in partnership with SMC[2], has set up an Ecolab Digital Center (EDC) in Bengaluru

- Lubrizol and Grasim Industries have entered into a definitive agreement to manufacture and supply CPVC resin in India through increased production capacity in Dahej, Gujarat *(proj. 2022)*

- INOX Air Products, a JV between Industrial Oxygen Company and Air Products, announced plans to build eight new greenfield Air Separation Units across India through 2024

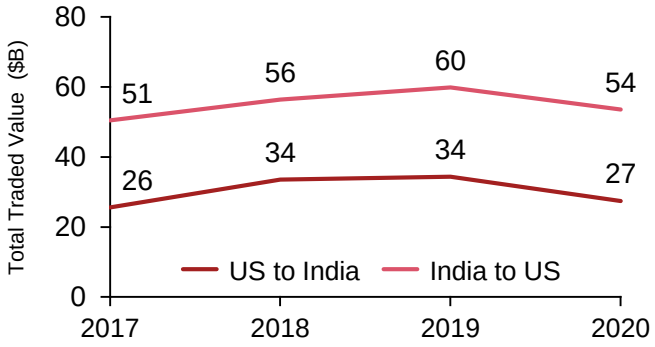
Source: H.B. Fuller, Dow, Lubrizol, Cision, Businesswire, Business Line

Illustrative, Not Exhaustive

Chemicals Goods represent a key area of global trade between US and India

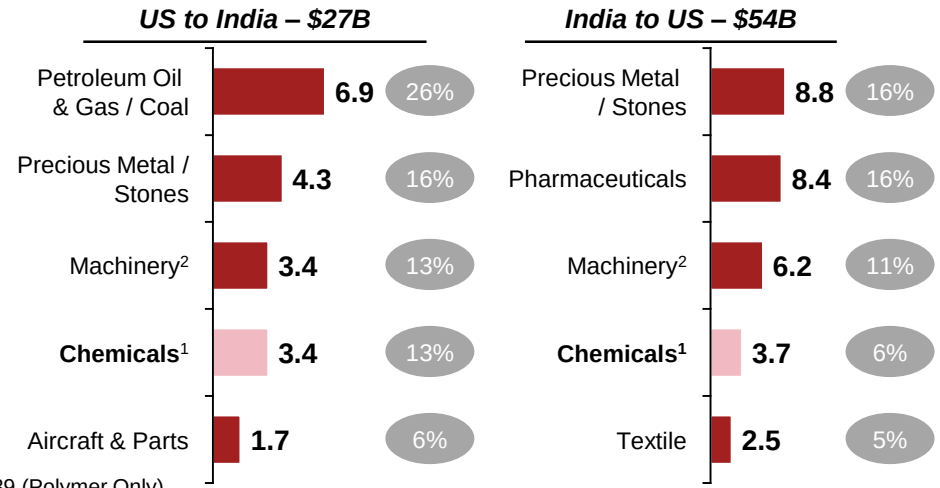
Chemicals Goods was one of the top traded categories between US and India in 2020 and represented $7B in total value

US-India Goods Trade from 2017-2020



Goods Trade Deficits ($B)	25	22	26	27

US-India Goods Trade Breakdown by Category (top five) *($B)*



1. Represents Chemicals Goods in UN Comtrade with HS Code- 28, 29, 32, 38, 39 (Polymer Only)
2. Represents both electrical and mechanical machineries

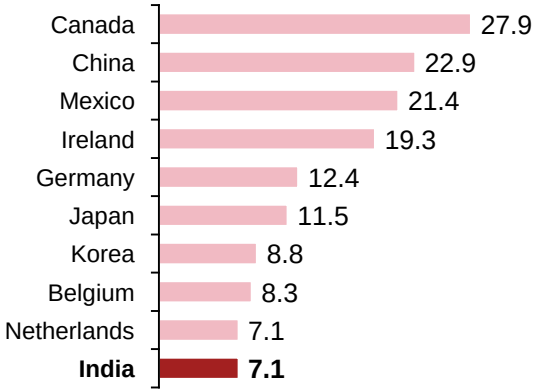
Source: UN Comtrade, PwC Analysis

India is well positioned with US in Chemicals trade and is projected to further strengthen their position going forward

India is currently the 10th largest chemical trade partner for the US and is estimated to increase to 7th by 2030E based on historical growth rate projections

Trade with India has had a higher CAGR than that of it's peers…

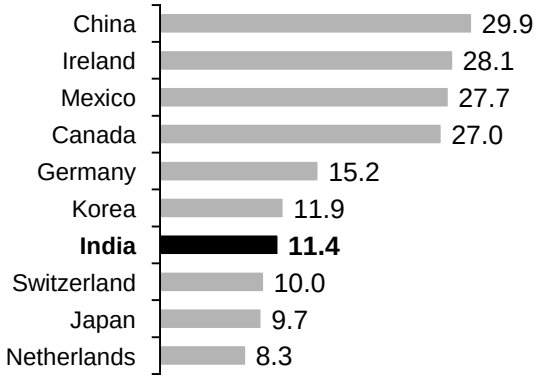
US 2020 Chemicals Trade (import and export) by key partners[1] *($B)*



10 Yr CAGR used to project future trade position

…which may result in an increased trade position in the future

PwC Estimate – US 2030E Chemical Trade (import and export) by key partners[1,2] *($B)*



Illustrative

1. Represents Chemicals Goods in UN Comtrade with HS Code- 28, 29, 32, 38, 39 (Polymer Only)
2. Estimated using 2020 trade values with historical 10 yr CAGR

Source: UN Comtrade, PwC Analysis

Overview of Agrochemicals Sector

India Chem 2021
March 2021

pwc

Agenda

Overview of Global & Indian Agrochemicals Industry

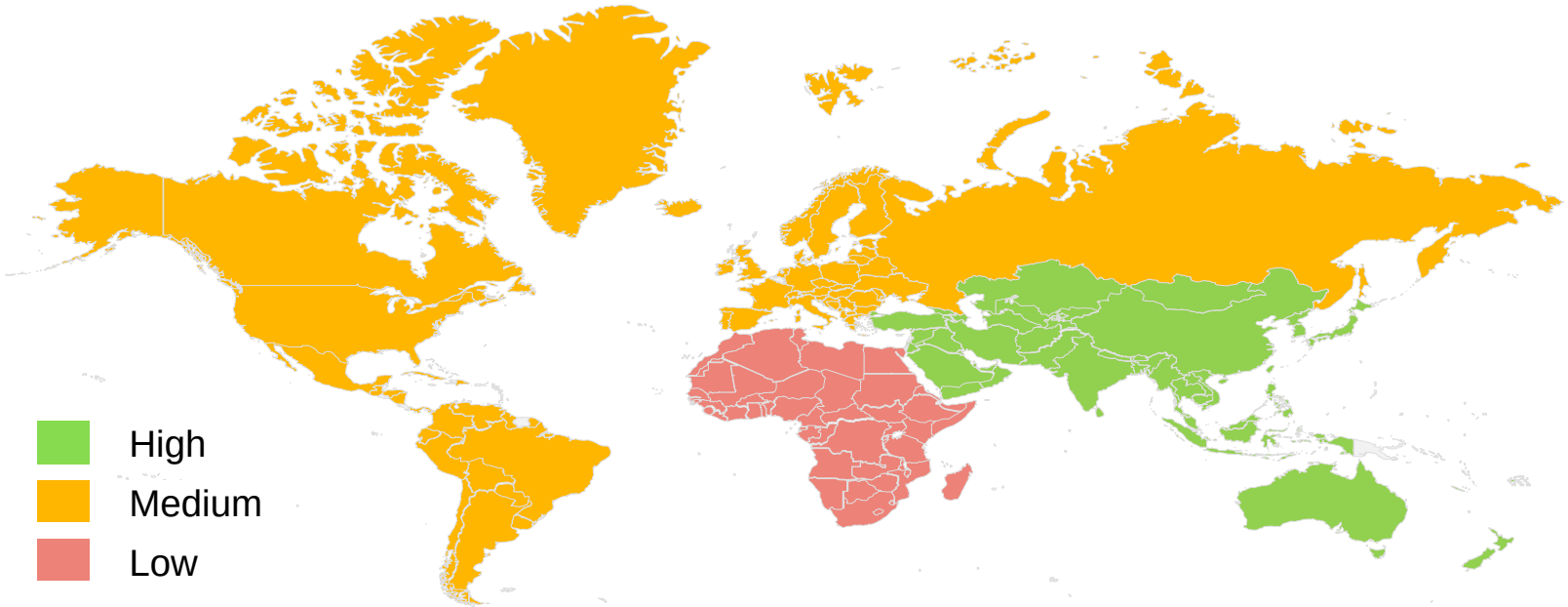
An Overview of Global Agrochemicals Industry

The Agrochemicals Industry is valued at around USD 208.6 Bn (2020) and is projected to reach USD 246.1 Bn in 2025 growing at a CAGR of 3.4%

Key highlights of the Global Agrochemicals Industry

- Growing demand for food supply due to the rapid growth in the human population has triggered agricultural intensification during the last few decades
- While North America is the fastest growing market, Asia Pacific is the largest market of agrochemicals
- The industry highly competitive market with the presence of several multinational companies.

Global Agrochemicals Market: Market Growth Rate, By Region, 2019



Source: Mordor Intelligence, PwC Analysis

Trends in Global Agrochemicals Industry

Global growth of agrochemicals market can be attributed to increasing adoption in developing nations

Strong research funding by key manufacturers for new products is expected to drive growth in next 5 years

Production of sustainable bio-based agricultural products is projected to increase due to increasing instances of ban on several pesticides/fertilizers

Higher instances of ban on Crop protection Chemicals in major regions like North America & Europe has slowed overall growth rate of agrochemicals in these markets

Recent research studies indicate that the increasing usage of agrochemicals in both developed and developing nations is with the aim of attaining higher crop yields

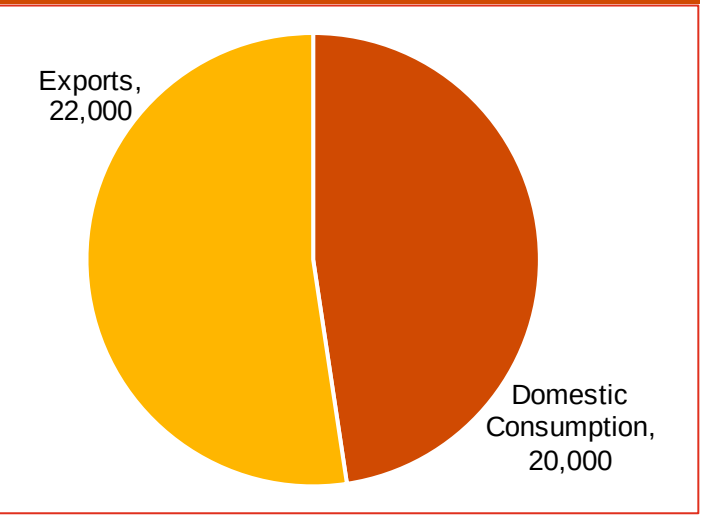
An Overview of Indian Agrochemicals Industry

Indian Agrochemicals Industry was valued at around Rs. 42,000 Crore (~6 Billion USD) in 2019-20 and is expected to grow at a CAGR of around 8% till 2025

Key highlights of Indian Agrochemicals Industry

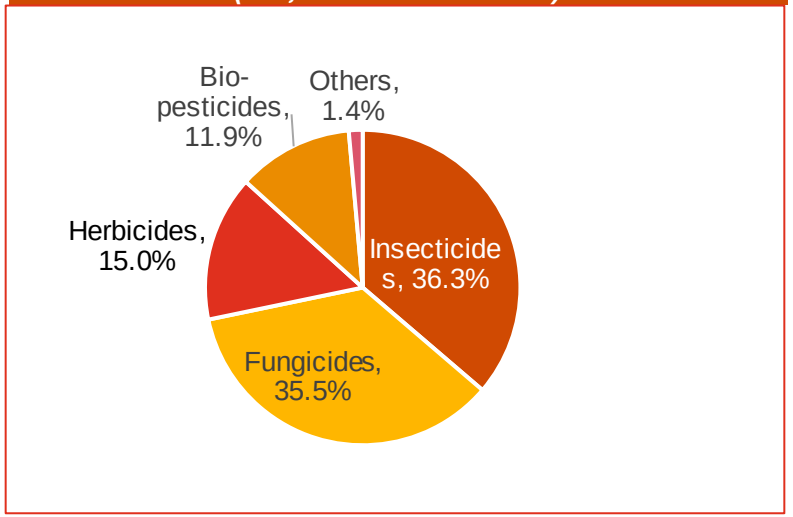
- Indian is the fifth largest producer and the fourth largest exporter of agrochemicals
- Inadequate use of agrochemicals can lead to ~25-30% yield losses in medium to long term
- Scientific, timely and sustainable use of agrochemicals is essential to ensure food security and enhance farmer income

Consumption vs. Exports in 2019 (Rs. Crore)



Source: PwC Research

Consumption of Agrochemicals by Segments in India – FY'19 (MT, Technical Grade)



Source: Statistical database, Directorate of Plant Protection, Quarantine and Storage

Trends in Indian Agrochemicals Industry

- Increasing focus towards digital avenues has improved decision making and enhanced traceability across the value chain
- Evolving models like direct selling through FPOs and direct-to-consumer (D2C) platforms like e-commerce are impacting the entire ecosystem
- Increasing focus on diversification into specialty nutrients products such as biofertilizers, bio-stimulants, micronutrients and organic products
- Monetization of farming services such as spraying of agrochemicals and direct-to-farm delivery of agri-inputs
- Increasing interest of farmers towards solutions like 'product as a service', mobile app based advisory, market information etc.

Challenges of Indian Agrochemicals Industry

Indian Agrochemicals Industry is facing few challenges which can limit its growth in future

Lack of awareness

- Average farmer lacks scientific knowledge of agronomy and agrochemical usage
- High reliance on recommendations by agrochemical dealers
- Imbalance in agrochemical usage has been limiting the crop yields

High reliance on generic molecules

- Low adoption of specialty molecules due to unaffordability and awareness
- Preference towards the use of time-tested genetic molecules
- High R&D costs and complex registration process limiting improved products in the market

Regulatory challenges

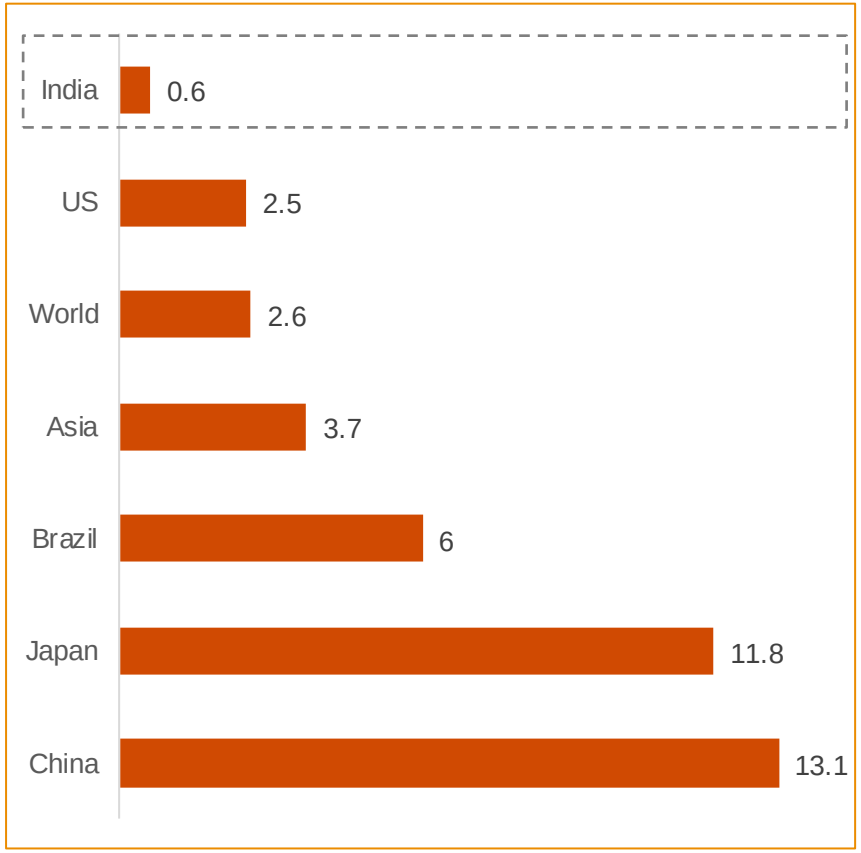
- Complex, costly and time-consuming registration process
- Registration of new molecules remains a forte of large global players
- Only 273 molecules registered in India, compared to 473 molecules in EU and 527 molecules in Japan
- Limited efforts towards improving R&D infrastructure and registration process

Low usage of agrochemicals

- Only 0.6 kg/ha of agrochemical is used in India (6 times lower than the average usage in Asia & 4 times lower than global average)
- High reliance on generic and bulky products imply significant gap between current and optimal usage

Source: European Commission; FAMIC Japan; Ministry of Agriculture and Farmer Welfare; FAOSTAT

Agrochemical usage in major regions and countries – 2017 (kg/ha)



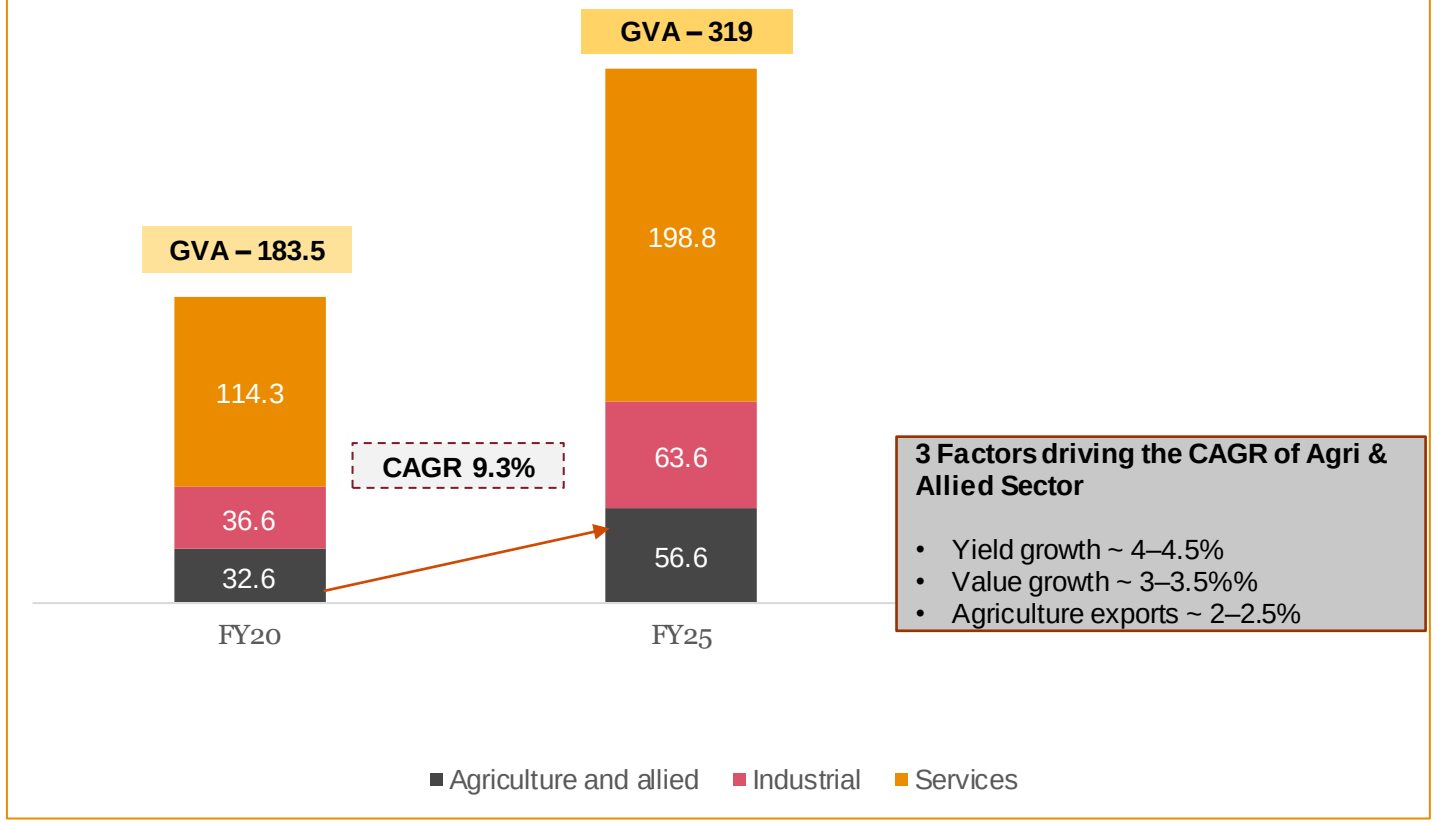
Source: FAOSTAT

Driving Growth & developing India as a Global Manufacturing hub

Role of Agriculture and Agrochemicals in Economic Growth

Agrochemicals will contribute to economic growth through industrial growth (direct) and improvements in agricultural output (indirect)

Contribution of agriculture sector in economic growth (INR lakh crore)



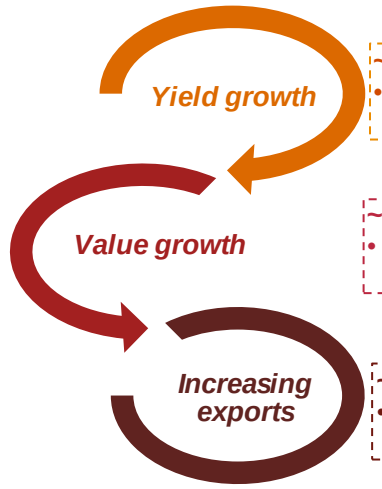
3 Factors driving the CAGR of Agri & Allied Sector

- Yield growth ~ 4–4.5%
- Value growth ~ 3–3.5%%
- Agriculture exports ~ 2–2.5%

Role of agrochemicals in economic growth

- Direct incremental growth through enhancement in ***Agrochemical Exports***
  ~ INR 16,500 crores
- Direct incremental growth through increase in ***Agrochemical consumption***
  ~INR 16,000 crores

Growth in agriculture sector ~INR 24 lakh crore



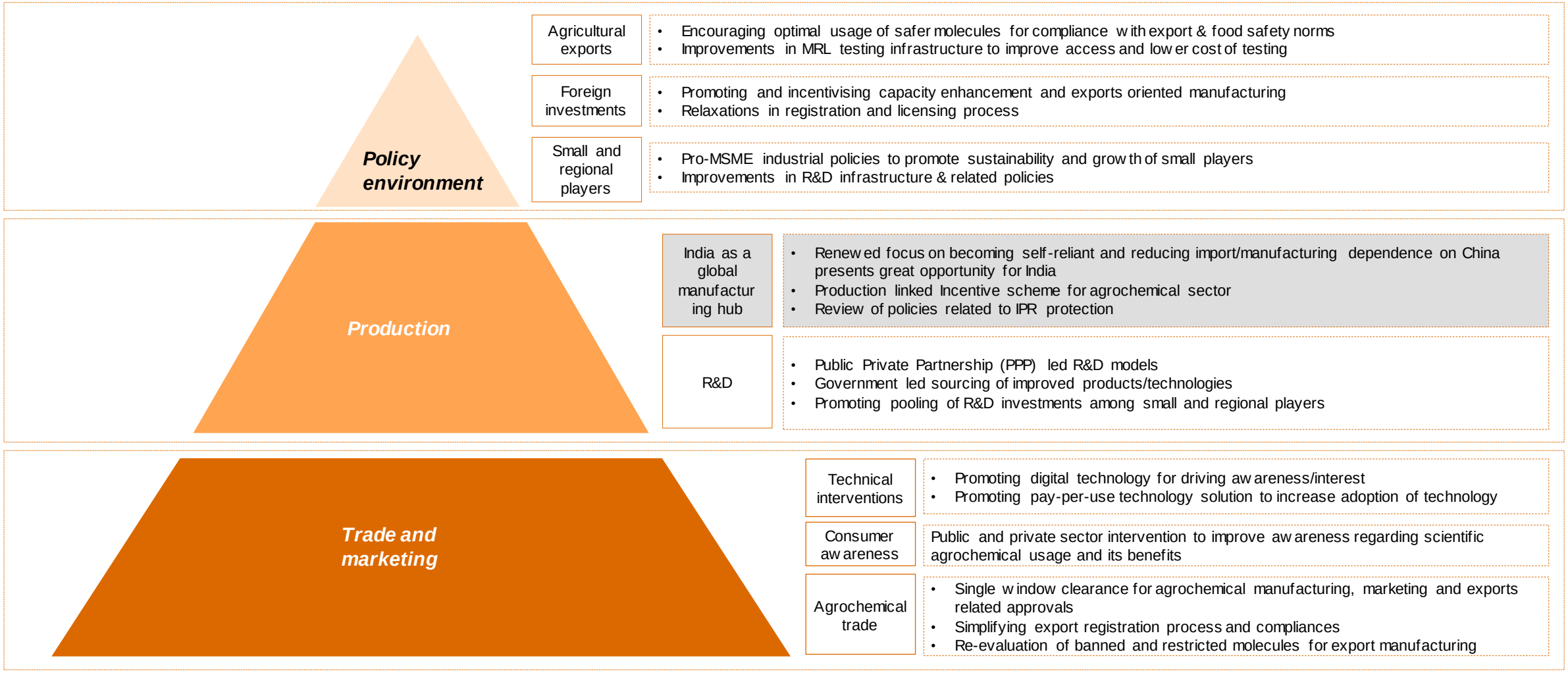
~4-4.5% growth
- Upto 30% improvements in yields or reduction in yield losses in major crops

~3-3.5% growth
- Promotion of high value and intensive agriculture

~2-2.5% growth
- Exportable surplus and compliance to food safety norms

Growth Drivers for Indian Agrichemical Industry

Reforms related to trade, marketing, production, manufacturing, product registration, IPR and other policies will drive the growth of the agrochemicals industry and agriculture sector



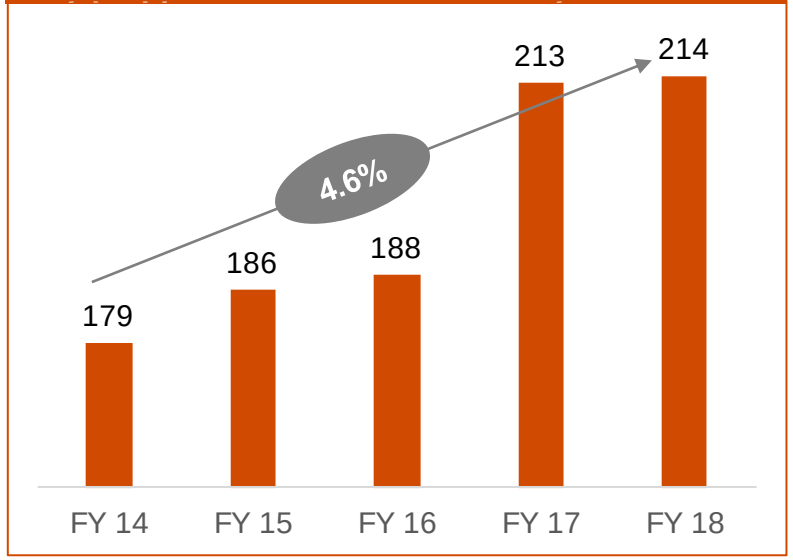
An Overview of Agrochemicals Manufacturing in India

India is 4th largest producer of agrochemicals globally, and 50% of the growth witnessed by the agrochemical companies in India (in last 5-6 years) has been driven by exports

Key highlights

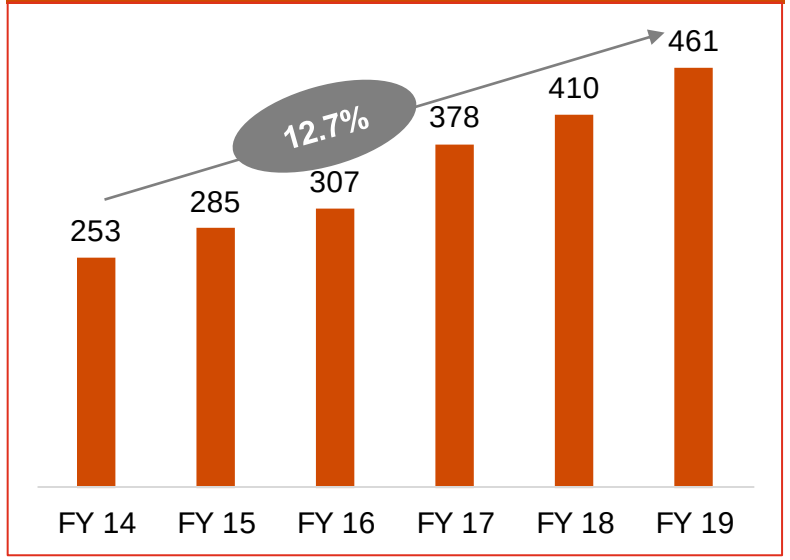
- Both Production and exports of agrochemicals has grown substantially in last decade
- India is net exporter of agrochemicals (13th largest) & exports stood at USD 1.8 Bn. in 2018-19 compared to USD 510 Mn. in 2010-11
- Production of agrochemicals has grown at a CAGR of ~5% in last 5 years
- Regulatory ban has impacted the industry over last few years. For instance, the proposed ban on 27 products in 2020, is expected to impact the exports worth ~USD 0.5 Bn.

Production* of Agrochemicals in India (in '000 MT) (* Approx. 43 Technical Grades)



Source: CARE Ratings, PwC Analysis

Agrochemicals Exports from India (in '100 MT)



Source: Statista, PwC Analysis

Over last decade, India has strengthened Manufacturing ecosystem of Agrochemicals

	2009-10	2018-19
Technical Manufacturers	~125	~145
Formulators	~800	~1000
Distributors	~1.5 Lakhs	~2 Lakhs
Technical Grade Pesticides Mfg.	~60	~80
Capacity Utilization	~58%	~80%

Source: FICCI, Industry Interactions

India as a Global Manufacturing hub

India can become "The Global Manufacturing Hub" for Agrochemicals due to number of favorable factors

India has unique advantage in catering to Domestic as well as Global Agrochemical Markets

Low Cost	**Over past decade, India has developed a unique advantage by mastering low cost manufacturing of agrochemicals (driven by availability of labour, tax benefits etc.)**
Manpower & Production Capacity	**India has sufficient availability of technically trained manpower and unutilised production capacity to fulfil local as well as global agrochemical demand**
Seasonal Domestic Demand & Low Usage	**India's domestic agrochemical demand is seasonal, hence providing an opportunity to cater to global markets. Moreover, agrochemical usage (kg/ha) is very low in India compared to other countries, which can drive manufacturing in future**
Impact of COVID	**Post COVID, many global manufacturers are contemplating a move of shifting their production from China to India and other countries. Hence, to reduce existing heavy reliance on China**
Govt. Focus	**Govt. has launched various schemes (Make in India, Start-up India, Production Linked Incentive Scheme etc.) in past decade, which will play a crucial role in transforming India into a global manufacturing hub**

Sentiments from the Industry

We would need to rebalance our supply chain between China & rest of the world – India included
- Leading Global Agrochemical Player

Govt. needs to speed-up the process of providing manufacturing/export licenses, so that India can become self sufficient
- Leading Indian Agrochemical Player

Govt. must help local manufacturers, so that India can scale/ strengthen its agrochemical manufacturing.
- Industry Association

Govt. needs to focus on strengthening local IPR laws to ensure viability of R&D investments in developing new molecules
- Leading Global Agrochemical Player

Owing to above factors & Industry Alignment, India can become a Global Manufacturing Hub for Agrochemicals in Future

Thank you

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Global CEOs Round Table: Industry Outlook

Deepak Mahurkar
Partner, Leader India Oil & Gas Industry Practice

17 March 2021

pwc

Is localization the new globalization?

Given today's uncertainty, leaders are preparing to rethink their supply chains, and to develop the localized ecosystems

Globalization

Economic, social and political integration of nations

Influencers

- Global financial crisis
- US-China tariff war
- COVID-19 induced disruption to global supply chains

Rise of Localization

- Diversifying the economy and driving sustainable economic growth
- Improving competitiveness of the economy and creating a greater role for private sector
- Contributing to the formation of a skills-based knowledge economy, and investing in R&D
- Strengthening economic resilience and self-reliance in the national supply chain
- Fostering innovation and entrepreneurship essential for a robust private sector

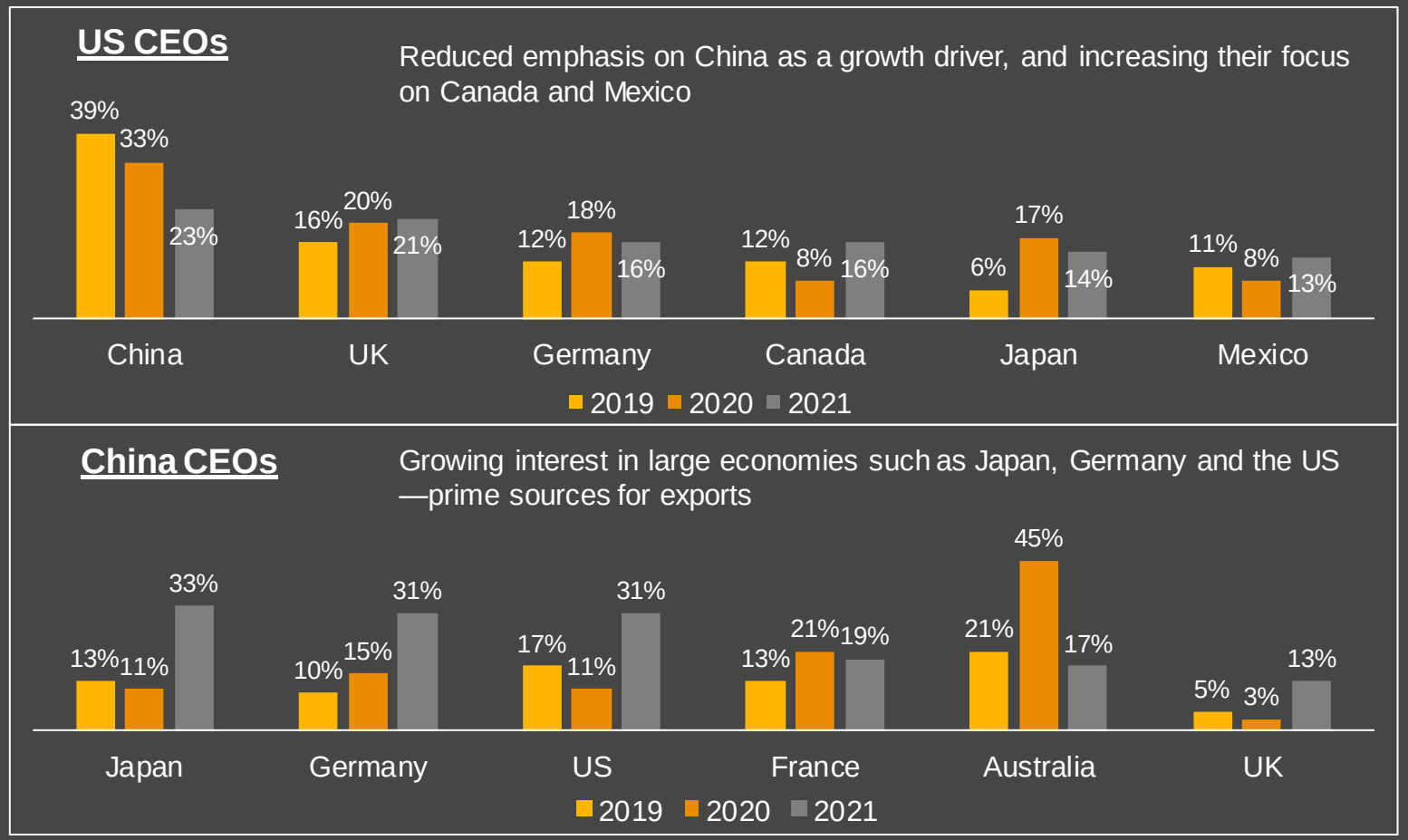
Key Levers

- Workforce
- Goods & Services
- Innovation & R&D
- Technology
- Capital

Source: PwC Research and Analysis

The shift towards localization has already initiated

PwC's 24th Annual Global CEO Survey indicates shifting focus of leaders towards the localized ecosystems



Mega-regional trade agreements

1. Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP)
2. Regional Comprehensive Economic Partnership (RCEP)

Refocus on East Asia's economic ties in the region itself

Source: PIIE
PwC

Question: Which three countries/ territories, excluding the country/territory in which you are based, do you consider most important for your organisation's overall growth prospects over the next 12 months?

Thank you

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Petroleum, Chemicals & Petrochemicals Investment Region (PCPIR), Rajasthan

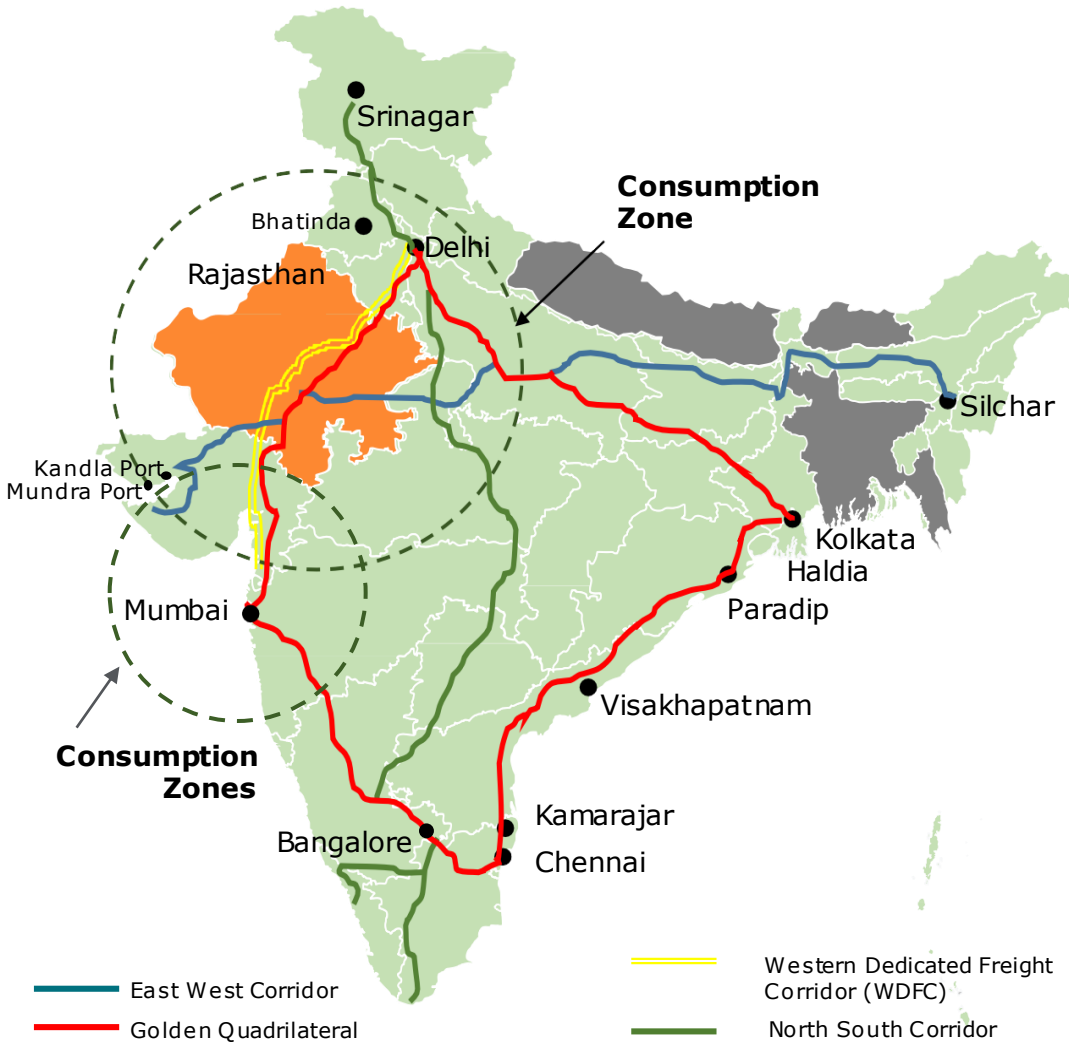
SUNRISE IN THE DESERT...

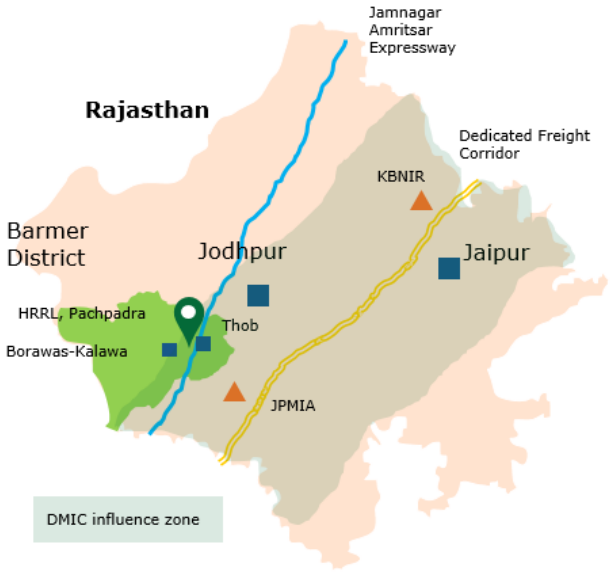
Rajasthan State Industrial Development & Investment Corporation Ltd. (RIICO)

WEBINAR | 27 JANUARY 2021

State of Rajasthan

Located in the Northwestern part of India with excellent connectivity to major cities and proximity to key consumption regions





Location Advantage

Largest state in India situated mid-way between the key markets in Northern and Western India

Resource Advantage

1st in mineral production – produces 16 minerals along with minor minerals

~1/4th of the total crude oil production in India

Excellent solar and wind resources

Connectivity Advantage

2nd largest rail network

3rd largest network of high-quality roads

8 Economic Corridors pass through the state

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Upcoming Refinery in Barmer and Potential Investment Themes

Upcoming refinery coupled with other regional advantages present a compelling rationale to shore up manufacturing of chemicals and downstream products in India

India's chemical industry is likely to grow 2x to reach USD 304 billion by 2025…

9 MMTPA Refinery and Petrochemical unit

Rajasthan government plans to develop a world class petroleum, chemicals and petrochemicals investment region (PCPIR) around the upcoming greenfield 9 MMTPA Refinery and Petrochemical unit at Pachpadra, Barmer ,

Petrochemical product slate of the upcoming Refinery includes…

- Polypropylene (1053 KTPA)
- LLDPE / HDPE (976 KTPA)
- Butadiene (150 KTPA)
- Benzene (137 KTPA)
- Toluene (107 KTPA)

01 — ***'Import Substitution' -*** *Focus on products where India is import dependent – Styrene, TDI, PVC etc.*

02 — ***'Balancing Combination' -*** *commodity plastics catering to northern demand center and 'value-added' specialties for B2B*

03 — ***'Co-dependencies and synergy' –*** *Feedstock of one unit feeding into another: Auto-components feeding into assembly manufacturers, chlor-alkali-PVC combination*

04 — ***'Mega-projects' –*** *large scale projects to develop manufacturing eco-system*

Source: HRRL

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Plethora Of Opportunities for Investment

Investors have tremendous opportunity to invest across the downstream value chain….

		Investment Potential* (₹)
PE / PP Convertors	▪ Proximity to northern consumption centers ▪ End use industries: E-commerce, cement etc. driving rapid growth	**INR 1000 Cr**

Polyvinyl Chloride	• Large scale units with high capex intensity
	  • Highest value petrochemical import
	  • Market growth particularly in north
		INR 6500 Cr

Butadiene Downstream	• Niche value added engineering plastics and synthetic rubber, typically used for automotive / white goods	**INR 2000 Cr**
Toluene Downstream	• Low volume but capital intensive unit, currently very few large manufacturers for downstream products such as TDI	**INR 2500 Cr**
Ancillary and Other Industries	• Aromatic solvents • Dye and dye intermediates • Chlor-Alkali	**INR 3000 Cr**

2030

Rs. 15,000 Cr

Investment Opportunity

Additionally, HRRL is investing Rs. 43, 129 cr.

2030

1.5 Lakh Jobs

Traction in setting up of above industries and associated infrastructure under PCPIR will pave way for opportunities in other industries (cement etc.) and non-processing enablers such as institutions, research facilities etc.

** High level estimation based on broad assumptions on price, volume, capex etc.*

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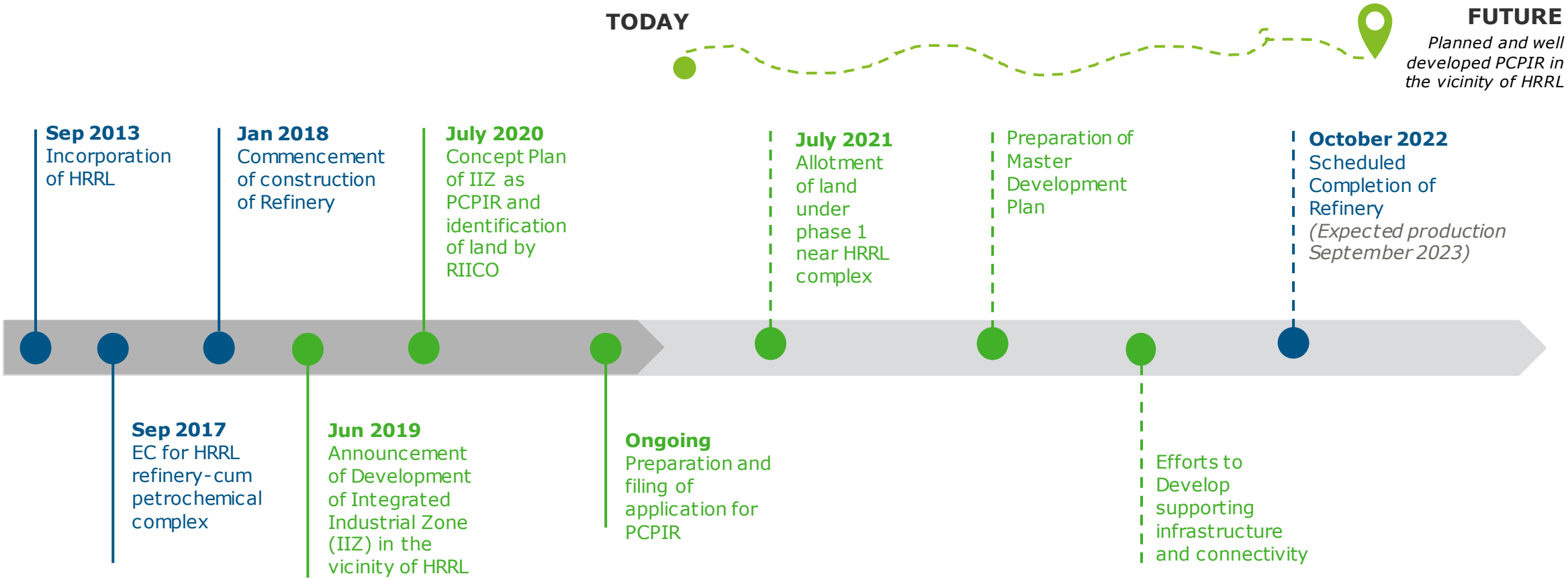
Target Timeline for Development of the PCPIR Region

Plans well underway for accelerated development of HRRL complex and the PCPIR



18 month window for potential investors to plan and strategize investments in the PCPIR

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PCPIR Rajasthan – Strategic Advantages

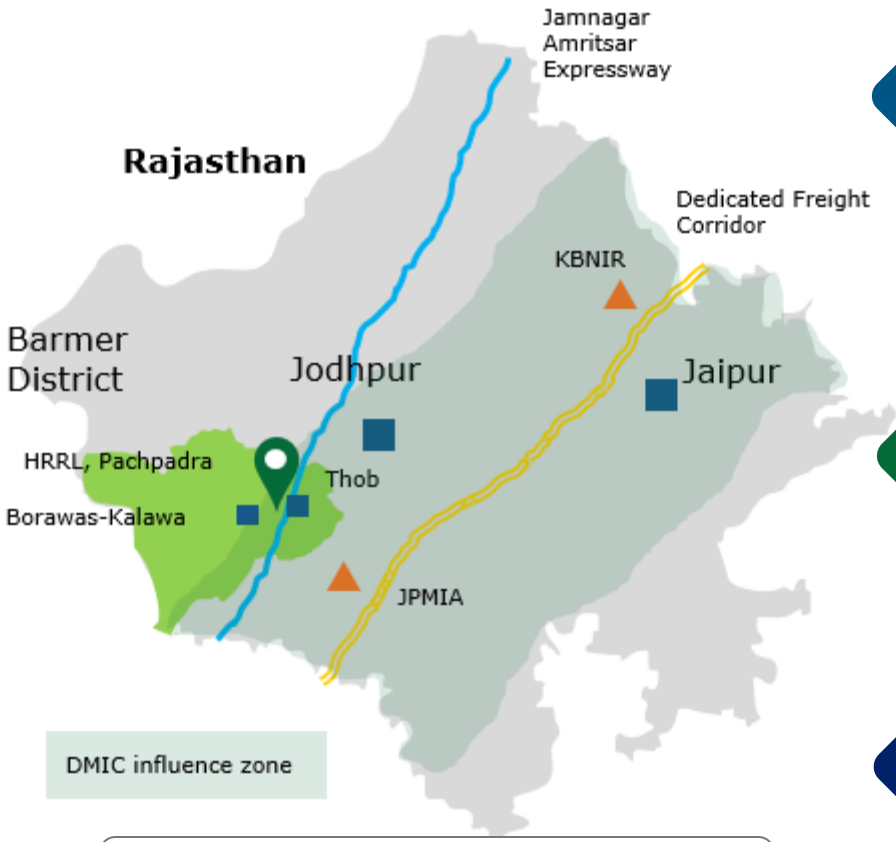
The proposed PCPIR will have excellent connectivity and location advantage

1 Delhi Mumbai Industrial Corridor (DMIC)

The proposed PCPIR will fall within the influence region of Delhi Mumbai Industrial Corridor (DMIC)

2 Amritsar Jamnagar Expressway

The six lane expressway will run adjoining to the HRRL complex and offers unhindered connectivity to Bhatinda and Jamnagar refineries for feedstock requirements and northern and western regions and ports for product evacuation.



3 Western Dedicated Freight Corridor (WDFC)

The region will have access to the dedicated freight railway line at Marwar junction and Jodhpur through existing line connecting Balotra, Jodhpur and Pali

4 Access to Ports

The region will have access to major ports – Kandla, Mundra, JNPT and numerous other ports along west coast

5 Access to Airport

The region will have access to Jodhpur airport located at ~ 100 km from HRRL

6 Access to Other Industrial Areas

The region will have be able to establish supply chains with JPMIA and other major industrial areas across Rajasthan

Source: DMIC, NHAI

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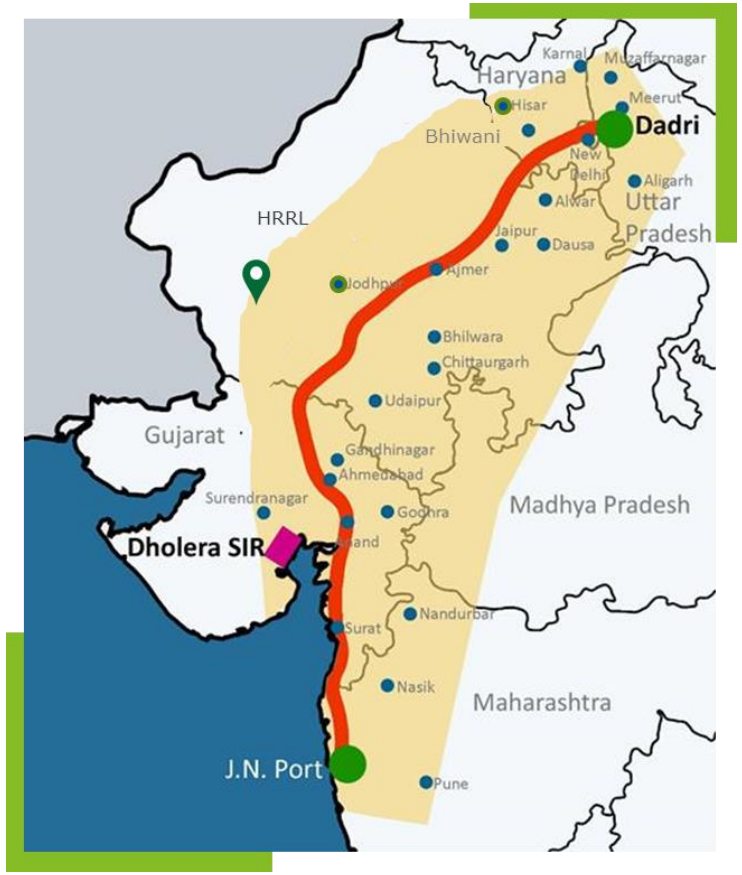
Creating an Enabling Infrastructure in the Region

Overall region level development planned - Major Projects In Rajasthan include DMIC, JPMIA

DMIC region

150 km along both sides of the Western Dedicated Freight Corridor (WDFC) is being developed as the DMIC…



The corridor will benefit from dedicated access to ports and hinterland markets, world-class infrastructure and utilities and logistics facilities and will become a catalyst for industrial development

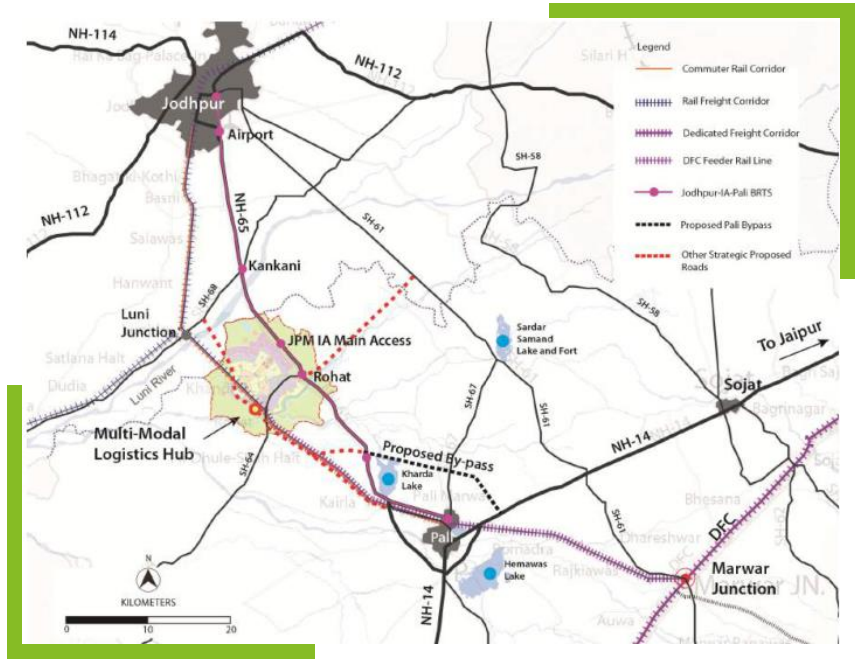
WDFC

DMIC influence area

Jodhpur-Pali-Marwar Industrial Area

Located 40 km from Jodhpur and 25 km from Pali along the border of the two districts…

Textile and apparel, building material, plastics, medical devices, auto components, handicraft, computers, electronic and optical products and machinery and equipment segments have been identified for development.



Source: DMIC, Govt. of Rajasthan

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Policy – Rajasthan Investment Promotion Policy 2019

Compelling incentives to establish industries in Rajasthan

Benefits for Manufacturing and Service Enterprises

Key Benefits for seven years,

- Investment Subsidy of 75% of State tax
- Employment Generation Subsidy
- Exemption for seven years for
  - 100% of Electricity Duty
  - 100% Land Tax
  - 100% of Market Fee
- Exemption from payment of 100% of Stamp Duty.
- Exemption from payment of 100% of conversion charges payable for change of land use and conversion of land.

Benefits to Chemicals* Sector

For investments of INR 10 cr. or more,

- 5% interest subsidy on term loans for 5 years up to Rs. 0.25 cr./yr.

OR

- Capital subsidy equivalent to 25% investment in plant and machinery upto INR 0.5 cr.

Customized Package

Customized package to enterprises if

- Investment is more than Rs. 100 Cr (Rs. 750 Cr for cement manufacturing enterprises)

AND

- Employment generation is for more than 200 persons.

Complete details may be seen in the scheme document by scanning the QR code alongside.

*Thrust sectors - Chemical, Petrochemical and Petroleum Ancillary sectors

Source: Government of Rajasthan

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PCPIR Planning in Progress – We are open for business!

An immediate opportunity of US$ 2 Bn with red carpet for potential investors…

- 243 Ha. of land being developed for industrial units at Borawas – Kalawa
- First phase of allotment from July 2021

Work in progress for allocation of 422 Ha. of land to RIICO at Ramnagar (Thob)

- 2290 Ha. of government land identified at 16 places in Barmer and Jodhpur districts

17,800 Ha. allotted for HRRL and construction is in full swing

Source: Govt. of Rajasthan

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- Thank You -

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EU Chemicals Strategy for Sustainability

IndiaChem
March 2021

#ChemicalsStrategy
#EUGreenDeal

Dr Michael BUCKI
European Commission
Delegation of EU to India

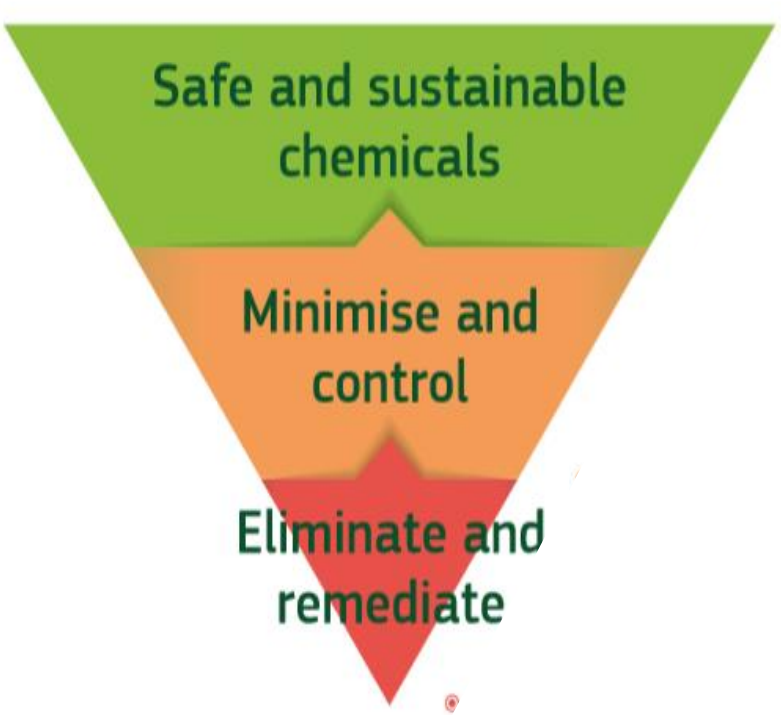
European Commission

/ GettyImages

The European Green Deal

European Commission

2030 vision – towards a toxic-free environment



- Chemicals are produced/used in a way that **maximises their benefits to society** while **avoiding harm to planet & people**
- **Production and use of *safe and sustainable chemicals*** becomes the EU market norm and a global standard

European Commission

TOXIC-FREE ENVIRONMENT: 5 building blocks

Innovation, competitiveness, recovery

Strengthen legislation for better protection

Simplification & coherence

Knowledge and science

Global

European Commission

TOXIC-FREE ENVIRONMENT: 5 building blocks

European Commission

Boosting innovation

- Develop EU safe and **sustainable-by-design criteria**
- **Provide funding** for:
  - **safe and sustainable by-design substances, materials and products**
  - **greening chemical production**
  - **access to risk finance**, in particular for SMEs and start-ups
- **Promote non-toxic material cycles** & waste decontamination solutions

European Commission

Setting the example globally

- **Global strategic objectives and targets** beyond 2020 – meet 2030 goals for sound chemicals management
- Promote the use of the **Globally Harmonized System of Classification and Labelling of Chemicals (GHS)** and propose new hazard classes
- **Common standards** and innovative assessment tools internationally (OECD)
- Sound management of chemicals **in international cooperation**
- Chemicals **banned in the EU not for export**

European Commission

TOXIC-FREE ENVIRONMENT: 5 building blocks

Innovation, competitiveness, recovery

Strengthen legislation for better protection

Simplification & coherence

Knowledge and science

Global

European Commission

Strengthening legislation

- **All chemicals** on the market to be used safely and sustainably.
- Substitute and minimise as far as possible **substances of concern**
- Avoid the **most harmful chemicals** in consumer products esp. for vulnerable groups

Endocrine disruptors

PFAS perfluoroalkyles

Mixtures

Environmental impact

European Commission

Revisions of EU REACH

Registration, Evaluation, Authorisation and Restriction of Chemicals

- **Extension to certain polymers of concern**
- **Information on environmental footprint, use and exposure, critical hazard properties** (carcinogenicity, endocrine disruption etc.)
- **Chemical Safety Assessment** to include "Mixtures Assessment" Factor, Derived Minimal Effect Level (for non-threshold substances with a dose-response relationship),
  → **new requirements for supply chain communication**
- **Extend the use of the Generic Approach for Risk Management** (including products for professional use, with possible exemptions for "essential uses", to be defined)
- **Increase control (import, e-commerce) and enforcement** + European Audit Capacity

European Commission

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European Commission

India Chem 2021

11th Biennial International Exhibition & Conference

Conclave on Global Agrochemical Industry

Shri R.G. Agarwal

Chairman, Dhanuka Group & FICCI Committee on Crop Protection Chemicals

Excerpts from the 1st Quad Summit

- In the 1st Quad Summit 2021 held between Leaders of **US, India, Japan & Australia** held on March 12, 2021

Quote

✓ The 4 countries plan to establish a series of working groups that will focus on climate change; critical and emerging technologies, including working to set technology standards and norms and jointly developing some of the critical technologies of the future, officials said

✓ In a joint op-ed in The Washington Post on Saturday, the four leaders asserted that all countries should be able to make their own political choices, free from coercion. "To strengthen our quest for a region that is open and free, we have agreed to partner to address the challenges presented by new technologies and collaborate to set the norms and standards that govern the innovations of the future," they wrote.

Unquote

Text Source: https://economictimes.indiatimes.com/news/international/world-news/quad-summit-went-very-well-says-president-biden/articleshow/81504454.cms

Source of image of Quad leaders meet: ANI

Appreciation of Key Government Initiatives

- Revolutionary reforms & decisions by Hon'ble Prime Minister, Agriculture Minister & Govt.
- We thank the Hon'ble Agriculture Minister for referring PMB 2020 to Standing Commitee
- Industry appreciates these initiatives to make Farmers सर्व सक्षम
  - ✓ Farmers' Produce Trade & Commerce (Promotion & Facilitation) Act, 2020,
  - ✓ Essential Commodities (amendment) Act, 2020,
  - ✓ Farmers (Empowerment & Protection) agreement on price assurance & Farm services Act, 2020
- **We appreciate the initiatives being taken under 3D agenda for reforms vide meetings held under chairmanship of Additional Secretary (PP) Shri Atish Chandra, IAS**

Source: The Economic Times

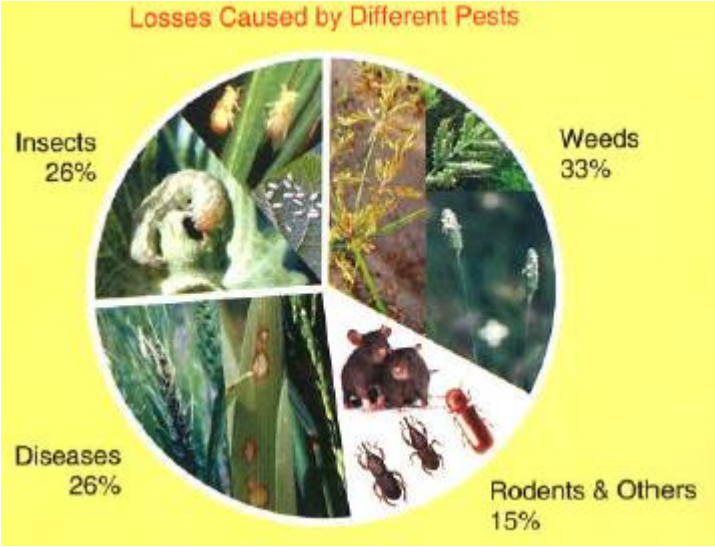
Source: The Financial Express

Crop losses threaten our food & nutrition security (1/2)

- Grain saved is grain produced
- As per IARI, 8-90% crop losses happen due to non usage of quality pesticides
- Also, Annual production losses due to pests & diseases in India estimated at Rs. 90,000 crores in 2002 (37th Standing Committee under Ministry of C&PC) (today's value may be around Rs. 4 lac crores)

Avoidable Crop Losses Due to Pests & Cost Benefit Ratio of Pesticides in Different Crops

Crop	Avoidable Losses (%)	Cost : Benefit*
Cotton	40-90	1:7
Paddy	21-51	1:7
Mustard	35-75	1:12
Sunflower	36-51	1:8
Groundnut	29.42	1:26
Maize	20.25	1:3
Pulses	40-88	1:4
Sugarcane	8-23	1:13
Vegetables	30-60	1:7
Fruits	20-35	1:4



Published by

Division of Agricultural Chemicals
Indian Agricultural Research Institute
New Delhi – 110 012.
Website : www.iari.res.in

*Source: **IARI's 2008 Study** titled 'Pesticides: A Critical Input for increasing Crop yields'*

Crop losses threaten our food & nutrition security (2/2)

Table 4. Current crop losses caused by insect pests to major agricultural crops in India

Crop	Actual production* (million tonnes)	Approximate estimated loss in yield		Hypothetical production in absence of losses (million tonnes)	Monetary value of estimated losses (USD million)
		%	Total (million tonnes)		
Cotton	58.17	30.00	24.93	83.10	15767.69
Rice	106.65	25.00	35.55	142.20	8467.36
Maize	24.26	18.00	5.33	29.59	1268.41
Rapeseed mustard	7.88	20.00	1.97	9.85	1026.70
Other Oilseeds#	15.16	12.00	2.07	17.23	1215.55
Groundnut	9.71	15.00	1.71	11.43	1172.13
Pulses##	19.78	15.00	3.49	23.27	2285.29
Coarse cereals###	19.03	8.00	1.65	20.68	378.20
Sugarcane	352.14	20.00	88.04	440.18	3160.25
Wheat	93.51	5.00	4.92	98.43	1135.75
Total/Average		16.80			35877.32

*Production and minimum support price (MSP) fixed by Government of India for 2013-14, are adapted from Directorate of Economics and statistics, Department of Agriculture and Cooperation (DAC, 2015) and Anonymous (2015).
#Other Oilseeds includes sunflower, safflower, sesamum, nigerseed, soybean, linseed, castorseed
##Pulses includes gram, lentil, arhar, moong, urd
###Coarse cereal includes jowar, bajra, ragi, barley, small millets

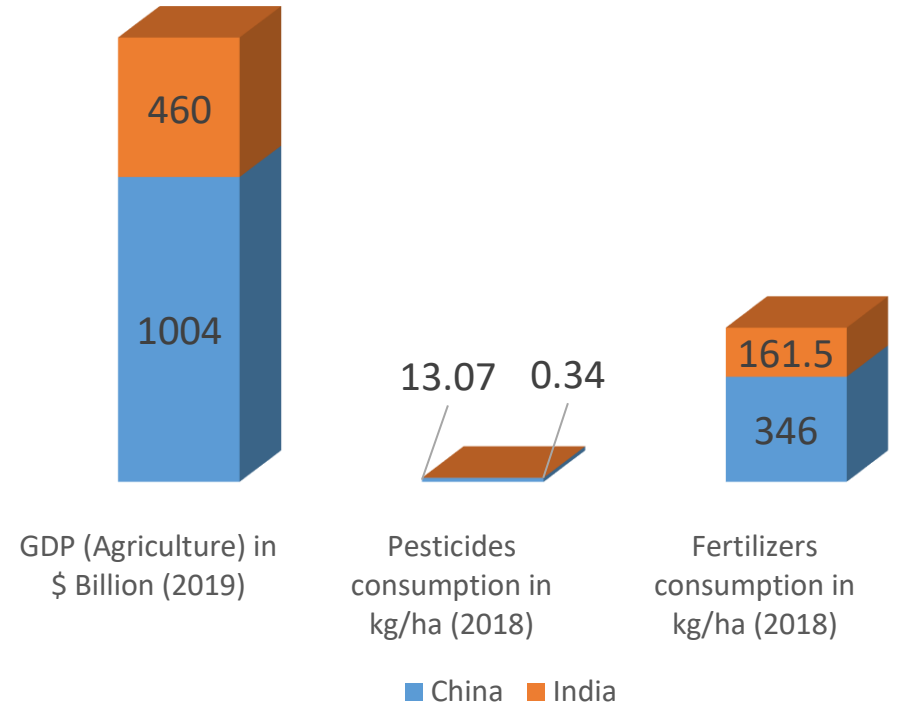
Rs. 2.65 lac crores
(estimated in 2015)

Source: *Crop Losses due to Insect Pests: Global & Indian Scenario* *Indian Journal of Entomology*, 77(2): 165-168 (2015) DOI No. 10.5958/0974-8172.2015.00033.4

Snapshot: India Vs The World & India Vs China

- India uses 58,000 tons of pesticides annually
- Use of pesticide in India lowest (< 0.34 kg/ha) (as per FAOSTAT 2018) globally compared to:
  - ✓ China (13.07 kg/ha),
  - ✓ Japan (11.84 kg/ ha),
  - ✓ Brazil (5.94 kg/ha)
- China is the largest consumer of pesticides (1.77 mt) globally, followed by USA (0.4 mt), Brazil (0.377 mt), Argentina (0.17mt), Canada (0.09 mt) & India (only 0.058 mt)

Particulars	China	India
Arable Land (2018)	119.49 mn ha	156.42 mn ha
Rainfall	645 mm	1083 mm



Source & UOM: Pesticides - 2018 FAO, GDP - 2019 World Bank, Fertilizer - FAO 2018, Arable land - FAO - 2018, Agriculture Land - FAO 2018 (http://www.fao.org/faostat/en/#data/RL) ; mt is megatonne

Crop Protection Challenges to Farmers

1. Non Availability of New technology products

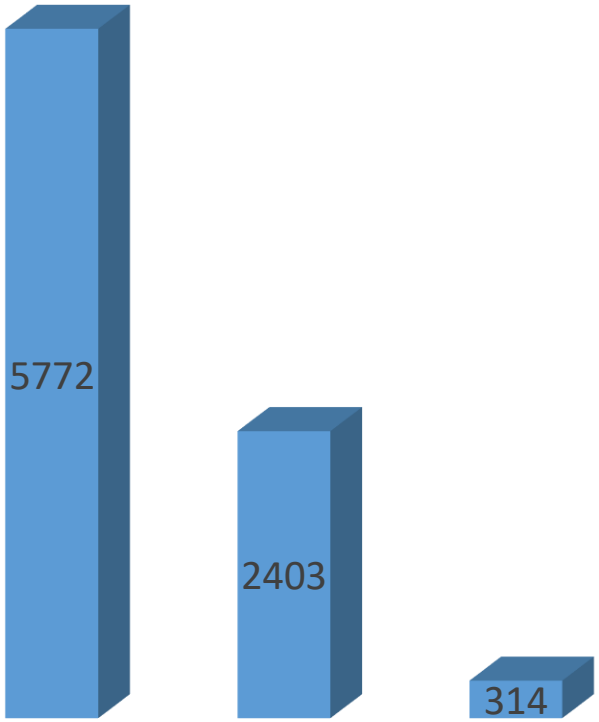
How to save farmers' hard grown crops in absence of new pesticides ?

- New Products are not easy to get:
  - No basic research in India & dependency on MNCs / Japanese Companies who invest around Rs. 2,000 Cr & 10 to 12 years on one new molecule research
  - India: 5 to 7 years time for registration of new products & investment of Rs. 30 – 50 Cr
  - New products not given Intellectual Property protection (Data protection)
  - Above leads to inordinate delay in introduction of new products in India
  - Proposal to increase Import duty from 10% to 20% on Formulation Imports
  - Out of a no. of pesticides registered world over, China has 950+, USA has 800+, Pakistan & Vietnam have 450+, whereas, India has **only 292 molecules**

2. Unregulated Players

- **5772:** Count of companies issued registrations by CIB&RC

  (as on 31.10.2020 from *https://pesticides-registrationindia.nic.in/GenReport/frmCompanyListReport.aspx*)
- **2403:** Number of pesticides manufacturing units as per Lok Sabha Unstarred Question no. 309 (15.09.2020 by Agriculture Minister)
- **314:** Companies which responded with data as desired by Govt. by various notices & notifications by Sh Jalaj Shrivastava, Ex Addl Secretary DACFW



- **5458:** Companies didn't submit data; maybe selling fake products :

  a huge threat to the food, nutrition, health & environment security of India
- **Continued Violation of 261st & other RC decisions, Insecticides Act 1968 & Rules 1971 by Central & State Govts.** ; No action after 2 cos. license cancellation in 2010 after Gazette no. 127, S.O. 166 (E) dt 22.10.2010

3. Impact of Unregulated Players

- Illegal imports (supporting China - biggest source for low quality products in India)
- Huge opportunity loss in terms of Revenue for Customs / GST / Income Tax / Trade Channel & lost employment of Indian Youth
- Menace of Spurious pesticides is very large in India. There is a large parallel grey market which runs parallel to the genuine industry.
- Damage of Indian image is contrary to desire of our Hon'ble Prime Minister who has taken India to the heart of USA & his address was dubbed a ROCKSTAR performance

Path forward with Proposals to deal with these Challenges

Farmers must get Quality Agrochemicals to nullify Crop losses as it works as an insurance to their crops & other agri-inputs

1. New Technology : IOT / AI / Agri-Drones

- Government should speedup issuance of guidelines for usage of ‘Drones in Agriculture’ & Artificial Intelligence
- Spray of pesticides through Drones for Crop protection for safety of farmers
- Consider Internet-of-things

Source: ScienceDirect.com

2. PMB ‘Pesticides Management Bill’ 2020

- **Implement ‘Ease of Doing business’ as per Government of India policy**
- Redraft PMB 2020 by following scientific & research based suggestions of NAAS, TAAS, Farmers’ Associations & Industry
- Define evaluation of Safer Alternatives; Define ‘pesticides’ clearly
- Mandate elaborated list of qualification of person & infrastructure requirement for obtaining registration & manufacturing license
- **Decriminalize clause of 5 years jail term & Rs. 50 lacs penalty as per the Government of India policy of decriminalizing all the commercial acts as presented by Finance Minister Smt. Nirmala Sitharaman under point no. 82 of her budget speech**
- Issue registration certificates of new pesticides in prescribed timeline (1.5 yrs)

Time to Act is NOW: ET Article of 29.10.2020

GLOBAL FDI

ET 29-10-20

Make China's Loss, India's Gain

Daniel H Rosen & Thilo Hanemann

The Covid-19 pandemic has elevated long-simmering debates about dependence on China-centred global supply chains. This rethink has created tremendous opportunities for India and other developing countries in the region — if they can seize them.

The experience of being forced to scramble to secure masks and ventilators at the height of the Covid-19 crisis has prompted countries across the globe to reassess the risks of depending on others for critical goods. This impulse preceded the pandemic, but has gained new momentum since it erupted. In addition to medical goods, a range of hi-tech inputs from China are facing closer scrutiny.

In most cases, Organisation for Economic Cooperation and Development (OECD) economies will not move their China-based factories home. More likely is a steady, deliberate shift of marginal foreign direct investment (FDI) away from China and toward emerging economies. This redistribution will not be even — it will reward the winners of a competition among many nations to establish themselves as an attractive alternative to China. Countries in the Association of Southeast Asian Nations (Asean), and potentially India, are in the running. Some will profit, while others are passed by.

China presents a useful roadmap for aspiring global manufacturers. Beijing moved to embrace foreign investment in the 1990s, rejecting previous economic theories that fixated on subsidising domestic manufacturing to displace imports, but failed to generate the knowhow and scale to do so. With FDI came technology transfer and competition, which fostered innovation and efficiency along with the development of stronger legal and regulatory systems. Those benefits are still visible today. In Shanghai, foreign firms generate about one-quarter of the city's GDP, two-thirds of imports and exports, and one-fifth of employment.

But if China's early growth is a roadmap, its recent performance is a cautionary tale. Inward FDI flows were flat over the past two years, even before the pandemic triggered a further drop in new investment. China has dragged its feet on further opening to foreign investment in services and non-manufacturing sectors. Under President Xi Jinping, China is shifting back toward State planning and Communist Party of China (CPC) interference in private business decision-making, leading foreign investors to look for alternatives.

Go see where's the money headed

China's loss is becoming developing Asia's gain. FDI flows to the Asean countries exceeded those to China for the last three years, bringing in nearly $156 billion in 2019. The shift is particularly visible in manufacturing. But Asean is also attracting investment in the services sector, where China has been a hesitant host.

India, with its size and labour pool, has always held promise as a global production hub. Annual FDI flows into India surged from about $4 billion in 2000 to $47 billion in 2008. But over the past decade, annual FDI inflows have stalled. Today, they are just over one-third of what China attracts each year.

India's comparative advantages in land and labour are powerful, but onerous bureaucratic rules and politics are even stronger. Prospective investors are stymied by shifting tax regimes. Despite some consolidation of labour laws at the federal level, there remain hundreds of labour laws at the state level, which can be fragmented, inconsistent and confusing for job-creators. These are formidable hurdles to businesses contemplating investing in India.

But with the right combination of reforms — some of which are already underway with the latest labour reforms — India could become a hi-tech manufacturing powerhouse. India's trusted relationship with the US and other advanced economies makes it a natural destination for electronics supply chains.

Last July, Taiwan-based iPhone assembler Foxconn announced it would invest up to $1 billion in a factory in India. Many more multinationals are ready to make the jump, if business conditions are right. India could slash red tape to attract the knowhow and partners it needs to become a new supply chain hub in electronics and many other industries.

Shaken by the Covid-19 pandemic, countries are thinking hard about how to restore supply chain resilience. Home-country reshoring can only be a small part of that, especially for non-hi-tech products. China will remain a manufacturing powerhouse but, at the margin, a diminishing one. Emerging economies in the region have an opportunity to draw in foreign investment that is looking for a new home and set themselves up for faster growth. But to do so, leaders must seize the opportunity, putting policies in place that make their countries an attractive alternative to China at a time of intensifying competition.

The writers are partners, Rhodium Group, New York, US

If changes aren't done in PMB 2020 as per Scientific recommendations to make Indian Pesticide industry a Champion Sector & a hub for Global market; then MNCs won't invest although they want to shift their base from China & may shift to any other Asian Country like Vietnam, Malaysia, Indonesia, Thailand, Taiwan, Philippines, Korea, etc.

Huge Agri Potential in India : Current Opportunity Loss

India Vs China						
Country	Arable Area Mn Ha	GDP from Agriculture		GDP / Area = c / a	Nomenclature	Ratio = d / e
	a	b (in US$)	c (in Rs.)			
China	119.49	1004	72,769,920,000,000	609,004,268,140	d	2.86
India	156.42	460	33,340,800,000,000	213,149,213,656	e	

Huge Size of the Indian Agri-Potential: To meet the Vision of a US$ 5 Tn Indian economy, the ADDITIONAL contribution from Indian Agriculture Sector can be 3 times of the current Indian GDP from Agriculture, provided our recommendations made in this presentation are considered by the Authorities. There is a huge scope of additional revenue for all stakeholders such as Govt. & Farmers which automatically will meet the Govt. target of Doubling farmers' income by 2022

Source: GDP - 2019 World Bank, Arable land - FAO - 2018, (http://www.fao.org/faostat/en/#data/RL)

आत्मनिर्भर भारत | Make-In-India | भारत माता की जय।

- We appreciate & support Hon’ble Prime Minister’s Nationalistic Vision to Make-in-India
- What China has been doing for decades, we have started in 2014
- A small group is misrepresenting आत्मनिर्भरता
- We may curb import of unnecessary luxury goods, but we need to import new technology pesticides which aren’t available in our Country (Ex. Rafael jets) to make India truly सशक्त

Thank You

We hope that the Government takes decisions in the favor of 140 Mn Indian farmers.

We believe in:

वसुधैव कुटुम्बकम

Let us together pray to God:

ॐ सर्वे भवन्तु सुखिनः। सर्वे सन्तु निरामयाः।
सर्वे भद्राणि पश्यन्तु। मा कश्चित् दुःख भाग्भवेत्॥
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