

**ANNUAL
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Centre for High Technology
Ministry of Petroleum & Natural Gas

At a Glance

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From the desk of the Executive Director



Dear Esteemed Readers,

Greetings!!

The whole world is presently witnessing an unprecedented COVID-19 Pandemic which has inflicted millions and costed many lives. With the advent of this pandemic, mankind throughout the world and India in particular is facing a period of uncertainties & fear. All walks of lives including our business sector have been heavily impacted. Amidst great concern for the future business, I still am of the firm belief that these testing times truly help us all in correcting our perspectives and consolidating our strengths. It must therefore be our endeavor to align our efforts to revisit our core business objectives, re-establish corrected plans & projections and continue to move forward. Hope is what we all must possess at these difficult times. Business shall definitely bounce back but all precautions must be taken at workplace to keep the pandemic at bay.

In this Annual report, I am pleased to recapitulate the many activities & initiatives undertaken in the year that has gone by. At Centre for High Technology, year 2019-20 witnessed successful completions of many initiatives undertaken for the first time viz. Study on Water Consumption Reduction in refineries, Demand side steam management Study, Inter Laboratory Correlation Programme and Rollout of BS-VI implementation w.e.f. 1st April 2020, completion of the Performance Benchmarking Study pertaining to the PSU Pipelines – 2018 cycle by M/s Solomon Associates, Evaluation of proposals received under Pradhan Mantri JI-VAN Yojana as CHT is the nodal agency, assisting BEE in finalising the achievement of energy reduction against targets set for Refineries under PAT, Feasibility Study for production of ethanol using waste gases through M/s Lanza Tech and Feasibility & Business Model for Reference Fuel through EIL & IOCL-R&D, etc.

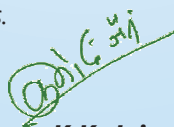
In pursuit of our major objective of Information & Knowledge Dissemination, 24th Refining & Petrochemical Technology Meet (RPTM), was successfully organised in association with Mangalore Refinery & Petrochemicals Ltd., during 19-21 January 2020 at Bangalore International Exhibition Centre, Bengaluru with the theme "Driving Refining & Petrochemicals towards Sustenance". The event got overwhelming response with record participation of around 1500 delegates from India and abroad, signifying growing importance and utility of the event. There were 80 Technical Oral Presentations, 78 Technical Poster presentations and 17 Exhibition Stalls. Also, in order to share best operational practices, 7 nos. Activity Committee Meetings were held during the year in various critical areas / technologies in Refining & Pipelines operations.

Annual awards were presented by the Secretary, PNG during the RPTM to the winners for Refinery Performance Improvement Award, Saksham and Innovation Awards for the year 2018-19. Swachhta Pakhwada Awards 2019 & Inter-Refinery Swachhata Ranking Awards 2018-19 were presented by Shri Dharmendra Pradhan, Hon'ble Minister, Ministry of Petroleum & Natural Gas and Steel, Govt. of India during September 2019. I congratulate all the prize winners.

Like every year, January 2020 also started off with the Saksham Audit through out the country, from 16th to 31st January 2020. CHT recently participated in a meeting held during February 2020 along with Oil Industry, American Chamber of Commerce in India (AMCHAM) and Ministry wherein technologies focusing on sustainability, environmental challenges were considered for possible areas of cooperation. CHT also participated in the COP25 conference held in December 2019 in Madrid, Spain.

Besides these, various important Governing Council Meetings, Executive Committee Meetings, Scientific Advisory Committee Meetings, Working Group Meetings were held during the year. I am glad to share that CHT has successfully been accredited with ISO 9001-2015 Management system certificate in June 2019 for a period of three years. CAG Compliance Audit was also successfully carried out at CHT during March 2020.

I would like to thank the patronage and guidance received from MoP&NG and the constant support and co-operation received from Indian refining sector. In the end, I am signing off with an appeal to all for adopting optimism which will help renew our energies in rededicating ourselves to our work goals.



K.K. Jain
Executive Director



Shri Dharmendra Pradhan, Hon'ble Minister of Petroleum & Natural Gas and Steel, Govt. of India, presented the Awards for Swachhata Pakhwada & Inter-Refinery Competitions on Swachhata Initiatives

Shri Dharmendra Pradhan, Hon'ble Minister of Petroleum and Natural Gas & Steel, Govt. of India, presented the Swachhata Pakhwada Awards - 2019 on 16th Sept. 2019 in presence of senior Ministry officials, to BPCL (1st Prize), ONGC Limited (2nd Prize), IOCL (3rd Prize) and PPAC (highly commendable). Swachhata Pakhwada Fortnight allotted to MoP&NG by Ministry of Drinking Water & Sanitation (MoDW&S) was marked from 1-15 July, 2019. To rank CPSEs / attached Offices under MoP&NG, Swachhata Pakhwada Awards are awarded for exemplary performance during the Swachhata Pakhwada Fortnight not only within the organisation but also outside the organisation w.r.t. innovation / creative activities & initiatives, Infrastructure, Waste Segregation & Disposals, Tree Plantation, Cleanliness Drives etc.



Hon'ble Minister also presented Inter-Refinery Swachhata Ranking Awards 2018-19 to Mumbai Refinery, BPCL (1st Prize), jointly to Panipat Refinery, IOCL & Bhatinda Refinery, HMEL (2nd Prize) and Bina Refinery, BORL (3rd Prize). Swachhata Ranking of CPSE Refineries was initiated by MoP&NG in 2017 based on Swachhata Index developed by Centre for High Technology. Total 18 refineries were divided into three Groups and the top two refineries from each group were shortlisted for final round.

Governing Council (GC) Meetings

The 37th Meeting of the Governing Council of CHT was held under the Chairmanship of Dr. M.M. Kutty, Secretary, P&NG, Govt. of India on 8th August 2019 at MoP&NG, Shastri Bhawan, New Delhi. The meeting was attended by GC members from MoP&NG, viz., JS (M), JS (R), Director (IFD), DS (R), and Secretary, OI&B; Chairman, IOCL; CMD – BPCL / HPCL / EIL, MD – MRPL / CPCL / NRL, Director – EIL / GAIL / IIP.

The 38th Meeting of the Governing Council of CHT

was held under the Chairmanship of Dr. M.M. Kutty, Secretary, P&NG on 27th December 2019 at MoP&NG, Shastri Bhawan, New Delhi. The meeting was attended by GC members from MoP&NG, viz., JS (E & CVO), JS (GP & M), JS (R), and Secretary, OI&B; C&MD, HPCL; Dir (R), BPCL; Dir (R), IOCL; MD, CPCL; MD, NRL; Dir (T), EIL; Dir (BD), GAIL; and ED (R&D), GAIL. During the meetings, Shri K.K. Jain, ED-CHT, made a detailed presentation on the progress and status of various activities / initiatives taken-up by CHT. The presentations covered the



following.

- Refinery Performance Improvement Programme (RPIP) of PSU Refineries
- Performance Benchmarking of PSU Refineries & Pipelines
- MBN roadmap till 2030
- Maximization of Grid Power & Green Power intake at PSU Refineries
- Development of Water Consumption Norms and Reduction of Water Footprint

- Strategy for implementation of BS-VI fuel supply
- Activities of Scientific Advisory Committee
- Pradhan Mantri JI-VAN Yojana & High Level Committee (HLC) Recommendations related to CHT.

GC accorded approval for the two projects for funding under HCF & CHT budget. GC was briefed about other activities/projects approved by Executive Committee of CHT. One proposal by IOCL (R&D) for funding under HCF was also discussed. GC also approved the CHT budget.

24th Refining & Petrochemicals Technology Meet

The 24th Refining & Petrochemicals Technology Meet (RPTM) was organized by Centre for High Technology (CHT) in association with Mangalore Refinery & Petrochemicals Limited (MRPL) under the aegis of Ministry of Petroleum & Natural Gas, Government of India during 19-21 January 2020 at Bangalore International Exhibition Centre (BIEC), Bengaluru. The theme of the Meet was "Driving Refining & Petrochemicals towards Sustenance".

Dr. M.M. Kutty, Secretary, P&NG inaugurated the Meet in the august presence of Shri Sunil Kumar, Joint Secretary (R), MoP&NG and senior officials of the Industry. The event got overwhelming response with record participation of around 1500 delegates / speakers / senior executives from oil Industry, leading Global Technology / Service Providers, Catalyst Manufacturers, R&D institutes signifying growing importance and utility of the event. CHT would like to thank for the patronage and guidance received from MoP&NG and the Indian refining sector.



(Dignitaries on the dias during Inaugural session of 24th RPTM from L to R) Shri M. Venkatesh, MD, MRPL; Shri Sanjiv Singh, Chairman, IOCL; Dr. M.M. Kutty, Secretary, P&NG; Dr. Anil Kakodkar, Chairman, SAC; Shri Sunil Kumar, Joint Secretary (Refineries), MoP&NG; Shri M.K. Surana, C&MD, HPCL and Shri K.K. Jain, ED, CHT

A total of 80 Technical Papers, including 47 papers from Global leaders in Refining & Petrochemical Technology such as Shell, UOP, Axens, Chevron, CB&I, Solomon, ExxonMobil, KBR, KBC, Grace, BASF, Johnson & Matthey, Mcdermott, LanzaTech etc., spread across 15 Technical Sessions were presented along with papers from Refineries and Petrochemical companies. Three Poster Sessions were organized during the three days of the Meet covering 78 poster papers including 16 papers from foreign licensors. Apart from these, 17 exhibition stalls were put up by oil companies, consultants and vendors for display of their technology, product and services.

Technical sessions covered the entire spectrum of downstream Petroleum and Petrochemicals sector viz. 'Refining and Petrochemicals outlook', 'Driving Refining & Petrochemicals towards Sustenance', 'Moving towards Sustainable future', 'Gasification



Lighting of the ceremonial lamp by Dr. M.M. Kutty, Secretary, P&NG in the presence of Shri Sunil Kumar, Joint Secretary (Refineries), MoP&NG and other dignitaries from the Oil Industry.

towards Sustainability, 'Advances in Refining Technology', 'Hydrogen Economy – Road to Sustainable Future', 'Biofuels and Alternatives', 'IR 4.0: Digital Revolution', 'Innovation in Refineries-Profit Improvement', 'Environmental – Best Operational Practices', 'Catalysts: Next Generation', 'Operational Risk Management', etc.



Shri M. Venkatesh, MD, MRPL, delivering the Welcome Address

Shri M. Venkatesh, MD, MRPL while welcoming the participants of the 24th RPTM reminded that any business requires survival, sustenance and growth.

Dr. Anil Kakodkar, Chairman, Scientific Advisory Committee, in his Keynote address, indicated that the choice of energy system should be largely driven by domestic resources like solar, biomass, wind and clean coal technologies using domestic high ash coals.



Dr. Anil Kakodkar, Chairman, SAC, presenting the Keynote address during the 24th RPTM

As a long term sustainability and energy security, we need to continuously follow the developments worldwide in the arena of energy transition. As energy systems are capital intensive and take time to develop, India can directly leapfrog to energy systems of future, which are sustainable and also specific to our conditions so as to cut down repeat costs involved in development of energy systems. Such changes require framing of policy directions and Govt. support in R&D and fiscal incentives so as to promote changes in the intended direction.

Shri Sunil Kumar, Joint Secretary (R), MoP&NG, in his Theme address put forth that India's share in energy will increase at the rate of 4.2% a year which shall reach 11% of the global demand and is likely to account for 25% rise in global energy demand by 2040.



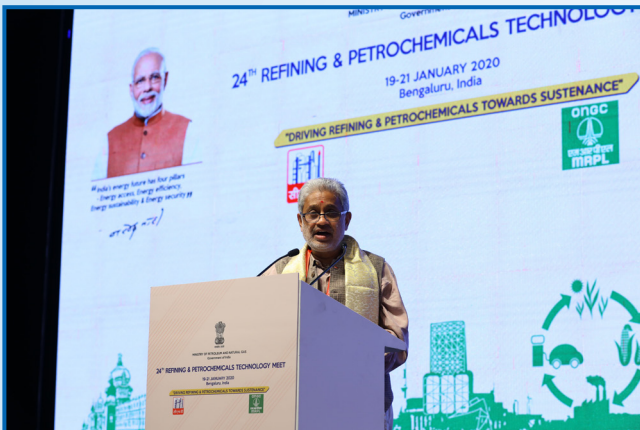
Shri Sunil Kumar, Joint Secretary (R), MoP&NG presenting the Theme address during 24th RPTM

Oil will continue to play important role in primary Energy Mix. India needs a combination of cleaner diesel & Petrol, CNG, Bio-fuels, Hydrogen & Electric. India's oil demand is projected to grow @ 3% till 2040 and therefore India needs to add Refining Capacity. In present environment, Refineries need to grow in their core business as well as integrate with Petrochemicals and Bio-Refineries, need to embrace new technologies and continuously follow the shift in future energy order and disruptions.



Dr. M.M. Kutty, Secretary, P&NG, in his Inaugural address, stressed that India is at a critical juncture faced with rapidly transforming energy landscape bringing in irreversible changes. The world is already seeing the impact of changing climate and is taking policy decisions to reduce Global warming. India has committed to reduce emissions level by 33-35% per GDP by 2030 over the base year of 2005 with renewable energy and energy efficiency improvements and policy interventions.

in petrol and 5% biodiesel blending in diesel by 2030. Govt. is giving impetus to advanced biofuels such as 2G ethanol, and announced PM JI-VAN Yojana Scheme in March, 2019 to provide financial support in the form of VGF to Commercial as well as demonstration plants. He said that the Theme of the Meet 'Driving Refining and Petrochemicals towards Sustenance' is very relevant and pertinent in present times.



Dr. M.M. Kutty, Secretary, P&NG, delivering Inaugural speech during the 24th RPTM

India is committed to improve access of energy to its population in a time bound manner and is facing triple challenges of energy demand, security and sustainability. Oil and Gas Sector is a major contributor to Indian economy and accounts for 36% share of energy basket. India is the 3rd largest consumer of crude and petroleum products and has 4th largest refining capacity & accounts for 5.1% of world oil consumption. Indian PSU Refineries are consistently achieving 100% capacity utilization and have reduced Energy Intensity Index (EII) by 17% since 2010 which is three times of Global average. Diversifying into Petrochemicals mitigates the risk of uncertainty in traditional fuels market. India has set an ambitious target of increasing share of natural gas in its primary mix from 6% to 15% by 2030. Considering Air Pollution, LPG was supplied to 80 million households through Prime Minister Ujjwala Scheme. Govt. decided to leapfrog from BS-IV fuel to BS-VI fuel in 2020 ahead of earlier plan of 2024. Govt. launched National Bio-fuel Policy in 2018. Key policy decisions were taken to promote ethanol blending programs to target 20% of ethanol blending



Release of Compendium by Secretary, P&NG and other dignitaries



Shri K.K. Jain, ED, CHT, presenting 'Vote of thanks' for the Inaugural Session of the 24th RPTM

Vote of thanks was presented by Shri K.K. Jain, Executive Director, Centre for High Technology.

Poster Gallery and Exhibition Stalls

Dr. M.M. Kutty, Secretary, P&NG, also inaugurated the Poster and Exhibition gallery. An exhibition showcasing a wide range of innovative technologies, products and services by PSU / R&D Units of MRPL, BPCL, IOCL/EIL and HPCL, reputed catalyst vendors, consultants and equipment manufacturers was organised.

Dr. Kutty showed keen interest while visiting the stalls and held interaction with the presenters.



Inauguration of Exhibition Gallery and Poster by Dr. M.M. Kutty, Secretary, P&NG

Glimpses of Award Function at 24th RPTM

During the RPTM, Refinery Performance Improvement Award 2018-19, Saksham Award 2019 and Innovation Awards for 2018-19 were presented by Dr. M.M. Kutty, Secretary, P&NG in the in the august presence of Shri

Sunil Kumar, Joint Secretary (R), MoP&NG, Dr. Anil Kakodkar, Chairman, SAC, Shri Sanjiv Singh, Chairman, IOCL, Shri M. Venkatesh, MD, MRPL, Shri M.K. Surana, C&MD, HPCL and Shri K.K. Jain, ED, CHT



Team IOCL Paradip Refinery receiving the first prize in Refinery Performance Improvement Award 2018-19



Team IOCL R&D receiving the prize in the category "Best Indigenous Developed Technology"



Team BPCL-Kochi Refinery receiving the second prize in Refinery Performance Improvement Award 2018-19



Team BPCL-Kochi Refinery receiving the prize in the category "Best Innovation in Refinery"



Team IOCL Guwahati Refinery receiving the Saksham Award 2019 for Best Reduction in Steam Leak



Team BPCL-Mumbai Refinery receiving the Commendation certificate in the category "Best Innovation in Refinery"



Team BPC R&D Centre receiving the prize in the category "Best Innovation in R&D Institute"



Team BPC R&D Centre receiving the commendation certificate in the category "Best Innovation in R&D Institute"

Valedictory Session

The 24th RPTM concluded with Vote of Thanks by Shri K.K. Jain, ED, CHT. The RPTM was a great knowledge sharing and learning experience for the delegates as it dealt with various aspects of global energy scenario,

Refining and Petrochemicals integration, process optimization & upgradation, value added products, innovative solutions to create and add value from the existing assets etc.

"India accords topmost importance to the Oil and Gas sector. We are implementing pioneering reforms in the sector aimed at fulfilling our needs and at the same time working towards creating a sustainable planet."

- Narendra Modi
Hon'ble Prime Minister of India

Takeaways from the 24th RPTM

Following are the key highlights/ takeaways from the RPTM:

1. Energy Transition and Outlook

In future, use of electricity is expected to be pervasive in all applications. Fortunately electricity can be produced using all renewables sources like solar, wind, hydro, nuclear or biomass which is abundantly available in country. However, electricity from these sources is variable and currently available battery systems are not so efficient, bulky and require scarce Lithium.

Hydrogen provides solution to these problems. Hydrogen can be stored without loss (unlike battery system) and can be converted back to electricity using fuel cells quite efficiently. Hydrogen systems can also eliminate the need for back up fossil based electricity generation systems, which are required to run intermittently and inefficiently to balance electricity availability from renewable sources. Stationary fuel cells are quiet and have very low emissions, so they can be installed nearly anywhere. These systems take up much less space and provide power on-site directly to customers, without the efficiency losses of long-range grid transmission.

Compared to EV, Hydrogen Fuel cell vehicles use small battery as electricity is produced on board. This also solves the problem of bulky battery and range associated with EVs. The EVs are thus a good solution for short distance city life usage; however, for long distance transport sector, heavy duty vehicles and distributed industrial power generation, hydrogen fuel may be the key in future. However, there is a need to develop technologies to reduce delivered H₂ Cost including production, compression, bottling and transport to end user, Fuel cell technology as well as steam electrolysis.

2. Future Refining

Currently, Delayed Coker is used by Indian refining industry as a major bottom upgradation technology, which produces low value petcoke.

Refineries should look for alternative resid upgradation pathways including pitch gasification.

In future, Gasoline fuel quality improvement will be for RON boost to 95 and Benzene reduction from 1.0% to 0.6% volume.

3. Petrochemicals

The demand for oil in the transportation sector is expected to peak in the mid-2030s due to energy transition particularly from transportation sector. But the demand for Petrochemicals continues to grow, supported by increasing urbanisation and improving standards of living due to present lower per capita consumption compared to world average. Thus, Integration of Refining with Petrochemicals & Ammonia is becoming more of a necessity rather than a choice due to changing market dynamics, the need to sustain profitability in the long run. There are several advantages in integrating refineries; valorisation of stranded streams viz. LPG / Naphtha from both Refinery and Petrochemical unit, integrated management of utilities and hydrogen etc. The integration provides hedge against cyclical profitability and also insulate refineries from disruption due to substitution of refinery produced fuels by other forms of energy.

Petrochemical integration is becoming the standard for new world scale refinery investments and in future it is possible some refineries produce only Petrochemicals

4. Alternative Fuels

World over, the share of renewable energy is progressively increasing; and it will continue to increase till it replaces fossils fuels to a level of global sustainability. In the interim period, Oil followed by increased share of gas will continue to play an important role in primary Energy Mix.

International Civil Aviation Organisation (ICAO)'s CORSIA, the Carbon Offsetting and Reduction Scheme for International Aviation, which deals with the increase in total CO₂ emissions from



international aviation above 2020 levels obligates all carriers to report their CO₂ emissions on an annual basis as of 1st January 2019 and from 2027, all international flights will be subject to offsetting requirements.

There are issues in commercial viability of 2G projects even with VGF as per international experience at present. There is significant potential for decentralized production of Compressed Biogas (CBG) from biomass/ MSW to augment gas supply particularly in rural areas where demand for cooking gas is expected to grow substantially. Therefore we need to adopt a holistic strategy on renewable energy by pursuing policy that is biomass feedstock agnostic as well as promote all biofuels on equal footing based on market dynamics and viability in medium and long term. In view of above, special thrust is needed to promote Bio Jet fuels and CBG & other drop in fuels based on economic merits.

India will have to develop infrastructure for import of alternative feed stocks like ethane, LNG, condensate, etc.

There is a need to put thrust on Gasification Technology, which allows diversification to alternative feedstocks like biomass, coal/ petcoke, MSW, plastic waste, etc. The Gasification also enables diversification to other businesses, as syn gas, the product of Gasification, can be used in production of hydrogen, power, Petrochemicals, urea or simply as fuel. We need to develop and demonstrate country specific clean coal technologies, including surface and underground coal gasification.

5. Sustainability

Hydrogen is emerging as sustainable energy solution in the long run. Many advanced countries like Japan, South Korea, etc. have already drawn programme to usher in to hydrogen economy by 2040. In future, with falling prices of renewable electricity, the electrolysis route would be viable.

6. Innovation

For increasing efficiency and to cut down cost of utilities as well capital investment in the

Petrochemical complexes, we need to promote establishment of large utilities companies having world class capacity to provide utilities and infrastructure at very competitive price under plug and play system.

There is a nexus between energy and water, as production of one is dependent on the other. India has 18% of world population with only 5% of water availability, vigorous efforts are required to reduce water footprint in the industrial application. Refining Industry is water intensive and many refineries are facing severe shortage of fresh water. The shortage of fresh water to refineries particularly land locked refineries is expected to increase and refineries need substantial work to reorganize their water input through utilization of city sewage water or zero discharge. Further, as Farming sector use almost 80% of our water, there is need to make our farming water efficient.

Several new ideas were presented on improvement in energy efficiency, environment, operational reliability, water conservation and catalyst systems.

7. Digitalisation

Digital transformation of businesses and operational processes can boost cost efficiency of the core business platform via Reduced Operational Risks, connected Operations & Insights, One Dashboard (Crude to Market), Pro-active Decision Making and Anywhere & Anytime Operations. In a rapidly transforming industrial world supported by digitalisation, we need to enable workforce with digital-enhanced skills and transform mind set towards machine. If well executed, it will enable producers to gain the ability to quickly respond to changes in the internal and external environment. With the emergence of Industrial Internet of Things (IIoT), control systems have become even more complicated, and as complication and connectivity increase, so will cyber security risks. There must be a balance between adding intelligence, securing devices and protecting data.

Industry need to adopt pragmatic approaches and policies in area of project execution including modular approach, digital interventions, etc.

Executive Committee (EC) Meetings & Working Group Meeting

The 27th Meeting of the Executive Committee of CHT was held under the Chairmanship of Shri Sunil Kumar, Joint Secretary (Refineries), MoP&NG on 9th July 2019 at Conference Room, MoP&NG, Shastri Bhawan, New Delhi. The meeting was attended by Director (Refineries) of IOCL, BPCL & HPCL; MDs of CPCL, MRPL & NRL; Director (T), EIL; ED (Trg, R&D and Start-up), GAIL; Dy. Chief F&AO, OIIB and senior officials from IOCL, BPCL, HPCL, EIL, CPCL, MRPL & NRL. During the meeting, detailed review was held on the progress and status of major activities of CHT including Refinery Performance Improvement Programme of 9 PSU Refineries, Development of Water Consumption Norms and Reduction of Water Footprint for 13 PSU Refineries, Performance Benchmarking Study of PSU refineries for 2018 Cycle, Benchmarking Study of PSU Refineries for Calendar Year 2020 onwards, Performance Benchmarking Study for Pipelines - 2018 Cycle, Study on Reduction of Steam Network at Refineries through M/s KBC and Lab Correlation Programme.

EC approved proposal on Feasibility Study for Ethanol Production from Off-gases; Proposal for Reference Fuel: EIL/IOC R&D and one R&D project (Design & Development of Fibre Optic gas Sensors and System for Petroleum Industry: CSIO/BPCL). EC recommended following items for approval by Governing Council: CHT Budget; appointment of Auditors and adoption of annual accounts of CHT; one proposal of IOC R&D (Compact Reformer Unit for producing H-CNG and trials at Rajghat Bus Depot and Organization of 24th Refining & Petrochemical Technology Meet (RPTM). EC also reviewed R&D projects funded by CHT.

The 20th Working Group Meeting was held under the Chairmanship of Shri Sunil Kumar, Joint Secretary (Refineries), MoP&NG on 9th July 2019 at Shastri Bhawan, New Delhi. The meeting was attended by Director (Refineries) of IOCL, BPCL & HPCL; MDs of CPCL, MRPL & NRL; Director (T), EIL; and senior officials from IOCL, BPCL, HPCL, EIL, CPCL, MRPL & NRL. The data on Physical, Financial & Project parameter for all

the PSU Refineries is collected every month and the consolidated information covering Actual performance vis-à-vis Targets along with reasons for deviation is presented during the review meeting chaired by JS(R), MoP&NG. During the meeting, detailed deliberation was done on Review of Refinery Performance; Status on maximisation of Grid Power intake at PSU Refineries; Incentivizing refinery for maximizing green power in MBN calculation; Improvement in Project Execution Strategy; MBN Roadmap-2030; Sharing of Streams (Loss due to dual tax regime); Catalyst Manufacturing Unit in India and PSU Refineries Capacity Expansion Projects (Major issues).

Following action items were presented during EC and WGM Meetings on 9th July 2019:

1. Feasibility Study for Production of Ethanol from Off-gases: Ethanol is being produced from Edible source (1st Generation) as byproduct and its availability is limited. Second generation ethanol can be produced from bio mass and research studies to improve yield and economics are on. Alternately the mixtures of CO & H₂ from industrial waste gases can be used to produce Ethanol using a bio-catalyst based technology. In Refinery, similar stream is Hydrogen Unit PSA Off-Gases containing CO+H₂+CO₂. M/s Lanza Tech is a global leader in gas fermentation technology. Based on Ethanol potential, six refineries have been identified based on detailed study and development of business case for ethanol production. Site suitability to be explored.
2. EIL/IOC R&D Proposal for Reference Fuel (Make in India initiative): Reference fuels (currently imported from Germany) are used by OEMs for testing their vehicles besides first fill. Specification of reference fuel is more stringent than Commercial fuel and with narrow specification and also pre-blended with ethanol and biodiesel. The proposal envisages selecting right blend stream available from PSU refineries to meet target quality. EIL and IOC R&D will carry out the study jointly.



3. Strategy for implementation of BS-VI fuel supply: Readiness for supply of BS-VI fuels were discussed during JS(R) review meeting on 12th June 2019. Refineries are in the process of upgrading the existing units, addition of new units to meet the target implementation all India basis by 1st April 2020.
4. Supply of Grade A (1000 ppm S) Kerosene: MoP&NG vide letter dated 16th October 2018 communicated to Industry that all refineries will supply Grade-A Kerosene (1000 ppm Sulphur) w.e.f. 1.4.2020. Industry is ready for production from refineries w.e.f. 01.04.2020. However, considering the low allocation and limited tankage, further 3 months to be required for dilution.
5. CHT initiated an Inter - Laboratory Comparison Programme for better co-ordination and reproducibility of product (MS, ATF & HSD) quality at Industry level. The program was done at two levels (Inter and Intra ones). All parameters tested were within acceptable deviation limit. Activity shall be repeated for Sulphur in BS-VI scenario.

The 28th Executive Committee Meeting (EC) was held under the Chairmanship of Shri Sunil Kumar, Joint Secretary (R), MoP&NG on 22nd Nov., 2019 at PCRA, New

Delhi. Shri K.K. Jain, Executive Director, CHT welcomed the Chairman and other members of EC. ED, CHT also welcomed Shri S.M. Vaidya, Dir (R) IOCL as member of EC. Thereafter, CHT made a detailed presentation on the status of Refinery Performance and Improvement Programme (RPIP) of PSU Refineries, Development of Water Consumption Norms and reduction of Water footprint, Performance Benchmarking Study of PSU refineries for 2018 cycle and plan for 2020, Performance Benchmarking Study for Pipelines – 2018, Reduction of Steam Network at refineries, Feasibility Study by M/s LanzaTech, Pradhan Mantri JI-VAN Yojana, on-going R&D projects, Catalyst Manufacturing Unit in India, CHT Budget etc.

The 21st Working Group Meeting (WGM) was held under the Chairmanship of Shri Sunil Kumar, Joint Secretary (R), MoP&NG on 22nd Nov., 2019 at PCRA, New Delhi. CHT made a detailed presentation on the Agenda Items viz. Review of BS-VI projects, Refinery Performance (Crude T'put, MBN, Operational Availability, Distillate), Status of grid power intake in PSU refineries along with future plans, Improvement in Project Execution Strategy by EIL, Sharing of Streams: Loss due to dual tax regime, Catalyst Manufacturing Unit in India etc.

Readiness of OMCs in BS-VI implementation

A follow-up meeting was held on 27 September 2019 at CHT involving representatives from Refining and Marketing. Shri K.K. Jain, Executive Director, CHT welcomed Shri Sushil Williams, Deputy Secretary (Refineries), MoP&NG and the representatives from the industry and emphasized on timely rollout of BS-VI fuels in the country.

A detailed review of BS-VI projects at PSU refineries along with readiness to supply BS-VI Gasoline and Diesel was done during 21st meeting of Working Group on 22nd November 2019. Refineries had planned up gradation of supply network from refinery up to marketing locations and subsequently till filling stations and the same was executed well before the rollout date 1st April 2020.

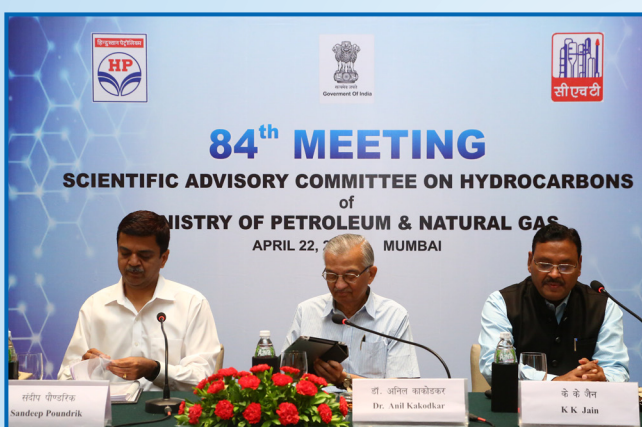


Shri Sushil Williams, Dy. Secretary (Refineries), MoP&NG & Shri K.K Jain, Executive Director, CHT taking update on BS-VI MS & HSD readiness from Industry on 27 September, 2019, at CHT. Shri Rajesh Nigam, CGM (S&D), IOCL making the presentation on behalf of industry.

Scientific Advisory Committee (SAC) Meetings

84th SAC Meeting

84th Meeting of the Scientific Advisory Committee (SAC) on Hydrocarbons of MoP&NG was held on 22nd April 2019 in Mumbai under the Chairmanship of Dr. Anil Kakodkar. SAC reviewed the progress of various ongoing R&D projects and discussed the new proposals for funding.



(Seated from L to R): Shri Sandeep Poundrik, JS(R), MoP&NG, Dr. Anil Kakodkar, Chairman, SAC and Shri K.K. Jain, Executive Director, CHT during the 84th SAC Meeting held on 22nd April 2019.



SAC deliberated on 'Pradhan Mantri JI-VAN (Jaiw Indhan Vatavaran Anukool fasal awashesh Nivaran) Yojana', a scheme launched by Government of India on 7th March 2019 to promote 2G Ethanol technology. The scheme covers broad guidelines, scope, and implementation mechanism to support 12 commercial projects (maximum Rs 150 crore per project) and 10 demonstration projects on different technology

(maximum Rs 15 crore per Technology). SAC is designated as the Nodal Body for recommending the eligible Project proposals & CHT is nominated as the Nodal Agency for implementation of the scheme. Recommended projects shall be approved by Steering Committee under the chairmanship of Secretary, PNG. For quick & effective implementation of the scheme, 3 sub committees were constituted by SAC to address the following:

1. Review of criteria for Project Developer Eligibility & Project Evaluation Parameters
2. Supply chain logistics for raw material as well as product streams covering various business models including co-operative model
3. Technology issues: To bring down 2G ethanol production cost including enzyme cost as well as cost of production of other energy forms

A mechanism was approved by SAC for implementation of the scheme after deliberations based on recommendations by sub-committees. Subsequently, CHT floated EOI for seeking proposals in June 2019.

85th SAC Meeting

85th Meeting of the Scientific Advisory Committee (SAC) on Hydrocarbons of MoP&NG was held at OIIB Bhawan, Noida on 5th July 2019 under the Chairmanship of Dr. Anil Kakodkar.



(Seated from L to R): Shri Sunil Kumar, JS(R), MoP&NG, Dr. Anil Kakodkar, Chairman, SAC, Shri K.K. Jain, Executive Director, CHT during the 85th Meeting of SAC held at OIIB Bhawan, Noida on 5th July 2019



85th Meeting of SAC held at OADB Bhawan, Noida on 5th July 2019, in progress

At the outset, Shri K.K. Jain, Executive Director, CHT welcomed Dr. Anil Kakodkar, Chairman, SAC, Shri Sunil Kumar, Joint Secretary (Refineries), MoP&NG and other SAC members. The special meeting of SAC was convened to exclusively discuss and finalise some of the key issues and guidelines for implementation of the PM JI-VAN Yojana. The representatives from concerned Ministries/ Departments were also invited. There was detailed deliberations on the recommendations of the three subcommittees (viz. Project Evaluation & Implementation Committee; Supply chain logistics Committee; Research & Innovation Committee) on the various provisions in the scheme notified vide Gazette notification dtd. 08th March 2019. SAC finalised the guidelines and also some of the recommendations, which shall be put up for considerations by the various concerned Ministries through MoP&NG. The objective of the scheme needs to be redefined and to be stated as "The intent of the scheme is to enhance the viability of the plants now or in future with evolution of technology and experience with the objective to obtain intangible benefits like reduction of environment pollution, reduction in dependence on fossil fuels & import of Oil & Gas, employment generation, rural development etc."

Meeting of Supply chain logistics Committee of PM JI-VAN Yojana

The meeting of Supply chain logistics Committee of PM JI-VAN Yojana was held at CHT on 10th June, 2019 under the Chairmanship of Shri Anil Pande, ED (OD & E), HPCL, for providing guidance in matters as per the terms of reference of the committee. Shri K.K. Jain,

ED, CHT welcomed the Chairman and other members of the Committee. After detailed deliberations, the committee recommended some additional clauses/ conditions on the various provisions (related to the terms of reference of the committee) in the scheme notified vide Gazette notification, for consideration by SAC.

Meeting of sub-Committees of PM JI-VAN Yojana

The meeting of sub-Committee 1 & 3 (Project Evaluation & Implementation Committee and Research & Innovation Committee) of PM JI-VAN Yojana was held at IOC-R&D Centre, Faridabad on 13th June, 2019 under the chairmanship of Dr S.S.V. Ramakumar (Director (R&D), IOCL) and Prof. R. Kumar (Professor Emeritus, IISc), for providing guidance in matters as per the terms of reference of both committees. Shri K.K. Jain, ED, CHT welcomed the Chairmen of both the committees and other members. After detailed deliberations, the committee recommended some additional clauses/conditions on the various provisions (related to the terms of reference of the committee) in the scheme notified vide Gazette notification, for consideration by SAC.

Review meeting of R&D projects

Review meeting of R&D projects was held at CHT, Noida on 25th June, 2019 under the Chairmanship of Prof. R. Kumar, Professor Emeritus, IISc, Bengaluru. Following projects were reviewed:

- Coal to Liquid (CTL) Technology
- Biomass Hydro-pyrolysis for production of fuel grade Hydrocarbons
- Slurry phase Residue Hydrocracking
- Catalytic Decomposition of Natural Gas
- Parametric study for Desalter

Shri K.K Jain, ED, CHT welcomed the Chairman & participants of this meet. During his Welcome address, he expressed that all the projects being discussed are very important from the point of view of Indigenous capability development. Few of the projects are of National Importance. He requested all concerned to complete the projects in the Mission Mode as time is the essence. Chairman stressed on regular and critical review of the projects so that timely decision can be

taken on the challenges arising in the projects.

86th SAC Meeting

86th Meeting of the Scientific Advisory Committee (SAC) on Hydrocarbons of MoP&NG was held at SCOPE Complex, Lodhi Road, New Delhi on 16th August '19 under the Chairmanship of Dr. Anil Kakodkar.



Shri K.K. Jain, ED, CHT welcomed the Chairman, SAC and Shri Sunil Kumar, Jt. Secy. (R), MoP&NG, and other members of SAC as well as special invitees from concerned Ministries/ Departments. The meeting of SAC was convened to discuss the issues/points raised by Committee Members of PM JI-VAN Yojana on the draft Request for Selection (RFS) and seek direction from SAC to finalise RFS document. SAC also had detailed review of the on-going R&D and HCF projects.

87th SAC Meeting

87th Meeting of the Scientific Advisory Committee (SAC) on Hydrocarbons of MoP&NG was held at SCOPE Complex, Lodhi Road, New Delhi on 13th December 2019 under the Chairmanship of Dr. Anil Kakodkar.



Dr. Anil Kakodkar, Chairman, SAC, Shri Sunil Kumar, JS(R), MoP&NG & Shri K.K. Jain, Executive Director, CHT along with SAC members during the 87th Meeting of SAC held at Scope Complex on 13th December 2019

The meeting of SAC was convened specially for discussion on proposals received under PM JI-VAN Yojana & evaluated by the Select Committee of SAC. SAC also had detailed review of the on-going R&D and HCF projects. SAC also had detailed deliberation on new projects of IOCL submitted for HCF grant.

Meeting of Select Committee of SAC for evaluation of proposals under PM JI-VAN Yojana

The meeting of Select Committee of SAC for evaluation of proposals received (for VGF / Grant) under PM JI-VAN Yojana was held under the Chairmanship of Shri L.K. Vijh, Director (T), EIL on 3rd December 2019 at CHT, Noida. Against the RFS (commercial & demonstration separately) issued under PM JI-VAN Yojana on 26th August 2019, 6 commercial project proposals (SAB Industries, IOCL, BPCL, HPCL, MRPL & ABRPL) and one proposal (IOCL R&D) for demonstration project were received. Project developers made presentation regarding their technology as well as proposed plant. Committee deliberated in detail about each proposal.

“The growth story of India depends on its success in science and technology sector. My motto for the young scientists in this country is - Innovate, Patent, Produce and Prosper. These four steps will lead our country towards faster development.”

- Narendra Modi
Hon'ble Prime Minister of India



Transition towards Energy Mix of future

- K.K. Jain
Executive Director, CHT

Driven by environmental concerns, global warming, changes in the mobility sector and falling costs of renewable power, the energy landscape is changing steadily and surely. The share of renewable energy is progressively increasing and it will continue to increase till it replaces fossil fuels to reach a level of global sustainability. As per the projections by Bloomberg, the world's Commercial vehicle oil demand peaks in 2035 and Passenger vehicle oil demand peaks even earlier in 2028.

While conventional energies will continue to play its major role in next few decades; Petrochemicals demand would rise given low per capita consumption in our country, refining sector need to be continuously aware of developments and align strategy for long term sustenance. Energy systems are not only capital intensive, take long time to develop. Therefore, India may strive to leapfrog to energy systems of future so as to cut down repeat costs involved in development of energy systems which is sustainable & specific to Indian conditions. This requires framing of policy directions & Govt. support in R&D and fiscal incentives so as to promote changes in the intended direction. The thrust should be on developing energy systems driven by domestic resources that are based on the following factors:

- Renewable Power (Solar, Wind, Nuclear, Hydro)
- India has surplus biomass of ~ 171 million ton. This can be used to supplement energy needs by pursuing policy that is biomass feedstock agnostic as well as promote all biofuels viz., CBG and other drop in fuels on equal footing based on market dynamics and economic viability. There is a need to develop Bio Jet fuels to meet CORSIA mandate as from 2027, international flights will be subject to carbon offsetting requirements
- India is bestowed with large coal resources of 101 billion ton, which is 5th in world. However, Domestic Coal is of inferior quality with high ash content. We need to develop clean coal technology for monetisation of our coal.

- India is believed to have Gas Hydrate potential equivalent to 130 trillion ft³ gas sufficient to meet demand for >300 years. India needs to accelerate development of technology for commercial exploration of this huge resource.

In future, use of electricity is expected to be pervasive in all applications, whether it is kitchens, mobility, as a prime mover in industry, in heating or in refrigeration. Electricity in its end use is clean and very efficient. The electricity is easily transported across national/ mini grid systems and can be traded. However, it is not a primary source of energy. Fortunately electricity can be produced using all renewables sources like solar, wind, hydro, nuclear or biomass.

The problem with renewable sources is their variable availability. This makes electricity from these sources also variable. Electricity can be stored in batteries; however, currently available battery systems are not so efficient, bulky and require scarce Lithium. The batteries also pose disposal issue in future.

Fortunately, hydrogen provides solution to these problems. Hydrogen can be stored without loss and can be converted back to electricity using fuel cells quite efficiently. Compared to ECV, Hydrogen Fuel cell vehicles use small battery as electricity is produced on board. This also solves the problem of bulky battery and range associated with ECVs.

Fuel cell

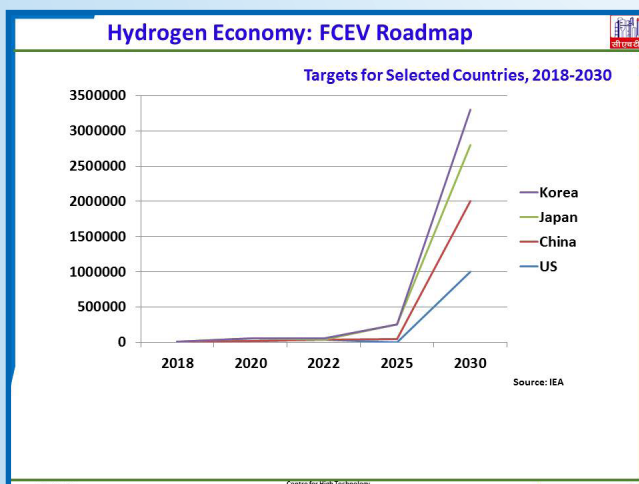
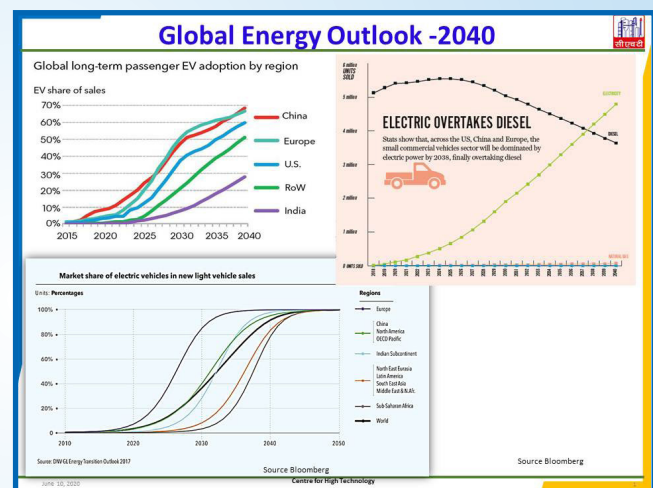
Fuel cells produce electricity by combining hydrogen fuel and an oxidant (oxygen or air) electrochemically in a more energy-efficient and environment-friendly way than today's modern combustion-based power technologies. Fuel cells can be categorized based on feedstock, power output, performance, operating temperature and end application. However, the fuel cells which seem to be more relevant to the Oil companies are Polymer Electrolyte Membrane (PEM) based, which uses neat hydrogen as a fuel and the other one is Solid Oxide fuel cell (SOFC), which can use fossil fuels for generating electricity.

PEM Fuel Cells operate in a low temperature range of 60-80°C. The catalyst commonly used is made of platinum with carbon or graphite as structural supportive materials. The compact design and features of the PEM fuel cells make it a stand-alone competitor for the automotive applications and back-up power solutions due to its small size, low operating temperature and low start-up time. The constraint associated with the PEM fuel cells, however, is their sensitive membrane which is prone to fuel contaminants and therefore, make purified hydrogen as a fuel of choice for their operation.

SOFCs operate at high temperatures, do not require expensive platinum catalyst material and are not vulnerable to carbon monoxide catalyst poisoning. Because of these high temperatures, light hydrocarbon fuels, such as methane, propane and butane can be internally reformed within the anode. Because of operation at high temp, these are more efficient, but take time to start. SOFC are more suitable to large stationary applications.

Thus for short distance city life usage and small commercial vehicles, EVs along with CNG may be the best choice. For long distance & heavy duty vehicles, where range may be a big issue, hydrogen may provide the solution. It is expected that by 2030, lifetime costs of Hydrogen, Electric and Fossil-fueled vehicle will converge (Energy & Environmental Science, 2019).

balance electricity availability from renewable sources. Stationary fuel cells are quiet and have very low emissions, so they can be installed nearly anywhere. These systems take up much less space and provide power on-site directly to customers, without the efficiency losses of long-range grid transmission. A Hydrogen-based energy will target specific applications and will follow electrification of end-use sectors. Currently hydrogen based applications are being developed and deployed for variety of applications including cars, buses, trucks, trains, aircrafts, forklifts, ships, drones, stationary power generation, etc. There is a need to promote H₂ as clean fuel by incentivising Centralised National Demonstration Facilities.



Hydrogen systems can also eliminate the need for back up fossil based electricity generation systems, which are required to run intermittently and inefficiently to

In some part of the world, hydrogen is being traded as "merchant hydrogen" in gaseous or liquid form. Currently, hydrogen is produced by steam methane reforming (SMR), partial oxidation of oil, coal gasification and electrolysis of water. SMR is preferred due to low gas prices and its availability across all the regions. With falling prices of renewable electricity, the cost of hydrogen through electrolysis route is already competing with SMR route. This throws opportunity to transit to hydrogen economy in near future as then the Hydrogen could be produced where there is water and electricity available. Many hydrogen filling stations have "electrolyzer" on site that can produce H₂ on the spot, negating need for transportation. Refineries can provide initial source of H₂ for ushering in to Hydrogen Economy and build infrastructure as a major supplier of H₂ in long term. Eventually, it will make refineries Future-ready and help in sustaining their business through switch to hydrogen.

“PSU Refineries Benchmarking – 2018 by M/s Solomon Associates”

Solomon Associates completed their Benchmarking Study in the mid of October 2019 and as per the contractual terms and conditions made a final consolidated presentation on the performance of PSU refineries at MoP&NG on 18th November 2019. Dr. M.M. Kutty, Secretary, P&NG chaired the meeting. Shri Sunil Kumar, Joint Secretary (Refineries), MoP&NG, representatives of M/s Solomon Associates along with Directors of PSU Refineries and ED CHT were the major participants in the meeting.

The following major points emerged out the detailed presentation made by Solomon:

- 1) New process units and refineries should be built considering external benchmarks.
- 2) Building up of strong reliability cultures and improvement in economic thinking skills, including total life-cycle cost analysis.
- 3) Refineries should always target an Operational Availability of $\geq 97\%$
- 4) Capacity utilization of Primary Conversion Units needs to be enhanced.
- 5) Explore economical options to purchase or transfer intermediate feedstocks for better complexity utilization.
- 6) Monthly review of Energy Intensity Index (EII) gap closure progress should be carried out.
- 7) Steam network size reduction should be taken up on priority for a better energy efficient operation.
- 8) Increased awareness on molecular management is required for a higher Volumetric Efficiency as refining is a volumetric business.

- 9) Yield performance of conversion unit to be further improvised.

The presentation enabled the participants to identify the major gap areas with respect to peers which the PSU's need to bridge & become globally competitive.

CHT in association with M/s Solomon Associates organized a 2 day “How to use data workshop” at OADB Bhawan, Noida on 19-20 November 2019 for study cycle year 2018.



(Seated from L to R) Mr. Kevin Henke, Solomon Associates, Mr. K.K. Jain, ED, CHT and Ms. Radhika Ojha, Solomon Associates during the inaugural session of the “How to use data workshop” held at OADB Bhawan, Noida, on 19th November 2019

The workshop aimed to provide a clearer insight on various Solomon KPI's, how have they been derived, interpretation of the data and its significance. The workshop saw a good representation from all the PSU's and comprised of a mixed team of members from Technical, Finance, HR, Maintenance, Operations. Detailed hands on experiences were also given by M/s Solomon Associates for a thorough understanding of the entire benchmarking process.



Group Photograph of the participants of the “How to use data workshop” held at OADB Bhawan, Noida, on 19th Nov. 2019

A total of 75 delegates participated in the workshop and the programme was well appreciated by all the participants.

Pipeline Benchmarking Study 2018 Cycle

EC in its 26th meeting held on 3rd January 2019 approved the Study of Pipeline Benchmarking Study of Indian Public Sector (PSU) Crude Oil, Multi-product Liquid, LPG & Gas Pipelines and SPMs to be carried out by M/s Solomon Associates. The consultant was shortlisted on the basis of EOI and Global tendering process undertaken by CHT on behalf of the participating companies. The agreement was signed on 28th January 2019 between M/s Solomon Associates and CHT.



Mr. K.K. Jain, ED, CHT, addressing the senior officials in presence M/s Solomon Associates, during the inaugural session of the "Executive Presentation of Study Results" held at OADB Bhawan, Noida, on 21st October 2019

M/s Solomon Associates successfully completed the 2018 cycle of Pipeline Benchmarking study during October 2019. M/s Solomon Associates made an Executive presentation of Study results on 21st October 2019. Two Workshops at Delhi & Mumbai were also carried out on 22nd October 2019 and 25th October 2019. Study results have been shared with all the participating companies.

Dr. M.M. Kutty, Secretary, P&NG chaired the meeting for the presentation of study results at MoP&NG on 10th February 2020. Representatives of M/s Solomon Associates along with CMD / Directors of PSU Refineries and ED CHT were the major participants in the meeting.

Training programme on M&V audit process

BEE organised a training programme on M&V audit process in Refining sector on 17th May 2019 at OADB Bhawan, Noida. The meeting was inaugurated by Shri K.K. Jain, Executive Director, CHT in presence of Shri

Milind Deore, Director, BEE. The meeting was attended by 21 Encon Engineers/Managers from Refineries and 35 empaneled accredited energy auditors, apart from 4 officers from CHT and 2 from BEE.



Shri K.K. Jain, Executive Director, CHT delivering the inaugural address at the meet held at OADB Bhawan on 17th May 2019

Ms Ritika Saxena from BEE, made presentation covering PAT scheme, its features, sectoral targets, institutional structure, Escerts trading etc. Shri Piyush Sharma from GIZ, made presentation on M&V principles, agencies involved, M&V process, EC rules 2012, role and obligations of empaneled accredited energy auditors etc. Shri I.H. Shivaraya, Advisor (Tech.) from CHT made presentation on Normalisation factors, and methodology of calculation with illustrative examples. Shri Dinesh Ghai from CII made presentation on the Proforma developed by CII for data entry and getting the calculation results.

The meeting provided a platform for clearing all the doubts of Refiners and Empaneled accredited energy auditors as M&V audit of 2nd PAT cycle was to be completed by 31st July 2019.

Development of Water Consumption Norms and Reduction of Water Footprint

A workshop cum meeting on ongoing "Water Consumption Study by EIL" was organized by CHT on 30th April 2019 which was attended by representatives from EIL, CHT and IOCL. The objective of the meeting was to ensure a better clarity in data sharing between EIL and participating refineries. EIL also made a presentation on various input data received as well as



the status of the ongoing study along with additional inputs required from the refineries. CHT and EIL in consultation with CHT had a fruitful session on future course of action to be adopted for early completion of the study to enable fixation of water consumption norms.

On 7th June 2019, a detailed review of ongoing study for IOCL Guwahati Refinery was carried out in presence of senior representatives from the refinery, EIL and CHT. The issues related to data sufficiency and the formats to be followed were deliberated in detail.

CHT along with EIL visited IOCL Gujarat Refinery on 14th & 15th of June 2019 for carrying out a detailed review of the ongoing study. CHT along with EIL interacted with the process owners in the refinery and a standard format was developed for preparing a unit wise and an overall water balance of the refinery. EIL has already submitted the revised water balance for IOCL, Gujarat refinery in line with the discussions held during the visit.

A review of water balance prepared by EIL was carried out at CHT on 16th July 2019 for HPCL Vizag & Mumbai refineries. In the meeting, the major issues related to the unit wise balances were highlighted to EIL and the modifications in the formats and the balances in line with the IOCL Gujarat was advised. EIL submitted the "Water Balance" with interim recommendations in August 2019.

On 3-4 September 2019, a meeting comprising senior members of all the PSU refineries along with the entire team of EIL and CHT was held where a detailed deliberation on "Water consumption reduction" initiatives were discussed.



Based on the two day meeting, a matrix of short and long term water conservation measures were identified for each refinery. Based on the matrix, refineries shall monitor the implementation of the schemes and projects in a time bound manner.

On 26th and 27th February 2020, a meeting was held at CHT to discuss the final water study report of EIL to develop an execution roadmap for short and long term initiatives for submission to MoP&NG. The meeting was attended by senior representatives from EIL, IOCL-RHQ, DR, GR, JR, BR, BGR, MR, PR, HR and PDR, HPCL-M, V, CPCL, BPCL-K and CHT. Post deliberations, with the refinery representatives a final date for completion of each of the initiatives along with its water savings potential (As submitted in the report) were compiled.

While the short term measures had a target date of completion by March 2022, the long term measures involved ideas/projects which shall be completed beyond March 2022. Out of the total savings of 5288 m³/Hr, the short term initiatives account for 2612 m³/Hr which is ~49% of the total water savings potential for the 13 PSU's which participated in the study.

Water & Waste Water Management in the Oil and Gas Sector

As a part of the newly established Centre of Excellence in Oil, Gas and Energy, a workshop on 'Water & Waste Water Management in the Oil and Gas sector' was organized jointly by Indian Institute of Technology Bombay (IITB) and Engineers India Limited (EIL), New Delhi on 11th January 2020. Based on the discussion in

various sessions, a list of potential projects (short as well as long term) was prepared during the brainstorming session. In each of the project, different PSUs expressed their interest based on the nature of issues. A working team for each project shall be formed to develop the detailed proposals.

Refinery Performance Improvement Programme (Phase II)

On 24th February 2020, a meeting was held at CHT with the representatives from IOCL-RHQ (on behalf of JR, BR, HR, BGR, GR, DR), CPCL and NRL which shall be participating in the RPIP (Refinery Performance Improvement Programme Phase II). The objective of the meeting was to review the Expression of Interest /Tendering process to be followed along with methodology to be adopted for selection and award of work. Based on the inputs received from the refineries a draft EOI was prepared by CHT and circulated to the

refineries for comments.

Post receipt of comments from the refineries, a meeting was held on 16th March 2020 where it was decided that the EOI shall be floated to identify new consultants capable of carrying out the study over and above the ones which were shortlisted for the Phase I study. The final EOI was then circulated and consent has been received from the refinery representatives for floating the EOI.

Grid Power Utilization

PTC made a detailed presentation at CHT on 10th May 2019 addressing the various aspects of grid power import in Indian Refineries. The session was mainly interactive where participants were apprised of the major benefits of power import along with major challenges and roadblocks which must be addressed to make the power import option further economical for industries instead of their own captive power plants. It also highlighted the various taxation and pricing aspects of grid power import.

On 13th August 2019, the sub-Committee formed to discuss the "issues related to grid power import

in PSU refineries" met and deliberated at length, the challenges being faced by the refineries with respect to high cross subsidy charges, wheeling charges, reliability etc. The meeting was attended by representatives from PTC along with senior refinery representatives and CHT. PTC updated the developments on various issues in the last one year while the refineries provided an update on the reliability issues being faced. Based on the inputs received, a detailed note highlighting the major areas of concern in power import along with assistance required has been prepared by CHT and forwarded to MoP&NG.

Baselining data Verification of Petrochemicals under PAT cycle IV

On 2nd July 2019, CHT attended a meeting at BEE office to review the draft reports submitted by EIL on baseline data verification audit for IOCL Panipat Petrochemical complex and RIL Hazira manufacturing division for

PAT cycle-IV. In the deliberation, CHT/BEE along with EIL reviewed the methodology and advised to make necessary updations/corrections in the report.

Recertification of ISO 9001:2015 Management System Certificate at CHT

Re-certification Audit was carried out successfully by M/s International Certification Services Pvt. Ltd. (ICS), Mumbai at CHT office on 07th June 2019 and

subsequently renewed certificate dtd. 17.06.2019 for ISO-9001-2015, with validity of three years up to 16th June 2022, was received by CHT.



Feasibility Study for Production of Ethanol from Refinery Off-Gases

A meeting was held at CHT on 14th August 2019 comprising representatives from IOCL, MRPL, BPCL, BORL along with representatives from LanzaTech (LT) to check the preparedness for the award of work for the subject feasibility study and to take the study forward. Out of the 6 refineries considered for Feasibility study in Phase-1, LOA dated 17th Dec. 2019 is issued by

BPCL-MR for the study. IOC-JR and IOC-HR could not take up the Feasibility Study due to land constraints. MRPL is taking up the study on its own due to reduced potential and site constraints. Confirmation is awaited from BPCL-KR and BORL regarding taking up of the Study.

Inter Laboratory Correlation Programme (ILCP) for BS-VI fuels

An Industry-wide Inter Laboratory Comparison Programme was initiated for better coordination of product quality of major fuels MS, HSD and ATF at industry level. The First Level Programme comprising of one refinery from each zone (IOC-Mathura in North Zone, BPC-Mumbai in West Central, HPC-Visakh in South East & IOC-Guwahati in North East) along with independent labs (IOC-R&D, BPC-R&D, HPC-R&D, IIP-Dehradun, SFPL-Noida) was completed during the period of June-October, 2018. After successful completion of first level, the Second Level, covering intra-zone, involving all refineries and major PPL/Mktg. installations of the zone and one R&D lab was

completed in May, 2019. A correlation programme was repeated for Sulphur in BS-VI scenario in NCR region with participation from refineries, marketing and R&D Centres for BS-VI grade MS and HSD and completed during the period of July-October, 2019

Following parameters were tested:

- MS : Density, Sulphur, Existing Gum Content, RON, Distillation and Aromatics
- HSD : Density, Sulphur, Flash Point, Recovery @360 Deg. C and Copper Corrosion

All the parameters tested were within acceptable deviation limit.

Development of Process Scheme for Reference Fuel, Feasibility Study by EIL & IOC R&D

Work Order was awarded to M/s Engineers India Ltd., along with IOC-R&D for "Development of Process Scheme for Reference Fuel" on 4th September 2019. Identification of Refinery streams for manufacture of Reference fuel was carried out. The project is expected to be complete in 26 weeks from the KOM. Kick off meeting was held on 27th January 2020 at CHT with

EIL & IOCL-R&D for the first phase of the study. EIL & IOC-R&D presented the study carried out using data from 10 refineries detailing the approach for LP model development. Draft Technical Prefeasibility report was submitted by EIL on 7th February 2020. EIL submitted final report on 20th March 2020 for review by CHT.

India Japan forum for Energy Efficiency, Conservation and Renewable Energy

Officials from CHT participated in the India Japan forum for Energy Efficiency, Conservation and Renewable

Energy organized by PCRA in association with JASE in New Delhi on 8th November 2019.

Meeting with officials from Oil Industry, AMCHAM officials and Ministry including CHT

AMCHAM organized a roundtable with the Centre for High Technology on energy and petrochemicals on 4th February, 2020 in New Delhi under the leadership of Shri Sunil Kumar, Joint Secretary (Refinery), MoP&NG and Shri K.K Jain, Executive Director, CHT. The purpose of the meeting was to enhance U.S.-India trade and technology collaboration in the energy sector. AMCHAM's Energy Committee was headed by Ms. Preetha Nair, Chairperson – Energy Committee, AMCHAM and Head Asia, True North Venture Partners, Mr. Robert Garverick, Honorary USG Chair – Energy Committee, AMCHAM and Minister Counselor for Economic, Environment, Science and Technology Affairs, U.S. Embassy, Ms. Dinah McDougall, Honorary USG Chair – Energy Cooperation Program, AMCHAM and Commercial Officer, U.S. Embassy, senior executives of American energy companies and senior U.S. government officials. The Committee had a roundtable discussion with senior executives from National Oil Companies (NOCs). After the keynote address on priority areas and expectations by CHT, presentations were made by 11 U.S. companies on the following possible areas of cooperation:

- Integration with Petrochemicals: Import reduction of major Petrochemicals, viz., methanol, PVC
- Niche Petrochemicals and sourcing of specialized technologies for Polyols, SAP, acetic acid, Acrylic acid/ acrylate, etc.
- Feedstock diversification - coal / petcoke/ biomass/ MSW gasification, condensate, Ethane, shale gas, etc.
- Biofuels production including 2G ethanol, drop in fuels, Advanced bio fuels, CBG, etc. and integration with Petroleum Refining
- Technological options for refinery's diversification in the areas like Hydrogen, Fertilizers, etc.
- Catalyst Manufacturing – Make in India

- Interface Management in Multiproduct Pipeline
- Carbon capture and utilization (CCU): CO₂ to Chemicals
- Hydrogen - An option for future: Production of hydrogen from renewable sources, and infrastructure for storage and dispensing for fuel cell and vehicles applications.
- Water Management
- Capacity building in India by US companies for supplying and manufacturing of equipment for Oil & gas sector.



Shri Sunil Kumar, Joint Secretary (R), MoP&NG chairing the meeting with officials from Oil Industry, AMCHAM officials and CHT



This was followed by Q&A where executives from NOCs sought clarifications from the presenters. The roundtable was concluded with a Vote of Thanks from the Joint Secretary (R), MoP&NG.

Knowledge Sharing Workshops at CHT

In pursuant to CHT's objectives to share information and new innovative technologies in the downstream hydrocarbon sector, a series of Knowledge Sharing Workshops were conducted in house at CHT. The first workshop was conducted on 22nd May 2019 with Dr. Anil Kakodkar, Chairman, Scientific Advisory Committee of MoP&NG, as Chief Guest. On this important occasion, he interacted with CHT officials and shared his valuable thoughts on the total energy picture of our country and Oil & Gas economy of the world. He stated that a country must strive to promote indigenous technology and become technology exporter, rather than raw material exporter thereby removing technological vulnerability. Keeping in view the existing challenges in the energy sector with regard to increase in import bill, he highlighted

the growing importance of alternative energy sources in the present scenario such as Biomass, Solar energy, gas, etc. He stressed that CHT should promote technology development to benefit the Nation.



Dr. Anil Kakodkar, Chairman, SAC being welcomed by Shri K.K. Jain, Executive Director, CHT during his recent visit to CHT office, OIBD Bhawan on 22nd May 2019



The second workshop was held on 12th Sept. 2019 which witnessed the gracious presence of Dr. J.L. Raina, Ex-CMD, IOBL as Chief Guest. While interacting with CHT officials, Dr. Raina shared his vast experience in the Oil Industry. He also highlighted the importance of adopting key attributes viz. self-commitment, integrity, team cohesiveness, leadership & inclusiveness in ones' job. He urged all the officials to have strong work ethics and dedicate all efforts to achieve CHT goals.

Energy Efficiency Improvement

Refineries are included in PAT (Performance Achieve and Trade), under which each refineries is mandated to meet the Specific Energy Consumption Targets. CHT was actively associated with BEE for baseline Audit of Refineries, target setting, for development of calculation formats and has been monitoring the progress. CHT has also checked the final M&V reports submitted by Accredited Energy Auditors and assisted BEE in finalising the achievements of Energy Reduction Targets for Refineries.

Under PAT cycle-II, which ended in 2018-19, the refinery

sector achieved savings of 1.482 MTOE against target of 1.08 MTOE over the base line year of 2014-15. The refinery wise energy savings targets for 2023-24 under new PAT cycle have also been mandated based on specific energy reduction of 4.49% the refining sector.

A Roadmap for Energy Reduction in PSU refineries till 2030, aligning with India's NDC of 33-35 % reduction in Specific Energy Consumption over base year of 2005, has been prepared. The roadmap has also assigned a midterm (2023-24) and long term target (2030) for each PSU refineries.

Activity Committee Meetings

1. Catalytic Reforming and Isomerisation

41st ACM on Catalytic Reforming and Isomerisation was organised by CHT in association with IOCL Paradip as the host Refinery on 9 - 10 April 2019 at Paradip. The meet was inaugurated by Shri TDVS Gopalakrishna, ED, Paradip Refinery, in presence of Shri K.K. Jain, ED, CHT.



Standing from L to R: Shri TDVS Gopalakrishna, ED, Paradip Refinery, Shri K.K.Jain, ED, CHT & Shri MRS Iyer, CGM, BPCL-Kochi Refinery.

The meet was attended by over 90 Participants. The participation was across Operations and Technical services departments of Refineries, R&D centres of IOC, BPC & HPC. Presentations were made location wise by the participants from Refineries covering both Reforming and Isomerisation. Papers were also presented by, UOP, Axens, KBR and Technip, apart from R&D Centres. The Technical sessions comprised a total of 27 presentations. The convener of the meet was Shri MRS Iyer, CGM, BPCL-Kochi Refinery was organized with experts ten Fxen, UOP, Convener and Shri Mohanlal on the panel. A Refinery visit was organised at the end of the 2 day event.

2. Hydroprocessing & Hydrogen Generation

13th Activity Committee Meeting was organized on 22-24 May 2019, jointly with BORL as the host. The meeting was inaugurated by Shri S.S. Sunderajan, MD, BORL in presence of Chief operating officer, Shri Abhai Raj Bhandari and Chief Financial Officer, Shri Manoj Heda & other senior officials of BORL and CHT. The Keynote address was delivered by Shri Brijesh Kumar, Advisor (Tech.), CHT. Inaugural address was presented

by Shri Sunderajan, MD, BORL.

The meeting was attended by 100 delegates. The convener of the meeting was Sri A.P Raghav, VP, BORL. Six licensors viz., CLG, UOP, Axens, HaldorTopsoe, Technip and KBR made presentations, four of whom made multiple presentations. Presentations were also made by Catalyst vendors viz., Johnson Matthey and Sud-chemie. The ACM was represented by all the Refineries, R&D centres of IOC, BPC, HPC, IIP & EIL. In all 47 presentations were made in the 3 day event. On the second day, Q&A session was organised with convener, Licensors viz., UOP, Axens and HaldorTopsoe and Sud-chemie on the Q&A Panel.

3. Rotary Equipment

ACM on Rotary Equipment was organized by CHT in association with IOCL Guwahati as the host Refinery on 27-28 June 2019 at Guwahati. The meet was inaugurated by Chief guest Shri K.K. Jain, ED, CHT, in presence of Mr. Sanjay Manchanda, ED(GR), as the Guest of Honour.

The meet was attended by 53 nos. of delegates from IOCL (Ref. / PL / Mktg / RHQ (M&I), BPCL- KR, BPCL-MR, HPCL-MR, HPCL-VR, GAIL, CPCL, HMEL, NRL, NEL, ONGC (MRPL), OMPL, EIL, OISD besides Vendors e.g. Eagle Burgmann India Ltd., Sundyne, Euroflex Transmissions, Mascot Dynamics and Burckhardt Compression (India) Pvt. Ltd.

Shri K.K. Jain, ED, CHT enlightened the participants with the objective of the meet and the need of conducting such meets on regular basis to ensure successful modernization of the oil refineries located across the country. In his speech, Shri Jain cited a number of focus areas of refinery operations such as sustained throughput, sustained quality products, safety, minimal environmental damage and compliance to environmental standards, energy performance involvement, GRM & NRM etc. and urged the rotary engineers to adopt a maintenance philosophy towards minimizing unplanned shutdown of equipment for maintenance, eliminating repeated failures, employing innovative methods for maximizing the life of components and system, maximizing the run length



of equipment, minimizing maintenance cost and developing cost effective inventory management. He also recommended the experts to play a significant role in sharing best practices, troubleshooting experiences and developments and operating experiences with new technology solutions in the CHT platform and help the Refineries to take leaps towards modernization.



(Seated on the dais from L to R): Shri N.K. Chakraborty, CGM(T) IOCL, GR; Shri Sanjaya Manchanda, ED, IOCL Guwahati Refinery; Shri K.K. Jain, ED, CHT during inaugural session of ACM on Rotary Equipment

In his Keynote address, Shri Sanjay Manchanda, ED, IOCL, GR called the Activity Committee Meet a 'give and take programme' saying that it will help the organizations to address their liability issues and various challenges faced by them. He also called for innovation to enable implementation of best cost effective practices in the Refineries. He further said that IOCL declared the year 2019 as the 'Year of Solutions' to push towards implementation of innovative practices in its operations and practices.

The Technical sessions comprised of a total of 37 presentations as per the agenda given by CHT. The convener of the meet was Shri P.K. Basumatary, GM(Maint.), GR. The two-day activity committee meet was concluded through a valedictory function at GR L&D Centre on 28th June 2019.

4. Electrical Maintenance and Utilities

Activity Committee Meet on 'Power Generation, Distribution, Electrical Maintenance and Utilities' was organized by CHT in collaboration with IOCL, Panipat Refinery on 30-31 July 2019. The meet was inaugurated by Shri Sanjaya Bhatnagar ED (PRPC). Shri P. Raman, Director, CHT, gave the Keynote address

to the participants wherein he urged the participants to share their best practices & areas of concern in Power Generation, Distribution & Maintenance. Shri Rahul Prashant CGM (P&U, IT), Panipat Refinery was the Convener of the meet.



(Seated on the dais from L to R): Shri G. C. Sikder CGM(I/C) IOCL PRPC; Shri P. Raman Director (CHT); Shri Sanjaya Bhatnagar ED (PRPC); Shri Rahul Prashant CGM (P&U, IT) during inaugural session of the ACM on Electrical Maintenance and Utilities on 30th July 2019 at IOCL Panipat Refinery

The two day ACM was attended by 64 delegates from all across the private and public sector oil companies in India. A number of reputed consultants and OEM's viz. Aveva, BGGTS, EIL, Yokogawa, Solvina, PTC, Schweitzer Engineering and GE Water & Process Technologies, also attended and gave presentations highlighting major developments going on across the globe in the area of enhancing reliability and optimization of existing assets. The delegates from oil PSU's shared several case studies on troubleshooting and experience pertaining to their refineries. The programme saw a detailed deliberation amongst the participants on the various ongoing issues as well as the path forward to be adopted for further optimization of the existing assets. The meeting ended with participants highlighting major takeaways which shall go a long way in helping to improve refinery performance.

5. FCC & SRU

The 46th ACM on FCC & SRU was held at Nayara Energy Limited, Jamnagar, during 29-30 August 2019. Total 85 delegates from refineries of IOCL, BPCL, HPCL, MRPL, HMEL, CPCL, BORL, Nayara Energy; R&D centres of BPCL & HPCL; CSIR-IIP; EIL; and private companies viz. Grace, Worley Comprimo & BASF participated in the ACM.



Shri S.S. Maji, Head-Technical, Nayara Energy addressing the delegates during ACM on FCC & SRU at Nayara Energy

Shri S.S. Maji, Head – Technical, Nayara Energy & Shri P. Raman, Director, CHT inaugurated the Meet and Shri Sanyasirao Buddhana, GM – Technical Services convened the Meet.

6. Advance Process Control, Blends, Optimization and Digital Transformation

The 19th CHT Activity Committee Meet on “Advance Process Control, Blends, Optimization and Digital Transformation” was organized by IOCL, Barauni Refinery in collaboration with Centre for High Technology, during 14 - 15 October 2019 at Begusarai.

Shri K.K. Jain, Executive Director, CHT in his inaugural address highlighted the 4th industrial revolution and the importance of digitization and digitalization. He elaborated on the impact of artificial intelligence in process industry and environmental impact mitigation thereof. Ms. Sukla Mistry, Executive Director, IOCL, Barauni Refinery in her Keynote address highlighted the current challenging environment of petroleum industry and the need to improve GRM of the Refinery to maintain profitability.

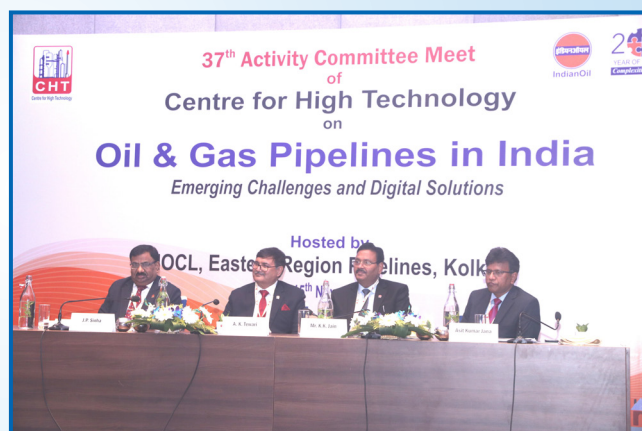


Group Photo of the delegates at the Activity Committee Meet on Advance Process Control, Blends, Optimization and Digital Transformation at IOCL, Barauni Refinery on 14th October 2019.

Shri V. Suresh, GM (AC&A), BPCL was the Convener the ACM. Over 110 delegates from IOCL, HPCL, BPCL, MRPL, Nayara Energy, BORL, Numaligarh Refineries Ltd., OMC R&D laboratories and IIP participated wherein the refinery representatives have presented their experience in APC. Also several vendors like Aveva, Honeywell, Aspen Tech, Equinox, Jaaji technologies and HTRI presented on the latest trends in Optimization.

7. Oil & Gas Pipelines

The 37th CHT Activity Committee Meet – Oil & Gas Pipelines was organized by IOCL, Eastern Region Pipelines during 14 – 15 November, 2019 at Kolkata. With the theme ‘Evolution of Oil & Gas Pipelines in India – Emerging Challenges and Digital Solutions’ the Meet witnessed a confluence of senior professionals of pipeline operators from across the country.



(from L to R): Seated on dais are Shri J.P. Sinha, Executive Director, IOCL, ERPL, Shri A.K. Tewari, Executive Director (Ops. & HR), IOCL, PLHO and Chief Guest of the Meet, Shri K.K. Jain, Executive Director, CHT and Shri A.K. Jana, CEO, Gail Gas Ltd. during the inaugural session of the ACM on Oil & Gas Pipelines at Kolkata on 14th November 2019

Shri A.K. Tewari, ED (Ops. & HR) IOCL, Pipelines H.O. was the Chief Guest of the meet. During his keynote address, Shri Tewari stressed that harnessing state-of-the-art cutting edge technology continuously has been the forte for Oil & Gas Pipelines for manifesting as game changers in transforming the overall petroleum energy landscape of the Nation. Thus such Meets on a regular basis only builds upon the prowess and reliability of this segment in the energy business, he added. He also expressed his firm belief that the Meet with its wide variety of technical sessions would transcend to bountiful takeaways for all participants and delegates.



In course of the inaugural session, the objectives of the Meet were shared by Shri K.K. Jain, Executive Director, CHT with the delegates. Shri K.K. Jain highlighted the various activities & functions of CHT. He also re-iterated his belief that this Meet shall benefit all the participants in terms of exchange of best practices and takeaways.

In his welcome address, Shri J.P. Sinha, Executive Director, IOCL, ERPL thanked everyone for gracing the occasion and mentioned that with a plethora of disruptions from technology as an enabler, there are marked paradigm shifts in conventional methods of

doing business in the nation's energy sector too. He too wished the Meet to be a success.

In tune with the impetus on supply of cleaner fuels pan-India, the inaugural session also had a presentation on overview and challenges in CGD sector of the country by the special invitee, Shri A.K. Jana, CEO, Gail Gas Ltd.

Shri Rajesh Uprety, GM (T&HSE), IOCL, ERPL was the convener of the meet. The event was attended by more than 100 nos. pipeline specialists of the country from both public and private sectors which included several stakeholder partners, service providers and associates.

Development of Catalyst Manufacturing Plant in India

With a view to set up world class Catalyst Manufacturing Unit in India-under Make in India, Expression of Interest (EOI) have been issued from bidders having global reach for marketing of catalysts and catalyst

manufacturing capability. The proposed catalyst plant is envisaged to be set up as a Joint Venture between an established Catalyst Manufacturer/Supplier and one or more PSUs under MoP&NG.

Furnace efficiency and Steam leak surveys

In order to improve energy efficiency and reduce energy consumption, CHT, in association with refineries, organizes Surveys every year in the areas of i) Furnace/ Boiler Efficiency and ii) Steam leak. These two areas are taken-up every alternate year. Survey in the area of Steam Leak was conducted during January, 2019 and

survey for Furnace/ Boiler Efficiency was conducted during January-February, 2020. Saksham Awards are presented based on the results of the Furnace efficiency and Steam Leak Surveys. The Awardee is selected by the selection committee set up by MoP&NG.

25th United Nations Climate Change Conference

The 2019 United Nations Climate Change Conference, also known as COP25 (25th United Nations Climate Change conference) was held in Madrid, Spain, from 2 - 13 December 2019 under the Presidency of the Chilean government.

CHT on behalf of the Designated Consumer in PAT II, presented a session on "Enhancing Energy Efficiency in Refinery Sector" in one of the Side Events on "Energy Efficiency" hosted by Ministry of Power. The session mainly focused on various initiatives taken up by the Indian refiners to enhance energy efficiencies, challenges ahead and the path forward for sustainability. The event was attended by representatives from various countries and Indian Industry.



Shri Sumit Jha, Joint Director, CHT made a presentation on 'Enhancing Energy Efficiency in Refinery Sector' in one of the side events on "Energy Efficiency" hosted by Ministry of Power at COP25 conference in Madrid

पर्यावरण दिवस

उच्च प्रौद्योगिकी केन्द्र के कार्यालय में 5 जून 2019 को पर्यावरण दिवस मनाया गया। इस अवसर पर, श्री के.के. जैन, कार्यकारी निदेशक, उच्च प्रौद्योगिकी केन्द्र, ने ओआईडीबी कार्यालय परिसर के प्रांगण में फलों के पेड़ लगाए। अन्य सीएचटी



श्री के.के. जैन, कार्यकारी निदेशक, सीएचटी, 5 जून 2019, पर्यावरण दिवस पर ओआईडीबी के परिसर में फलों के पेड़ का रोपण करते हुए।

अधिकारियों ने भी इस अवसर पर फलों के पेड़ लगाए। श्री के.के. जैन ने उच्च प्रौद्योगिकी केन्द्र के सभी अधिकारियों से अपील की कि वे हरित पर्यावरण और स्वच्छ वायु को बढ़ावा देने में मदद करने के लिए अधिक से अधिक वृक्षारोपण करें।



5 जून 2019 पर्यावरण दिवस के अवसर पर श्री के.के. जैन, कार्यकारी निदेशक, सीएचटी, तथा अन्य अधिकारियों के साथ

5 वां अंतर्राष्ट्रीय योग दिवस

पेट्रोलियम और प्राकृतिक गैस मंत्रालय, भारत सरकार के दिशा-निर्देशों के अनुरूप उच्च प्रौद्योगिकी केन्द्र द्वारा 21 जून 2019 को 5 वां अंतर्राष्ट्रीय योग दिवस मनाया गया। इस अवसर पर, योगाचार्य और उनके समूह ने नोएडा के ओआईडीबी भवन के सभागार में OIBD, CHT, OISD, ISPRL के सभी अधिकारियों और कर्मचारियों के लिए योग अभ्यास का प्रदर्शन किया। योगाचार्य ने योग के महत्व और स्वास्थ्य लाभों के बारे में भी बताया और स्वस्थ जीवन को बनाए रखने के लिए प्रतिदिन योग का अभ्यास करने का अनुरोध किया। योगाचार्य ने कहा कि कुछ योग व्यायाम जैसे कि अनुलोम-विलोम, आंखों के व्यायाम आदि घर के साथ-साथ ऑफिस के समय भी किए जा सकते हैं।



स्वच्छता पखवाड़ा

पेट्रोलियम और प्राकृतिक गैस मंत्रालय, भारत सरकार के दिशानिर्देशों के अनुपालन में उच्च प्रौद्योगिकी केंद्र, OADB भवन में स्थित अन्य कार्यालयों OADB, OISD, ISPRL, RGIPT के सहयोग से 1-15 जुलाई 2019 के दौरान स्वच्छता पखवाड़ा मनाया। स्वच्छता पखवाड़ा को सफल बनाने के लिए सीएचटी ने स्वच्छता से संबंधित दिवस वार कार्यक्रमों का आयोजन किया। आम जनता में स्वच्छता के प्रति जागरूकता बढ़ाने के लिए विभिन्न प्रकार के कार्यक्रम आयोजित किए गए जैसे कि नुककड़ नाटक, परिसर में वृक्षारोपण, भाषण प्रतियोगिता आदि। इस पखवाड़े के दौरान, विभिन्न गतिविधियों की गई थीं। OADB कार्यालय परिसर और हिंडन नदी, नौएडा के आसपास की जगह की सफाई संयुक्त रूप से CHT & OADB द्वारा की गई थी।

श्री के.के. जैन, कार्यकारी निदेशक, उच्च प्रौद्योगिकी केंद्र ने



नौएडा के होशियारपुर में स्थित गर्ल्स इंटर कॉलेज के बच्चों को स्वच्छ पानी उपलब्ध कराने के लिए आरओ वाटर प्यूरीफाइंग सिस्टम का दान दिया। इस अवसर पर नौएडा में स्कूल के बच्चों को एक स्वच्छता किट भी वितरित की गई। पखवाड़े के दौरान, वॉकथॉन का आयोजन किया गया था, जिसमें अधिकारियों और कर्मचारियों ने स्वच्छता के बारे में जागरूकता फैलाने के लिए बैनर और होर्डिंग लगाए। अधिकारियों और कर्मचारियों के लिए स्वच्छता पर हाउस स्लोगन प्रतियोगिता आयोजित की गई थी, जबकि अनुबंध पर काम करने वाले कर्मचारियों के लिए स्वच्छता पर विचारों के लिए लिखित प्रतियोगिता सीएचटी में आयोजित की गई थी। स्वच्छता पखवाड़ा के समापन दिवस के दिन 15 जुलाई 2019 को श्री के.के. जैन, कार्यकारी निदेशक, सीएचटी द्वारा विजेता प्रतिभागियों को पुरस्कार वितरित किए गए।



हिंदी पखवाड़ा समारोह

हिंदी पखवाड़ा का आयोजन सीएचटी में 2-16 सितम्बर 2019 को किया गया था। पखवाड़े के दौरान राजभाषा- हिंदी में विभिन्न प्रतियोगिताओं का आयोजन किया गया था और अधिकारियों ने उत्साहपूर्वक भाग लिया था। श्रीमती उषा बिजोला, संयुक्त निदेशक (राजभाषा) MoP&NG, समापन समारोह की मुख्य अतिथि थीं, जो 16 सितंबर 2019 को आयोजित की गई थी।

मुख्य अतिथि ने सभी अधिकारियों को राजभाषा - हिंदी का अपने दिन-प्रतिदिन के काम में यथासंभव उपयोग करने के लिए प्रोत्साहित किया। श्रीमती उषा बिजोला द्वारा विजेताओं को पुरस्कार प्रदान किए गए। श्री के.के. जैन, कार्यकारी निदेशक, सीएचटी ने भी विजेताओं को बधाई दी और हिंदी पखवाड़े के समापन की घोषणा की।



‘स्वच्छता ही सेवा’ – अभियान

पेट्रोलियम और प्राकृतिक गैस मंत्रालय के निर्देशों के अनुसार स्वच्छ भारत सेवा ‘अभियान 11 सितम्बर से 2 अक्टूबर, 2019 (गांधी जयंती) तक CHT में मनाया गया। ‘बैन-सिंगल-यूज’ प्लास्टिक’ के संदेश के साथ बैनर परिसर में प्रदर्शित किए गए थे और इस अवधि के दौरान कार्यालय द्वारा कई गतिविधियाँ भी की गईं।

1. सभी सीएचटी अधिकारियों द्वारा स्वच्छता शपथ
2. ओआईडीबी बिल्डिंग के आसपास के इलाकों से प्लास्टिक की बोतलें, प्लास्टिक बैग आदि इकट्ठा किए
3. 27 सितम्बर 2019 को ‘एकल उपयोग प्लास्टिक’ के बैन के संदेश को फैलाने के लिए पास के क्षेत्रों में वॉकथॉन का आयोजन किया गया



श्री के.के. जैन, कार्यकारी निदेशक, सीएचटी और अन्य सीएचटी कर्मचारियों ने 2 अक्टूबर 2019 को ‘स्वच्छ भारत सेवा’ के अवसर पर ओआईडीबी परिसर में स्वच्छता अभियान चलाया।

राष्ट्रीय एकता दिवस

सरदार वल्लभ भाई पटेल ने कई भारतीय रियासतों को एकजुट करके भारत देश के निर्माण में महत्वपूर्ण भूमिका निभाई है। सरदार वल्लभ भाई पटेल की जयंती मनाने के लिए 31 अक्टूबर 2019 को सीएचटी में राष्ट्रीय एकता दिवस मनाया गया। सरदार वल्लभ भाई पटेल भारत के आयरनमैन के रूप में भी प्रसिद्ध हैं और भारत

गणराज्य के संस्थापक सदस्यों में से एक हैं। श्री के. के. जैन, कार्यकारी निदेशक, सीएचटी ने सीएचटी के सभी अधिकारियों और कर्मचारियों को एकता का संकल्प दिलाया और उनसे देश की एकता और अखंडता के लिए काम करने का आग्रह किया।

सतर्कता जागरूकता सप्ताह

हर साल की तरह, सीएचटी में 28 अक्टूबर से 2 नवंबर 2019 तक सतर्कता जागरूकता सप्ताह मनाया गया। श्री के.के. जैन, कार्यकारी निदेशक, सीएचटी ने सभी अधिकारियों और कर्मचारियों को 28 अक्टूबर 2019 को जागरूकता प्रतिज्ञा दिलाई।

यह जागरूकता सप्ताह अभियान नागरिक भागीदारी के माध्यम से सार्वजनिक जीवन में अखंडता और सदभावना को बढ़ावा देने के लिए हमारी प्रतिबद्धता की पुष्टि करता है। सतर्कता आयोग ने इस वर्षा के विषय को अखंडता-जीवन का एक तरीका चुना है।

Compliance Audit at CHT by CAG for 2017-2019

Indian Audit and Accounts Department (CAG) carried out the Compliance Audit at Centre for High Technology (CHT), Noida during the period 12-20 March 2020. The statutory audit was done for F.Y. 2017-2018 & 2018-19. The main objective of CAG audit was to ensure effective compliance of CHT’s activities with the laid down policies/ guidelines and procedures of Government of India. The audit further aimed at verifying whether all processes of product procurements/ hiring of various services is being done timely and at reasonable rates with evaluation of bidders in accordance with the pre-defined GFR rules,

other statutory criteria, transparency, etc.

During the audit, the outstanding Paras of CHT’s Inspection Reports for F.Y. 2016-17, were also reviewed. It may be noted that all the paras of previous inspection report for year 2016-17 have been settled except the para on “Non-utilization of funds of Hydrogen Corpus Fund”.

In the end, CAG Audit team acknowledged the complete support & co-operation received from Centre for High Technology, Noida at each stage of the audit process conducted.

