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Government of India
Ministry of Chemicals and Fertilizers
Department of Chemicals and Petrochemicals

Room No.233, 'A' Wing
Shastri Bhawan, New Delhi-1

Dated: 3th January, 2014

Subject: Draft National Chemical Policy-2014 for inter-ministerial consultation, soliciting suggestions/ comments of the stakeholders.

The chemical sector is the mainstay of a large number of industries and accordingly, the Department of Chemicals and Petrochemicals (DCPC) has framed a **draft National Chemical Policy-2014** to facilitate the growth and development of chemical sector in India taking a futuristic view. The policy comprehensively discusses the various issues involved in a holistic manner, and accords high importance to R&D, creation of infrastructure, technology up-gradation, safety & security, sustainability, pollution & environmental aspects, effluent/waste disposal & treatment, green chemicals, etc.

2. As part of inter-ministerial consultation process, it is requested to kindly send your suggestions/ comments, if any, on the draft National Chemical Policy-2014 to the undersigned, by e-mail at arun.agarwal@nic.in, drr1@rediffmail.com, or by post, by 18th January- 2014.

This may be kindly treated as urgent.

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To

As per the attached list.

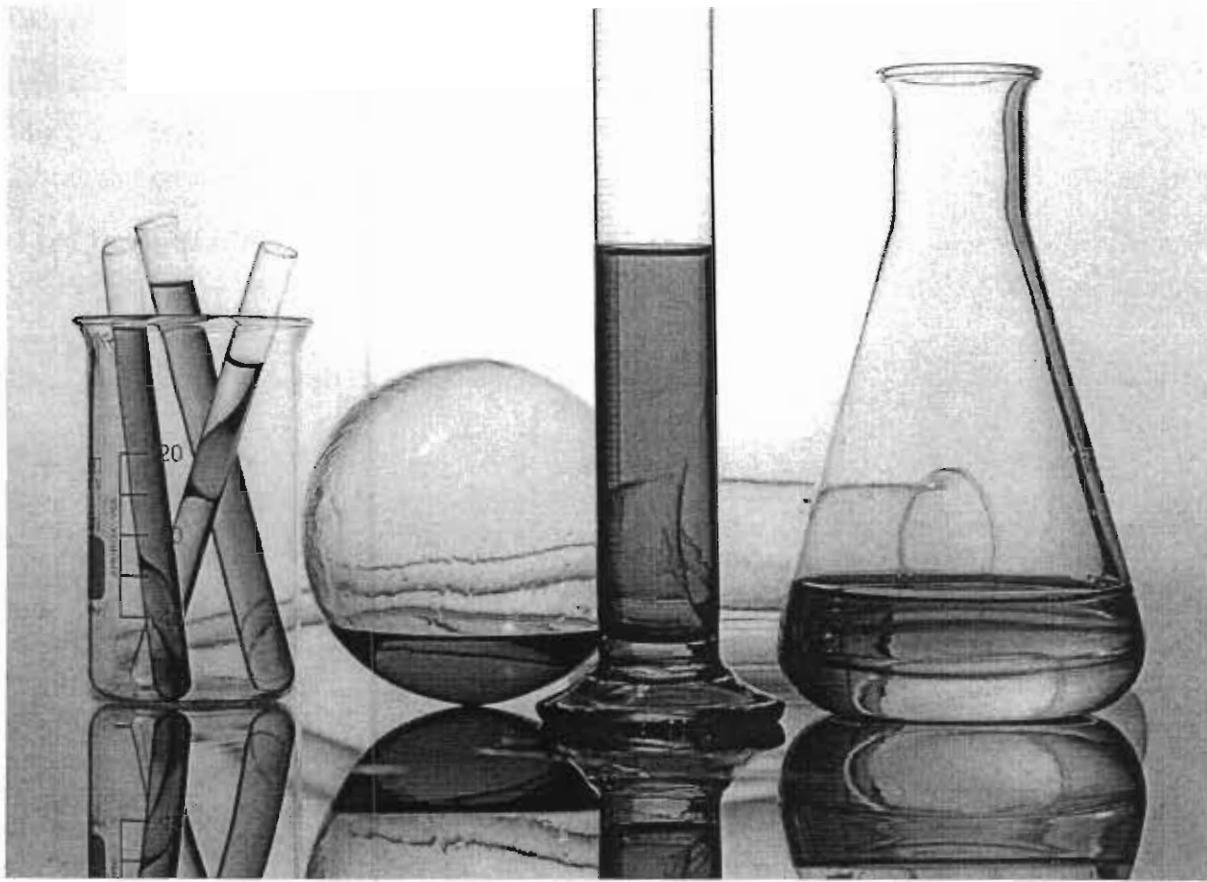
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DRAFT NATIONAL CHEMICAL POLICY

(Final Draft NCP-2014)

**Government of India
Ministry of Chemicals & Fertilizers
Department of Chemicals & Petrochemicals**

NATIONAL CHEMICAL POLICY

PREFACE

The need for a dedicated policy for the chemical sector has been felt for a long time. It was realized that with a view to facilitate rapid increase in the share of this sector in GDP, accelerate the development, support inclusive growth and provision of gainful employment, an enabling policy framework is the need of the hour.

In March 2011, the Planning Commission constituted a Working Group on chemicals and petrochemicals to identify the long-term goals, formulate a road map & strategies for the growth of the chemical sector during 12th five year plan (2012 – 17) and measures for strengthening R&D in the chemical sector in the country. The Working Group on chemicals and petrochemicals consulted various Industry Associations to seek their inputs and submitted its report to the Planning Commission in September 2011. The Report of the Working Group recommended to formulate a National Chemical Policy.

In pursuance of the report of the Working Group, a draft National Chemical Policy has been prepared indicating various imperatives essential for the growth of the chemical sector in the Country. The vision is to increase the share of the chemical sector in GDP from 2% to 6% within a decade. Dept of Industrial Policy and Promotion (DIPP) has come out with the National Manufacturing Policy in 2011 and the Planning Commission has prepared the 12th Five Year Plan. Relevant points from these documents have been suitably incorporated in this policy document, wherever appropriate.

This Policy document has been prepared after extensive consultations with the stakeholders and inputs from the industry, concerned Ministries/Departments of the Govt, and experts in the field of chemical technology development, and business environment. The policy seeks to present specific action points in the areas identified as constraints that require immediate attention and remedial measures. However, still there could be other roadblocks which may affect the growth of the sector, and efforts will be made to address them also appropriately.

1. Background

1.1 The chemical industry is an indispensable and integral constituent of the growing Indian industry. The mankind is immensely benefited, right from its inception till date, by the use of chemicals and life, without chemicals, is unimaginable and inconceivable. The wide range of chemical products play vital role in catalyzing not only the economy of the country, but also making the life-style of human beings comfortable and sophisticated. Apart from the above, chemicals are essentially contributing in several other fields, viz., health, agriculture, environment, forest, communications, pharmaceutical, transport, power, textile, infrastructure, housing, defence, etc.

1.2 The chemical Industry, one of the oldest in India, is critical to the economic development of any country and has played an important role in our country's ongoing metamorphosis from an agrarian economy to an industrialized economy. This industry occupies a pivotal position in meeting basic needs & improving quality of life and is one of the most diversified sectors covering thousands of commercial products. The industry is the mainstay of the industrial & agricultural development of the country & provides building blocks for several downstream industries, such as textile, paper, paint, soap, detergent, pharmaceutical, varnish, etc. The chemical sector is predominately based on derivatives from cracking of naphtha and other hydrocarbon feedstock providing the building blocks, such as Benzene, Toluene, Xylene, Ethylene, Propylene etc.

1.3 The Indian Chemical Industry has the major advantage of being extremely diverse in the range of products that it manufactures and going forward, the industry can build on this base substantially.

1.4 Indian companies have already begun innovating new substances, molecules processes and products by registering their own patents and Intellectual Property Rights (IPRs). The stage is now set for a major jump in this trend. Another positive aspect is that there is a growing trend of entrepreneurship and product innovation. The policy seeks to recognize that entrepreneurship and innovation hold the key and thus provides the necessary enabling environment to nurture this evolution.

1.5 The chemical sector, though holds promise for the future, faces significant challenges also. Lack of a strong base in application R&D, a highly competitive international trade environment, inadequate infrastructures (roads, ports, power, etc), multiplicity of regulatory approvals and need to move to eco-friendly technologies in

the industry, inadequate availability of an enabling eco-system, are among the major challenges. A stage has now been reached where sustaining the growth trends largely depend on our ability to foster a strong R & D and manufacturing base in the country. A holistic view, by evolving interdependent and synergistic policies, can overcome these challenges.

1.6 Some other aspects also merit attention. Inadequate capacity and lack of competitive technology to produce a number of key items indigenously is an area of concern. With increasing demand, without commensurate increase in domestic output, India had an import bill of approx INR 202,347 Cr (USD 36.8 billion) in 2012-13. Growth and sustainability of this sector may also get affected by heavy dependence on imports. A strong manufacturing and R&D base need to be created that would facilitate export promotion and import substitution and would also keep under control the perpetuating threats to India's strategic sectors and interests, which is a cause for rising concern.

1.7 As the policy, per se, is an evolving and a dynamic concept to facilitate the growth and development of the chemical sector, it may be revisited, as and when required in future, to address the emerging trends & scenarios. Against this backdrop, the Government recognises the need to formulate a policy with the following aims to bridge the gaps and face the challenges for becoming a world leader:

2 Present status of the chemical industry

2.1 The Indian chemical industry, estimated to be about INR 600,000 crores (USD 108 billion), is approximately 2% of GDP of India. Share of industry in national exports is around 9.2 %. Despite its large size and significant GDP contribution, India's chemical industry represents only around 3% of the global chemical industry size.

Indian chemical sector ranks 6th in the world and 3rd in Asia. It is also one of the largest industrial sectors in the Indian economy and an important employment generator. The Indian chemical industry comprises both small, medium and large-scale units, and presently, there are about 70,000 chemical manufacturing units. Indian chemicals industry comprises a wide range of chemical products including pharmaceuticals (29%), petrochemicals (21%),

specialty chemicals (19%), fertilizers (17%), agrochemicals (3%) and other base chemicals constituting ~11% of the total Indian chemicals industry.

2.2 There are no quantitative or other restrictions on the import of chemicals except for few chemicals which are covered under the obligations as per International Conventions. Indian chemical industry exports dyes, pesticides and specialty chemicals which form about 3% share in the global market and contributes significantly to foreign exchange earnings.

2.3 In the chemical sector, 100% FDI is permissible under automatic route, except for the three items listed below. Manufacture of most chemical products, inter-alia covering organic/ inorganic chemicals, dyestuffs and pesticides is de-licensed. Entrepreneurs need to submit only IEM (Industrial Entrepreneurs Memorandum) with the Department of Industrial Policy & Promotion (DIPP), Government of India, to set up a chemical manufacturing. Only the following items are covered under the compulsory licensing list because of their hazardous nature:

- Phosgene & its derivatives
- Hydrocyanic acid & its derivatives
- Isocyanates & di-isocyanates of hydrocarbons

2.4 The basic Customs Duty on most of the chemical feedstock is 2.5%, and Import Duty on most of the chemical products is at 7.5%. In general, the Central Excise duty rate for chemical sector is about 12%.

3. Aims and Objectives

The principal policy objectives are to create an enabling framework to meet the growing demands in all areas to foster innovation, catalyze manufacturing, addressing environmental concerns and adopting green technologies, encourage HRD and R&D through academic institutions & industry that not only cater to the growing domestic needs but also take advantage of global export opportunities as a logical expansion of the industry. This policy is being proposed to

- 3.1 increase the chemical sector growth to 6% per annum to make it an important engine of growth of the economy and enhance the share of Indian industry to 6% of global market.
- 3.2 enhance global competitiveness of Indian chemical industry through appropriate policy support;
- 3.3 create a conducive environment for attracting large investments in the chemical industry and facilitate ease of doing business,
- 3.4 increase the domestic demand and per capita consumption of chemicals;
- 3.5 ensure availability of necessary feedstock and quality infrastructure in order to optimally utilize manufacturing capacities and to encourage Indian chemical companies to manufacture import substitutes.
- 3.6 leverage significant export potential of the country, after meeting the domestic demand, in segments like bulk organic and inorganic chemicals, agrochemicals, dyestuffs & specialty chemicals;
- 3.7 adopt a cluster approach and also a cluster within cluster approach to encourage development of ancillary industries around them;
- 3.8 enhance the image of the industry by creating public awareness.
- 3.9 strive towards making India a reliable hub for the manufacture of quality chemicals with focus on high end chemicals, viz. Specialty Chemicals, as also an R&D hub, in view of the quality and quantity of man power available.
- 3.10 facilitate access to the latest technologies, as per India's specific requirements, provide assistance for technology up-gradation, make the industry more competitive; thereby increasing domestic value addition and technological "depth" in the sector;
- 3.11 promote R&D with focus on sustainability and green technologies so as to ensure consistent and long-term growth, particularly with regard to the environment including energy conservation, optimal utilization of natural resources and restoration of damaged/ degraded eco-systems;
- 3.12 rationalise the statutory regulations and controls;
- 3.13 establish focus on green chemicals, especially derived from renewable sources / waste

- 3.14 promote human resource development, including creation of appropriate skills for inclusive growth, and to ensure the availability of critical human resources required for achieving the desired growth as well as to meet the future challenges;
- 3.15 set up a "National Chemical Centre" for acting as a repository of chemical industry information, resource for trade-related initiatives, making chemical standards and driving innovations;
- 3.16 put in place a robust frame-work for promoting safety and security of chemical facilities across the value chain;
- 3.17 promote disaster resistant and resilient chemical sector in India.

4 Vision, targets and future thrust areas

- 4.1 The Vision for the Indian Chemical Industry is:-

"To facilitate the accelerated growth and development of the chemical industry to meet local and global requirements, in an environment friendly manner, with focus on innovation, sustainability and green technologies, so as to enable it to become a globally competitive major-player."

- 4.2 Considering current stagnation in the chemical sector, it is estimated that with an overall GDP growth rate of 6% p.a., the Indian chemical industry could reach the turnover of \$144 billion by 2017 and \$193 billion by 2022. However, the Indian chemical industry could aspire to grow much more, driven by its aspirations. This would require the industry to not only effectively meet its domestic demand but also leverage the large export potential.
- 4.3 The thrust areas for chemicals include specialty chemicals, agrochemicals, green chemicals including bio-fuels, etc. Adequate feedstock (both fossil and renewable) availability, exploiting export opportunities for generic agrochemicals and Active Pharmaceutical Ingredients, are vital factor for the sector. In a nutshell, growth-oriented ecosystem, with emphasis on R&D, green technologies, infrastructure and chemical clusters, will provide thrust to the sector.

5 Chemical industry imperatives

India envisages the future growth of its chemical industry by successfully utilizing its inherent strengths while effectively addressing the key challenges. The following challenges need to be addressed to achieve the aspirational growth target defined in the Vision.

5.1 Feedstock

5.1.1 India faces significant challenges in terms of feedstock availability and prices.

Organic chemicals based on Ethylene, Propylene, Benzene, Xylene, Toluene, Naphthalene and their derivatives are imported in large quantities due to non-availability of cost-competitive feedstock. Apart from large imports of methanol (exceeding 80% of domestic demand), India also imports significant volumes of sulphur, urea, ammonia rock phosphate and potash, which are key raw materials for various downstream sectors.

India has limited availability of crude oil and natural gas but possesses large deposits of coal. Therefore, a need exists to aggressively pursue alternative sources like coal, pet coke and bio-mass, along with associated research. The coal gasification process may also be exploited optimally for producing ammonia, methanol, etc.

5.1.2 The various measures recommended for securing key feedstock are as follows:

- (i) A policy could be evolved, in consultation with industry, for allocation of feedstock as follows:
 - a) Each future cracker, including expansion of the existing ones should have provision for merchant sale of the above building blocks (as relevant) with at least 20% of each reserved for merchant sale.
 - b) Priority to given to best suited products (e.g. gas for fertilizers, coal for power, naphtha for petrochemicals).
 - c) Refineries and crackers need to be encouraged to invest in areas which can ensure sustained and incremental feedstock supplies (e.g.:

Implementing high severity Fluid Catalytic Cracking (FCC) in refineries for propylene and recovering aromatics from cracker Py-Gas).

For boosting domestic feedstock supply, adoption of the "Consortium Cracker" approach could be considered. Every PCPIR could have a cracker complex which produces all the building blocks (ethylene, propylene, benzene, toluene, etc.). Such crackers could be set up through various routes, viz. Government PSUs, private sector, PPP model. In order to obtain competitively priced oil, coal and mineral-based feedstock, a strategic plan to secure various feedstock from feedstock-rich countries with competitive supplies needs to be developed. Further, Government to Government agreements for long-term supply security of basic minerals and other feedstock at competitive price need to be explored and initiated.

- (ii) To set up global scale plants, there is a requirement to encourage strengthening and improving capacities for the manufacture of base chemicals such as phenol, methanol, nitro benzene, ammonia, etc.
- (iii) Need exists to set up support funds or provide incentives for adoption of certain capital intensive technologies, such as coal gasification for coal-based chemicals.
- (iv) There is a need to provide incentives for using bio-based raw materials as a way to reduce dependence on fossil fuel-based products. The national level research laboratories should take initiatives towards process development for commercial products, such as epichlorohydrin, propylene glycol, 1,3 propanediol and bio-ethanol from agro-waste, as well as compost from city and agro waste, .
- (v) For industrial use, there is a deficit of ethanol in the country which is a building block for many chemicals. Therefore, the policy of mandatory blending of ethanol in gasoline requires to be revisited, .
- (vi) for reviewing the Customs Duty on feedstock /building blocks, in order to correct the inverted duty structure, wherever it prevails, the matter needs to be taken up with the concerned authorities.

5.2 Infrastructure

Current infrastructural deficiencies in roads, ports, railways, pipeline networks, power, water, common effluent treatment and discharge facilities and other essential infrastructure for the chemical industry (chemical warehousing, logistics, terminals, etc.) have retarded its growth and added to manufacturing costs.

Several measures are needed on a priority basis to augment and upgrade infrastructure that include:

- a) Setting up of an Empowered Group of Ministers (EGoM), with special focus on the following:
 - Resolving infrastructure inadequacies and other industry needs;
 - Expediting large scale infrastructure projects, especially those involving multiple states and agencies.
- b) PPP models to build dedicated infrastructure for chemical industry needs
- c) Identification, earmarking and reservation of dedicated plots for setting up chemical clusters need to be taken up with the concerned authorities for required facilitation
- d) Augmentation of infrastructure in existing clusters to raise them to global levels of development by adoption of global best practices
- e) Special fund could be set up to ensure availability of finance to improve infrastructural facilities of SMEs, especially closer to large anchor plants
- f) "Plug-and-play" model needs to be the objective in the creation of infrastructure, and strive towards "plug-in-plug-out" model in the long-term.

5.3 Chemical clusters

- 5.3.1 As per National Manufacturing Policy-2011, establishment of National Investment and Manufacturing Zones (NIMZs) will be developed in the nature of greenfield industrial townships, benchmarked with the best manufacturing hubs in the world. These NIMZs will seek to address the infrastructural

bottleneck which has been cited as a constraining factor for the growth of manufacturing.

[There is a need to form clusters with provision of common infrastructure facilities as indicated earlier in Clause 5.2]

5.3.2 For addressing the infrastructure related problems of the existing industry and for setting up of new chemical clusters “Single Window Support Mechanism” would be considered to evolve and expedite the process in consultation with the concerned Ministries/Departments at Centre/State/UTs. The “Single Window” mechanism should provide its comments within 3 months; else the matter would be referred to a national level committee, especially constituted for this purpose, with representation from the concerned Ministries/ Departments of Center and State. This national level committee would take decisions on such issues in a time bound manner.

5.3.3 Funds need to be earmarked/allocated for upgrading the sustainability of the existing chemical clusters, currently strained on account of technology limitations and capacity limitations.

New Clusters to be promoted giving precedence and accordance to (a) geographical evolvment, (b) scale and size, (c) technical and product range, i.e. upstream and downstream integration and product synergies, (d) shared common utilities. These need to be benchmarked with global chemical clusters and parks.

5.3.4 For chemical clusters in North-East and backward areas, special incentives such as concession in duties/taxes, tax holidays should be considered. These Chemical parks should be planned and set up in dedicated chemical zones and compulsorily away from residential zones so as to ensure community safety.

5.3.5 The policy seeks to support existing Chemical Zones in order to ensure their conformance with the mandated standards of safety, health, environment, site security and infrastructural adequacy, in a graded, harmonious and time bound manner. A dedicated and funded program and package will be put in

place to revive, stabilize, grow and technologically upgrade these identified chemical zones.

5.3.6 The past experience indicates that time taken for environmental clearance is long and therefore, automatic clearance route needs be explored by the Ministry of Environment and Forests (MoEF) to enable expansion of the existing plants to the extent of 25% every year, in case there is no increase in the effluent load. Further, where the original plant and /or the industrial estate/cluster has already undergone the Environmental Impact Assessment /Environmental Clearance (EIA/EC) process, flexibility in the product mix may also be considered subject to the condition that the total pollution load remains unchanged

5.4 Consolidation of small capacities

It is envisaged to create awareness about benefits of capacity consolidation amongst SMEs. Wherever possible, consolidation of smaller capacities and establishment of chemical clusters could be supported by shifting downstream capacities closer to the mother/anchor plants, and provisions of part financial assistance for any such relocation.

5.5 Need for consolidation of Acts and Rules

5.5.1 Relevant Acts and Rules governing chemical sector in India can be broadly classified into following:

- Acts/Rules related to import and export
- Acts/Rules related to manufacturing of chemicals
- Acts/Rules related to transportation of chemicals
- Acts/Rules related to consumer's interest for using chemicals
- Acts/Rules related to protection of work-place safety, occupational and human health and environment, security and safety

5.5.2 At present, there are multiple Act/Rules in India governing the chemicals industry that fall under the purview of different Ministries/Departments. An illustrative list for reference is given below:

Ministry	Act
Ministry of Environment & Forests	Environment Protection Act, 1986
Ministry of Labour	Factories Act, 1948
Ministry of Road Transport & Highways	The Motor Vehicles Act, 1988
Ministry of Commerce & Industry	The Explosives Act, 1884
Ministry of Home Affairs	The Disaster Management Act, 2005
Dept. of Chemicals & Petrochemicals	The CWC Act, 2000
Ministry of Agriculture	Insecticide Act 1968,
Ministry of Petroleum and Natural Gas	Petroleum Act 1934
Ministry of Rural Development	Land Acquisition. Act, 2013

As the policy envisages a single window approach, there is an urgent need to consolidate and update various applicable Acts and Rules governing the chemical sector in order to expedite approvals and facilitate compliance.

5.5.3 India, being a signatory to Strategic Approach to International Chemical Management (SAICM), has an obligation to have a proper chemical management framework, and accordingly, inventorization of the chemicals needs to be taken up by adopting a holistic approach on priority for integrated, effective and efficient management of chemicals.

5.6 Taxes/ duties and energy cess

In order to increase the competitiveness of the Indian chemical sector vis-a-vis other countries, there is an urgent need for reduction in the taxes on feedstock,

intermediates inputs as well as streamlining the mechanism for refund of taxes and duties on power and water, used for export of chemicals, apart from expediting the Goods and Services Tax (GST) implementation at an early date.

One of the major issues, relating to the duties & taxes, that impacts the entire cross-section and value chain of the industry, is inverted duty structure. Typically, basic raw materials, building blocks/ feedstock and fuels should be at the lowest rate of duty. This should be followed by slightly higher duty for primary chemicals, still higher for secondary chemicals and still higher for final products/chemicals, to give opportunity for value addition and also provide adequate competitive protection. In addition, energy prices in India are significantly higher than the global average. This translates into high end-product costs, exposure to commodity pricing volatility and threat of dumping from low-cost producers. The electricity duty and power cess, levied by states on captive power generated as well as power supplied, varies from NIL in some States to as high as 10 to 40 paisa per unit in other States, adding spirally to cost of production as these are not VATable. These taxes & levies, imposed by the State Governments, should be made VATable.

5.7 Specialty chemicals as a focus area

In view of the importance and bright prospects of specialty chemicals, including their export potential, this segment deserves special attention and incentives in the policy. Special focus needs to be provided to the specialty chemicals industry by the following measures:-

- By setting up capacities in PCPIRs through demarcating special zones to aggregate feedstock demand.
- Encouraging the anchor tenant of PCPIRs to set up an Ethylene Oxide (EO) plant with stringent manufacturing standards to meet the demand of this important feedstock for specialty chemicals.
- Setting up of chemical clusters and consolidation of Acts/Rules would be another initiative in this direction.
- Considering the sun-rise nature of the sector, adequate R&D support needs to be provided.

5.8 Fund for Technology up-gradation for chemicals

The "National Manufacturing Policy" calls for technology acquisition and development in *Part B, para 4*, as reproduced below:

"Technology development and up-gradation is critical to attaining the stated objectives of the Policy. Going up the technology ladder is the quickest way to become globally competitive and ensure sustained growth of the manufacturing sector. This will depend not just on development of indigenous technological expertise, but also on the ability to make crucial technology acquisitions in the global market.

In today's world, green technology is not a choice but an imperative for sustainable development. Availability of affordable technologies has always been a constraint on our manufacturing growth. Adoption and/or adaptation of these technologies entail costs which are substantial especially for SMEs. Hence, there is a need for supporting adoption of green technologies and resource conservation practices."

A number of chemical plants are of smaller capacities and operating at uneconomic scales of production with obsolete technologies. The industry, especially the micro, small and medium enterprise sector, does not have access to capital to upgrade technology on its own. Also, non-availability of technology leads to imports in technology-intensive sub-segments. To address these issues, It is proposed to establish a "Chemical Up-gradation & Innovation Fund" (CUIF) for the chemicals sector, similar to the textile sector, MSME segment and sugar industry. The corpus of such funds is normally generated by levying cess on the goods and/or services pertaining to that particular sector(s). The CUIF could also be used for supporting capacity expansion of the existing plants to achieve economies of scale, migration to green chemistry, setting up of common chemicals infrastructure (e.g. effluent treatment plants, boilers, chemical waste disposal plants, incineration plants, etc.), which would benefit industries and the environment.

For raising fund for the above purposes, a "Chemical Up-gradation & Innovation Cess" at the rate of 1% additional duty could be levied on all imports of

chemicals. The allocation of funds from CUIF to be made through a committee consisting of Government nominees and industry representatives.

5.9 Research and Development

To meet the evolving consumer requirements and to compete globally, R & D spending needs to be increased substantially to at least 3-5 % of revenue. Various measures, which could be considered to promote research in the chemical industry are –

- For focused indigenous development in the chemical sector, concerted efforts towards creating a suitable road-map to align technology, demand, standards and regulations are required, after considered evaluation of available and emerging technologies and emerging trends.
- Technological development, global in nature but customised according to local needs, should be as per international standards. The focus to be on innovative pollution free technologies, especially useful for SMEs, which may not have their own R&D base.
- Commercial R&D, to be set up by leading chemical industries, preferably in PPP mode, for carrying out customized research expeditiously
- Promoting synergy of academia, R&D centres, manufacturers, and other stakeholders for achieving collaboration and reorientation of their efforts for creation of IPRs, and deployment of new products and services suited to Indian environment. This would include optimal utilization of the existing CSIR laboratory assets and faculty for industry needs.
- Implementation of an effective Intellectual Property Rights (IPR) system to promote investment in innovation and strengthen the links in the complete value chain from basic research to Intellectual Property Rights (IPR) generation, product design and development, product commercialization, etc.
- Considering that R&D involves huge investment and time, framework to safeguard confidential business information (CBI) needs to be evolved.

- Creating state-of-the art testing & laboratory infrastructure for carrying out R&D, conformance testing, certification, etc. prominently, in the vicinity of chemical industry clusters and academic institutions,
- As India is a signatory to “Organization for Economic Co-operation and Development” (OECD) agreement on MAD (Mutual Acceptance on Data), the industry and R&D centres should utilize the facilities and benefits available thereunder.
- To position India as a global hub for R&D by leveraging the large knowledge pool in country, and by taking up new appropriate schemes in the areas, such as bio-technology (that includes white bio-tech), renewable energy and clean technologies, including bio-fuels, water management technologies, etc.
- To promote investments in upcoming technologies/ sunrise sectors, fiscal incentives such as accelerated depreciation, tax benefits, subsidies, etc. could be provided. Technology tie-ups with global companies, wherever needed and deemed fit, could be facilitated.
- Preference may be accorded to green chemistry research for which “Green Chemistry Centers” may be set up across the country by involving different stakeholders like universities, research institutions, etc.
- The corpus of the Chemical Up-gradation & Innovation Fund would be utilised for supporting R&D/ innovations activities in the chemical industry.

For realizing the above, the following steps / initiatives, could be taken for the chemical sector:-

5.9.1 Development of regional chemical clusters and innovation centers in universities and research institutes dedicated to chemical industry

- Driving the innovation agenda nationally would require strengthening regional capacity for innovation and strong industry-academia linkages.
- Dedicated clusters for chemical industry could be created in regions with large share of chemical industries (e.g. in Gujarat, Maharashtra, Tamil Nadu, Andhra Pradesh) and similarly universities focused on chemical engineering to be identified to develop innovation hubs for chemical industry.

5.9.2 International collaboration agreements with other advanced countries in this sector

Collaborations need to be established in the form of bilateral exchange forums, linkages between relevant industry associations and research institutes with countries advanced in the chemical sector.

5.10 Setting up of a National Chemical Centre

For promoting an integrated and holistic growth & development of the sector in an environment friendly manner, it is envisaged to set up a **National Chemical Centre** to carry out studies, develop standards and support innovation.

5.10.1 NCC would be tasked with **conducting studies and making recommendations for promoting & safeguarding the chemicals sector** with a view to:-

- provide an effective regulatory framework and adequate safeguards to ensure fair competition, and protection of industry as well as consumer interests
- study the trade practices adopted by other countries, especially with respect to the dumping of chemicals by them into India, if any, that causes injury to the domestic industry, and provide reports in this regard for taking remedial measures;
- study the international chemical sector scenario, e.g. trade practices, standards, new innovations, duty structure (including inverted duty structure), and other areas, and recommend to the Government suitable measures;
- conduct studies for inclusion/exclusion of specific chemicals in Free Trade Agreements (FTA), bilateral as well as multilateral;
- evolve a *Chemical Management framework*, that will include, inter alia, Inventorization of the Indian chemical sector, containing data on production, consumption, imports, exports, toxicological properties and classification criteria akin to Globally Harmonised System of Classification and Labeling (GHS);
- survey the chemical sector and to forecast trends including demand/supply/ strength/ threats, technologies, opportunities, etc.;
- disseminate awareness and information about hazardous chemicals;

- evolve input output norms to accelerate export of chemicals;
- take up studies in the domain of the international Conventions, dealt with by the DCPC, such as Rotterdam Convention, Stockholm Convention, Chemical Weapons Convention, REACH, etc.

5.10.2 Development of Chemical Standards

The NCC will formulate standards for the Indian chemical sector and actively participate in the framing of standards by international bodies as follows:

- Formulation and adoption of standards for the chemical sector, including in the areas of green chemistry and specialty chemicals.
- Framing chemical facility safety & security testing standards, keeping in view the prevailing & evolving mechanized, rapid, accurate, animal independent methods for safety risk assessment.
- Evolving Green Benchmarking norms and its evaluation mechanism taking the automobile sector as a reference with ratings such as Bharat II and III.
- Ensuring compliance with chemical standards, including safety and security norms, by evolving & implementing a comprehensive Certification and Inspection frame-work;
- Performing functions relating to the disaster management in the chemical sector, as indicated in para 5.11;
- conducting training courses in the area of chemical safety and security;
- There is also a need to revisit, re-evaluate and re-formulate existing environmental standards, regulations and policies, having bearing on the chemical sector, NCC would closely work with MoEF towards this end.
- Providing requisite training for inspection, verification, validation and certifying organizations.

5.10.3 Supporting innovation

The NCC will support innovation by taking up the following:-

- Carrying out technology and product development forecast.
- Evolving and periodically updating the national program for technology/product development.

- Acting as a nodal agency to monitor and ensure the implementation of various recommendations made for promoting indigenous R&D, IPR creation, Confidential Business Information (CBI) protection and manufacturing and deployment of products and services.
- Collaborating with the Ministry of Science of Technology, and specifically with Department of Science & Technology (DST), Department of Scientific & Industrial Research (DSIR) and leading national laboratories
- A centralized R&D Technology Park (R&DTP) should be created to provide "plug in" facilities for MSMEs so that they can have access to the world class R&D facility to develop and enhance their customer offerings.
- All the expertise R&D, including laboratory research, pilot facility and scale-up expertise would be made available in this R&DTP to facilitate world class innovation at a competitive cost for industry.
- Formulating the roadmap for innovation 2022.
- Any other area relevant to the chemical sector

Committee(s) would be setup with representations from the Government, academia, chemical companies, industry associations and reputed research/ educational institutes to identify and select R&D/Innovation projects with the objective to support them.

5.11 Chemical Disaster Management

For capacity building and creation of a "disaster resistant & resilient chemical sector" as well as for management of industrial disasters, industrial segment-specific guidelines & Standard Operating Procedures (SOPs) need to be evolved with focus on the Indian conditions/ requirements, and training courses would be conducted, as given below:-

- Imparting appropriate concerned training to NDRF (National Disaster Response force) and other connected/concerned agencies on handling chemical disasters as well as associating with deployment of such trained personnel along the major arterial routes in the event of chemical emergencies.

- Sensitizing the chemical industries to comply with the guidelines and SOPs and impart training to the personnel of this sector.
- Collaboration with industry associations for capacity building for transport emergency response
- Ensuring conformance through certification with the laid down guidelines / SOPs, etc.

5.12 Sustainability

For long-term viability of the chemical industry, the sector needs to adopt sustainable measures such as:

- Phasing out and replacement of hazardous chemicals with more environment-friendly ones, taking into account adequate lead time to develop suitable substitutes for these chemical uses.
- Evolving a chemical waste (C-waste) management policy, with sustainability as its hallmark.
- Developing guidelines on responsible sourcing across the value chain, including guidelines on environmental footprint covering water use efficiency, waste management, responsible mining, impact on communities, etc.
- Cost and quality comparison studies need to be conducted for alternative feedstock, and technologies for chemicals such as fertilizers, agrochemicals, specialty chemicals, additives, etc., and incentives could be provided to chemical companies to switch over to sustainable alternatives.
- For encouraging companies to seek "Responsible Care Certification" as a key driver for sustainable growth of the Indian chemical industry, due weightage may be accorded to "Responsible Care" movement, certification and logo for fast track project clearances from the concerned bodies such as MoEF.
- Incentivizing companies that are compliant with environmental/occupational health and safety management systems, such as Responsible Care®, ISO 14001, OHSAS 18001, etc. through a transparent mechanism by according fast track clearances, priority loans at subsidized/lower rates, etc.

- Identifying focus areas and supporting reputed and active educational & research institutes to develop low water intensive, environmentally compliant, safe green processes, etc.
- As per Vision 2050 of World Summit on Sustainable Development, Water will be the most scarce resource globally and the situation for India will be alarming, given that demand for water will outstrip supply.
- Promoting innovative initiatives to Reduce, Reuse, Recycle; incentivizing the development of Green Products and Processes (bio-feedstock, bio-degradable products, eco-friendly processes, etc.), and encouraging industry to consider and adopt “Green Benchmarking”.

5.13 Human resource development

5.13.1 Human resources are vital to the development of the Indian Chemical Industry, which is facing a huge challenge in getting world class talent. In order to facilitate and attract trained and skilled human resource to the chemical industry, it is required to take appropriate steps to strengthen technical education in the country and to establish newer institutes with good facilities. As per NSDC (National Skills Development Corporation) report on Human Resource and Skills Requirement for the Chemicals and Pharmaceutical Sector 2022 (Skills Gap Report of 2010), the estimated requirement for skilled people by 2022 will be about 10 lakh. Chemical industry currently employs 8.0 lakh people, while the incremental human resources requirement is expected to the tune of 2.0 lakh people by 2022. Lack of quality education and low investments in skill development are the major challenges in India. Hence, skill development needs a significant policy thrust.

5.13.2 Towards this end, the following steps could be taken to put in place an enabling HRD eco-system:

- Assess the manpower requirement at different skill and expertise levels by partnering with “National Skill Development Council” and industry to identify the relevant needs of the sector and prepare a roadmap.

- Certification programmes for experienced semi skilled employes need to be initiated for productivity & safety enhancement and technology absorption.
- Skill development programmes for drivers and logistics related personnel to be initiated for safe transportation of chemicals
- Create an enabling framework in partnership with Ministry of Human Resource Development (MHRD) to periodically upgrade academic curriculum of courses, which are aligned with the technological advancements in the sector for meeting the human resource requirements.
- Coordinate efforts to meet the demand for human resources in different parts of the chemical eco-system.
- Develop a pool of certified experts for Responsible Care (RC) verification audits and Certification audits.
- Set up a high-level Apex body (supported by advisory groups, comprising representatives from industry, academia, PSUs, etc.) to oversee and to act as guiding and enabling source for all aspects relating to skill development in chemical field.

5.13.3 For promoting quality training and capacity building for bridging the talent gap for development of the sector, the strategy could be as follows:

- Establishing training institutes in chemical clusters wherein theoretical training to be imparted in the classroom and practical training on the shop-floor for enhancing employability.
- Promoting and augmenting training institutes in urban and rural areas to cater to the skill and training needs of the sector. New ITIs, vocational training institutes, etc. need to be set up to develop skill base in chemical field (preferably through some sort of PPP model), with focus on chemicals relevant to the chemical cluster(s) of that area.
- Existing training institutes, especially under the DCPC and other such organisations could be developed as national level centres of excellence.

- Collaboration between Government and industries needs to be promoted to upgrade the current Chemical Departments in universities to the level of world class Departments (in terms of infrastructure, faculty qualifications, industry interaction, administration etc.), as well as to set up specialized universities, that will, inter-alia, run courses such as B.Sc. / B. Tech in specialized chemicals fields like dyes & pigments technology, etc.
- Developing and conducting courses in areas such as "Safety & Security in the Chemical Industry", "Safe Handling of Hazardous Chemicals", etc.
- In order to bridge the gap between the demand and supply of technically qualified personnel in this sector, Chemical Engineering Education Centres (CEECs) could be set up for imparting education at various levels, such as certificate courses, diploma, graduation, post-graduation, and doctoral. CEECs could be along the lines of Central Institute of Plastic Engineering and Technology (CIPET), an autonomous body of DCPC, which imparts education and training in plastics.
- To attract talented students to this area, special incentives such as scholarships, stipends, etc., along with good career prospects could be considered;
- To encourage collaboration with premier educational institutes like IITs and chemical institutes of excellence for bridging the gap between research/ academics and field problems
- To support universities and colleges to establish green chemistry and engineering educational programs
- To disseminate the created chemical expertise to the related fields. Further, such expertise will also be made available to other countries.

5.14 Chemical industry image

Chemicals find applications in all walks of our life. They increase aesthetic appeal by way of providing coloured dyes and paints, increase our longevity by providing health care pharmaceuticals, provide protection, safety & comfort through building &

construction chemicals, and provide food security to the mankind by fertilizers and pesticides.

Although, the chemical industry - through various inventions - has brought about improvements in our lifestyle, it continues to be saddled with a negative image. One of the reasons is that Safety, Health & Environment (SHE) and security standards are not adopted strictly by the manufacturers of the Chemical Sector.

- Programs/schemes could be taken up for improving the image of the industry. Specific image building activities, such as leading sustained media campaigns, organizing workshops, trade fairs, etc. to be undertaken in collaboration with industry associations etc.
- Establish "Centers for the promotion of Chemical Sciences" at national, regional and State levels, and "Kendriya Rasayanik Vigyan Kendras" at District level and below to further enhance the image of the industry; attract, retain & train talent and position the industry as a growth engine of the economy.
- Interactive chemistry education program to educate children about role of chemistry in building a sustainable future need to be initiated. Further dedicated projects may be taken up to provide science based solutions to address critical requirements.
- Industry players should also invest in initiatives to set up 'Rasayan Vigyan Kendra' on the lines of 'Krishi Vigyan Kendras' in rural areas to increase awareness about chemicals.
- For avoiding adverse effects of chemicals, if any, chemicals should meet the stipulated quality and regulatory norms. In some segments such as Agrochemicals, Specialty Chemicals, Dyes and Colourants etc, spurious, misbranded and other such counterfeits need to be strictly monitored and weeded out, and action to be taken as per the existing provisions.

It is expected that the chemical sector industries and their association/federations, would also award scholarships to the promising candidates to further attract and retain talent.

5.15 Promotional Issues

5.15.1 National Awards for Technology Innovation

A scheme of "National Awards for Technology Innovation" in various fields, such as dyes, pesticides, chlor alkalies, etc. could be formulated. Under this scheme, the awards for outstanding contributions made in technology innovations could be institutionalized. The selection for awards could be made by a Committee of eminent persons.

5.15.2 National Awards for Chemical Safety & Security Rating System

A number of chemicals are required to be handled, stored and processed in appreciable quantities in any chemical, petrochemical and petroleum industry. These chemicals pose various types of hazards due to their flammability, toxicity, explosive nature, corrosiveness etc. In view of such hazards, stringent regulatory requirement and various management systems & controls are introduced to ensure safety. In order to motivate and encourage the industry to adopt the best practices for safety and security, evaluate all potential hazards systematically, and to identify the areas for improvement to minimize incidents, security vulnerability and their consequences; 3-Awards (i.e. 1st, 2nd & 3rd), could be distributed, each for large, medium and small scale sectors by assessing their performance in terms of the "Chemical Plant Safety & Security Rating System".

5.15.3 Industrial Trade Fairs and Exhibitions

There is a need to actively facilitate and support the marketing and organization of major exhibitions and events in order to provide a platform to the Indian chemical manufactures to show case their strengths.

5.15.4 Market Development

New avenues need to be explored for export of chemical from India to Latin American, African, CIS, Eastern European and Middle East countries through our embassies and missions abroad.

The above measures and their focused implementation would contribute substantially towards the attainment of the objectives stated in the Policy.

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