

Executive Summary of

Third Party Evaluation Study Of The New Schemes Of Petrochemicals

(I) Setting Up Of Plastic Parks, And

(ii) Setting Up Of Centres Of Excellence

Conducted by

Prof. Ashok Vishandass

and

Dr. Saket Bihari

1. The schemes of setting up of plastic parks and Centre of Excellence are embedded in and emanate from National Policy on Petrochemicals-2007 that envisioned sustainable development of the petrochemical sector through, *inter-alia*, the promotion of research and development (R&D), human resource planning and development to cater to the needs of the industry by adopting a mission mode approach. The policy was formulated to improve existing petrochemical technology and research in the country and to promote the development of new applications of polymers and plastics.

2. The Gross Value Added (GVA) of Chemical Sector registered a Compound Annual Growth Rate (CAGR) of 12.47% during the period 2012-13 to 2017-18 compared to 9.06% in the Manufacturing Sector during the corresponding period. Implicit in it is that the Chemical Sector grew one and half times faster than the Manufacturing Sector.

3. As the two Schemes under Study viz. setting up of Plastic Parks and setting up of the Centres of Excellence (CoEs) are distinct from each other, this Report is divided into two Parts. Part-I of the report covers (i) Scheme of setting up of Plastic Parks and Part-II delves on (ii) Scheme of Setting up of CoEs. The Executive Summary is also divided accordingly.

Plastic Parks

4. Plastic products are widely used in almost every facet of modern life for their versatility, durability, excellent insulating properties, low weight, low production costs, and energy-efficient production processes. Plastics are now an inevitable part of our lives, ranging from kitchenware to medical supplies, construction materials and automotive supplies, safety, security devices and packaging materials and, finally, home decorations. These advantages explain a perceptible shift from the conventional material-based products to plastic based products.

5. The approach for the evaluation study took cognizance of the objectives, processes, and outcomes of the scheme. When it comes to the objectives of setting up Plastic Parks, parameters were designed to quantitatively and qualitatively assess them. The objective-based approach was adopted to measure if initially set goals of the scheme were duly met.

Apart from the evaluation of the objectives of the scheme, its processes, and outcomes were also studied. The strengths and weaknesses of the scheme were viewed in the light of whether the process of the scheme has been instrumental in achieving the desired objectives. Finally, the outcomes of the scheme, in addition to the objectives were evaluated to deepen the understanding of the impact of the scheme within the Plastic Parks.

6. The Focus Group Discussion (FGD) was a central part of the qualitative data collection used in the evaluation study. The implementing Agencies of Plastic Parks were invited during the process of FGD. This resultantly helped address multiple questions of relevance like direct benefits extended by the scheme, their views to improve its efficacy.

7. The sample was confined to the Plastic Parks set-up under the scheme. The DCPC seeks to set up 10 Plastic Parks in the country, out of which 6 parks have been accorded approval. Out of 6 Plastic Parks under the study, two plastic parks at Paradeep and Tinsukia have been visited 'in person' while other four were visited virtually to assess the progress made over the years. Of these, Plastic Park at Tamot has made significant progress. In contrast, the progress of work at Park at Thiruvallur is extremely slow and requires significant push by the higher level. The other four Parks lie in the middle of the spectrum in terms of their stages of progress and can be operationalised with direction at appropriate level.

8. Actual utilization of funds for setting up of Plastic Parks (including those under COE, separate figures of BE/RE for the two schemes are unavailable) constituted 69% of the total RE during 2016-17 to 2020-21. Percentage utilisation of funds is lower at 49% when actual expenditure during last five years i.e. 2016-17 to 2020-21 is compared against the corresponding BE. Slow progress of construction / operationalisation of Parks under the Scheme explains low level of actual expenditure.

9. To accelerate the pace of construction to fully operationalize all the Parks, it is recommended that a High-Level Empowered Committee (HLEC) be constituted to review the progress of the Plastic Parks at fixed periodicity, preferably once in two months. It is also recommended that the HLEC be empowered to accord all the approvals on the spot, as and when warranted. This will help accelerate the pace of construction and operationalizing of Parks in a Mission mode.

10. Land is a precious natural resource and its sub-optimal utilisation entails huge economic and financial cost to the nation It was found that the creation of infrastructure facilities/its maintenance plan of was not handled by SPV in a professional and timely manner. Credible inbuilt maintenance plan needs to be put in place and be monitored.

11. Information, Education and Communication (IEC) should be used effectively for creating awareness and consequently nudging prospective entrepreneurs to come forward for setting up of their units in the designated Plastic Parks. However, this aspect has not

been harnessed imaginatively, except taking some 'baby steps' like printing of some brochures etc. Hastening and accelerating the progress of construction, ease of according necessary approvals, backed by aggressive wide publicity on advantages of the Park, will attract prospective entrepreneurs.

12. Services of a reputed media agency be hired to design aggressive publicity to attract a good number of prospective entrepreneurs. The channels of publicity should be meticulously chosen. At the same time, suitable measures be taken to ensure 'ease of doing businesses.

13. The plastic parks should be encouraged to start production on a scale that would enable to reap the benefits of the economies of scale. It would let the plastic production of India be recognised at the global level. That would further lead to increased exports, bringing more foreign exchange and investments. The biodegradable plastics and polymers would contribute to eco-friendly and 'Green' economy.

14. To increase productivity and resource use efficiency, utilization of the capacity of domestic units already created needs to be rolled out along with the building of new capacity in the country.

15. The major challenge is the segregation and re-aggregation of plastic waste streams such as packaging waste, including laminated plastic. Pollution caused by plastic waste is tormenting the environment including aquatic resources necessitating urgent action. The setting up the plastic parks would ensure better management of plastic sector. It is pertinent to note that the country is committed to phase out the single-use plastic by 2022.

16. The equity participation of at least 26% in SPV is done by the State Governments or its agencies, providing the necessary assistance for external/ access infrastructure as roads, power, water supply etc. However, the maintenance of plastic parks was found ineffective during the field visits, though the maintenance of assets is to be taken care of by the SPV. The Programme Manager under the scheme of Plastic Parks are expected to assist the department in handling an array of tasks, monitoring the project, release of funds and provide handholding support for making the contact effective and enforceable. The ineffective asset maintenance inhibited social return on investment (SROI).

17. The scheme of setting up parks is expected to impinge on individuals and communities across different social layers in and around the areas surrounding the Parks in terms of infrastructure-related facilities, ranging from roads to electricity to water, sewage, health, employment generation and boosting the local economy which will positively impact the State Gross Domestic Product (SGDP).

18. The cost of land in Plastic parks is stated to be much higher than that in the open market and this is frequently quoted as the cause of disinclination of entrepreneurs not to come

forward for setting up their units in the designated Plastic Parks. However, in reality, this is an 'optical illusion' in the sense that land in the Plastic Parks is fully developed with facilities such as water, sewage, roads, electricity etc. whereas these facilities are usually unavailable on the land offered at cheaper rates outside PPs. If the imputed value of the costs of these developments is taken into account, the cost of land in Plastic Parks may well turn out to be more competitive. Accordingly, it is recommended that the concerned State Industrial Development Corporations/DCPC dispel the 'optical illusion' by prominently publicizing this aspect to attract prospective entrepreneurs.

19. Indian manufacturers are not able to compete in many product categories with the corresponding cheaper imports from different countries. It is imperative to protect the domestic petrochemical sector by suitably imposing tariff rates on the relevant imports. At the same time, the Department (DCPC) should set up a high-level group, comprising representatives from the Ministry of Finance, private sector, and the industry chambers, to review GST applicable to the petrochemicals sector with a view to provide impetus for increased domestic production.

20. The scheme of setting up of Plastic Park is unique of its own kind and does not have convergence with any other scheme, either of the Ministry/ Department itself or another Ministry /Department.

21. The government is in the process to reform the old Petroleum, Chemicals and Petrochemicals Investment Regions (PCPIR) policy notified to attract mega investments to transform India into global chemical manufacturing hub. This will help to realize India's vision of becoming US \$ 5 trillion economy and provide substantial employment to the youth. Setting up of Plastic Park will contribute to this endeavour.

22. Considering the fact that scheme of setting up of Plastic Parks is one of its kinds in terms of its gearing-up support to the ecosystem with requisite state-of-the-art infrastructure, capacity to generate jobs, direct and indirect employment, and has a potential of 'green' growth of the sector, the study recommends continuation of this scheme viz. setting up of Plastic Parks.

Centres of Excellence (CoEs)

23. Considering the intensive use of versatile materials, synthetic polymers, the Centres of Excellence (CoE) were set-up. The driving force for setting up CoE was to address to the need for conservation of natural resources, energy efficiency and the inherent advantages of the material. It was required to augment cost effectiveness by exploring the possibilities of innovative designs. The versatility inherent in use of plastics and polymers led to a paradigm shift in manufacturing from relatively heavier metal/conventional material based products to synthetic products.

24. For setting up of CoEs, the team leader of the centre prepared the proposal and submitted it to the head of the institution. The head of the institution evaluated the proposal and brought out some quality improvements. The proposals were submitted to DCPC thereafter. The DCPC evaluated the proposal through a duly constituted expert panel consisting of the head of the institute, experts in the identified field, CSIR, Department of Science and Technology. The final approval of the COE was accorded by the DCPC at the level of Secretary (C & PC). It is expected that the COEs as a project would work on Public Private Partnership (PPP) and attain international reputation within three years.

25. The Centre-wise broad objectives of COEs are/were: 'Sustainable Green Materials' and 'Bio-engineered Sustainable Polymeric Systems' (CIPET, Bhubaneswar), 'Green Transport Network' (GREET) (CIPET, Chennai), 'Advanced Polymeric Materials' (IIT-D), 'Sustainable Polymers' (SusPol) (IIT-G), 'Process Development, Wastewater Management in Petrochemical Industries' (IIT-Roorkee), 'Sustainable Polymer Industry to research & innovation' and 'Specialty Polymers for Customized' (NCL, Pune). Technically speaking, each CoE has distinct emphasis and objectives.

26. CoEs have contributed to the innovations in the plastic industry. Various sophisticated apparatus and equipment procured with the help of funds released by the DCPC have been put to productive use for research which also helped in registering some patents. The MoUs have been signed with certain International Institutes of repute. The scholars under Doctoral programme associated with the CoEs have been working assiduously to formulate polymer recycling strategies.

27. In essence, the CoEs are acting as competency and development Centres. As per the extant guidelines on funding of COEs, only Rs. 6 crores is granted to each COE and no funds is given after completion of three years. COEs find it difficult to carry on their activities and maintain expensive and sophisticated apparatus/equipment after this period due to constraints of funds. It is recommended that DCPC may meet requisite resource gaps in funds beyond three years in case of those COEs who could demonstrate meritorious work in the form of registration of process/product patents, Organisation of international Conferences, and publication of quality research in international journals during initial period of three years.

28. For long term sustainability of COEs beyond initial period of grants by DCPC, it is recommended that COEs may collaborate with private companies/entrepreneurs to drive full benefits out of it. Industry should be encouraged to invest in COE. The COE should also tie-up with private companies/entrepreneurs to drive full benefits out of their research, intellectual property created and sophisticated apparatus/equipment acquired. Efforts should be made to get some commitment of private players in the relevant industry to use COE on 'pay per use' basis. This will increase productivity and viability of COE.

29. As per the extant guidelines, COE, Delhi is not receiving any grant from DCPC upon completion of 4 years of functioning including one year of extension. COE, Delhi made out a case for financial support to it at least for another three years (beyond the stipulated period of three years as laid down in the guidelines) by DCPC. It is recommended that the existing guidelines be modified to the extent that some grants for maintenance of apparatus/equipments be provided to COEs, even after completion of the initial period of three years.

30. The financial support under the scheme was considered as inadequate and needs to be enhanced considerably. The CoEs required more international tie-ups and collaborations to equip with the emerging technology. The scholars also need to be paid additional contingency to meet their increasing research expenditure.

31. Several innovative processes were invented and registered as patents. The patents related scholarly work were published in internationally reputed journals. Some books, book chapters, articles were published by faculty of the CoEs in national and international journals of high repute, a few of these also received international accolades.

32. The Industry, Academia in the relevant field, Faculty of COEs and Research Scholars have benefitted from the setting-up of Centres of Excellence. The interaction of industry representatives with Researchers at COEs had satisfactory interaction, indicating the effectiveness of the scheme of COEs.

33. CoEs are focusing on developing indigenous and innovative technology which also leaves its footprint on the global technology initiative. In this regard, the Centres have trained a number of Post-Doctoral Fellows, PhD research scholars, M.Tech. Students, who have been under training to carry out high impact scientific research on biodegradable plastic-based technology. With the state-of-the-art research capabilities, excellence in basic science, engineering and proven delivery of applied solutions, the CoEs aim to advance the field of additive manufacturing in India. The Centres also invite interested industrial partners to actively participate for collaborative researches.

34. The awareness aspect of the scheme of the COEs is rather low and the same needs to be scaled-up in several educational institutes and Industry so that research in emerging technology and Patents awarded in the field of Plastics and Polymer Sciences are fully tapped for commercial exploitation by the Industry/Entrepreneurs and academia.

35. National Skills Qualifications Framework (NSQF) compliant basic skill-based education to be imparted amongst the scholars pursuing Ph.D. in biodegradable polymer and plastic areas at CoEs. CIPETs are skilling the youth in polymer technology and helping them to gain employment not only in India but also in foreign countries and thus assisting not just in employment generation, but also bringing remittances to the country. Almost 5 lakhs

student have been trained/skilled by various CIPETs and these centres (CIPETs) cater to the need of youth in getting gainful employment. This will also be helpful in making skilled manpower available to upcoming entrepreneurs

36. A good number of scholars under doctoral programme in COEs have been working assiduously to formulate polymer recycling strategies. COEs need to prioritise registering 'Product patent' which would enhance the value of the Centres and credibility.

37. The scheme of setting up of Centres of Excellence (CoEs) is unique of its own kind and does not have convergence with any other scheme, either of the Ministry/ Department itself or another Ministry /Department.

38. Considering the fact that scheme of setting up of Centres of Excellence (COE) supports the ecosystem with requisite state-of-the-art research facilities, has capacity to create 'intellectual properties', patents, and has potential of 'green' growth of the sector, the study recommends continuation of this scheme viz. setting up of Centres of Excellence (COE).
