

Department of Chemicals and Petrochemicals.

The State Government has already proposed the setting up of the first PCPIR along the coastal stretches in Cuddalore and Nagapattinam districts. A petroleum refinery project, under implementation by Nagarjuna Oil Corporation, a joint venture of TIDCO, will be one of the anchor units in the Cuddalore-Nagapattinam PCPIR. The Nagarjuna refinery is likely to go on stream in 2011.

SUPPORT INFRASTRUCTURE

Setting up the PCPIR in Ramanathapuram would require an initial investment of around Rs. 16,000-crore, to provide support infrastructure such as roads, power and water to attract investment from the private sector, according to government officials. An area of about 25,783 hectares along the coastal stretch of Thiruvadanai taluk has been identified for the PCPIR in Ramanathapuram.

According to the Government policy, a PCPIR would be a specifically delineated region, with an area of over 250-sq. km., planned for the establishment of manufacturing facilities for domestic and exported production in petroleum, chemicals and petrochemicals, along with the associated services and infrastructure. A PCPIR would be a combination of production units, public utilities, logistics, environmental protection mechanisms and residential areas. Each PCPIR would have a refinery/petrochemical feedstock company as an anchor tenant. The internal infrastructure of the PCPIR will be built and managed by a developer or a group of co-developers.

INDIA OFFERS STAKES IN PETROCHEMICAL PLANTS TO KUWAIT

India has offered Kuwait a stake in ONGC's Rs. 12,440-crore petrochemical plant at Dahej in Gujarat and IOC's proposed chemical

unit at Paradip. The oil-rich nation's national oil firm Kuwait Petroleum Corp (KPC) has time and again spurned offers for stake in Indian refinery projects as it, like its Saudi counterpart Saudi Aramco, wanted auto fuel distribution rights – a proposition not possible considering only state-owned firms qualify for government subsidies.

Petroleum Minister Mr. Murli Deora recently met his Kuwaiti counterpart Sheikh Ahmad Al-Abdullah Al-Ahmad Al-Sabah on the sidelines of the XII International Energy Forum in Mexico and offered a stake in the mega petrochemical plants being built on the west and

east coast, said Mr. Sunil Jain, Joint Secretary, Petroleum Ministry.

PARTNERSHIP OPPORTUNITIES

ONGC is keen to get an overseas major who can either bring technology or marketing support for its Dahej plant that would be built by February 2012. ONGC holds 26% stake in ONGC Petro-additions, the special purpose vehicle (SPV) formed for setting up the chemical complex at the Dahej special economic zone (SEZ). Five percent stake is with the Gujarat State Petroleum Corp (GSPC) and state-owned gas utility Gail India has 19%. About 20-25% stake is likely to be offered to a foreign company.

The Dahej petrochemical complex would comprise of global scale cracker and downstream polymer plants. OPaL will use C2-C3 (ethane and propane) compounds extracted from imported liquefied natural gas (LNG) to make polymers. ONGC is looking for someone who can sell the polymers the plant makes. KPC was also offered a stake in the 1-mtpa petrochemical plant that was split from the Rs. 29,777-crores refinery at Paradip for building in future. The chemical plant would be built after the 15-mtpa refinery is commissioned in 2012. IOC has been looking at equity partners in companies like Saudi Aramco and Kuwait Petroleum, who can supply crude oil to the Paradip refinery project in Orissa. However, since the two declined offers, the petrochemical plant is now being offered.

NCL SCIENTISTS SHOWCASE TECHNOLOGIES DEVELOPED FOR CHEMICALS

The Director General of CSIR, Prof. Samir Brahmachari, inaugurated an exhibition 'Touching Lives in a Million Forms' which was organised at the NCL Innovation Park, adjoining the NCL campus in Pune on 1st April. The exhibition showcased a number of technologies from the different

AP TOPS IN PHARMA MANUFACTURING

The profitability of the pharmaceutical industry in South India has improved by 12% in the first half of the current fiscal compared with the year-ago period, according to a study by Confederation of Indian Industry (CII) – Southern Region. The improved sales, a strong 38.5% increase in operating profit driven by fall in power and fuel costs, among others were behind this improved profitability, the study said. Higher sales and fall in net interest further improved net profit by 47%, the report added. The study, which looked at performance of 39 companies involved in the drugs and pharmaceuticals manufacturing in the CII southern region, indicated that Karnataka had a strong biotechnology industry, while Tamil Nadu and Puducherry had strengths in formulations. Andhra Pradesh, as leading manufacturer of all southern States, had companies in all the three segments – bulk drugs, formulations and biotechnology. "Kerala has a strong ayurveda products base, but the presence of pharmaceuticals industry in the State is small and limited to plants of companies headquartered elsewhere," the study says.

laboratories under the CSIR-fold, especially from NCL.

EPICHLOROHYDRIN PROCESS

The Chemical Engineering and Process Development Division of NCL showcased its technology for the manufacture of epichlorohydrin – a key raw material for epoxy resins – using a catalytic route that is superior in terms consumption of raw materials and utilities. According to scientists at NCL, the TS-1 catalyst that is at the heart of the process eliminates the use of lime or caustic that is integral to the traditional process; reduces generation of solid effluents; and the low temperature and atmospheric pressure conditions permits long life of the catalyst. The technology has been commercialized by the Aditya Birla Chemicals at their plant in Thailand.

CONTINUOUS BIODIESEL PROCESS

NCL has also developed a solid recyclable catalyst for biodiesel production, which can be used for converting a range of oils including karanja, jatropha, unrefined rubber seed oil (containing up to 20% free fatty acids) and used oils. The continuous process, which has been optimized using this catalyst is efficient (95-98% conversion) and yields a high purity glycerol (98% purity), in contrast to the conventional process using alkali methoxide catalyst. The catalyst and the process patents for this process have been licensed to Benefuel Inc (USA) for commercialization.

INTELLECTUAL PROPERTY ON VINYL ESTERS

Also on display were platform technologies for manufacturing vinyl esters such as vinyl benzoate and vinyl 2-ethyl-hexanoate. NCL's technology development efforts in this area have focused on reuse and recycle of the palladium complex catalyst system, which is crucial to the process economics. According to Dr. Prashant Barve, Head, Process



Development and Engineering Division, NCL, the technology, which has been demonstrated at a scale of 1-tpd, has been successfully commercialized and is protected by two global patents. "The process developed by us is a zero effluent process, with total recycle and reuse of the catalyst. It permits large turnover of 20-25 kg of product per kg of the catalyst."

The technology has been deployed at an Indian company, which in turn, does toll manufacturing for an American corporation.

LACTIC ACID: CUSP OF COMMERCIALISATION

NCL's efforts to commercialise technology for manufacture of L(+)-lactic acid from sugarcane juice was also on display at the exhibition.

Lactic acid is an important monomer for preparation of polylactic acid (PLA), a biodegradable plastic, and also finds use in the manufacture in the food processing industry. The unique technology that has been developed at NCL produces 99.8% pure lactic acid using a strain of lactobacillus. The fermentation technology has been demonstrated in an 8,000-litres industrial fermenter, while the technology for downstream separation and purification has been successfully developed in at a scale of 2-kg/hour.

According to Dr. Sanjay Nene, Head, Biochemical Engineering Unit, Chemical Engineering Process Development Division, NCL, a 1-tpd (ton per day) unit has been installed at Godavari Sugar Mills Ltd. at Sameerwadi (Karnataka) and the eventual plan is to scale this up to commercial scale. "The Chinese are offering lactic acid at Rs. 50 per kg. With our technology, we are

confident that we can match these prices."

CONTRIBUTION TO ATOMIC ENERGY PROGRAM

NCL's contribution to the nation's atomic energy program was also highlighted in the exhibition. The laboratory played a key role in enabling development of indigenous technology for a key raw material used in uranium enrichment. The relevance of the technology can be gauged from the fact that it is 'restricted technology' and not available for licensing. The Heavy Water Board, under the Department of Atomic Energy, has put up a 40-kg per batch plant at Tuticorin plant for this extractant based on NCL's technology. The plant has been successfully operating and produces the desired purity of the product, starting from low grade industrial chemicals as raw materials.

APPROPRIATE TECHNOLOGY FOR WATER PURIFICATION

The Polymer Science and Engineering Division of NCL presented its development of an ultrafiltration membrane for purification of drinking water, which has been licensed to Membrane Filters India Ltd. (Pune).

The technology is unique in the sense that it can be operated using a manually operated pump, with no need for electricity, unlike other more expensive options. This makes it easily adaptable to operations in remote areas, where availability of potable water and electrical power is not reliable. The filtration system is also suitable for water purification in domestic applications and public places such as schools, colleges, bus stands etc.