

SUMMIT ON “INDIA: GLOBAL CHEMICALS & PETROCHEMICALS MANUFACTURING HUB”

25th – 26th November, 2021

2nd Edition



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1. Event Snapshot

“Summit on India: Global Chemicals & Petrochemicals Manufacturing Hub” (GCPMH 2021) was jointly organized by **Department of Chemicals & Petrochemicals, Ministry of Chemicals & Fertilizers, Government of India**, and **FICCI** from 25th November to 26th November 2021 at Hotel Le Meridien, New Delhi.

The summit was inaugurated by **Dr. Mansukh Mandaviya**, Hon'ble Union Minister of Health & Family Welfare, Chemicals & Fertilizers, Government of India on 25th November 2021.

Key Highlights of the Summit:

- Session 1: **Exploring the Potential of PCPIRs** and Paving Way for Inclusive Growth in Region, Sector, and Economy
- Session 2: **Strategic Global Partnerships**: Crucial for driving Investments and Business Development
- Session 3: **Evolving opportunities** in Chemical & Petrochemical Industry in Post COVID Era
- Session 4: **The importance of ESG** (Environmental, Social, and corporate Governance) and Circular Economy in shaping the future of chemical and petrochemical industry
- Session 5: **Dynamics of Feedstock**: Leveraging Synergies of Value Chains between Petroleum and Petrochemicals - A Roadmap from Oil to Chemicals
- Session 6: **Supply Chain Disruptions** in the Chemicals & Petrochemicals Industry and Way Forward
- Session 7: **Emerging Trends in retaining the industrial momentum and growth** in Chemicals & Petrochemicals industry: Importance of Sustainable Green Chemistry and the Role of Digitalization
- **India @75: FICCI Chemical and Petrochemical Industry Awards**





2. Introduction

- The Indian Chemicals & Petrochemicals Industry is growing rapidly due to the positive reforms undertaken by the Government of India in recent years and atmosphere of encouragement. Chemical industry in India is a diversified industry, covering about 80,000 commercial products. It provides key building blocks to a host of downstream industries such as automobiles, textiles, papers, paints, soaps, detergents, pharmaceuticals among many others. It is a capital-intensive industry which employs approx. 2 Mn people in India.
- The estimated size of the Indian chemical sector stands at approx. USD 187 billion in FY-20, and it is expected to grow at ~6% per annum to reach \$254 Bn by FY2025. 100% FDI in this sector is permitted under the automatic approval route and the manufacturing of most of the chemical products is de-licensed except for a few hazardous chemicals.
- In pursuance to your vision of Make in India and to provide impetus to the growth of the sector, Department of Chemicals and Petrochemicals, Government of India, Ministry of Chemicals and Fertilizers and Federation of Indian Chambers of Commerce and Industry (FICCI) have organized the 2nd edition of, “India: Global Chemicals & Petrochemicals Manufacturing Hub” from 25th to 26th November 2021 at Le Meridien, New Delhi, India.
- The primary goal of this summit is to bring together global Diaspora leaders, CEOs, government authorities, key industry players and subject matter experts from around the world in an open dialogue, under one roof to discuss the key developments, sectoral issues and the way forward with respect to Indian chemicals and petrochemicals industry.
- Summit on “India: Global Chemicals & Petrochemicals Manufacturing Hub” has helped to develop possible strategies, sharing insights, exploring opportunities and challenges which will shape the Chemicals and Petrochemicals Industry in India and across the world in the next decade.



3. Program Schedule

Day 1: Thursday, 25 th November 2021	
0830 – 0930 hrs.	Registration
0945 – 1045 hrs.	Inaugural Session
1045 – 1130 hrs.	Networking Tea Break
1130 – 1230 hrs.	Session 1: Exploring the Potential of PCPIRs and Paving Way for Inclusive Growth in Region, Sector, and Economy
1230 – 1345 hrs.	Session 2: Strategic Global Partnerships: Crucial for driving Investments and Business Development
1345 – 1500 hrs.	Business Networking Lunch
1500 – 1615 hrs.	Session 3: Evolving Opportunities in Chemical & Petrochemical Industry in Post COVID Era
1615 – 1730 hrs.	Session 4: The importance of ESG (Environmental, Social, and corporate Governance) and Circular Economy in shaping the Future of Chemical and Petrochemical industry
1730 – 1830 hrs.	Networking Tea Break
1830 – 1930 hrs.	India @75: FICCI Chemical and Petrochemical Industry Awards
1930 hrs. onwards	Business Networking Dinner
Day 2: Friday, 26 th November, 2021	
1100 – 1215 hrs.	Session 5: Dynamics of Feedstock: Leveraging Synergies of Value Chains between Petroleum and Petrochemicals - A Roadmap from Oil to Chemicals
1215 – 1330 hrs.	Session 6: Supply Chain Disruptions in the Chemicals & Petrochemicals Industry and Way Forward
1330 – 1430 hrs.	Business Networking Lunch
1430 - 1545 hrs.	Session 7: Emerging Trends in retaining the industrial momentum and growth in Chemicals & Petrochemicals industry - Importance of Sustainable Green Chemistry and Role of Digitalization
1545 - 1600 hrs.	Tea



4. Highlights from the Day 1

4.1 Inaugural Session

Agenda

Day 1: Thursday, 25 th November 2021	
0945 – 1045 hrs.	Inaugural Session
Moderation by Shri Samir Kumar Biswas , IAS Additional Secretary (Chemicals), Department of Chemicals & Petrochemicals, Ministry of Chemicals and Fertilizers, Government of India.	
0945 – 0950 Hrs	Lighting of the Lamp and felicitation of the dignitaries
0950 – 0955 Hrs.	Welcome Address by Mr. Prabh Das , Chairman, FICCI Petrochemicals Committee and MD & CEO, HMEL Mittal Ltd.
0955 – 1005 Hrs.	Sectoral Presentation by Shri Yogendra Tripathi , Secretary, Department of Chemicals & Petrochemicals, Ministry of Chemicals and Fertilizers, Government of India
1005 – 1010 Hrs.	Address by Thiru Thangam Thennarasu , Hon'ble Minister for Industries Department, Government of Tamil Nadu
1010 – 1020 Hrs.	Guest of Honour Address by Shri Bhagwanth Khuba , Hon'ble Minister of State, Ministry of Chemicals & fertilizers and Minister of State, Ministry of New & Renewable Energy, Government of India
1020 – 1035 Hrs.	Chief Guest Address by Dr. Mansukh Mandaviya , Hon'ble Union Minister of Health & Family Welfare, Chemicals & Fertilizers, Government of India
1035 – 1040 Hrs.	Release of Knowledge Paper prepared by FICCI & PwC
1040 – 1045 Hrs.	Concluding Remarks & Vote of Thanks by Mr. Deepak C Mehta , Chairman, FICCI National Chemical Committee and Chairman and Managing Director, Deepak Nitrite Ltd.

Key discussion points

Summit on “India: Global Chemicals & Petrochemicals Manufacturing Hub” inaugural session was held at Le Meridien, New Delhi on 25th November 2021. The 2nd edition of this summit was conducted in a unique hybrid- (physical and digital) format.

Dr. Mansukh Mandaviya, Hon'ble Union Minister of Health & Family Welfare, Chemicals & Fertilizers, Government of India, **Shri Bhagwanth Khuba**, Hon'ble Minister of State, Ministry of Chemicals & fertilizers and Minister of State, Ministry of New & Renewable Energy, Government of India, **Shri Samir Kumar Biswas**,



IAS Additional Secretary (Chemicals), Department of Chemicals & Petrochemicals, Ministry of Chemicals and Fertilizers, Government of India, **Shri Yogendra Tripathi**, Secretary, Department of Chemicals & Petrochemicals, Ministry of Chemicals and Fertilizers, Government of India, **Mr. Prabh Das**, Chairman, FICCI Petrochemicals Committee and MD & CEO, HMEL Mittal Ltd, **Thiru Thangam Thennarasu**, Hon'ble Minister for Industries Department, Government of Tamil Nadu, **Mr. Deepak C Mehta**, Chairman, FICCI National Chemical Committee and Chairman and Managing Director, Deepak Nitrite Ltd. inaugurated the event

by lighting the ceremonial lamp.



Prabh Das, MD & CEO - HPCL - Mittal Energy Limited gave his remarks welcoming the dignitaries on the dias and said that the summit will help the industry grow and achieve new heights. He mentioned that Indian economy marches towards the vision of a 5 trillion economy by 2025 with a contribution of 1 trillion from manufacturing industries. Also, chemical and petrochemical sector is going to play a very crucial role in achieving the dream of Atma Nirbhar Bharat.

He also stated that this chemical and petrochemical industry is projected to reach from 165 billion to 300 billion by 2025. One of the key indicators of tremendous growth potential for this sector is the rising chemical and petrochemical imports and the lower per capita consumption. He stated that the total consumption of polymer is around 16 million ton and is expected to go up to 23 million ton by 2025 and to 32 million ton by 2030. A huge investment of 3 to 4 billion dollars goes into setting up a cracker. If India doesn't accelerate the process of setting up these





plants, we might lose our competitive advantage so there is an urgency in taking these Polymers forward quickly.

He ended on the note hoping that the conference will bring out the issues in front of the policy makers and this industry would be able to guide itself to help India become a global manufacturing hub.

Shri Yogendra Tripathi, Secretary, Department of Chemicals & Petrochemicals, Ministry of Chemicals and Fertilizers, Government of India reminded the audience about contributions of chemical industry in hard times of covid, and how the industry joins hands with the government for all the basic requirements & supplies. The petrochemical sector evolution establishment started happening in 1960s. India remains an oasis of growth amongst slowing global outlook and in the post pandemic world and India will continue to be one of the fastest growing economies of the world. Further he spoke about the GOI's proactive steps to ensure that Indian economy becomes an attractive destination for investment. All the economic reforms in the past few years like the aggressive corporate tax cuts, promoting FDIs and start-up culture in India have been remarkable. Manufacturing is a major sector for Indian economy as it has a strong consumer market with a large working population.



He highlighted that 'Chemical and Petrochemical' sector plays a role in each and every item an economy needs and needs to deal with. The Chemical Industry market was initially estimated to be USD 187 bn in FY-20 and is projected to reach USD 254 bn by FY-25. There is a supply demand gap in petrochemicals and intermediate chemicals which will provide business opportunities in 2025. Also, specialty chemical segments are expected to witness the highest growth than the sector as a whole. There are major petrochemical projects under implementation and the total investments made are around USD 16 bn. Market and feedstock access, lower operating and capital cost are some of the key factors which will help India give a competitive edge in this sector. Also, policy initiatives and production linked incentive schemes will act as 'Game Changers' for Indian Chemical Industry.

Thiru Thangam Thennarasu, Hon'ble Minister for Industries Department, Government of Tamil Nadu spoke



about the advantages of Tamil Nadu which are crucial for any industry to thrive. The state is striving forward to improve the business ecosystem by building investor's confidence. The strategic location of the state complemented by its excellent logistics and infrastructure; industrial friendly policies provide the investors with one of the most profitable platforms to establish their operations in Tamil Nadu. The aspirations of the government are to make Tamil Nadu a trillion USD economy by 2030.

Recognizing the importance of specialty chemicals and petrochemicals, the government has categorized them in sunrise sectors to extend financial support through additional incentives. To further strengthening this ecosystem, TN has established the polymer park near Chennai and also proposed to set up a petrochemical park in the state.



Shri Bhagwanth Khuba, Hon'ble Minister of State, Ministry of Chemicals & fertilizers and Minister of State, Ministry of New & Renewable Energy, Government of India spoke about the initiatives of the government to help create demand and make India self-reliant. He extended a vote of thanks to the organizers of this summit wherein various industries around the country come together and pitch their ideas on how to make India a global hub. He spoke about the potential of India for foreign investments and India's proactive approach to improve its market accessibility across the globe. He also highlighted all the initiatives taken by the government for facilitating the growth of the industry specifically in terms of ease of doing business, reforming corporate tax regimes which gave boost to this sector. He also invited industry leaders to invest in Research & development in India.



Dr. Mansukh Mandaviya, Hon'ble Union Minister of Health & Family Welfare, Chemicals & Fertilizers, Government of India spoke about the importance of industrial growth and highlighted the strengths of India to help it become a global hub. He spoke about how wealth creation has been one of the key agendas of the government. He stressed the importance of chemical and petrochemicals in our day to day lives. He spoke about the potential of this summit as a platform to discuss new



and innovative ideas and a platform to discuss about changing government policies to aid industrial development. He spoke about India's success in tackling the pandemic and how India is proving its mettle against other developed nations. Also, India is going to benefit from the PLI scheme which will help it become a global manufacturing hub. The government and industries should focus on how to make the chemical and petrochemicals sector environment friendly and reduce carbon footprint.





4.2 Exploring the Potential of PCPIRs and Paving Way for Inclusive Growth in Region, Sector, and Economy

Day 1: Thursday, 25 th November 2021	
1130 – 1230 Hrs.	Session 1: Exploring the Potential of PCPIRs and Paving Way for Inclusive Growth in Region, Sector, and Economy
Moderation by Mr. Kamal Nanavaty , President, CPMA	
1130 – 1140 Hrs	Context Setting by Shri Samir Kumar Biswas , Additional Secretary (Chemicals), Department of Chemicals & Petrochemicals, Ministry of Chemicals and Fertilizers, Government of India
1140 – 1150 Hrs.	Presentation by Mr. Venkata Pisipaty , Head - KIZAD Polymers Park, Abu Dhabi Ports on “An ideal hub for downstream manufacturing”
1150 – 1200 Hrs.	Presentation by Mr. Goutam Biswas , Technology Director, Technology Marketing, Chevron Chemicals on “Permian Crude to Chemicals, feedstock diversification at manufacturing hub”
1200 – 1210 Hrs.	Presentation by Mr. Tan Wooi Leong , Senior Director, Oil & Gas, Surbana Jurong
1210 – 1215 Hrs.	Talk by Mr. Prabh Das , MD & CEO, HPCL–Mittal Energy Limited
1215 – 1220 Hrs.	Presentation by Ms. Pooja Kulkarni , MD & CEO, Guidance Tamil Nadu on “Ecosystem in Tamil Nadu”
1220 – 1225 Hrs.	Presentation by Shri N V Ramana Reddy , Ex-Officio Special Commissioner, Government of Andhra Pradesh
1225 – 1230 Hrs.	Presentation by Mr Rohan Jain , Town Planner in Gujarat PCPIR region
1230 – 1235 Hrs.	Presentation by Shri Hemant Sharma , Principal Secretary, Industries Department and Skill Development & Technical Education Department, Government of Odisha on “Chemical and Petrochemical Ecosystem in Odisha”
1235 – 1240 Hrs.	Presentation by Mr Kulveer Singh , Representing Government of Rajasthan

Key Key Discussion points

Mr. Venkata Pisipaty, Head - KIZAD Polymers Park, Abu Dhabi Ports on “An ideal hub for downstream manufacturing” shared some key observations detailed as follows:

- They are a major contributor to the Abu Dhabi ports and to the region’s economy with the group accounting for 24% of the FDI flows into MENA in 2018
- The industrial zone is home to over 1500 pure industrial and distribution companies

- They are integrated with Khalifa ports and it hosts 3 container terminals each having long term concession agreements. These agreements have meant easier access to global consumer markets with direct port connectivity with Khalifa port growing by over 75% in the last 2 years
- The accessibility of their Khalifa port has helped in providing efficient cost to serve models for their clients and new consumer touchpoints across the globe
- They focus on industrial verticals with ecosystems and value chains and specially on integrated downstream polymers value chain
- Their integration with the transport department was very important from the offset to ensure we could create a strong export hub and a policy framework which was globally relevant.



Mr. Tan Wooi Leong, Senior Director, Oil & Gas, Surbana Jurong highlighted the following key points:

- Surbana Jurong is one of Asia's largest consultancy powerhouse, delivering urban, infrastructure and engineering solutions to support sustainable social and economic growth for their clients
- They have a holistic sustainability design approach backed by science-based performance tools
- Major trends facing industrial clusters are impetus to decarbonize and result in high energy consumption and climate change and affects the global supply chain
- Industrial clusters will also shift towards the adoption of more low carbon alternatives in its energy mix
- Circularity in industrial clusters can be implemented by integrating chemical value network design, clean production initiative and inter-business industrial symbiosis
- They will connect and collaborate to assist clients solve their challenges through their multidiscipline technical expertise across all phases of a project's lifecycle

Mr. Goutam Biswas, Technology Director, Technology Marketing, Chevron Chemicals highlighted the following key points:



- Their strategy is to accelerate growth in lower carbon energy and deliver higher returns with lower carbons
- The competitive production cost of ethylene in US and Middle East have significant advantages and India need to replicate the same
- India should look at alternate options of developing a thermal/direct crude to chemicals plant by getting the appropriate feedstock
- Permian Crude is suitable for converting directly to chemicals because of its high quality and richness in hydrogen and paraffin content

Mr. Prabh Das, MD & CEO, HPCL– Mittal Energy Limited shared some key observations detailed as follows:

- Support is required from state and central government in terms of capital investment
- The problem of getting sizeable land for manufacturing chemicals is because of SARFAESI act and government needs to help companies so that they can use the land for industrial purposes

Ms. Pooja Kulkarni, MD &CEO, Guidance Tamil Nadu highlighted the following key points:

- Tamil Nadu is one of the top investment destinations in India and is the 2nd largest economy in India
- Every 2nd car exported from India is manufactured in Tamil Nadu which shows the enormous potential of this state
- There are 3 petrochemical complexes upcoming which will bring an abundant opportunity for downstream industries
- The state offers a conducive climate and stability and continuity in industrial policy
- Tamil Nadu has sector specific investment leads to facilitate investments



Shri N V Ramana Reddy, Ex-Officio Special Commissioner, Government of Andhra Pradesh spoke about pro-active and investor friendly approach of Andhra Pradesh and about the rich benefits it offers to industries. He elaborated upon the following points:

- Andhra Pradesh is the only state in India to have 3 National Industrial Corridors and is leading the corridor and port industrial development
- AP contributes 8% of total India's production value as on FY-20, i.e. USD 11.9 bn and approximately USD 2.4 bn worth of investments were made in chemicals and petrochemicals in the same year
- AP has the opportunity to build self-sufficiency in Petrochemical Intermediates and drive downstream industries



Mr. Rohan Jain, Town Planner in Gujarat PCPIR region spoke about the Gujarat PCPIR and the major industries which are commissioned there. He also highlighted the following key points:

- Gujarat was the first state to activate the special investment region act
- Some of the key factors that led to the development of the Dahej region as a Petrochemical hub are rich natural resources and feedstock, port and waterfront, robust supporting infrastructure etc.
- Dahej SEZ is a Multi-Product Special Economic Zone (SEZ) developed by Dahej SEZ Ltd.



Shri Hemant Sharma, Principal Secretary, Industries Department and Skill Development & Technical Education Department, Government of Odisha elaborated upon the following points:



- Paradeep is the PCPIR in Odisha which is also the home to IOCL's largest refinery complex
- There are a number of incentives as per Odisha's industrial policy which help promote more industries to set up their plants in Odisha

Mr. Kulveer Singh, representing Government of Rajasthan spoke about strategic advantages of Rajasthan which includes excellent connectivity to major cities and proximity to key consumption regions. The proposed PCPIR in Rajasthan will have location advantages and accessibility to ports, airports and other industrial areas. A greenfield refinery and petrochemical complex are being developed by Government of Rajasthan and HPCL. Several of the ethylene downstream petrochemicals have immense potential in future so there could be significant merit in exploring a cracker unit at an early stage.



4.3 Strategic Global Partnerships: Crucial for driving Investments and enhancing Trade



Day 1: Thursday, 25th November 2021

1240– 1345 Hrs.	Session 2: Strategic Global Partnerships: Crucial for driving Investments and enhancing Trade
Moderation by Ms. Swati Khandelwal, Executive Editor, Zee Business	
1240 – 1345 Hrs	Panel Discussion

1. **Mr. Deepak C Mehta**, Chairman and Managing Director, Deepak Nitrite Ltd.
2. **Mr. Neelanjan Banerjee**, Vice Chairman & Managing Director, LANXESS India Private Ltd.
3. **Mr. Rakesh Mehta**, Director, Board of ExxonMobil India chemical business
4. **Mr. Amit Chaturvedi**, Head SCM Petchem, Reliance Industries Limited
5. **Mr. Deepak Mahurkar**, Partner and Leader Oil and Gas Industry Sector, PwC India

Key discussion points

Mr. Deepak C Mehta, Chairman and Managing Director, Deepak Nitrite Ltd. stated that the petrochemical companies focus more on the market as compared to the availability of raw material. India is being discussed as one of the potential markets beside China. In the past few years, India has become the fifth-largest player in the chemical industry hence it will definitely attract players in the world. The government has assisted financially but India still lacks in technology and availability of raw materials. He further said that these changes could be addressed via global collaborations.



He shared that global player are looking for agility and, in that context, India has come out as a very good option. That's how this PCPIR is developed, the idea was connected to every other supply chain & is supposed to be not only interdependent but also cost-effective.

Mr. Neelanjan Banerjee, Vice Chairman & Managing Director, LANXESS India Pvt. Ltd. spoke about how India as a market a better demographic and geopolitical scope has than other countries. The most important thing is that Indian companies are getting more and more aware of sustainability and climate neutrality. Industries have started setting up their climate-neutral goals and foreign investors have also started considering these goals as one of the criteria for their investments.



Mr. Rakesh Mehta, Director, Board of ExxonMobil India chemical business spoke about how India is a growing market and with urbanization, the demand of the middle class is only going to increase. He highlighted the fact that their company have come up with solutions for the packaging industry which is a development in the front of sustainability, and their solution is trying to replace multilayer packaging. ExxonMobil is trying to bring MSMEs and small sectors to global standards by bringing new technology products by bringing specialty raw materials to the market.





The chemical sector is highly capital intensive, and one of the factors that act as the roadblock is the regulations. The regulations are too complex to be understood by some of the foreign players and there is a need to streamline them. Reliance invested USD 130 bn complex in Jamnagar and that is a 1.4 million barrels of refining complex which shows that Reliance is positive about its growth in the chemical sector. To boost this growth we need to augment the infrastructure, port capacity and multi-modal capacity.

Mr. Amit Chaturvedi, Head SCM Petchem, Reliance Industries Limited discussed about the significant work in bringing in the technology from global players. He shared on length about the perspective of these players which has changed over the past few years in sharing their technology to India. He highlighted the fact that technology had always been a major challenge to Indian players especially when it comes to specialty products. He also emphasized that foreign players consider India's market as the biggest potential compared to other economies.



Mr. Deepak Mahurkar, Partner and Leader Oil and Gas Industry Sector, PwC India spoke about the insecurities in the minds of technology providers in IP protection which is a very big concern. There are a lot of niche chemical projects which got terminated because of the unavailability of the feedstock. He also said that the investors are concerned about some of the sales which happen in cash, and they are waiting for payment solutions to get developed in these segments. He also mentioned that we need the government to lead the plans by up to 5 to 10 years. There should be magnanimous discussions

on the requirement of infrastructure considering the current requirement of the chemical industry. Investors will only think about India if our industry is thinking on the front of decreasing carbon emissions.

4.4 Evolving opportunities in Chemical & Petrochemical Industry in Post COVID Era

Day 1: Thursday, 25 th November 2021	
1500 – 1615 Hrs.	Session 3: Evolving opportunities in Chemical & Petrochemical Industry in Post COVID Era
Moderation by Mr. Kapil Malhotra, Global Business Unit Head- Fluoropolymers, Gujarat Fluorochemicals Limited	
1500 – 1615 Hrs.	Panel Discussion <ol style="list-style-type: none"> 1. Context Setting: Presentation by Mr. Rajendra Gogri, CMD, Aarti Industries Ltd. 2. Mr. Jonatas Melo, Senior Vice President, Asia South, Borouge 3. Mr. Narayan Krishnamohan, Managing Director, BASF 4. Mr. Adnan Ahmad, Managing Director – India, Clariant Chemicals India Ltd. 5. Mr. Anil Bhatia, Vice President & Managing Director - India, Emerson

Key discussion points

Mr. Rajendra Gogri, CMD, Aarti Industries Ltd set the context for the discussion through a presentation and highlighted the following:



- India remains underpenetrated in the chemicals sector. Per-capita chemical consumption is significantly lower than developed markets leaving headroom for growth in the coming 10 years
- Indian GDP growth at ~7% and C&Pc demand grew 1.3 times the GDP growth. India has managed to bounce back, and the Index of Industrial Production has returned to Pre-COVID levels
- Increasing domestic demand, room for import substitution and expanding export opportunities will act as key drivers for C&Pc industry growth. The expected

CAGR is 9-11% for the period 2020-2025. The low cost of construction and operation, large local market, rule of law, large talent pool and the “China+1” model being adopted by western nations to limit dependency on China act in favour of India becoming a global manufacturing hub

- Some post-COVID trends that are shaping the Chemicals and Petrochemicals industry are health & safety consciousness, increased demand for biocidal and functional materials, work from home & digitalization and availability of financial incentives

Mr. Adnan Ahmad, MD – India, Clariant Chemicals India Ltd. shared some key observations detailed as follows:



- Biggest opportunity that India has is that it is currently punching well below its weight (only 3% of the global chemicals supply as compared to China which is close to 40%). India should not stop targeting the Chinese market as it is the biggest chemicals market in the world.
- Chemicals industry accounts for only 5% of the global CO₂ emissions but 90% of the products we use contain chemicals. This message needs to be broadcasted to the customers as well as the workforce. This will help in attracting the best talent further driving innovation. The industry will play a major role in the sustainability drive that the government is pushing.
- Lack of infrastructure and competitive feedstocks are major hurdles, and we need to work on this effectively immediately to make India a global hub

Mr. Anil Bhatia, Vice President & Managing Director - India, Emerson elaborated upon the following points:

- “Hyper-automation” using advanced technology to augment the human world has been fast-tracked due to the pandemic. Artificial intelligence, machine learning and robotic process automation will play a huge role in the coming decades. This will help the chemicals industry in two ways. Firstly, it will cut down costs by 20-25% and secondly, it will attract youngsters to join the companies as they want to work for a technologically savvy company.
- The digital strategy should not be shortsighted, it has to be for the complete ecosystem. Productivity, reliability, safety and carbon emissions are the pillars of the ecosystem which need to be understood.

Mr. Narayan Krishnamohan, Managing Director, BASF highlighted the following:

- The macros in play will create demand across the board from upstream to downstream. Fully integrated chemical plants are not possible if economies of scale are not present. This requires a long-term vision 10 to 15 years. The policies and infrastructure required need be looked through a broader window. The growth cannot be achieved all at once and it has to come sector by sector.

Mr. Sandeep Puri, Vice President, Asia South - Packaging, Borouge shared some key observations detailed as follows:

- Increasing affluence of the Indian consumer, growth across sectors and policy interventions for sustainable growth will shape the Indian C&Pc sector
- Borouge is not only transferring products to the customer but also the know-how for future

4.5 The importance of ESG and Circular Economy in shaping the future of chemical and petrochemical industry

Day 1: Thursday, 25 th November 2021	
1615 – 1730 Hrs.	Session 4: The importance of ESG and Circular Economy in shaping the future of chemical and petrochemical industry
Moderation by Raman Jee Jha, Director Oil & Gas Industry Consulting, PwC India	



<p>1615 – 1725 Hrs.</p>	<p>Presentations/ Talk:</p> <ol style="list-style-type: none"> 1. Talk by Mr. Frans Stokman Executive Director Petrochemicals, CEFIC on “Pathways for Petrochemicals” 2. Presentation by Mr. Janardhanan Ramanujalu, Vice President, South Asia, SABIC on “Role of CE in enabling ESG” 3. Presentation by Ms. Miranda Zhang, Senior Editor, Recycled Plastics and Polypropylene, S&P Global Platts on “Asian Recycled Polymers: Sustainable plastics, sustainable growth” 4. Presentation by Mr. B K Sethuram, Managing Director, Celanese India on “Sustainability and Engineering Plastics” 5. Presentation by Mr. Ravi Kapoor, Managing Director, Heubach Colour Pvt. Ltd. on “Sustainable and ESG Practices for the Indian Speciality Chemical Industrial” 6. Talk by Mr. S. Sunil Kumar, President, Henkel – India on “Importance of ESG and Circular Economy in shaping the future” 7. Talk by Mr. Vishal Sharma, Senior Vice President - India, Middle East and Africa, Ecolab Inc
<p>1725 – 1730 Hrs.</p>	<p>Concluding Remarks by Mr. Rajesh Srivastava, Co Chairman, FICCI Chemical Committee and CEO & MD, Jubilant Ingrevia</p>

Key discussion points

Mr. Frans Stokman, Executive Director Petrochemicals, CEFIC shared some key observations detailed as follows:

Petrochemicals in Europe is a very large sector and a provider of key building blocks of industrial ecosystems. ‘Green Deal’ which is an introduction of sustainable agricultural, financing, energy, climate neutrality, transport. Key focus areas of European Commission are:

- Reduction of 55% if greenhouse gases in ne3ar future
- Effective Carbon pricing mechanisms
- Cement, fertilizer, petrochemicals

For cracker industry, electrification, use of green electricity, infrastructure, change of feedstocks, renewable feedstock, hydrogen are important factors to consider and to understand carbon capture storage for effective utilization which is very effective in recycling including mechanical and chemical recycling to reduce carbon footprint. He also said that CEFIC is now looking for pathways looking at angle of circularity and sustainable biomass.

Mr. Janardhanan Ramanujalu, Vice President, South Asia, SABIC highlighted the role of CE in enabling ESG. He spoke about the importance of ESG to the chemical industry due to a number of factors:

- Enablers of many industry
- Providers of solutions of climate change, sustainable economy
- Major role in carbon neutrality of chemicals

He also discussed about the relation of ESG to SDG to Chemical Industry by SABIC:

- Resource Efficiency
- Climate Change & Energy
- Environmental, health and safety
- Innovation & sustainable solutions
- Circular economy
- Governance & integrity

SABIC and Plastic energy have started construction of world's first commercial unit to upscale production of SABIC's certified circular polymers derived from used plastic which is going to be operational in another 6 months. SABIC also built the world's largest CO₂ purification and liquefaction plant to convert CO₂ into valuable products like Urea, Methanol & for food industries. SABIC is also building the world's first large scale chemical site to operate on 100% renewable power.



Ms. Miranda Zhang, Senior Editor, Recycled Plastics and Polypropylene, S&P Global Platts spoke on Asian Recycled Polymers: Sustainable plastics, sustainable growth and elaborated upon the following points:

- Not only the demands are good in western market, but the supply is tight too especially for high quality grades due to low recycling and lesser imports due to container shortage which prevents Asian materials to ship to western markets
- In Europe and US, they have rolled out legislations to make use of recycled plastics.
- Rapid expansions of plastic recycling are undergoing in Asia despite lack of legislations for usage
- Global recycled plastics continues to grow in 2021, after experiencing a slowdown because of the pandemic and Key recycled plastics are displacing virgin demand. % of virgin demand recycled is expected to reach 12% by 2029 from 8% in 2021.



Mr. B K Sethuram, Managing Director, Celanese India spoke about "Sustainability and Engineering Plastics" and shared some key observations detailed as follows:

- Engineering Plastics are designed to be durable which makes recycling it challenging and difficult
 - 3 key focus areas in circular economy in Engineering Plastics – use of bio-based material by Mass-balance approach, finding recyclable content which could be post-industrial and post-consumer, and managing end of life management of these plastics
- Recycled polyamides will help bring down carbon footprints



Mr. Ravi Kapoor, Managing Director, Heubach Colour Pvt. Ltd. spoke about “Sustainable and ESG Practices for the Indian Speciality Chemical Industrial” and highlighted the following:

- ESG will drive 6 major transitions (energy and carbon, resources and circular, mobility and cities, food and health, social and community, finance and value) for our overall economy and different sector, industry will be impacted differently by these 6 transitions
- Process optimization and intensification will reduce cost and globally sized capacities will ensure optimized costs
- Heubach is the only company to implement Integrated Waste Management in phthalocyanine chemistry
- Heubach has a green chemistry hierarchy and effective pollution prevention mechanisms in place

Mr. S. Sunil Kumar, President, Henkel (India) spoke about “Importance of ESG and Circular Economy in shaping the future” and elaborated upon the following points:

- Henkel’s key pillars include sustainability by adding value to customers and building a strong collaborative culture
- For CSR, solar lights were installed in villages and districts
- Henkel’s focus is on end to end compliance from perspective of sustainability
- On circular economy approach especially in packaging, Henkel’s take a 3 module approach – compatibility, debonding and new designs

Mr. Vishal Sharma, Senior Vice President - India, Middle East and Africa, Ecolab Inc. highlighted the following:

- ESG is good for business and will help in top line growth, cost reduction, reducing regular risks and increasing productivity of people
- Circularity is about looking at the product and processes right from the design stage to make sure they are recyclable eventually
- He highlighted the 3 horizon approach – everything they do is done in manufacturing facilities, next is done around the community outside manufacturing facilities and last is to concept of circularity in the products being used by consumers or business

Mr. Rajesh Srivastava, Co Chairman, FICCI Chemical Committee and CEO & MD, Jubilant Ingrevia gave concluding remarks and shared some key observations detailed as follows:

- Jubilant have had great insights on circular economy and carbon neutrality
- In process rewiring need of mankind, we have lost track of our commitment to society and now is the time to instill the purpose driven growth and on ESG for sustainability
- Sustainable operations are the only way operations can become scalable



4.6 India @75: FICCI Chemical and Petrochemical Industry Awards

Agenda

S. No.	Category	Company
For Excellence in Health Safety and Environment		
1	Chemicals (Joint Winner)	National Peroxide Limited
2	Chemicals (Joint Winner)	Jubilant Ingrevia Limited
3	Petrochemicals	Reliance Industries Limited (Nagothane Manufacturing division)
For Excellence in CSR		
4	Chemicals (Turnover < 1000 Cr)	Tagros Chemicals India Ltd.
5	Chemicals (Turnover > 1000 Cr)	Tata Chemicals India Ltd.
6	Chemicals (Turnover > 1000 Cr)	Deepak Nitrite Ltd.
7	Chemicals (Runner Up)	Gharda Chemicals Ltd.
8	Chemicals (Public Sector)	Hindustan Petroleum Corporation Ltd
9	Chemicals (Public Sector)	Indian Oil Corporation Ltd
10	Chemicals (Private Sector)	HPCL-Mittal Energy Ltd
For Excellence in Energy Conservation and Management		
11	Chemicals	Godrej Industries Limited – Chemical Division
12	Petrochemicals (Private Sector)	Reliance Industries Limited (Dahej Manufacturing division)
13	Petrochemicals (Public Sector)	Brahmaputra Cracker and Polymer Limited - Assam
For Company of the Era		
14	Chemicals	Aarti Industries Limited
15	Petrochemicals	Reliance Industries Limited
For Leading Company Contributing Towards Atmanirbhar Bharat		
16	Chemicals	Deepak Nitrite Ltd.
17	Chemicals (Runner Up)	Excel Industries Limited
18	Chemicals (Runner Up)	Balaji Specialty Chemicals Pvt. Limited
19	Petrochemicals (Public Sector)	Indian Oil Corporation Ltd
20	Petrochemicals (Private Sector)	Reliance Industries Limited
For Excellence in Manufacturing		
21	Chemicals	Godavari Biorefineries Limited (Distillery Division-Sameerwadi)
For Excellence in Sustainability		
22	Chemicals (Private Sector)	Chemfab Alkalis Ltd.
23	Chemicals (Public Sector)	Institute of Pesticide Formulation Technology
For Distinguished Contribution (Lifetime Achievement)		



24	Chemicals	Shri Yogesh M. Kothari (CMD, Alkyl Amines Chemicals Ltd.)
25	Petrochemicals	Mr. Manmohan Singh (Former President, RIL)
26	Agrochemicals	Dr. Raman Ramachandran (MD & CEO, PI Industries Ltd.)
27	Plastics & Polymers	Shri Suketu Vakil (President, Polymer Technology RIL)
For Excellence in Sub Sector		
28	Plastics & Polymers	Brightflexi International Pvt. Ltd
29	Specialty Chemicals	Balaji Amins Ltd.
30	Dyes & Dyestuff	Huntsman International (India) Pvt. Ltd.
31	Chlor Alkali	Chemfab Alkalis Ltd.
For Heritage Company of India		
32	Winner	Bengal Chemicals & Pharmaceuticals Ltd
33	Winner	DCM Shriram Industries Ltd.
34	Winner	Tata Chemicals India Ltd.
35	Winner	PI Industries Ltd.

Key discussion points

FICCI initiated the “FICCI Chemicals and Petrochemicals Awards Scheme” in 2012. The basic purpose of this Award Scheme is to encourage innovation, process excellence, sustainability and facilitate best practices in the Chemical and Petrochemical industry. FICCI Chemicals and Petrochemicals awards 2021 were distributed on 25th November 2021 at Le Meridien, New Delhi in the presence of eminent dignitaries from Industry and Ministry of Chemicals and Fertilizers.



5. Highlights from Day 2

5.1 Dynamics of Feedstock: Leveraging Synergies of Value Chains between Petroleum and Petrochemicals – A Roadmap from Oil to Chemicals

Day – 2: Friday, 26th November 2021	
1100 - 1215 Hrs	Session 5: Dynamics of Feedstock: Leveraging Synergies of Value Chains between Petroleum and Petrochemicals – A Roadmap from Oil to Chemicals
Moderation by Mr. Janardhanan Ramanujalu , Vice President, South Asia, SABIC	
1100-1200 hrs.	Presentations/ Talk: <ol style="list-style-type: none"> Context Setting Shri Samir Kumar Biswas, Additional Secretary (Chemicals), Department of Chemicals & Petrochemicals, Ministry of Chemicals and Fertilizers, Government of India Presentation by Mr. Deepak Mahurkar, Partner and Leader Oil and Gas Industry Sector, PwC India on “Dynamics of Feedstock: Leveraging Synergies of Value Chains between Petroleum and Petrochemicals” Presentation by Dr. SSV Ramakumar, Director (R&D and P&BD), Indian Oil Corporation on “Enhancing Naphtha flexibility and Petrochemical intensity index of Refineries” Talk by Mr. Prabh Das, MD & CEO, HMEL Mittal Presentation by Mr. Deepak C Mehta, Chairman and Managing Director, Deepak Nitrite Ltd. on “Oil to Chemical Transformation” Talk by Mr. Avinash Verma, Managing Director, ONGC Petro Additions Ltd. Presentation by Mr. B Ashok, CEO, Ratnagiri Refinery and Petrochemicals Limited on “Dynamics of Feedstock: Shifting Priorities”
1200-1215 hrs.	Chief Guest Address by Shri Hardeep S Puri , Hon'ble Minister of Petroleum and Natural Gas, Minister of Housing and Urban Affairs, Ministry of Petroleum and Natural Gas, Government of India*

Key discussion points



Mr. Janardhan Ramanujalu, Vice President, South Asia SABIC, initiated the talk on a roadmap from Oil to Chemicals with a brief introduction on Petrochemical feedstocks production in India. He mentioned following points:

- In India, petrochemical started as a byproduct to refining and fuel industry. To reach 10% of the byproduct share was challenging for us and it took many years to reach that level. India exported a lot of feedstock in the form of Naphtha for oil blending.

- From petrochemical byproduct industry to refining industry, refinery integration started taking place in India, for example, multiple HPFCC investments took place. Besides use of Off gases has lifted up from refining industry to the downstream crackers by 15-17%. On the other hand, Chinese are far ahead of us, they have reached 30-40% on purpose conversion of feedstock to petrochemicals from their refining. From opportunity point of view, hypothetically entire oil to chemicals can fetch between 70-80% of petrochemicals.
- India has little more about 250 MTPA of refining capacity and we are using an average less than 10% of that as a feedstock, some advanced private sector consumption is 15-16%, other very old refineries are 5-6%, but all refineries are expanding so India do have a chance. If on purpose design to have around 10% additional feedstock from an existing capacity can take care of at least 8 to 10 crackers feedstock in future but of course our oil demand and energy demand are also growing so that doesn't give us the possibility.
- The important thing which comes out from the petroleum and petrochemical integration is the Hydrogen economy which is equally precious energy resource. Also, the new refineries can be designed to be built with a higher share of chemicals

Mr. Samir Kumar Biswas, Additional Secretary, Department of chemicals and petrochemicals, Ministry of Chemicals and Fertilizers, addressed about the growth of the Indian chemical and petrochemical sector, challenges faced and what is required to expand the Indian value-added specialty chemicals and commodity chemicals market.



- Indian chemical and petrochemical industry is of substantial size and growing at a very fast pace and certainly there are lot of obstructions which are holding India back from achieving the potential that is possible to achieve.
- As far as specialty chemical is concerned, India is doing really good in terms of production, exports and meeting the global demand, but when it comes to production of intermediates which is required for the production of specialty chemicals and also certain building blocks is highly deficit and there is no clear-cut solution yet though we have been talking about

reserving certain portion from new/ existing crackers or downstream further value addition, those could not materialize due to various reasons so we need to really deliberate what could be the best solution keeping in view how it is resolved globally, globally intermediates or building block for specialty chemicals and the feedstock are available in the open market for trading, how that happens? Whether that kind of situations exists in India or not? If not, what really needs to be done for achieving that kind of scenario so that all the industry gets their feedstock and intermediates depending on the requirement from the market freely and easily. This is very important and crucial if at all we have to grow as a global hub for manufacturing chemicals value added specialty chemicals along with other commodity chemicals.

- Out of 23 refineries in India, there are 11 crackers. Now the demand polymers itself so high and growing so fast, no cracker really plans a configuration wherein they are in a position to sell ethylene, propylene and other basic building blocks required for petrochemicals. There are various options possible keeping into view the global best practices, the situations existing elsewhere and what best could be done. That is the primary focus and objective of this conference.

Dr. SSV Ramakumar Director (R&D and P&BD) Indian Oil Corporation Ltd, mentioned about how the refineries need to manage the petroleum streams to be gainfully utilized and the future refinery imperative on how to increase the petrochemical intensity and how to reduce dependency on liquid products.

- All refineries in India can be integrated with other petrochemical complexes to maximize the petrochemical precursors with two products mainly from maximizing MS and middle distillates.
- India would be striving out for phasing down and not the phasing out of any of the fossil resources but nevertheless the aspirational targets announced by the honorable Prime Minister Narendra Modi to reduce the 1 Billion tons of CO₂ emissions by 2030 and attaining net zero CO₂ emissions as a country by 2070, these are the tallest ambitions.
- India's current share of natural gas in world oil and gas consumption stands at 1.5% and the overall consumption of natural gas and the gas portfolio in the energy pie would be rising to 6% by 2030.
- Petrochemical demand growth is driven by the GDP growth approximately 1.4 times of GDP. Growth in petrochemicals will contribute about 35-40% of increase in total crude oil demand. There are several petrochemical imports such as Polycarbonate, PVC, PTA, MEG, PP HDPE etc. It is desired to reduce import dependency to bring in 'Atmanirbhar Bharat'.
- There is a gap in the per capita petrochemical consumption of India versus the rest of the advanced worlds. All projections are to at least bridge this gap and there should be 15 world scale additional crackers plants are required. Since lot of petrochemicals are being imported so there is need for a rigorous Indigenization in this domain. Hence, the Indian Oil Corporation and the R&D center's main theme in this scenario is indigenization in the refinery process technology, petrochemical technology, catalysts, specialty chemicals and value-added chemicals.
- As far as petrochemical integration is concerned, in a refinery the most important petroleum streams is naphtha. Naphtha predominantly goes into MS (motor spirit) production or it is used for hydrogen generation.
- Hydrogen Generation Unit is one of the key units in any refinery it is in fact the lifeline of all refineries. But this produced hydrogen is termed as grey hydrogen since it is obtained from fossil fuel which in turn comes from naphtha such as straight run naphtha and cracked naphtha coming from Delayed Coker, Vacuum unit, and Hydro-cracker unit. Little amount of naphtha goes into producing petrochemicals. This scenario is going to change because there will be more focus on production of petrochemicals shifting its priority from third to the number one priority.
- Technologies for generation of high RON (Research Octane Number) of 95 streams adds flexibility to MS pool with respect to Naphtha re-routing for value addition. There are some special technologies to get RON of 95 like alkalization or dimerization, Indian Oil has indigenous technology for dimerization of C₄ streams to C₈ which will give phenomenal stream of 125 RON and with this stream of 125 RON is introduced to MS pool majority of the naphtha can be taken out. The indigenously developed technology used by the Indian Oil is called as Octamax and is under operation at IOCL Mathura refinery.
- The other technology is AmyleMax technology which is used for light LCN streams in refinery if they are etherified, the octane number is raised and that much of naphtha can be relieved from MS streams. AmyleMax technology is under operation at Gujrat refinery.
- Indian Oil's 'INDALIN' Technology probably one of the best solutions for conversion of 'Cracked Naphtha' to 'chemicals' at much lower energy intensity and flexibility compared to existing technologies. The crude to chemical yield for 'INDALIN' technology is around 50-55%. Indian Oil is





poised to provide novel technological solutions for enhancing petrochemical intensity and naphtha management.

Mr. Deepak Mahurkar, Partner and Leader to the oil and gas industry sector at PwC India, addressed on how to capture growing markets and plan new investments.

- Access to feedstock will play a critical role to capture these growing markets and plan new investments. Indian chemical industry is valued around 187 USD Billion in FY 2019-20 and expected CAGR in next five year is 6.2% Specialty chemicals is anticipated to register highest growth rate among all the chemical segments.
- The ethylene and Propylene derivatives are currently suffering and are running deficits for feedstocks. Now, if these supplies are made available obviously the downstream industry will be developed and therefore the planning starts from there like what is the demand in the market and how can we get to the feed stocks.
- Oil to chemicals technologies can reorient crude value chain from conventional fuels to chemicals. The petrochemical yield from conventional process is around 7%. There are three alternative routes to maximize the petrochemical yield and petrochemical value chains.
 - Integrated olefins with steam cracker incorporated route yields around 27% of petrochemicals which is nearly equal to 74% increase in petrochemical yield from conventional route.
 - Crude oil to p-xylene complex route yields 70% yields of petrochemicals which is suitable for mixed crude.
 - Crude oil to chemicals complex route yields 40% yields of petrochemicals for light crude oil as a feedstock.

Mr. Deepak Mehta, Chairman and managing director of Deepak Nitrite, Chairman of FICCI committee mentioned innovative options to produce Knowledge based Chemicals.

- Refinery configuration in India is only designed to yields products which are required for transportation, and other domestic usage and these products are LPG, gasoline, Diesel, Fuel Oil, and Coke. But there are some refineries which gives option for different products, such as olefins aromatics which are obtained from units such as Fluid catalytic Cracker, Aromatic Extraction and Olefinic Catalytic Cracker.
- Refiners needs to hydrogenate unsaturated hydrocarbon (olefins) and benzene for producing fuels or recycle for processing. Is it better to extract these olefins/ aromatics for value-addition and will minimize hydrogen consumption and increase petrochemical output
- Molecular finger printing is to exploit recovery of high value chemicals e.g., Naphthalene, Isoprene, Piperylene, DCDP, Indene, Iso-amylene etc.
- Lot of Hydrogen get produced in the cracker from naphtha and one choice is that can we really look at capturing all this surplus hydrogen and ensure that next to these crackers we set up ammonia plant so that all of the hydrogen is gainfully utilized to make ammonia and finally to make Urea. Ammonia is also one of the potential options for replacing aviation fuel where it may be better to use ammonia which could produce hydrogen and could become a replacement for aviation fuel.

There are large number of valuable intermediate or valuable specialty products for example, acrylonitrile, propylene oxide where India continues to be a huge importer of these products and as we move towards the redesigning the slate of manufacturing more of these products would be made in India.

Mr. Avinash Sharma, Managing Director, ONGC Petro-additions Ltd. Has given a view on how to grow fast in Oil to Chemical business.



- India needs standalone petrochemical plants and standalone crackers to come with more capacity and to facilitate more production to the country and if that must materialize only naphtha perhaps may not be the solution. Mixed feed will be a better option for a standalone cracker since it provides reliability in terms of availability, we have more option apart from naphtha such as natural gas, ethane, propane etc.

- Importing propane and developing downstream facilities in India is finding more interest in India, however there is not much interest so far in bringing ethane and

developing standalone projects on that, though India remains one of the major importers of the ethane, but it is only by one single player. There are sourcing options now emerging more which largely dominated so far by US capacities and other capacities in the Middle East.

- Government will have to take a step forward to support infrastructure development in the country to make these imports possible. The key to make ethylene, propylene available is to make infrastructural developments and to incentivize the player who are coming forward to put up a basic and core infrastructure largely for importing. Such incentivization from government would support such initiative and that would also facilitate more capacity as well as will make more feedstock available for trading.

India should import ethane and develop infrastructure facilities for petrochemical complexes. Where to import is another logical question and perhaps most simple answer would be identified PCPIR (Petroleum, Chemical and Petrochemical Investment Region) will be the best destination. Dahej itself is the leading PCPIR and it seems to be the right location. Indian National Oil Companies should come forward to make these investments possible. These are the efforts India should take step forward in becoming global chemical and petrochemical manufacturing hub.

Mr. B Ashok, former chairman of Indian Oil, CEO Ratnagiri Refinery Project, has given a brief idea on dynamics of feedstock and what are the shifting priorities.



- India's strong market fundamentals will drive rapid growth in petrochemical demand, India potentially need 15+ world scale petrochemical assets by 2035 to meet domestic demand. Many of these expansions are all hypothetical capacities which means they are not announced capacities and it is hoped that some projects will come through and if that hope doesn't happen then that would huge gap created in supply and demand of Indian Petrochemicals.

- To give an example, domestic availability of petrochemical feedstocks remains a key challenge. The

likely shortfalls of basic building blocks of Propylene by 2030 is about 2.6 million tons and for ethylene it is about 17 million tons. Similarly, for others like propylene oxide and ethylene oxide is around 0.250 million tons and 4 million tons respectively. India is going to have a tremendous shortfalls of basic petrochemical building blocks.



- Multiple avenues have been suggested to overcome feedstock challenges in the domestic chemicals sector.
 - Integration of Petrochemical with refinery – Significant progress in recent past with majority of standalone refineries planning petchem integration (e.g., such as IOCL, BPCL Mumbai, HPCL, HMEL, Nayara etc.)
 - Robust Ecosystem with downstream players – PCPIR has seen limited progress due to issues related to land acquisition, feedstock sharing, planning and implementation focus. Critical to shore up implementation with a focused task force.
 - Partnerships and Alliances – Partnership with feedstock advantaged regions to secure feedstock (JV or offtake agreements, buying consortiums) can be a viable alternative.
 - Non-traditional hydrocarbon feedstocks – MTO/CTO suffer from issues such as high CAPEX, economics, and sustainability concerns. PDH and ethane can be viable alternatives for select coastal locations.
 - Alternative non-hydrocarbon feedstock – Chemicals derived from bio-based feedstock have seen selective success. However, technology, scale and economics remain big challenges. Unlikely to capture major share in next decade or two.
- The capex estimates for integrated refinery + petchem (7500-8000INR Cr/MMT) is almost twice as much as standalone refinery (3500-4000 INR Cr/MMT). High capex requirements require focused attention to ensure viability. Key drivers for cost to be so much high are
 - Licensing cost for integrated refineries due to multiple uses of feedstock
 - Additional infrastructure requirements (storage, logistics etc.)
 - Higher project execution complexity leading to higher EPC cost
 - Higher utility and HSE cost.
- Three key areas of support that can act as tailwinds for the sector.
 - Regulatory – Incentives for project specific infrastructure, lower effective tax regime, streamlining approvals accelerated land acquisitions and Contract enforcement
 - Ecosystem and infrastructure – Operating model support like Plug and Play infrastructure (e.g., Jubail in KSA, Pengrang in Malaysia), Industrial clusters, centralized utilities and ancillary industries and ownership model innovations like BOO/BOOT to lower upfront Capex.
 - Technology – Innovations to drive down licensing costs, further advancements in crude oil-to-chemicals (COTC), Advancements in carbon capture and use (CCU).



5.2 Supply Chain Disruptions in the Chemicals & Petrochemicals Industry and Way Forward

Day – 2: Friday, 26th November 2021	
1215 – 1330 Hrs.	Session 6: Supply Chain Disruptions in the Chemicals & Petrochemicals Industry and Way Forward
Moderation by Mr. Suresh Ramachandran , Country Head & Managing Director, Arkema India	
1215 - 1315 Hrs	Presentations/ Talk: <ol style="list-style-type: none"> Context setting by Mr. Puneet Goel, Associate Director, Oil & Gas Industry Consulting, PwC India Presentation by Mr. Sagar Kaushik, Chief Operating Officer, UPL Ltd. on "Disruption assessment". Presentation by Mr. Shohab Rais, COO - Indian Chemical Business, Tata Chemicals Limited
1315 - 1330 Hrs	Concluding Remarks by (Session Chairperson) Shri Amitabh Kumar , Joint Secretary, Department of Commerce, Ministry of Commerce & Industry, Government of India*

Key discussion points

Mr. Suresh Ramachandran, Country Head and Managing Director, Arkema India.

He discussed the effects of supply chain in chemical and petrochemical industry in pre covid, covid and post covid effect. Covid has done remarkable transportation in the supply chain industry, lot of challenges and there have been some very key impacts like reliability cost and as well as visibility. Covid has created lockdown effect, calendar effect as some economies were reviving earlier from covid, other economies were going down because of the vaccination program being different at different places. Many aspects of supply chain were affected like ocean freight cost, availability of containers availability of vessel schedules has completely gone haywire. Demand forecasting has been very big problem for supply chain professionals.

Mr. Puneet Goel, Associate Director, Oil and Gas Industry Consulting, PwC India, has given his views on how we forecast clear supply chain, demand, and supply.

- Covid-19 has been affecting chemicals and petrochemicals businesses, global movement of supply chain the freight, the ships has been reduced resulting lot of petrochemical plants were out of stocks some of the refineries in the US itself had shut down their plant operations. There was also fall in oil price which has resulted massive disruption in supply chain. Prior to covid we were talking about a mega trend of global supply chain, integrated supply chain now that trend itself is changing. One of the reports from BCG identifies few of the mega trends now completely reversing, i.e., Globalization of supply chain has become the localization of supply chain.
- Companies are facing challenges due to disruptions due to the pandemic, geopolitical causes, trade sanctions etc.
 - Decreased demand from end use segments like automotive, construction sectors due to pandemic
 - Reduced feedstock produced in refineries due to steep decline in demand of transportation fuels during the pandemic



- Supply disruptions due to trade wars, trade sanctions can cause imbalances in global supply chains
- Dependency and concentration on limited supplier network, JIT models to avoid excess inventory caused supply chain disruptions creating massive supply shocks during the pandemic
- Limited availability of ships, leading to global logistics delays and rising freight costs.
- Petrochemical companies are going to rely on local suppliers close to their geographies to reduce the risk of country level movement as well as trade war risk movement. Secondly, Digitalization supply chain visibility becomes essential element for making a supply chain work. Multiple solutions again consulting firms, technology companies and even petrochemical companies are looking on how to digitalize. A study by BCG has shown only 20% of petrochemical companies have defined digital supply chain so rest 80% of petrochemical companies are still to move towards digitalization and that's the mega trend which will define success in future.

Mr. Sagar Kaushik, COO Chief Operating Officer, UPL Ltd, addressed the challenges faced by chemical and agrochemical industry due to Covid-19.


- Indian chemical production has sharp reduction of 6.45% from 11943 KMT FY 2019-20 to 11172 KMT for the FY 2020-21. The petrochemical production has fallen by 3.22% from 43524 KMT FY 2019-20 to 42121 KMT FY 2020-21. Highest impact took place into the inorganic chemical sector like phosphorous. This was linked to the complete shut-down of some of the sectors like mining sector. On the other hand, agrochemical sector has shown positive change with strong grown of 2.13% in agrochemical and 32.54% in pesticides and insecticides. These services of agrochemicals were identified as essential services.
- India exports during April 2020 to September 2020 declined by 20.6% due to Covid-19 and the imports during April 2020 to September 2020 declined by 33%. The decline in imports was demand driven.
- Now some of the positive impact on the segment are innovation-based models, remote functioning Government support and policies, boost in demand for specialty chemicals, emerging collaborations between stakeholders especially MSMEs and informal sectors.

Mr. Shohab Rais, COO - Indian Chemical Business, Tata Chemicals Limited has given his views on how global supply chain disruptions in recent time started.

- Disruption spiked during early 2020 and are starting to increase again over the course of 2021. Supply chain disruption losses equal to 42% of one year's earnings before interest, taxes, depreciation, and amortization on average over a decade. To reduce dependency on China, many firms are looking to opt out for investments in China. The most attractive manufacturing destination after china was India.
- World is highly dependent on China across chemicals space, India is today where China was in 2006. China has much greater presence across top chemicals segments; opportunity for Indian companies to capture higher export share. India is well placed to capitalize on the expected trade flow changes and take it's share.
- Key enablers to fully tap this emerging opportunity
 - Become self-sufficient and reduce imports in key organic and inorganic feedstock
 - Think global: create world scale capabilities
 - Value chain integration for long term cost competitiveness
 - Build Digital and analytical as a core capability to improve margins
 - Weave circular economy and sustainable into business strategy



5.3 Emerging Trends in Chemicals & Petrochemicals industry in retaining the industrial momentum and growth

Day – 2: Friday, 26th November 2021	
1430 - 1545 Hrs.	Session 7: Emerging Trends in Chemicals & Petrochemicals industry in retaining the industrial momentum and growth <ul style="list-style-type: none"> • Sustainable Green Chemistry • Role of Digitalization
Moderation by Mr. Raju Kapoor, Director- Industry & Public Affairs, FMC	
1430 - 1545 Hrs	Panel Discussion <ol style="list-style-type: none"> 1. Mr. RG Agarwal, Group Chairman, Dhanuka Agritech Ltd. 2. Mr. Ajai Sirohi, Chief Development Officer, Toray Industries 3. Ms. Vinati Saraf Mutreja, CEO and Managing Director, Vinati Organics Limited 4. Mr. Saurabh Tayal, Senior Principal, Accenture 5. Mr. Meghav D. Mehta, Director, Deepak Phenolics Ltd. 6. Mr. Paul Krimlowski, Director Green Chemicals & Fuels Product Line, Air Liquide, Germany 

Key discussion points

Mr. Raju Kapoor, Director- Industry & Public Affairs, FMC welcomed all the co panelist and gave his views on emerging trends on chemicals and petrochemicals and retaining industrial growth in covid era. After Covid waves, India's GDP will grow at much higher rate and nearly comparable to pre covid figures and the major driving force in manufacturing is due to chemical and petrochemical sector. Covid has thought us the Digitalization and Sustainability.



Mr. R. G Agarwal, Group Chairman of Dhanuka Agritech Ltd, has given the insights of Indian agrochemical sector. Due to agrochemical, we get food, environment, health security and wealth security. Today only 290 molecules are registered by Ministry of Agriculture while worldwide 1175 molecules are present. Registration system is so slow that it takes 4 to 5 years, and government should look after this issue soon.



Mrs. Vinati Mutreja, CEO and Managing Director, Vinati Organics Limited, has given her views on sustainability. While green chemistry is a must it is going to take some time to come to India. India is still growing and trying to cope up with other economies. Global Chemical companies are looking at sustainability very seriously and hence Indian chemical companies are making steps in a right direction.

Mr. Saurabh Tayal, Senior Principal Accenture, has addressed the entire digital things adoption in Indian industry and what kind of trends are present. The companies have adopted the digitalization but still they are struggling with realizing the full potential. First challenge is the confusions which are due to so many solutions bombarded every day, secondly there is still doubt whether it's a fancy solution or is it going to put any value to the business. And finally, there is insecurity in terms of readiness in digital world.



Mr. Ajai Sirohi, Chief Development Officer, Toray Industries India Pvt Ltd, spoke about the following:



- A lot of our digitization efforts probably came out from complex MRP system which we can share with internal and external decision makers. We have Accenture India which has a big name in India's IT industry, and we should take assistance of such a great player in making Digitization of Indian chemical industry a success.

As part of the conference, concurrent **B2G Meetings were organized between States Government and Industry Stakeholders**. Over **60 Meetings were held between the PCPIR States** - Government of Tamil Nadu, Government of Odisha, Government of Andhra Pradesh, Government of Gujarat, Government of Rajasthan who participated as Partner State.

Discussion ended with vote of thanks.