

PetroFed

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PETROFED

Voice of Indian Oil & Gas Industry

July-September 2016 | Vol.15 Issue 3



**Impact of Increasing Refining Capacity
on Global Crude Trade Flow (Cover Story)**

**Behavioural Safety Management
in Oil & Gas Industry : Indian Research**

GST impact on Oil & Gas : Feeling the heat

FROM **POWERING** TO **EMPOWERING**



Lighting up the dreams of our North East

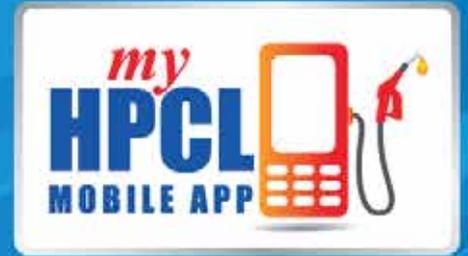
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From the Director General



This quarter PetroFed completed 14 years of existence. Within this period, PetroFed has carved a niche for itself as an apex Society to promote growth & development of the oil & gas industry. PetroFed has also become an effective platform for raising the issues & concerns of the oil & gas sector.

The PetroFed Oil & Gas industry awards, introduced in 2007, were distributed by Secretary, MoP&NG, Shri K. D. Tripathi on August 8, 2016. The Awards function is the most cherished event for the Oil & Gas industry. This year we changed the format of the Awards Ceremony by adding lecture by an industry expert, conducting panel discussions on 'Impact of GST on Oil & Gas Industry', release of study report on impact of low oil prices and presentation of the market survey conducted by PetroFed & Eye On. The new elements added to the gala Awards evening brought in more vibrancy to the Ceremony.

The PetroFed & Eye On survey results released during Awards Ceremony indicated strong investors' confidence in the industry's oil & gas market and the investment conditions. As per the Survey results, new government policies like Hydrocarbon Exploration and Licensing Policy (HELP) have been received positively. A large majority of respondents were of the opinion that developing a gas-based economy is the most efficient way to curb CO₂ emissions in India. In this survey 83% of the respondents rated current investment conditions in India as positive, with an even higher number, 89% and 92% of those surveyed stating that investment opportunities will continue to exist in the mid- and long-term respectively. 85% of the respondents felt that policy reforms have also brought in more transparency.

As a part of the project on 'Accelerating India's transition to gas' taken up by PetroFed alongwith IHS & ICF with support of British High Commission, workshops were organised

on August 23 at New Delhi and on September 17, 2016 at Bengaluru in which we had the presence of the Hon'ble Minister; Joint Secretary, MoP&NG; CEOs and leaders from the industry. The workshops were organised to deliberate on steps required for facilitating infrastructure development, expand existing markets and create new markets for increasing gas share in total energy mix.

Further, to develop a gas based economy in India, PetroFed in partnership with CII and Natural Gas Society has initiated a national campaign 'Gas4India', which was launched by the Hon'ble Minister on September 6, 2016. #Gas4India is a unified cross-country, multimedia, multi-event campaign to communicate the national, social, economic and ecological benefits of using natural gas as the fuel of choice to every citizen who uses, or will use in the near future, gas in any way - to cook, travel, light their homes, and power their businesses. The year-long campaign also hopes to connect with youngsters, who will inherit this nation, and inform them about this cleaner, greener fuel of the future. The #Gas4India campaign includes social engagement via Twitter, Facebook, YouTube, LinkedIn and its official blogsite, as well as hyper-local, offline events to directly connect with consumers through discussions, workshops, and cultural events.

The landmark GST Bill was introduced in the parliament on August 3, 2016. The historic tax reform will help our economy and pave the way for a common market across the country, subsuming a raft of state-level taxes. However, the exclusion of Crude oil, Natural Gas, MS, HSD and ATF ('excluded goods') from GST will hurt the petroleum industry adversely, and accordingly we had made a representation to Government on 21st July 2016. It was highlighted that the main concern of the industry was with regard to non-availability of input credit and the consequent stranding of taxes in their hands in GST regime. The Government was requested to address this issue and two options were suggested in this regard. Further, PetroFed along with industry members met Government officials at various levels including Commissioner GST to represent the case of the petroleum industry with regard to GST. Simultaneously, we organized workshops/round table meetings on GST by inviting senior Government officials from Ministry of Finance particularly those who are involved in implementation of GST. We are constantly pursuing the matter and are hopeful that an amicable solution will be found.

On 16th September 2016, Ministry of Road Transport & Highways (MORTH) issued gazette notification for BS VI vehicular emission norms and corresponding fuel quality specifications of commercial gasoline and diesel fuels which will be effective from April 2020. We are happy that Government has favorably considered the representations of PetroFed on the requirements of Indian Refiners for quality parameters of commercial BS VI gasoline and diesel while meeting the environmental objectives. Specifications in respect of Octane

numbers of gasoline, flash point and density of diesel were maintained as per the demand of Refiners.

Our PetroFed Society is soon going to be amalgamated with PetroTech Society. It is hoped that with merger of the two bodies, it may be possible to serve better towards the growth of India's oil & gas industry. I hope the amalgamated Society will be able to better address the issues related to the petroleum sector.

Dr. R. K. Malhotra
Director General

Petroleum Federation of India

Core Purpose Statement

- » To be the credible voice of Indian hydrocarbon industry enabling its sustained growth and global competitiveness.

Shared Vision

- » A progressive and credible energy advisory body stimulating growth of Indian hydrocarbons sector with global linkages.
- » A healthy and strong interface with Government, legislative agencies and regulatory bodies.
- » Create value for stake holders in all our actions.
- » Enablers of collaborative research and technology adoption in the domain of energy and environment.
- » A vibrant, adaptive and trustworthy team of professionals with domain expertise.
- » A financially self-sustaining, not-for-profit organization.

For more details, kindly visit our website: www.petrofed.org

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Impact of Increasing Refining Capacity on Global Crude Trade Flow

Cover Story

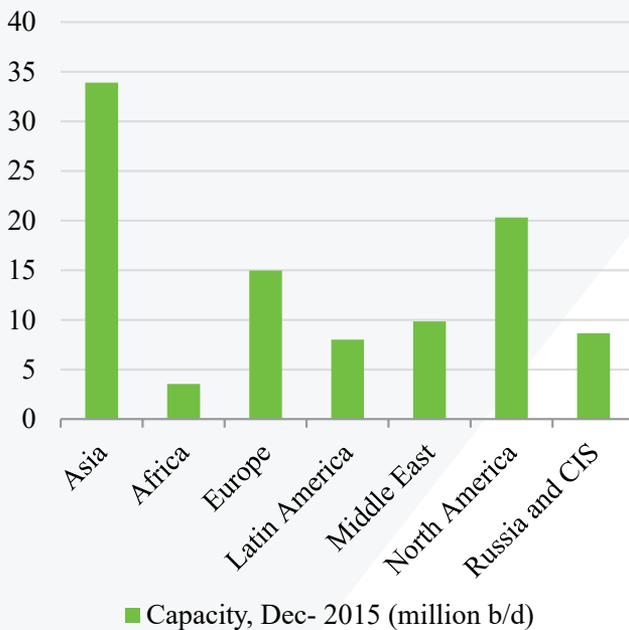


Dr. Habib Khan
Analyst, Downstream,
Stratas Advisors

Refining

Refinery capacity is expected to increase globally till 2035 even though Europe will experience decline. The majority of the global increase in the refinery capacity is expected in Asia, Latin America and Middle East regions. This uneven increase in refinery capacity will impact global crude trade flow.

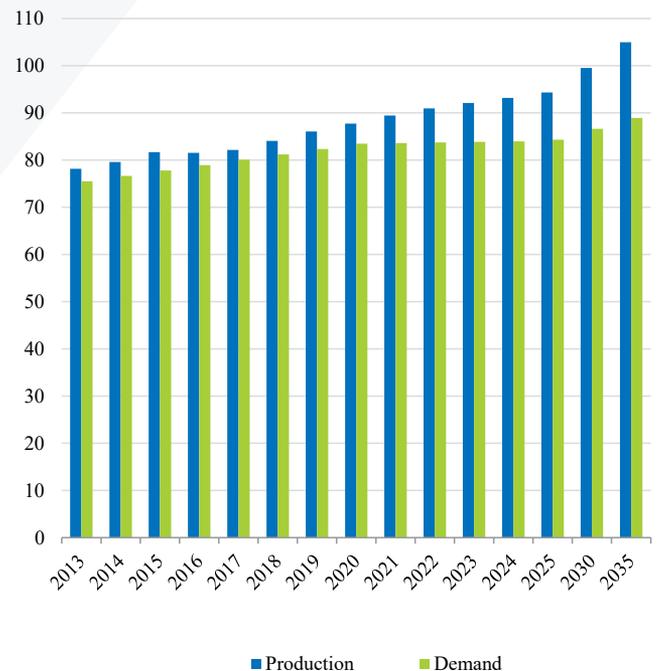
The chart and table below show current CDU refining capacity (million bpd) by region.



Region	Capacity, Dec 2015
Africa	3.55
Asia Pacific	33.90
Europe	14.98
Latin America	8.01
Middle East	9.84
North America	20.32
Russia and CIS	8.65
Global Total	99.25

Source: Stratas Advisors

Global oil markets will continue to require expansion of crude oil production and refining between 2016 and 2035. Non-OPEC sources, driven by North American unconventional crude oil (tight oil and oil sands) and Russian production, will provide much of the supply in the short term. In longer term, OPEC will provide essentially all of the incremental crude oil needs. The chart below shows projected production and

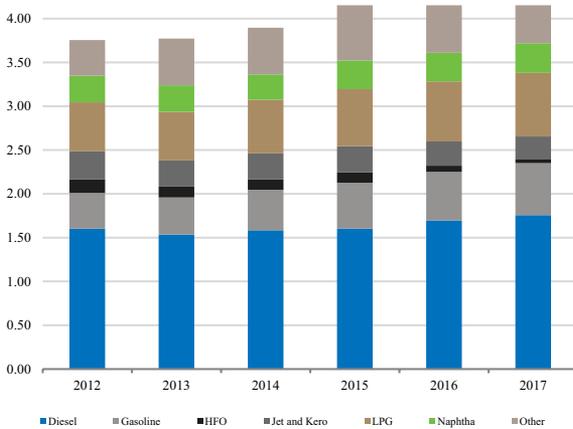


Source: Stratas Advisors

demand of crude oil till 2035. Europe and North America will not have significant refining capacity expansions due to regulations and lack of demand growth. Latin America is expected to have significant refining capacity expansions till 2035. However, worsening political and economic situation in countries like Venezuela and Brazil may impede expansion projects.

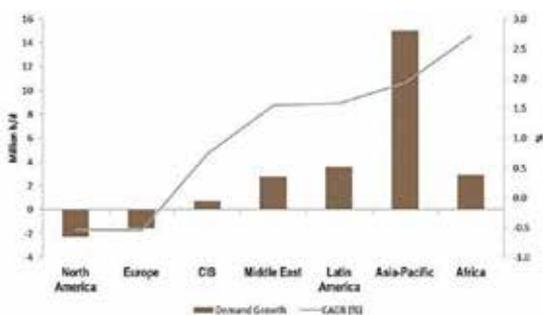
Based on an analysis of demand outlook, global market availability of products and existing refining capacity in Africa, it is projected that there is no need to add crude oil distillation capacity in the region. This assumes a significant increase in utilization of all existing capacity in the region. Aggregate utilization for the region is projected to increase from 68% in 2014 to just below 95% by 2035. Many projects have been announced in Nigeria; however, the country is burdened by a situation in which existing refineries are underutilized and security is minimal. Therefore, making any prediction about the success of individual projects is extremely difficult. Since 2012, Nigeria focused on revamping and increasing the utilization of its four existing refineries, which should preclude construction of any large refining centers. The plan to privatize the refineries seems to have been abandoned for now. While the large projects are uncertain, progress has been made in the construction of so-called modular refineries, which have capacities below 20,000 bpd. Two refineries with a combined capacity of 8,000 bpd came onstream in 2011. As utilization tightens in the coming years, countries like South Africa may expand refining capacity and overall utilization may never reach 95%.

The Asia-Pacific region will be the primary driver of crude oil and refined product demand, refining capacity and global

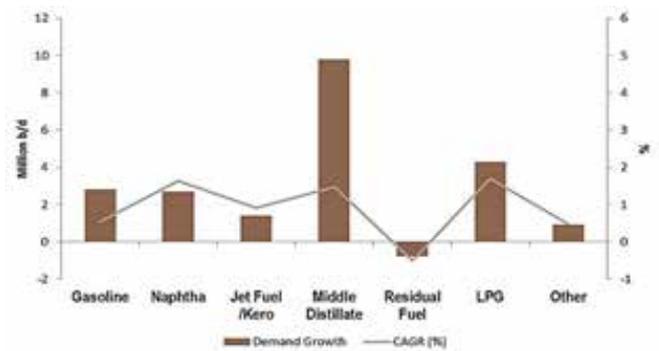


Source: Stratias Advisors

trade flow until 2035. Although Japan (included in the Asia-Pacific figures) is projected to experience a significant decline in the next few years, demand growth in entire Asia-Pacific region will account for staggering 71% of the increase in worldwide refined product volumes.



China's is by far the largest factor in Asia-Pacific demand, accounting for about 58% of the growth in the region. The demand growth in China alone, 8.70 million b/d from 2014 to 2035, will far exceed total growth in every other region. China's petroleum product growth will average 2.9% per year. Demand will be driven mainly by growth in transportation fuels.



Source: Stratias Advisors

India is the second largest factor in Asia Pacific demand. Increased demand will support India's announced mega projects. More projects are expected till 2035. The figure below shows India's trend of increasing product demand.

Product Demand Trend of India (million bpd) Latin America will account for the second-largest portion of growth in demand (17% of global product growth), followed by the Middle East (13%).

The figure below presents global demand growth by individual product from 2014 to 2035. Middle distillate is projected to have the largest volumetric growth, but naphtha and LPG demand will be growing at faster annual rate. The main middle distillate driver will be continuously increasing demand for transportation diesel around the world. Even in some regions where the demand for most products will decline, middle distillate demand will increase, at least temporarily.

The only product group that will undergo a global decline is residual fuel. This will occur despite its growing use in marine markets in some regions. The main driver of the declining global demand will be its substitution in power generation and industry by alternative low-carbon fuels such as natural gas, and in the longer term renewables.

In the growth of the jet fuel/kerosene group is a hidden decline of kerosene. Kerosene's demand for heating and domestic use will decline for the same reasons as residual fuel - fuel substitution.

Source: Stratias Advisors

The table below shows some of the largest refinery projects worldwide

Country	Refinery Location	Capacity (bbl/d)	Start Year
Kuwait	Al Zour	600,000	2018
UAE	Fujairah	500,000	2020
Saudi Arabia	Jazan	400,000	2017
Saudi Arabia	Ras Tanura	400,000	2020
Nigeria	Dangote	400,000	2018
India	Maharashtra	360,000	2017
India	Orissa	300,000	2018
Malaysia	Pengerang	300,000	2019
China	Zhangjiang	300,000	2018
Iraq	Nasiriyah	300,000	2020
Ecuador	Jaraminjo	300,000	2020

A summary of the impact of increasing refining capacity in different regions is presented below.

North America

Crude oil trade flow from Middle East to North America is expected to increase from 2.3 million bbl/d to 2.84 million bbl/d in 2025. Trade flow from other regions to North America currently is small and expected to be small till 2035.

Latin America

Crude oil trade flow from other regions to Latin America currently is 0.682 million bbl/d. Trade flow to Latin America is expected to reach a peak by 2025 at 0.89 million bbl/d. The majority of the increase will come from Africa (from 0.346 million bbl/d to 0.45 million bbl/d).

Europe

Refinery capacity in Europe is expected to decrease by 0.37 million bbl/d by 2020. Capacity is expected to increase from

2021 to 2035 by 0.26 million bbl/d. That means the capacity in 2035 will be less than the current capacity. Crude oil trade flow only from Africa to Europe is expected to increase from 2.633 million bbl/d (current) to 2.85 million bbl/d in 2035. Trade flow from Russia and CIS to Europe is expected to remain flat through 2035. Trade flow from rest of the regions to Europe is expected to decrease over time.

Asia

Asia will experience the largest increase in refinery capacity from current 30.6 million bbl/d to 34 million bbl/d by 2035. Crude oil trade flow from Middle East to Asia will increase from current 13.6 million bbl/d to about 15 million bbl/d by 2035. Flow from Africa to Asia is also expected to increase from current 2.25 million bbl/d to 2.5 million bbl/d by 2020, and then remain at a steady level. Crude trade flow from North America to Asia will decrease gradually and reach almost to zero by 2030. Trade flow from Russia & CIS region to Asia is expected to decrease from current 1.5 million bbl/d to 1.16 million bbl/d by 2025 and then gradually increase afterwards.

Africa, Middle East, Russia & CIS

Refinery capacities are expected to increase gradually in all these three regions. However, crude oil trade flow to these regions from other regions will remain insignificant.

The table below shows largest changes in crude trade flow (million bbl/d)

From Region	To Region	By 2025	By 2035
Middle East	Asia	0.9884	1.4374
Middle East	North America	0.5439	0.4509
Africa	Asia	0.2551	0.2751
Africa	Europe	0.0465	0.2265
Africa	Latin America	0.1107	(0.1394)
Latin America	North America	(0.0362)	(0.1552)
Latin America	Europe	(0.2846)	(0.2846)
Latin America	Asia	(0.6928)	(0.8481)

Source: Stratas Advisors



Behavioural Safety Management in Oil & Gas Industry: Indian Research



Dr. Harbans Lal Kaila
Former Professor of Organizational Psychology, SNTD Womens' University, Mumbai

Health, Environment & Safety

Introduction

Organizational, BBS is an employee empowerment and responsibility to progressively create and sustain total safety culture. Indian Corporates have now recognized that the unsafe behaviour of employees greatly hit the company's business and its balance sheet and it is hoped that people at workplace would involve to put their efforts to prevent the pain, suffering and financial losses brought about by accidents and related injuries at work (Health and Safety Executive, 2005). While inaugurating a safety seminar, a plant manager of an oil industry stated, "our productivity is going to hamper if we don't efficiently implement behaviour safety practices.

We should be recognized as a safe organization". Another safety manager said, "sustainability being a core value of organizations today, behaviour safety approach provides us the best sustainable safety for our fellow employees and workmen". Another manager expressed, "safety mostly suffers as an attachment to the contractor, hence the financial responsibility should be of the contractor but safety responsibility must be held with the company" (Kaila 2010)

Safety officers and plant heads of Oil and Gas organizations across India listed a set of safety compromises they allow and the violations employees practice regularly (Kaila 2013), as below :

- Production targets contradict safety
- Work permit rules are violated
- Global/horizontal corrections are not done
- Top management is more concerned about sale not safety
- Pressure from seniors that load had to go for marketing
- 'No safety - No operations' is a clear instruction from the top management but it is not practiced, as the sync between top, senior, middle, junior employees is lacking.
- PPE are given by the contractors but the quality of PPE is compromised often.
- Officers and contract workmen are checked differently by the security personnel at the gate. Seniors are not checked but workmen are thoroughly scrutinized.
- Speed limit of vehicles by company officers is not complied.
- Safety briefing before issue of work permit is overlooked/not practiced.
- Production capacity as per OISD guidelines is not followed. Production often exceeds the plant capacity.
- Mock drills and night inspections are compromised for production targets.
- "Unsafe is ok" is the unconsciously driven mindset in Indian industry what needs a change through BBS approach.

Indian industry is now witnessing a positive transformation in safety management. The behavioural trends across 9 sites in India during the year 2015 (Table 1) indicate the varying degree of safe and at-risk behaviours that exist in industrial settings. The correction of at-risk behaviour varied from 30% to 93% and the safe behaviours after correction ranged between 86% to 99% that shows a healthy effect of BBS intervention across sites (Kaila, 2016).



Table 1: Behavioural Trends across 7 Sites in India

Location	Number of Observations	Safe Behaviour	At-risk Behaviour	Corrected Behaviour	Correction of At-risk Behaviour	Safe Behaviour after Corrections
1.	837	641	196	167	85%	97%
2.	5066	4336	730	482	66%	95%
3.	727	590	137	128	93%	99%
4.	154	118	36	18	50%	88%
5.	392	282	110	94	85%	96%
6.	661	506	155	119	77%	95%
7.	161	128	33	10	30%	86%

Concerns of BBS Steering Committee

The major concerns of the BBS Steering Committee included key elements of the BBS Project which were shared at the Corporate Meeting of a large Gas Company in March 2015 as below:

1. Whether HODs are aware of the existing at-risk behaviours?
2. Is BBS really becoming a line function?
3. Are motivational awards for observers/lead trainers in place?
4. Is BBS a part of the monthly operational review as 20% behavioural risk exists for operations?
5. In 6 months, 38% injuries decreased, safe behaviors went up from 70 to 80%, number of observers increased but BBS training is not fully completed for all employees/contract workmen.
6. What is the action plan for achieving zero at-risk behaviour for HODs?
7. BBS banners are still not visible in the plant areas.
8. Quarterly external review is needed for BBS follow-up by the expert.
9. BBS sustainability is simple if we focus on zero compromise/tolerance for at-risk behaviours. Regular refresher training for existing BBS observers is needed for keeping the momentum on.

Some of the remarks made by the senior managements across Indian work sites are: safety culture is being improved in many aspects as a result of BBS implementation. BBS has made a positive impact on the day to day working by way of enhanced safety consciousness and concern among majority of employees including contract employees towards safe behaviours.

In overall, there is a significant change in safe behaviours and involvement of employees and contractors. The employees

are committed for building safer organization marching towards zero incidents and no harm culture for which BBS must sustain in the company. Continuity of BBS approach is the success mantra for total safety culture (Kaila, 2014b).

BBS Queries & Concerns of CMD of an Oil & Gas organization

Query: 1. What is the critical take away from BBS journey?

Reply: The critical take aways from BBS journey are: undoubtedly the heightened involvement of people and clarity about the criticality of unsafe behaviours at site and its spot-correction. However, it needs to be further drilled down amongst contract workmen that need regular emphasis and accountability by the HODs which is evidently less.

Another outcome of BBS is the declining trend in unsafe behaviours. Critically speaking, the major take away would be to compare and comprehend the safety incidents record before and after the launch of BBS. This is very significant for reaching towards zero injury and zero at-risk behaviour at sites. However, this would take a couple of years.

Query: 2 Is there any internal assessment being done on the effectiveness of BBS program?

Reply: The internal assessment is being done on the effectiveness of BBS program through the monthly meetings of the BBS steering committees and the functional committees. What weakens the effectiveness of BBS program is the passive leadership of HODs and their weekly interaction with lead trainers. The leadership for safe behaviours from EICs is still not up to the mark. What further weakens the BBS implementation is the lack of sufficient motivation, reward and recognition for the BBS lead trainers. The ongoing identification of gaps through follow-ups and hand-holding by the expert would ensure complete BBS implementation and its continual effectiveness. Both the qualitative (the field interactions/meetings) and quantitative (data drive) effectiveness index need equal emphasis.

Query: 3 Is there any individual feedback system for people undergoing this BBS program, in case it is, what is the feedback?

Reply: The feedback is the risk-based conversation, spot correction and counselling on the unsafe behaviour observed and safe behaviours appreciated by the trained BBS observers. However, all trained observers are not active, hence this individual feedback system is weak as because there is a lack of weekly interactions between lead trainers and observers to regulate this feedback process. What would really strengthen the BBS performance in the organization, is the monthly BBS observations/feedbacks essentially being linked to the individual KRA/KRO of employees. The corporate monitoring through monthly reporting from the participating sites in the BBS project serves as a strong tool and the real time feedback mechanism to sustain its implementation. Finally the continual leadership of top management over the years would assure and sustain the BBS full implementation practicing of safe behaviours by all sites (Kaila, 2015).

BBS implementation brought out a number of positives

BBS is a whistleblower on the behavioural risks which are apparently business risks like violating standard procedures and so on. BBS means when you are walking through your work place and observe that somebody is working with such a risk, you stop for a couple of minutes and alert him for spot correction as a big brother not as boss, and this correction procedure is developed in the organization as a regular way of work life involving everyone including all top to bottom, and this entire BBS activity is measured in a scientific way each month (Kaila, 2015).

The lead trainers from all India locations in September, 2016 narrated that the BBS implementation at GAIL brought out a host of positives such as:

- » The observers /lead trainers are now involved in training in addition to HSE staff.
- » The frequency of safety meetings has increased.
- » The safety awareness and compliances have gone up.
- » People are working more safely (safe behaviours increased from 65 to 85 percent).
- » There is an increased focus on behaviour and a structured approach is being used.
- » There is a distribution of safety ownership. Safety culture has evolved.
- » Contractor involvement in safety has boosted.
- » There is a shift in safety culture from reactive/dependent to independent/ interdependent.

Sustainability of BBS

BBS project to sustain requires continuous corporate guidance, handholding, feedback, mentoring, etc (not blaming, fault-finding ever). Importantly it also requires the continuity of risk-based conversations (RBC) between an observer and observee that means how passionately an observer conveys the risk.

In order to develop sustainability for BBS at site, a set of 12 actions are suggested (Kaila, 2016):

- a. Cultural-shift measurement survey from reactive, dependent to independent, interdependent level
- b. Accuracy and quality of behavioural index
- c. Management engagement (frequency of monthly steering meetings)
- d. Frequency of observations and corrections
- e. Continuity of awareness building and strengthening risk-based conversations
- f. Awards, recognition and motivation of observers, mentors and departments
- g. Comparing injury/accident data before/after BBS launch
- h. Linkage of BBS with employee performance management
- i. Departmental leadership commitment at HOD level
- j. Difference between BBS data and field reality
- k. Propaganda/publicity of BBS at site
- l. Extensions to road safety, home, personal life corrections, neighborhood industry.

CONCLUSION

To conclude, if we hope to put an end to the human, financial, production and business losses due to accidents at work areas, then we need to essentially empower our human resource to get rid of their at-risk behaviours through BBS implementation and sustain it by involving all of them. To re-emphasize and caution all concerned, it is easily predictable that the workplaces that have not implemented behaviour safety monitoring must expect minor or major incidents anytime in future, as hundreds of unsafe behaviours go un-rectified on daily basis. Finally, BBS application holds promise for achieving of totally safe industry to work for each of us.



Political and Market Conditions Delay Uniform Approach for Fuel Quality

Marketing



Huiming Li
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Fuel quality improvements continue to focus on issues surrounding sulfur and octane (gasoline) because of the legislative and regulatory developments occurring globally for them. Of the two, sulfur reduction continues to be the key focus of governments and industry stakeholders globally. Notably, other properties such as benzene, aromatics, olefins, RVP in gasoline, and cetane, lubricity, density, polyaromatics, cold flow in diesel etc. are important as well, but there is lesser regulatory activity for them at this time.

Drivers for the further tightening of fuel specifications include:

- » Deteriorating air quality and public health due to rapidly growing vehicle fleets and fuel demand;
- » Alignment/harmonization with fuel specifications of the EU (CEN) or the U.S. (ASTM); and
- » Enable use of more advanced vehicle emission controls and systems.

In analyzing the trends occurring in local, regional and global fuel quality, Stratas Advisors selected the world's top gasoline and diesel markets for comparative analysis. As shown in the table below, some of the top markets include the U.S., China, Brazil, Japan and India.

Top Gasoline and Diesel Markets

Rank No.	Country	2014 Gasoline Demand(1) (thousand b/d)	Country	2014 On-Road Diesel Demand (2) (thousand b/d)
1	U.S.	9,078	U.S.	2,765
2	China	2,330	China	2,010
3	Brazil	1,005	India	968
4	Japan	912	Brazil	789
5	Russia	843	France	693
6	Canada	808	Germany	664
7	Mexico	751	U.K.	480
8	Indonesia	533	Italy	469
9	Saudi Arabia	522	Spain	418
10	India	455	Japan	410

Notes:

- (1) Volumes include ethanol and other blending components such as ethers.
- (2) Volumes include biodiesel (as FAME, HVO, etc.) and GTL diesel where applicable.

Source: Stratas Advisors, August 2016

GLOBAL FUEL SPECIFICATIONS

Most countries are reviewing gasoline and diesel specifications and trying to align their fuel parameters with regional or international standards. Even if some regions are already harmonized, it will still take some time for others to achieve this goal. Developing countries are in the progress of primarily reducing sulfur content, but also looking at decreasing benzene, aromatics and olefins content, while both developing and developed countries alike have plans to further increase octane. The timeframe for implementation of stricter harmonized standards will vary country by country, since there are different configurations in place for their refining industries, varying fuel import sources, diverse vehicle fleets and/or erratic political and market conditions.

SULFUR

Sulfur has a significant impact on vehicle emissions by reducing the efficiency of catalysts. Sulfur also adversely affects heated exhaust gas oxygen sensors. This means that reductions in sulfur will provide immediate reductions of emissions from all catalyst-equipped vehicles on the road. As sulfur levels are reduced, they often indicate the emission reductions that occur with different vehicle technologies. For example, a requirement for 150 ppm sulfur gasoline corresponds with the implementation of Euro 3 emission standards for new gasoline vehicles and likewise 50 ppm for Euro 4 standards.

Sulfur continues to be the key parameter of focus for gasoline and diesel. Current gasoline and diesel sulfur limits worldwide vary from 10-15 ppm in the most developed regions to 10,000 ppm in developing countries. In the next 5-10 years, several countries are expected to reduce gasoline and diesel sulfur to 50 ppm and below, although reduction to 150 ppm and above is still ongoing in several developing countries (see maps below).

Notably, many countries are leapfrogging (i.e., skipping interim decreases in sulfur reduction) since it may be more cost-effective for refiners when investing in refinery upgrades.

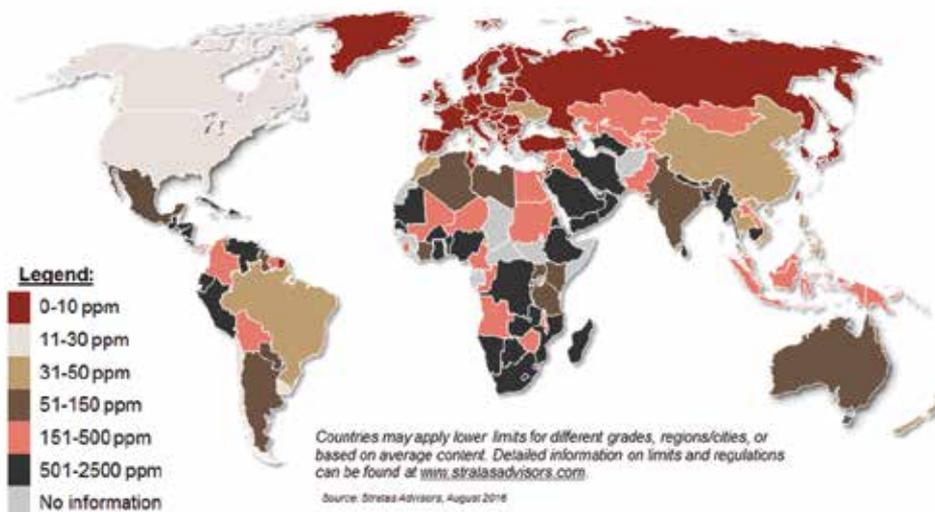
For example, countries such as Saudi Arabia and the Republic of South Africa are leapfrogging from gasoline sulfur levels as high as 1,500 ppm to as low as 10 ppm. However, there are also countries that continue to follow the traditional route of reducing first to 150 ppm for gasoline or 350 ppm for diesel, then to 50 ppm and eventually to 10 ppm. These typically apply to the larger countries such as China, India and Russia.

Generally, plans to reduce sulfur will only proceed depending on the progress of refinery upgrades of desulfurization units or distribution of the lower-sulfur fuel product on schedule.

Maximum Gasoline and On-Road Diesel Sulfur Limits (2016)

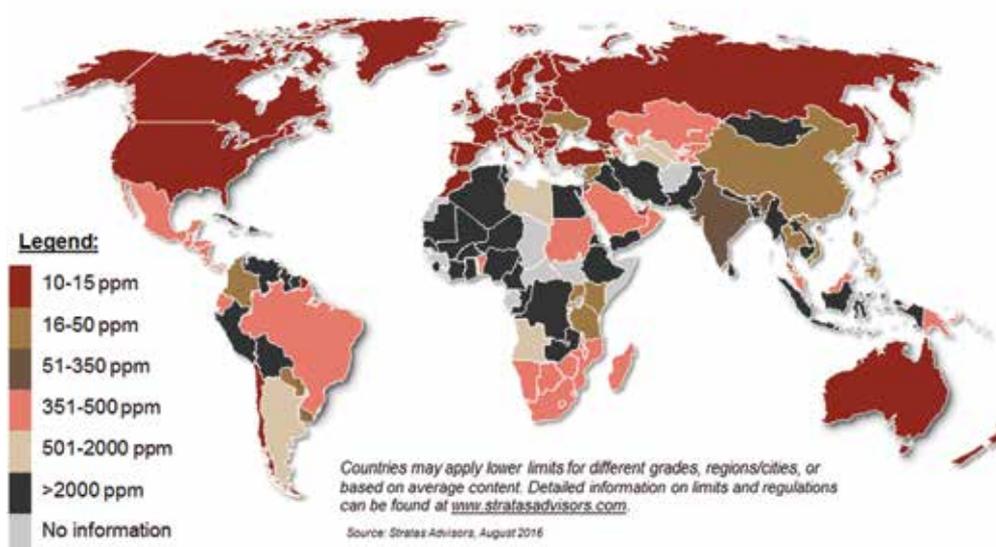
Max Sulfur Limits in Gasoline, 2016

Russia implemented 10 ppm since July 2016



Max Sulfur Limits in On-Road Diesel, 2016

Russia implemented 10 ppm since January 2016



Source: Stratas Advisors, August 2016



OCTANE

Octane continues to be an emerging issue with sulfur reductions being implemented for gasoline across the world, and also as more countries have plans to further increase octane to enable advanced emission control technologies and improve fuel efficiency on vehicles.

Octane is regulated in various regions and countries using different approaches. Many countries establish minimum RON and MON levels for gasoline, whereas AKI is used in others such as the U.S. Generally, it is required that refueling pumps indicate the octane level being sold as vehicle technologies require different octane and one or more grades can be found at the pump. Other factors for setting legislative octane limits include refining complexity for gasoline production, quality of gasoline imports, gasoline blending (oxygenates being used) and market competition driving distinctions among gasoline grades.

Notably across the world, current gasoline octane grades range widely from RON 80 to RON 100, or AKI 81 to 91 in the Americas. Most countries have two or more grades available on their markets as shown in the table below. In six of the Top 10 markets outside of the Americas, they do not share a common gasoline grade and it is observed that the RON 95 grade dominates the gasoline pool in the EU-28 member states, while 87 AKI is observed to be a common grade in the Americas. In fact, ASTM International is considering setting a minimum of 87 AKI in the U.S.

Current Market Share of Gasoline Grades by Octane in Top Gasoline Markets (in %)

Country/Region	RON < 91	RON = 91	91 < RON < 95	RON = 95	95 < RON < 98	RON ≥ 98
China	5	-	85	10	<1(1)	
EU-28 average	-	0.6	-	65.6	27.8	6.1
India	-	99	<1	1	-	<1
Indonesia	96.0	-	3.5	0.5	-	-
Japan	89.2	-	-	-	-	10.8
Russia	1.0	-	66.6(2)	31.3	-	1.1
Saudi Arabia	-	65	-	35	-	-
AKI(3)	min. AKI = 87	min. AKI = 89	min. AKI ≥ 91			
Brazil	>99	-	<1			
Canada	89.8	1.5	8.7			
Mexico	89.2	-	10.8			
U.S.	84	6	10			

Notes:

- (1) Select cities
- (2) Grade A-92
- (3) AKI = (RON+MON)/2

Source: Stratas Advisors, August 2016

Current markets offer various options to obtain octane. Typical and new additives and blending components used to improve octane around the world include the following:

- » Refining streams (alkylate, isomerate, reformat);
- » Aromatics (benzene, toluene, xylene);
- » Ethers (ETBE, MTBE, TAME);
- » Alcohols (ethanol, methanol);
- » Metallic additives (iron, lead, manganese); and
- » Amines (monomethylaniline [MMA] / N-methyl aniline [NMA]).

The table below shows a wide variety of the top gasoline markets' current and future options to enhance octane in gasoline, where MTBE and ethanol appear to be the more popular options. Lead has largely been phased out worldwide with Algeria to be one of the last standing countries using leaded gasoline today.

Current and Future Octane Enhancers Used in the Top Gasoline Markets

Rank No.	Country	Current Octane Enhancers Used	Future Octane Enhancement Options
1	U.S.	Ethanol(1)	Ethanol
2	China	MMT, MTBE, methanol, ethanol	MTBE, methanol, ethanol
3	Brazil	Ethanol	Ethanol
4	Japan	ETBE	ETBE
5	Russia	MTBE, NMA(2), TAME, ETBE	MTBE, TAME, ETBE
6	Canada	Ethanol	Ethanol
7	Mexico	MTBE, TAME	MTBE, TAME, ethanol
8	Indonesia	HOMC(3)	HOMC, MTBE, ethanol
9	Saudi Arabia	MTBE	MTBE
10	India	Ethanol	Ethanol

Notes:

- (1) Refiners are required to blend ethanol under the federal Renewable Fuel Standard (RFS2) program. Refiners have taken advantage of the octane increase ethanol provides, but if there were no requirement to use ethanol under the RFS2 program, many refiners would likely prefer to use reformat, isomerate and alkylate to enhance octane and not ethanol. Moreover, the variable impact of ethanol blends on volatility has increased the complexity of refining and transporting gasoline blendstocks.
- (2) NMA – N-methylaniline
- (3) HOMC – high octane mogas component, mainly consists of reformates

Source: Stratas Advisors, August 2016

CONCLUSION

Most countries are reviewing gasoline and diesel specifications and trying to align their fuel parameters with regional or international standards. Even if some regions are already harmonized, it will still take some time for others to achieve this goal. Developing countries are in the progress of primarily reducing sulfur content, but also looking at decreasing benzene, aromatics and olefins content, while both developing and developed countries alike have plans to further increase octane to enable advanced emission control technologies and improve fuel efficiency on vehicles. The timeframe for implementation of stricter harmonized standards will vary country by country, since there are different configurations in place for their refining industries, varying fuel import sources, diverse vehicle fleets and/or erratic political and market conditions. Oil price drops as observed in 2015-2016 have also impacted refinery upgrade projects in some regions of the world, e.g. Latin America and Middle East, which have delayed their schedule of low-sulfur fuel implementation in a number of countries.

Legislative developments continue to occur globally for the two parameters of sulfur and octane. Current maximum gasoline and diesel sulfur limits set worldwide still vary widely from 10 ppm to 10,000 ppm. However, the outlook is clear for sulfur reduction to either 50 ppm or 10 ppm within the next 5-10 years.

With demand for higher octane gasoline (RON \geq 95) to enable technologies that can help increase vehicle and engine efficiency, several options are available to meet or increase octane requirements including usage of ethers, ethanol and additives such as amines used mainly in Russia and CIS countries (e.g., NMA). MTBE and ethanol remain the most common octane enhancers used in the top gasoline markets. Stratass Advisors expects that ethanol and biodiesel will continue to be used in the markets with established mandates such as the U.S., Brazil or the EU. Asia Pacific and Latin America will also remain consumers of ethanol and biodiesel, although MTBE will continue to remain popular as a blending component for gasoline. For example, Mexico plans to introduce ethanol to complement the use of MTBE but this will be challenging due to the lower cost of MTBE compared to ethanol and existing policy frameworks. On the other hand, Russia and Saudi Arabia are not likely to use ethanol as an octane enhancer.

It is common knowledge that maximum benefits will be achieved when fuel quality requirements are implemented with stringent vehicle emissions regulations, which enable advanced emission-control technologies and would, in turn, help countries or regions achieve their air quality targets. Governments in some countries have taken this systems approach, particularly with sulfur reduction. Others have not – or have not been able to do so in a coordinated time line – hampered by factors such as refinery modernization costs, or high costs of importing fuels of better quality.





The Undiscovered Country: The Future of Industrial Automation



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Technology

Abstract— The Internet of Things (IoT), and specifically the Industrial Internet of Things (IIoT), has the promise and potential to be the most disruptive influence on automation systems since the advent of microprocessor based Distributed Control Systems. Early architectural styles are emerging for IoT in which ubiquitous sensing is coupled to cloud-borne Data Analytics and Storage systems. This article considers how IIoT technologies should be adapted to create IIoT architectures that enhance the capabilities of automation systems.

THE INTERNET OF THINGS

The development of the Internet over the past three decades has led to connectivity between people, organizations, and businesses on a scale that would have been difficult to imagine when it first emerged in the 1980s. This ubiquitous connectivity is rapidly extending beyond people to “things” as all manner of devices, sensors, controllers and actuators become connected in what is now referred to as the Internet of Things, or IIoT.

IIoT has its roots in the early 1970’s and can be considered to have an Epoch date of 1969, the year that the Internet itself (then ARPANET) was first deployed, when UNIX was released by Bell Labs, and when Honeywell first conceived of a micro-processor based Totally-Distributed Control system (TDC-2000). Given the premise that IIoT is based on the harmonious alignment of the Internet to smart digital sensors and devices, it is clear that ARPANET and TDC-2000 are foundational pillars of IIoT. UNIX is foundational as well as it formed the underlying basis and structure for client-server computing, workstations, Personal Computing, server farms, and virtualization.

The current IIoT landscape is characterized by a large number of emerging application areas and supporting technologies, many of which are still in the early stages of development. The result is that much of the promise of IIoT is still to be delivered and there will inevitably be a certain amount of churn as competing approaches attempt to establish

themselves and the hype surrounding IIoT meets the reality of deploying commercially viable solutions. Nonetheless, the confluence of technology coming together in IIoT approaches do enable new sorts of applications and business models that will undoubtedly create new opportunities and disrupt existing business practices.

The Internet of Things has, to a large extent, been enabled by the rapid emergence of a series of technology inflections. These technologies are virtualization, cloud computing, pervasive networking, big data analytics and machine learning, smart devices, mobility, and cyber security. These technologies enable the new types of systems typical of what is recognized as the IIoT.

These technologies come together in a general architecture that consists of three main domains – the cloud, the network, and the edge – as illustrated in Figure 1.

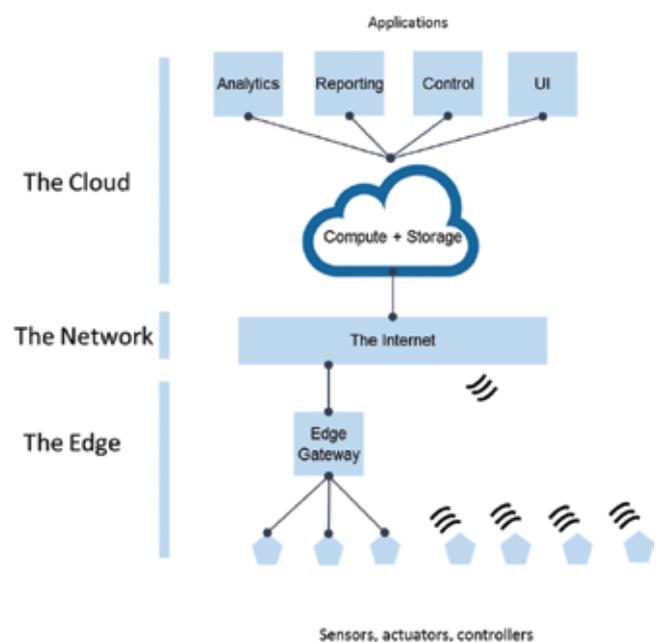


Figure 1 Internet of Things Architecture

The cloud includes compute and storage mechanisms together with applications including analytics, reporting, control and user interfaces. The user interfaces may actually live at the edge and are often combined with sensors as in the case of smart phones.

The network is the means by which the components of the architecture are connected together. This connectivity is built on IP based protocols, some of which are conventional protocols such as HTTP with others being more specialized protocols designed specifically to enable IoT-based applications involving large amounts of data collection and distribution.

The edge consists of the “Things” in the Internet of Things such as sensors, actuators, and controllers. In some cases these devices are connected directly to the network via 3G/4G cellular or Wi-Fi. In other cases an intermediary, an edge gateway, provides connectivity to one or more devices that support only local connectivity.

The next section explores the specialization of IoT for Industrial Automation – the IIoT.

THE INDUSTRIAL INTERNET OF THINGS

The Industrial Internet of Things is, in broad terms, the application of IoT technologies to the planning, running, analysis, and optimization of industrial enterprises. The IIoT approach is being developed in a number of initiatives such as Industry 4.0 and the Industrial Internet Consortium and aim to bring together the means of production (the physical plant) with the advanced Internet-based computational and analytic capabilities to create “cyber-physical” systems that transcend the capabilities and scope of current automation systems. In simplistic terms the IIoT connects the world of industrial Things (sensors, actuators, controllers, robots, etc.) to computational capabilities residing in Internet-based storage and analytics.

A. IIoT vs IoT

IIoT differs from the more generic concept of the IoT with respect to several key quality requirements that result in architectures that expand on IoT approaches. A fundamental difference is that IIoT aims to enhance the operation and management of industrial production processes, many of which involve exothermic reactions for which safety is a primary concern. Security of IIoT-based systems is also of paramount importance not just from a safety perspective, but also in cases of the production of essential and strategically important goods and services. This concern results in more stringent security, reliability, availability requirements and the ability to continue operation with intermittent access to Internet resources. When failures occur, the system must continue operation where possible or degrade gracefully, deterministically, and safely.

Another fundamental difference between IIoT and human and consumer applications of IoT is that an industrial plant is a very long-lived, capital intensive asset requiring long term support in the face of rapid technological advances. This reality requires support for existing, often ageing equipment and infrastructure and a means of protecting investments in intellectual property concerning the planning, execution, and optimization of production activities. In contrast, other applications of IoT involve short product life-cycles that are often driven by whims of fashion and budget. Consumers willing to rip/replace to get improved functionality (e.g., IoT enabled lightbulbs, thermostats, refrigerators, etc.). Similarly, manufacturers generally don't want to retrofit existing appliances as it doesn't move new product – it is part of a planned obsolescence that leads to increased / new sales. On the other hand, it is very expensive to shut down an industrial process to replace / upgrade equipment. Instead industrial enterprises favour keeping things running as long as possible – as exemplified by the huge spare parts business for obsoleted systems. One consequence of this is that many devices that will form part of the IIoT will continue to communicate via existing, often old protocols and will need special mechanisms to integrate them into the wider IIoT environment.

B. IIoT Architecture

Figure 2 illustrates the key elements of an IIoT architecture.

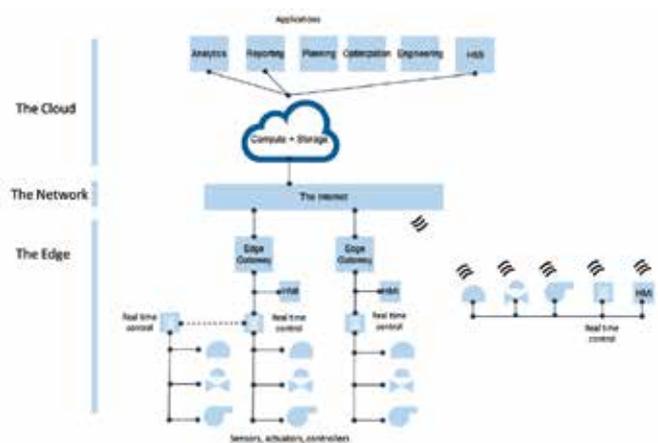


Figure 2 Industrial Internet of Things Architecture

The IIoT edge computing environment consists a wide range of devices including sensors, actuators, controllers, and human machine interfaces (HMIs). These devices are located in close proximity to the production process and may communicate directly with cloud-based services or via an edge gateway that acts as a data concentrator and/or filter and protocol converter. Edge devices may act collectively in a federation of devices to provide an autonomous coordinated set of capabilities at the edge. For example a federation of sensors, actuators, controllers, and HMIs may provide real-time control and management for a process unit or area.

Such a federation would utilize peer-to-peer communication amongst devices using a variety of protocols. While there is a trend toward open IP-based protocols in the IIoT, such as OPC UA, there will continue to be a role for existing protocols such as HART, FieldBus, Modbus, and so on, particularly for existing installed devices. Edge gateways are used to interface heterogeneous devices and protocols with cloud-based services.

1) IIoT vs DCS

Some of the key differences between an IIoT architecture and a conventional DCS architecture can be illustrated by comparing the architectures at their highest levels. The structure of a DCS and associated applications typically confirm to the well understood Purdue Enterprise Reference Architecture developed in the 1990s. The Purdue model structures an industrial enterprise into a series of layers ranging from the physical process (Level 0), basic control (Level 1), area control (Level 2), site manufacturing operations and control (Level 3), and business planning and logistics (Level 4). Enterprise wide business systems, such as ERP systems are often considered as Level 5 of the Purdue model.

This abstract model typically has a corresponding realization in the topology of the system in which boundaries between levels are often expressed as network boundaries across which security can be enforced. Figure 3 illustrates the basic organization of the Purdue model, including a Level 3.5 DMZ that helps segregate the system in terms of access control and cyber security. The IIoT architecture illustrated previously in Figure 2 is, at the highest level, separated into two major subdivisions – the edge and the cloud. This structure can be further broken down into a seven level model, also shown in Figure 3.



Figure 3 Purdue Enterprise Reference Architecture model on the left and IIoT Reference Model on the right

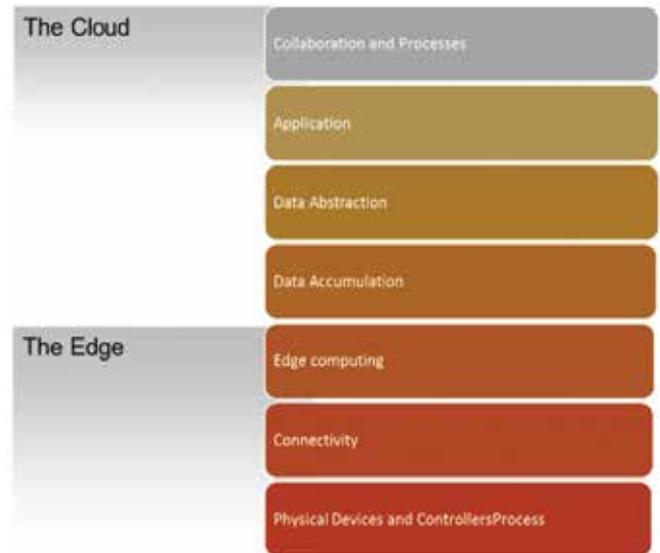


Figure 3 Purdue Enterprise Reference Architecture model on the left and IIoT Reference Model on the right

Applying an IIoT architecture to an industrial enterprise requires reconciling these two different organizational structures so that the key architectural qualities provided by the Purdue model (safety, security, reliability, efficiency) are maintained and enhanced within an IIoT-based structure.

An approximate allocation of Purdue model levels to the basic IIoT partitioning is illustrated in Figure 4. 2)

a) IIoT benefits

IIoT can provide better support for key automation system requirements in the areas of safety, security, reliability, and efficiency.

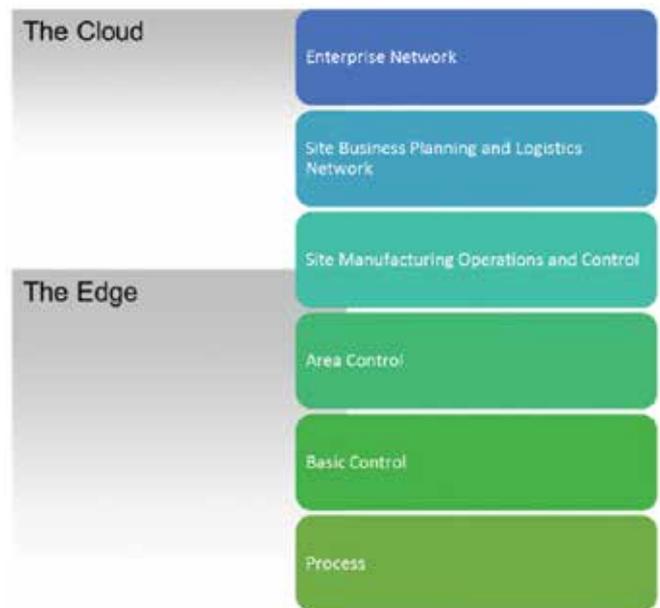


Figure 4 Approximate correspondence between levels in the Purdue model and the basic structure of the IIoT

b) Safety

The overriding concern in any industrial enterprise is safety. There are well-understood and well-developed sets of practices and standards concerning the basic safety of an industrial process. For example, the Safety Integrity Level (SIL) model provides a quantitative measure of the risk reduction provided by Safety Instrumented Systems that are responsible for the basic safety of a process and formalized in IEC 61511. These practices are embodied in products such as Honeywell's Safety Manager that provides a SIL-certified safety platform based on a Quadruple Modular Redundant architecture and the Universal Safety Logic Solver that provide very high levels of reliability even in the face of component failures. There will continue to be a key role for Safety Instrumented Systems in any IIoT based automation system.

c) Security

A concern closely related to safety is that of security. Unless an automation system is secure from unauthorized access and activity its safety cannot be guaranteed. Aside from preventing compromises to the safety of the plant, security also serves to protect the intellectual property inherent in an industrial processes itself and the procedures for planning, scheduling, executing, maintaining, and optimizing production on the process. Increasing levels of computer-based automation have increased the risks associated with cybersecurity attacks and has led to the development of cybersecurity standards and practices such as ISA/EC-62443 (formerly ISA-99).

Many existing DCS components have no inherent security built in. For example, they may lack any explicit access control mechanism and may transmit data on the network in plain text. The legacy components do not disappear in an IIoT-based system, but are confined to the edge computing environment to which access is strictly controlled. Access to legacy DCS components, via edge gateway devices, involves both access control and secure communications.

IIoT also helps by pulling some automation system functionality up into the cloud environment that has rich access control and communications security mechanisms built-in and the centralized nature of the infrastructure makes it much easier to maintain in order to address security concerns.

d) Reliability

The reliability of an automation system can be enhanced both by pushing functions out to the edge and into the cloud. As with safety, pushing functions, especially control functions, out to the edge allows those functions to act more autonomously with fewer dependencies on other components, reducing the potential causes of failure. Moving functions into the cloud allows them to be more easily managed, maintained and upgraded reducing the impact of these operations on the system. The decoupling of edge and cloud-based functions also allows them to be managed much more independently allowing the system to remain operational through a much wider range of life-cycle events. Cloud-based

deployment also makes it very easy to expand a system with additional storage and computational resources in order to facilitate incremental plant expansions.

e) Efficiency

With a production process that is running safely, securely, and reliably, attention can turn to making production as efficient as possible in order to maximize the profitability of the enterprise.

The ability to make the right decisions depends on having the relevant information available on which to base the decisions and a means of determining the course of action to take on the basis of that information.

Collecting more data from uncorrelated sources provides opportunities for applying data analytics, modeling, and machine learning techniques to gain better insight into the current and future state of the enterprise. This information can then be delivered to those in decision making roles in ways that allow the decision makers to act on that information. Decision making can be decentralized and put in the hands of those responsible for the enacting the decision.

Analytics, modeling, simulation, and machine learning techniques also provide additional opportunities for closing the loop and enacting decisions automatically. In these cases, the decision making process can be pushed out to the edge environment to enhance the capabilities of the autonomous elements of the system.

C. Standards

A significant difference between today's DCS and an IIoT system has to do with heterogeneity; whereas a DCS tends to be a combination of a vendor's proprietary technology, the IIoT must accommodate fine-grained use of technologies and functions from multiple vendors, and to do so over a long time horizon. To do this, new standards beyond those allowing for communications interoperability (HART, Foundation Fieldbus, ProfiBus, OPC, etc.) will need to emerge to allow for functional alignment from multiple sources. OPC UA (OPC Unified Architecture) is one such standard; it has protocol support as well as the semantic richness of a well-defined namespace that encourages collaboration across many different application classes (history, alarms, events, control, security, etc.). Although OPC UA won't be the only standard employed in IIoT, it has the potential to be the lingua franca of interoperable and well-bred IIoT solutions.

CONCLUSION

In many ways, the IIoT represents an "undiscovered country", full of promise, but waiting to be explored and mapped out. This article has attempted to map out this undiscovered country and provide pointers to how the promise of future automations systems will be realized. The resulting vision is a new form of automation system architecture that balances the computational and life-cycle benefits of Cloud Computing with the requisite on-premise appliance-hosted capabilities necessary to provide safe, secure and long-lasting automation for complex manufacturing systems and processes.

Tax implications on investments in Discovered Small Fields



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Finance

Oil and gas constitutes a major share of imports of India. In order to bring substantial investment, generate sizable employment and increase in domestic production of oil and gas, the Government of India ('GOI') has introduced new policy regime for exploration licensing viz. Hydrocarbon Exploration and Licensing Policy ('HELP').

Under the new HELP Policy, 'Discovered Small Field ('DSF') bid round: 2016' have been introduced. The GOI has offered forty six (46) contract areas comprising sixty seven (67) discovered small fields spread over nine (9) Sedimentary basins. The prime objective of the round is monetizing discovered fields to boost domestic oil and gas production. Out of these, twenty six (26) Contract areas are located onland, eighteen (18) contract areas are located in shallow water offshore and two (2) contract areas are located in deepwater offshore.

Some of the salient features of the DSF round is as under:

- » The revenue earned from the contract will be shared with the Government under Revenue Sharing Model.

Contract areas	Rates of royalty	
	Crude Oil	Natural Gas
Onshore contract areas	12.5%	10%
Offshore contract areas	10%	10%
Deepwater (beyond 400 meters isobaths)	5% for first seven years; 10% thereafter	5% for first seven years; 10% thereafter

In addition to the aforesaid considerations, it will be important for an Investor / Contractor to analyse important tax deductions / concessions / considerations. Awareness of such aspects will enable the investor to factor-in the tax cost before making a bid for the project.

Direct Tax:

- **Deduction under section 42**

Income earned by a contractor from the exploration and production of oil and gas in India is taxable on 'net' basis

This model is different from earlier regimes where the profits were required to be shared with the Government under Profit Sharing Model.

- » The uniform licence will enable the contractor to explore conventional as well as unconventional oil and gas resources including CBM (Coal Bed Methane), shale gas/oil, tight gas and gas hydrates.
- » Upto 100% participation by foreign companies is allowed in the bid for one or more contract areas. The bidder need not have any exploration and production industry experience.
- » The contractor or producer is free to sell both oil as well as gas produced from the contract area exclusively in the domestic market through a transparent bidding process on arm's length sales principle without any interference of the government.
- » No oil cess is to be levied on crude oil production.
- » Royalty rates payable to government are mentioned as under :

i.e. after reducing revenue expenditure from the income earned in India. Capital expenditure are generally not deductible while computing 'net income' of a taxpayer. However, companies doing exploration and production can claim deduction of exploratory & drilling Expenditure (including abortive or infructuous expenditure) incurred before / after commercial production of the mineral oil under section 42 of the Income-tax Act. This deduction is available only if the same is provided for in the agreement with the Government of India.

The model agreement given under DSF round provides for deduction of expenditure under Section 42 of the Income-tax Act. Thus, the investors can consider this deduction while computing its taxable profits. It is important to analyse this deduction on any expenditure made for acquisition of facilities from the companies who are putting these fields in the DSF Round for doing exploration and drilling.

- **Depreciation**

Under the Income-tax Act, depreciation is generally available at a fixed percentage of the actual cost of asset acquired by a tax payer. Additional depreciation is allowed to a tax-payer, if certain criteria are met.

With respect to DSF fields, the tax-payer is eligible for depreciation on capital expenditure (other than those incurred in respect of exploration and drilling operation), in respect of asset owned by the tax payer and facilities acquired as per rates prescribed under the Income-tax Act. Additional depreciation @ 20% of actual cost will be available in respect of any new machinery and plant (other than ships and aircraft, office appliances, computers, vehicles etc.), which has been acquired and installed.

- **Investment allowance**

Investment allowance is an additional deduction granted to a taxpayer over and above normal expenditure / deduction to boost investments in a particular sector.

In case new plant and machinery (other than ships and aircraft, office appliances, computers, vehicles, etc.) are acquired and installed by the tax-payer on or before 31 March 2017, investment allowance @ 15% of the actual cost is available, provided cost of new plant and machinery exceeds INR 250 million.

- **Site Restoration allowance**

Site restoration allowance is provided to the exploration companies to encourage building a corpus for meeting site restoration obligations in future. To encourage such investments, site restoration allowance are provided for contributions to Specified Bank account. Such contribution is eligible for deduction from the net income of the tax-payer. However, maximum deduction is permitted upto 20% of profits of the taxpayer.

- **Minimum Alternate Tax**

The GOI has clarified that provisions of Minimum Alternate Taxation (MAT) are not applicable to a foreign company, if it does not have a Permanent Establishment in India or is not required to seek registration under section 592 of Companies Act, 1956 and / or section 380 of Companies Act 2013. The Company with Project Office in India to carry-out exploration and production activities will be subject to MAT.

- **Presumptive taxation for service providers**

A non-resident providing services or facilities or supplying plant and machinery on hire for prospecting or exploration or production of mineral oil can opt for presumptive tax regime. In this case, the law provides that profits of the service provider are deemed at 10% of the gross receipts. Applying tax rate of 43.26% (maximum rate applicable) on such profits for a non-resident company, the effective tax rate comes to 4.326% of gross receipts.

Non-resident service provider also has an option to claim lower profits if it maintains books of account and these accounts are audited.

Indirect Tax:

- **Customs duty exemptions**

- a. Custom duty exemption is available on import of goods such as seismic survey equipments, rigs, marine vessels, etc. (which are specifically notified) to be used for petroleum operations in DSF fields. This exemption is available on meeting certain prescribed conditions.
- b. Custom duty exemption is available on parts and raw materials used for manufacture of goods to be supplied in connection with offshore oil exploration or exploitation. This exemption is available on meeting certain prescribed conditions.

- **Excise duty exemption**

Excise duty exemption is applicable on the goods supplied against 'International Competitive bidding' (where such goods are exempt from custom duty). Since DSF fields are subject to international competitive bidding, excise duty exemption can be availed on certain goods purchased by the contractors for exploration and production of oil and gas.

- **Goods and Service Tax ('GST')**

GST will be introduced as new indirect tax, which will subsume various indirect taxes, which are levied by the Central and State Governments. The proposed GST law does not cover Petroleum as of now. Thus, the mineral oil produced from DSF fields will not be subject to GST. However, the input materials, machineries and services procured by the Contractor will be subject to GST. This will result in certain cost escalations on account of indirect tax front.

Apart from the aforesaid generic tax considerations, each investor may wish to invest through different structures for e.g. investments can be made directly from outside India, through an Indian company or a Joint Venture company. Each investment vehicle has different tax considerations and a comprehensive tax study is required to understand tax cost associated with the investment.

The information contained herein is of a general nature and is not intended to address the specific circumstances of any particular individual or entity. The views and opinions expressed herein are those of the author.



A 'Pipe' dream?



Amit Wankhede

General Manager - Upstream
Business Affairs
BP India

Oil & Gas

India, quite contradictorily, bends the global trend in that the dominance of coal and oil has continued to rise and rise.

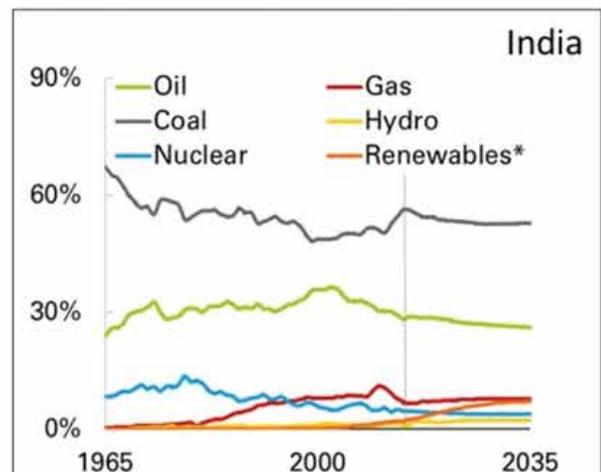
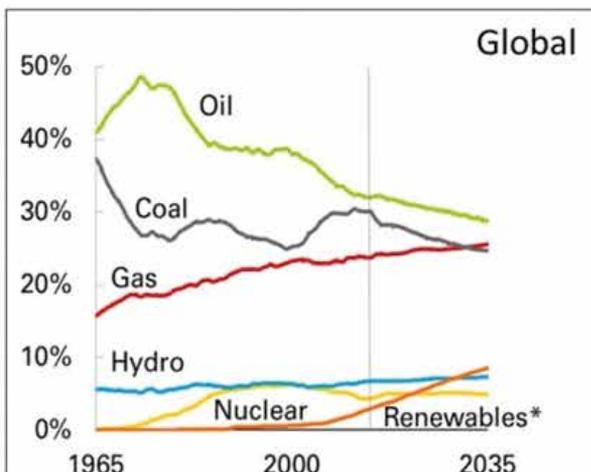
While globally the use of Gas has grown incrementally, contributing a quarter of global energy today, in India its presence is a mere 6% in the energy mix. And if you think that we will catch up soon – don't hold your breath! The pundits predict that gas is likely to remain a poor laggard crawling precariously with 8% share till 2040, in case of status quo.

For India's steadfast economic development, it is incontestable that energy is the growth engine. Environmental and COP21 commitments need clean energy for which renewables, are a partial solution but it will take some time before they become a major component in the energy mix.



'19th Century belonged to Coal, 20th century to Oil while the 21st belongs to Gas' aptly sums up the global energy trend over the last three hundred years.

Shares of primary energy



*Includes biofuels

And it is here that Gas provides the right solution as a bridge fuel: it is readily available, abundant, affordable and acceptable as a cleaner fuel.

For India to transition to a Gas-based economy, country-wide accessibility is a major requirement. This would require creating a robust supply and distribution network through a pipeline infrastructure – in other words, a national gas grid.

What differentiates the success of Dahej and Hazira running over 100% capacity from the initial failure of Cochin is the presence and absence of pipeline connectivity in their respective cases. A CNG taxi driver can ply seamlessly from one city of Gujarat to another due to the existence of CNG Stations connected by pipelines. Think about it - if pipeline connectivity is provided to 50,000 fuel pump stations, it will create an additional revenue stream for dealers and companies alike and give a huge impetus to motorists for opting for CNG vehicles.

While the global prices of gas have slumped and LNG is available at 5\$ at the import terminal, the price the end customer pays today is close to an astounding 9 dollars. This is due to the cascading impact of pipeline tariff, taxation, duties and multiple margins. A robust gas grid will ensure that the customer is able to negotiate with multiple suppliers. These suppliers and marketing companies in turn will have the flexibility to secure supplies from different sources and provide gas at optimal price.

The success of shale in USA and benefits of intensive gas usage in Gujarat are built on the foundation of a strong pipeline network.

Public private partnership (PPP), Government financing and other innovative ideas for funding pipeline projects would clear the path for raising funds. Offering equity to State Governments or partial linkage of tariffs to capacity utilization would also pave the way for multiple stakeholder alignment. Land acquisition is a challenge which can be overcome by utilising access to national and state highways, rail network, along existing oil and water pipelines or land owned by Central government agencies. From 15000 KM currently, the aim should be to double the gas pipeline network to 30000 KM in next 8-10 years. The current low utilization need not be seen as a deterrent for setting a lofty target.

As national highways and railways have created a backbone for development for Indian transportation, optic fibre and transmission tower network have built the telecom industry, the national gas grid and pipeline distribution network along smart cities and Make in India initiatives would establish a gas economy for India.

Then we would not call it a pipe dream!





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GST impact on Oil & Gas: Feeling the heat



Abhishek Jain

Tax Partner, EY

with support from Achal Chawla
and Yash Agarwal, EY

Finance

Goods and Service Tax, the biggest Indirect Tax reform since independence would soon be a reality. The process of amending the Constitution has been completed and the GST Council has been formed. The GST Council and the Government has to now come up with the final legislation which needs to be adopted by the Central Government and respective State Governments.

Amid celebrations and cheers by the Government, industry and stakeholders with the progress on GST front, the oil & gas sector will be left in the cold.

The Constitution Amendment Act has excluded five petroleum products viz. crude oil, natural gas, petrol, diesel and aviation turbine fuel, from the ambit of GST initially and the same shall be included later, on the recommendations of the GST Council, whereas, other petroleum products (e.g. kerosene, naphtha, LPG) are covered within the ambit of GST. Thus the industry would be pained to comply with both the current tax regime as well as the GST regime.

Currently, the upstream sector in the oil & gas industry is suffering from the burden of excise and service tax paid on goods and services as their credit is not available since the resultant products i.e. crude oil and natural gas are not subject to excise duty. Under the GST regime since both these products would be excluded, the upstream sector would not be allowed to take credits of the GST paid on their procurements.

Refiners will pay GST on the procurement of plant, machinery and services for manufacture of MS, HSD and ATF, however, the input GST would not be creditable against the excise duty and the VAT paid on these products.

Apart from reversal / non-eligibility of credits of the GST paid on procurement of goods and services some of the significant impact areas on the oil & gas sector are increase in costs, adhering to compliances under the multiple tax regimes and overall impact on the economy.

The Government is considering a proposal favouring imposition of a modest tax on these products which is expected to be taken up by the newly constituted GST Council.

The idea is to have some minimal tax of about 2% or 3% so that seamless flow of credit is not broken and cascading is removed. Tax at marginal rate may not hurt the consumers much but would be a huge respite for the oil & gas industry as it would address their biggest challenge i.e. availability of GST credits.

Although the Model GST Law (MGL) is in public domain, more clarity is still under the wraps. Irrespective of whether the petroleum products gets included or not under the GST regime, there are other significant issues which need clarity sooner than later for industry to plan from a GST implementation perspective.

Taxability of offshore supplies

GST would be applicable on either inter-state supplies of goods and services or intra-state supplies of goods and services. The intra-state and inter-state supplies would be determined basis the location of the supplier and the place of supply. As per the MGL where the location of the supplier and the place of supply are in the same state the same would be considered as intra-state supplies. Further, location of the supplier and the place of supply are in different States the same would be considered as inter-state supplies.

The definition of 'India' under the MGL extends to the Continental Shelf (CS), Exclusive Economic Zone (EEZ) and any other Maritime Zone i.e. beyond the territorial waters of India. In a scenario, where the place of supply for goods / services is in the CS / EEZ, such supplies may neither qualify as intra-state / inter-state supplies.

The companies in the upstream sector carry out activities of exploration and extraction of crude and gases in the CS/EEZ. For carrying out such activities goods and services are procured by them. In a scenario where on such procurements the place of supply would be in the CS/EEZ it would result into an ambiguity regarding the taxability of such supplies as intra-state/inter-state supplies as CS/EEZ are not part of any State.

Therefore, clarity is required on whether supplies to CS / EEZ would be taxable under GST. In absence of any clarity it would lead to undesired litigation.



Taxability of transportation of goods through pipelines

The definition of location of supplier of service under the MGL includes a fixed establishment other than the establishment for which the registration has been obtained.

In case of cross country pipelines, compressor stations are set up at various places to increase the pressure in the pipeline for transportation of goods. Moreover, due to the fact that pipeline is embedded to the earth there can be a view point that the pipelines and the compressor stations qualifies as fixed establishment and thus, is covered within the meaning of the term location of supplier of service.

Therefore, in case of cross country pipelines there is a fixed establishment in each state from where the pipeline crosses

and such establishment can be considered as location of supplier of services. This results into an ambiguity as to whether the GST would be payable in each state from where the pipeline crosses or only in the state where the supplier of service is registered.

The former view would lead to multiple compliances and registrations. Moreover, the valuation of services for payment of GST would be a bigger issue. The latter view may lead to loss of credits of goods (viz. pipes) used / installed in the states other than the State of registration.

Self-supply of service

Inter-state stock transfer of goods and self-supply of services is taxable under the MGL. The FAQ's released by CBEC on the MGL clarify that inter-state stock transfers / self-supplies



Shri P. Raghavendran, President (Refinery Business), RIL

With GST covering only part of petroleum products Industry will have greater compliance costs and higher amount of stranding of taxes in the value chain. Quite a lot will depend on the rules that are formed subsequently. The zero rating of many of these products that the FM spoke about would solve quite a lot of problems, but if that does not happen in GST council or if alternative measures are not found, industry will end up with higher amount of stranding and higher amount of costs.

Shri A.K. Srinivasan, Director (Finance), ONGC

For the upstream taxes will be stranded. Industry can't take credit because natural gas and crude oil being excluded from GST, while certain products are forming part of it which will makes handling this regime to be a very difficult process. The compliance is also going to be a very difficult proposition because Industry will have to maintain the GST and the earlier existing taxes in the system. Hence this will definitely be a challenging task for the Industry.



Shri Subir Purkayastha, Director (Finance), GAIL

Non inclusion of Gas in GST will definitely increase cost of production for industries using gas like Petrochemicals, Fertilizers etc. because the CENVAT credit which was otherwise available will now be missed. Besides the compliance issue will of course be there. GAIL is dealing in products which are under GST and which are not under GST, so the cost of compliances will go up. GAIL will have to go for registration virtually in every state now. There could be a possible ray of hope if it is covered under the credit regime with zero tax.



Shri A.K. Sharma, Director (Finance), IOC

There are implications of keeping the major petroleum products which are diesel, petrol, ATF, crude and natural gas out of GST but the implications are such which are in the form of stranded taxes While GST is a welcome step for the country and the economy and we fully support it, for the petroleum industry dealing with the dual mechanism both from compliance point of view and cost point of view We are in a most difficult stage as there will be financial burden.



Shri R.K. Garg, Director (Finance), PLL

The point of concern is what is the purpose of taking out petroleum products and that too some of them and at that natural gas out of GST and whether it is because the state governments wanted to keep their revenue intact. It is apprehended that the exclusion of petroleum products out of GST is because the State Governments want to keep their revenue channel intact. If so and considering that the government has already committed to a revenue neutral regime for five years, petroleum products should be included and revenue neutrality be maintained in the new scenario as well. Otherwise it will result in a hybrid situation where we will be having higher cost definitely. There will be cascading impact on the consumer ultimately.



Shri Upender Gupta, Commissioner (GST), CBEC, Govt. of India

We are conscious of the problems and we are examining as to what can be done. GST is an uncharted territory in India and its impact will unfold with the time.. We do not know what would be the impact. At the same time, GST is a decision which has to be taken by Centre and state governments together. For the last 70 years we have been following origin based taxation and now suddenly we are moving towards destination based taxation.



will be taxable even if there is no consideration. However, there is no clarity on what constitutes inter-state self-supply of services under the GST regime. For instance in case of a refinery which has a cross country pipeline to transport crude from one location to another, can it be said that there is an inter-state self-supply of service to the refinery.

For sectors which are included under the GST regime, taxability of inter-state stock transfer of goods and self-supply of services would only result in cash flow issue wherein the tax paid at the state of supply would be available as credit in the destination/consumption state.

However, for the oil and gas sector, since the output would be outside the GST ambit, majority of the GST paid on the stock transfer of input goods and services would be reversed since such goods and services would be used to supply products which are outside the purview of GST.

Dispensing with the concept of 'goods of special importance'

Under the current regime, Article 286 of the Constitution of India empowers the Parliament to declare some goods as goods of 'special importance' and to impose restrictions and conditions in regard to powers of states to levy tax on sale and purchase of such goods and prescribe the rates and incidence of tax on such goods of 'special importance'. Parliament can restrict powers of the State Government to tax such 'declared goods'.

Under the CST Act, declared goods are those declared under Section 14 as 'goods of special importance' in inter-state trade or commerce. Crude oil is included in the list of 'declared goods' under the CST Act and Section 15 of the CST Act states that tax on 'declared goods' cannot exceed 5%. Thus under the current regime, the tax on crude oil does not exceed 5%.

The 122nd Constitutional Amendment Act 2016, has amended Article 286 and the powers of the Central Government to declare some goods as 'goods of special importance' have been withdrawn. Consequently, the State Government would be able to levy VAT at a higher rate on crude oil. Currently, Credit of VAT paid on crude oil is not available in certain states (such as Gujarat). Higher VAT rate on crude oil would be additional cost for the refiners.

Inclusion of subsidy in the value of supply

Under the MGL, any subsidy linked to supply of goods is to be included in the valuation for payment of GST. Oil Marketing Companies are entitled to subsidy on LPG / SKO sold under Public Distribution System (PDS). However, determining of subsidy at the time of sale would be a challenging task. The same may result in interest and penalty at a later stage.

In fact levying GST on subsidy amount and then repaying the same to OMCs at a later date would only result in a scenario wherein the tax is collected at the time of supply and refunded at a later date by way of subsidy. Moreover, by levying GST

on the subsidy, Central Government would lose revenue on account of subsidy provided to the extent of GST pertaining to the States.

Other points

Under the MGL, input tax credit is not available for immovable property. However, the same would be available for plant and machinery which has not been defined. There is no clarity as to whether storage tanks and pipelines would be considered as plant and machinery under the GST regime.

Besides the above anomalies, there are several areas where clarity is lacking such as whether natural gas includes compressed natural gas, liquefied natural gas, lean/rich natural gas, piped natural gas.

Benefits under the GST

Though GST would certainly be an area of concern for the oil and gas sector resulting in increase in costs and compliances under the multiple tax regimes and various unresolved issues, there are certain areas which would definitely result in reduction of costs.

Entry tax savings

The Entry 52 in List II under Schedule 7 of the Constitution of India, giving power to tax goods on their entry in a State has been removed under the Constitutional Amendment Act. Under the current regime, states have the power to levy entry tax on various petroleum products such as Natural gas, for their use, consumption or sale within the state.

Certain states provide for set-off of entry tax against the VAT liability output VAT liability, provided such goods are used in manufacture or are resold. However, in certain states no adjustment is available and the entry tax is a cost. Subsuming of entry tax under the GST regime would certainly be beneficial to the extent entry tax was currently being paid.

Benefit of CST included in the Import Parity Price

Certain petroleum products such as LPG are being valued at Import Parity Price. In case of intra-state sales, VAT being creditable is paid over and above the IPP. However, in case of an inter-state sale, IPP is inclusive of CST. Therefore, under the current regime, on inter-state sale of certain petroleum products there is loss to the extent of CST liability to refineries.

Under the GST scenario since IGST paid on interstate sale would be creditable, the same can be recovered over and above the IPP by the refineries from the customers.

Conclusion

To conclude, the GST Bill in its present form excludes a major portion of the oil & gas industry products thereby excluding the industry from most of the benefits of available under the GST. In addition there would be additional burden on the industry due to dual tax compliances. Thus, the oil & gas industry would largely be negatively impacted under the GST regime and profitability of the industry will be hit.



Occupational safety and health at workplace not a nightmare in Oil and Gas Industry



Dr. M. Ahmad

DGM (HS) Corporate HSE Department
Indian Oil Corporation Limited

Health, Safety & Environment

Oil and gas industry is mother of all industries, because without this energy all other industries shall fail to operate. Besides the hydrocarbons, this industry produces valuable and useful by-products, like Polypropylene, HDPE, Precursor of urea and bitumen, etc. This industry because of its hazardous nature has very high potential to adversely affect the health of the employees and population around. Oil and gas industry has wide range of activity, starting from oil exploration, drilling, transportation of crude and products, refining, storage, distribution and use of products suiting to user industries. Each one of the activities has occupational health issues at workplace. Acknowledging the risks involved is the first step in protecting the health of the employees.

The health hazards in oil and gas industries may be from hydrocarbons in various forms: Crude and its products, chemicals used in processing, additives, effluents, emissions, by-products and chemicals used for treatment of utilities. The health hazards common to any other industry, also affects the employees of oil and gas industry, which may be classified as:

Physical agents and their Health hazards:

Dust: Respiratory problems, Pneumoconiosis, asbestosis

Heat: Dehydration, Heat stroke, Burns

Light: Eye strain

Electricity: Electrical Shock, Burns

Radiation: Burns, bone marrow depression, genetic mutation

Noise: Irritation, disturbed sleep, hypertension, noise induced deafness

Vibration: Altered/loss of function of nerves, Constriction of blood vessels

Chemical agents and their Health hazards :

Acids, Alkalis, toxic gases, mist and vapours, asphyxiant, irritants, corrosives, sensitizers, hepatotoxin, neurotoxin, haemotoxin, nephrotoxin, etc.

The Chemical Hazards may be Organic and Inorganic Substances. It may be in solid, liquid or in gaseous form. It may be Harmless like Nitrogen, ethane, methane or may be Noxious which is further classified as Irritants :NH₃,SO₂,H₂s,NO_x,H₂S

Odourless: CO,CO₂

Asphyxiant: CO,H₂S

It may also be acids or alkalis' or in the form of salts or minerals. The Air-conditioned environment may lead to condition which is termed as Sick Building Syndrome. This may be due to gases like VOCs, and microbes. The chemicals enter human body through contact, Inhalation, and Ingestion.

The Biological agents and their Health hazards :

The Biological hazards may be bacteria like Legeionella. The micro-organism Legeionella thrives in damp warm atmosphere, or where there are wet area e.g cooling towers. Legeionella virus causes Pneumonitis which is difficult to diagnose and treat, and Olivarus (micro-organism for treating oily sludge) which is not harmful to humans at present but in future may turn harmful to humans if mutation takes place.

Mechanical agents and their Health hazards :

Fatigue due to shift duty or long working hours and Non Observance of ergonomic Principles may lead to cumulative trauma disorder, and psychosomatic disorders.

Psychological factors and their hazards :

The Psychological factors that may affect an employee may be occupational stress at workplace due to unclear role, boredom, monotony, competition, or rivalry.

An occupational illness (or disease) is defined by OSHA as, "any abnormal condition or disorder, other than one resulting from an occupational injury, caused by exposure to factors associated with employment." The ILO/WHO defines occupational health as "the promotion and maintenance of the highest degree of physical, mental and social well-being of employees in all occupations". The Occupational health program aims at detecting the occupational illness early when the disease is reversible.

The occupational safety and health is defined as "the science of Anticipation, Recognition, Monitoring and Control of hazards , with a view to Preserve , Protect , and Promote the Employees health and the population around ."

The quantity of hazard and duration of exposure are the two factors which determine whether an employee will suffer from occupational illness or will lead to an accident. If the quantity of hazard is large and duration of exposure is less, it will cause an accident. An employee exposed to large amount of gas for small duration will cause sudden difficulty in breathing, unconsciousness and sometimes death (accident), whereas if the employee inhales small amount of toxic gases for years, this will cause chronic obstructive lung disease –an occupational illness. All occupational illness is easy to prevent but difficult to treat medically. Noise induced deafness is one example, which is preventable by using various engineering methods, but almost impossible to cure.

Active participation of employers' and workers' organizations is essential for the development of programs for the prevention of occupational diseases. Employers have a duty to prevent occupational diseases by taking preventive and protective measures through the assessment and control of risks at work. Managers, supervisors, OSH professionals, workers, safety and health representatives and trade unions, all have important roles to play through effective dialogue and participation. Employees and their organizations have a right to be involved at all levels in formulating, supervising and implementing prevention policies and programs , and the employees will like to own the systems.

During the past two decades, the population of working females has rapidly increased. This increase in the working female population leads to certain concerns, such as adverse effects on reproduction due to exposure of toxic chemicals in the workplace, musculoskeletal disorders because neither the tasks nor the equipment they use, are adapted to their built and physiology. In addition, female workers have specific stress-related disorders, resulting from job discrimination.

WHO conducted a study "Fatal and Nonfatal Occupational Injuries and Illnesses in the Oil and Gas Industry" in 2000 , and published in April 2014 inferred that, the occupational

risk factors were responsible worldwide for 37% of back pain, 16% of hearing loss, 13% of chronic obstructive pulmonary disease (COPD), 11% of asthma, 8% of injuries, 9% of lung cancer and 2% of leukemia. These selected risks at work resulted in the loss of about 24 million years of healthy life and caused 850,000 deaths worldwide, about 40% of the ILO estimate of 2.2 million total deaths.

The Factories Act (1948) was amended in 1987 following the Bhopal gas tragedy. A special chapter on occupational health and safety to take care of the workers of hazardous industry was added. Under this chapter, pre-employment and periodic medical examinations and periodic monitoring of the work environment is mandatory for the industries defined as hazardous under the Act. The maximum permissible limit has been laid down for a number of chemicals. This act is implemented by the State Factory Inspectorates, which are supported by the industrial hygiene laboratories.

The aim of occupational Safety & Health program is Anticipating the hazard, Identification, monitoring and control of hazards at workplace. Protection of health of the employees, population and Promotion of health of employees, Medical treatment and Rehabilitation is the main objective.

The OS&H Management covers the following 5 easy steps

Anticipation of the hazards :

The following factors are normally taken into account

- » Technology
- » Raw Materials
- » Process
- » Finished product
- » Effluents , Emissions and By-products

Identification of the Hazards:

The hazards may be may be identified in various groups: Physical ,Chemical,Biological,Mechanical and Psychological. Identification of a hazard is done through a structured format, by a group of Supervisors, Safety personnel and Occupational health group. The aim is to identify the hazard, the location of the hazards and the employee /group of employee exposed to the hazard ,so that the target group of employees are pin pointed and protected.

Monitoring of the hazards :

There are three types of Monitoring which are being carried out and each one has its own significance

- » Work Environment
- » Personal
- » Biological

For monitoring the chemicals, Suitable Equipments should be used. Direct measuring equipments are more preferable. Noise level meter for measuring sound level at a particular location , noise dosimeter for the quantity of noise entering the human body through ears. Five types of gases can be recorded by multi gas detectors through which an employee passes , which can be analysed later to know the level of exposure to an employee.

Three types of TLVs for chemical substances are defined:

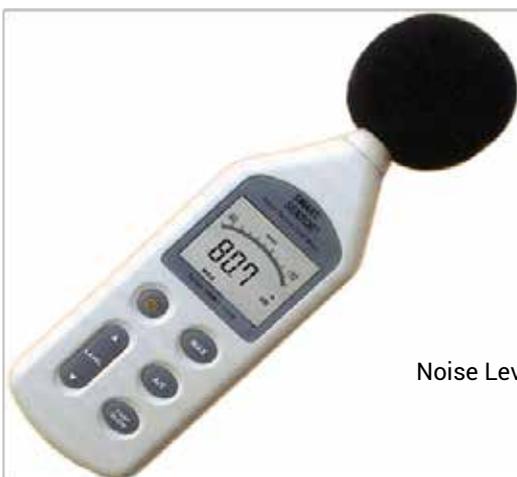
1. Threshold Limit Value - Time Weighted Average (TLV-TWA): average exposure on the basis of a 8h/day, 40h/ week work schedule
2. Threshold Limit Value - Short Term Exposure Limit (TLV-STEL): spot exposure for a duration of 15 minutes, that cannot be repeated more than 4 times per day
3. Threshold Limit Value - Ceiling (TLV-C): absolute exposure limit that should not be exceeded at any time.



Gas Detector



Noise Dosimeter



Noise Level Meter

The frequency of monitoring is decided by quantification of the hazard. For quantification, severity, frequency and probability is taken into account.

● **Biological Monitoring of Chemicals :**

The Chemicals entering the human body through Inhalation, Ingestion or Skin contact ,may be assessed by Environmental monitoring .Once the chemicals enters the human system ,it is metabolized or excreted .This we can know by biological monitoring . The chemicals once metabolized by human systems exert toxic effect on human body ,can be assessed by medical surveillance

Biological monitoring is the assessment of worker exposure to a hazardous agent through the measurement of a biomarker which results from contact with the agent. The biomarker typically is the agent or its metabolite in a biological specimen derived from the worker . Biological monitoring data reflects the total absorption of a chemical by an individual through all routes of exposure (inhalation, ingestion, absorption through the skin or a combination of these routes) and thus represents the individual's actual exposure level. One of the examples of the biological monitoring is exhaled air for detection of alcohol in breath.

● **Mechanical Hazard:**

Ergonomic Injuries may be Work related musculo-skeletal disorder, or repeated trauma disorder. A comprehensive ergonomics program includes:

- » training to increase ergonomic awareness and build in-house expertise;
- » collecting information on employees' injuries and discomfort;
- » identifying risk factors in the workplace that are causing injury and discomfort;
- » giving workers input into how they do their jobs;
- » developing ways to control ergonomic hazards by modifying equipment, the office environment, and the organization of work;
- » implementing a medical management program to identify RSIs early and ensure appropriate medical treatment; and
- » evaluating the effectiveness of the ergonomics program.

Control of the Hazards :3 types of controls are being exercised :

● **Engineering Control Includes**

Training of Managers about hazards at workplace , its effect on human body and environment, how the bad effects can be prevented.

- » Identification and survey of hazardous area.
- » Monitoring of levels of hazardous substances.
- » Substitution of toxic substances-TEL Phenol, Benzene.
- » Isolation and enclosed processes.
- » Ventilation- natural, forced, exhaust.

- » Wet- procedure.
- » Use of suitable PPE.
- » Treatment of waste products and proper disposal.

● **Medical Control / Surveillance Constitutes**

Pre-employment examination: This forms the basic health data of the employee. The record of Age , Gender, Personal habits like Smoking, consuming alcohol, and previous employment history indicating exposure of Chemicals , Noise ,and dust , will help in placement and monitoring employees, health during the course of employment.

Periodic medical examination: This examination is conducted at specified interval to assess the health of the employee in relation to the hazards he is exposed to.

Biological monitoring: Monitoring the biological samples like blood, urine, etc of employee is an important indicator of absorption of chemicals through all routes

Health education : Training about the health hazards

Rehabilitation : In cases where the employees' health is beyond further recovery.

● **Administrative Control**

May be in the form of Job rotation, Change in shift, Frequent supervision for strict adherence to safety measures

Training :

Training to the employees at all levels depending on their responsibilities is an important component for making Occupational safety and health program a success.

The industries are required to define performance indicators to assess the maturity of capability through continual improvement. Last, but not the least , experience is the best life-line. As they say "Learning from others' mistakes educates us", this holds true to save employees and the population around from occupational health hazards.

All occupational illness should be prevented when possible, controlled when necessary and treated when appropriate.





The Influence of Fuel Octane on Fuel Consumption

Technical Study

ACFA & EFOA conducted a study of fuel octane's effects on the fuel consumption in light-duty vehicles (LDV)

Asian Clean Fuel Association (ACFA) and its European sister organization European Fuel Oxygenates Association (EFOA) appointed Ricardo Strategic Consulting to conduct a study of fuel octane's effects on the fuel consumption in Light-Duty Vehicles (LDV). Key findings and conclusions of the study are discussed here:

Introduction

The study focuses on regulatory requirements for fuel economy or greenhouse gas (GHG) emissions, the LDV technology roadmap to meet those requirements and the role of fuel octane in this future challenge.

Regulatory requirements for LDV fuel economy or greenhouse gas emissions are driving significant changes in how LDV, especially their powertrains, are being designed. Ricardo's technology roadmap suggests that internal combustion engines will continue to play an important role in LDV powertrains, even as LDV are increasingly electrified. Ricardo also sees an increasing role for fuels to contribute to an overall "wells to wheels" GHG reduction strategy.

It was noted in the report that with downsized engines being an important part of future engine design, operation in high-load, knock-limited regimes becomes more likely. The main benefit of increasing the commonly available octane in fuels thus appears to be that it facilitates engine design changes, such as increases in compression ratio, which directly lead to improved fuel consumption.

Therefore, Ricardo expects fuel octane number, especially Research Octane Number (RON), to be an important contributor to future GHG emissions reduction from LDV in all markets.

The study report explores the following points:

- » Current and forthcoming regulatory requirements for greenhouse gas (GHG) emissions or fuel economy that are driving the need for new technology on LDV
- » The Ricardo view of future engine and vehicle technologies for improved fuel consumption that may affect the preferred fuel octane number
- » A ranking of fuel consumption improving technologies by cost and benefit, and where fuel octane fits in this ranking
- » How the effect of RON on combustion differs from that of MON, how these different effects could be exploited, and what confounding factors might limit exploitation

Regulatory Requirements

The growth of both regulation and targets for Low Carbon Vehicles (LCV) sets a major challenge for the road transport sector. GHG emissions targets from key global markets for passenger cars are shown in Figure 1. These targets have been normalized by the International Council on Clean Transportation (ICCT) to the New European Drive Cycle (NEDC), which is currently the drive cycle used for GHG emissions testing in the EU. As can be seen, the regulatory targets are challenging, and will require a 4–5% improvement each year in GHG emissions.

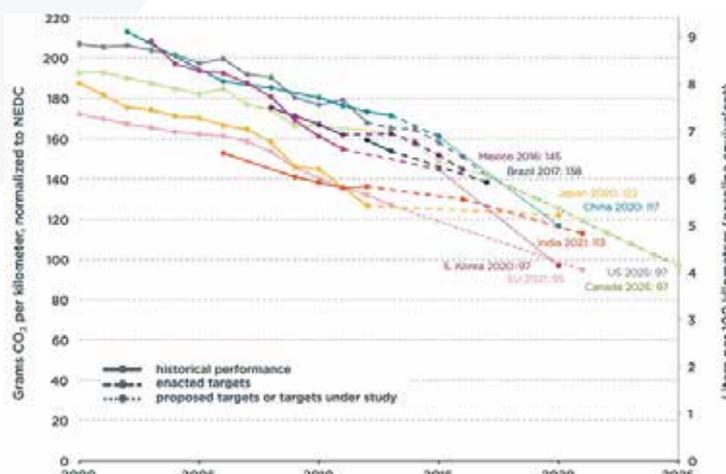


Figure 1: GHG emissions requirements for passenger cars from key global markets, normalized to the NEDC. [30]

Regulatory bodies are not only focusing on GHG emissions requirements, though. The EU and the United States (US) are both pressing ahead with increasingly stringent limits for criteria pollutants, such as nitrogen oxides (NOx), particulate

matter (PM), carbon monoxide (CO), and hydrocarbons (HC) or non-methane organic gases (NMOG).

Table 1 uses data from Ricardo to show light-duty vehicle criteria pollutants for US and EU regulations.

Table 1: Criteria pollutant requirements for California (US) LEV III, US EPA Tier 2, and EU Euro 6 using data from Ricardo EMLEG. EPA Tier 3 requirements mirror LEV III, but with stricter PM limits.

Ems Category	Mileage for compliance	NMOG (g/mi)	NMOG + NOx (g/mi)	CO (g/mi)	NOx (g/mi)	HCHO (mg/mi)	PM (g/mi)
Calif LEV160	150,000	—	0.160	4.2	—	4	0.01
Calif ULEV125	150,000	—	0.125	2.1	—	4	0.01
Calif ULEV70	150,000	—	0.070	1.7	—	4	0.01
Calif ULEV50	150,000	—	0.050	1.7	—	4	0.01
Calif SULEV30	150,000	—	0.030	1.0	—	4	0.01
Calif SULEV20	150,000	—	0.020	1.0	—	4	0.01
Tier 2 Bin 8	120,000	0.125	—	4.2	0.20	18	0.02
Tier 2 Bin 7	120,000	0.090	—	4.2	0.15	18	0.02
Tier 2 Bin 6	120,000	0.090	—	4.2	0.10	18	0.01
Tier 2 Bin 5	120,000	0.090	—	4.2	0.07	18	0.01
Tier 2 Bin 4	120,000	0.070	—	2.1	0.04	11	0.01
Tier 2 Bin 3	120,000	0.055	—	2.1	0.03	11	0.01
Tier 2 Bin 2	120,000	0.010	—	2.1	0.02	4	0.01
Tier 2 Bin 1	120,000	0	—	0.0	0.00	0	0
Euro 6 Class M + N1 I (SI)	0	0.160	—	1.6	0.10	—	0.007
Euro 6 Class M + N1 I (CI)	0	—	0.273	0.8	0.13	—	0.007
Euro 6 Class N1 II (SI)	0	0.208	—	2.9	0.12	—	0.007
Euro 6 Class N1 II (CI)	0	—	0.313	1.0	0.17	—	0.007
Euro 6 Class N1 III (SI)	0	0.256	—	3.6	0.13	—	0.007
Euro 6 Class N1 III (CI)	0	—	0.345	1.2	0.20	—	0.007

GHG emissions reduction will be one of the top drivers for light-duty vehicle development over the next decade. GHG regulatory targets are converging across global markets, although some regions are moving faster than others. Regulatory targets for criteria pollutants such as NOx, PM, and HC are also expected to tighten in parallel. Therefore, manufacturers are highly motivated to seek solutions that address GHG and criteria pollutants.

Current rules for GHG emissions focus only on the vehicle and powertrain, hence they are on a so-called “tank to wheels” basis. Fuels are currently regulated separately for their GHG benefits where low-carbon standards exist, so there are limited opportunities for vehicles to be designed comprehensively in an LCV framework. Although the World-Wide Fuels Charter provides a recommended global standard for gasoline fuels, these fuels are ultimately regulated on a market by market basis. For example, European Commission

sets fuel standards for the EU; likewise EPA has the main authority for fuels in the US. Governmental agencies rely on industry tests and standards as well, especially for performance-based metrics, such as measuring RON and MON.

In the near term, then, Ricardo expects LDV GHG emissions requirements to remain on a “tank to wheels” basis, with only a nominal consideration of the GHG benefits of a lower-carbon fuel. As discussed earlier, though, there is a role for fuels to play in reducing fuel consumption and, therefore, GHG emissions.

The cost-benefit overview for leading fuel economy improvements shows a mix of options available to manufacturers.



The most cost effective options are for improvements in internal combustion engine design and powertrains, as illustrated in Table 2. Ricardo's analysis is that Hybrid Electric Vehicle (HEV) systems are considerably more expensive to reduce one gram CO2 per kilometer.

ACFA deems it as important to mention, that HEVs have two engines, an electric one but also internal combustion engine, and the higher-octane-enabled efficiency improvement on the internal combustion engine (higher compression ratio) is directly transformed into an efficiency of the HEVs, too.

The Positive Impact of Higher Fuel Octane

The various technologies listed in Table 2 are already being implemented by key manufacturers, although their benefits are not simply additive –some synergies are possible, as are some conflicts. As marked in the table, higher fuel octane will facilitate changes to engine compression ratio, direct injection fuel systems, and higher boost pressures from turbocharging and other advanced boost systems.

Technology	Benefit	Cost	Influence of Octane
Advanced Fuels	+	0	Strong
Compression Ratio Increase	+	0	Strong
Cam Profile Switching	++	€€	Moderate
Direct Injection Fuel System	++	€€	Strong
Turbocharging	++	€€	Moderate
Active Valvetrain	+++	€€€	Moderate
Advanced Boosting Systems	+++	€€€	Strong
Exhaust Energy Recovery	+	€€€	N/A

Table 2: Ranked technologies for improving LDV fuel economy.

In Ricardo's view, the internal combustion engine has considerable scope for further development, with a thermal efficiency of 50% or more possible in the longer term, with future improvements coming from a combination of better combustion and the implementation of waste heat recovery systems. Ricardo analysis suggests that these future engines incorporate technologies that will benefit from higher fuel octane.

ACFA considers it as important to mention, that – when compared to current efficiency levels – future internal combustion engines could become significantly more efficient by increasing the thermal efficiency to a level >50%.

Fuel Octane Number Effects

The octane number, or octane rating, is a standard measure of the anti-knock properties of a motor or aviation fuel. Most markets report the Research Octane Number (RON) at the fuel pump, although in North America RON is averaged with the Motor Octane Number (MON) to make the anti-knock index (AKI).

A higher fuel octane number moves the knock limit further from normal operation, and thereby lets the fuel withstand more compression before detonating. This is attractive because an increase of only one ratio number, such as from 9.5:1 to 10.5:1, reduces on-cycle fuel consumption by about 2%, which is a significant potential improvement from a relatively low-cost change in engine design.

Thus, higher octane fuels allow fully stoichiometric operation at high speeds and high load in the absence of exhaust temperature limits to protect turbines or catalytic converters. The higher octane number is beneficial, then, because increasing the compression ratio (CR) provides a fuel consumption benefit across the whole engine operating map. The heuristic is that increasing the compression ratio by one decreases on-cycle fuel consumption by approximately 2%. Figure 2 shows the effect of CR on engine thermal efficiency and also shows how CR can be increased for engines that require premium fuel.

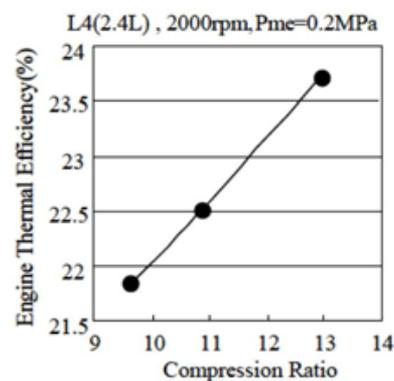
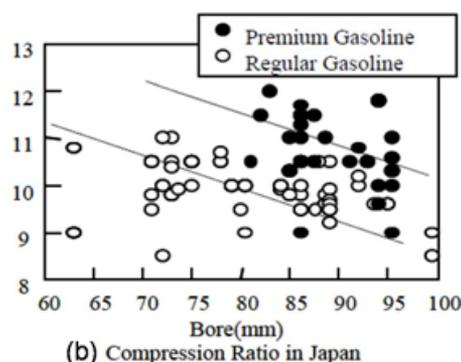


Figure 2: (a) Effect of compression ratio on engine thermal efficiency and (b) differences fuel requirement by CR and bore.



Summary of Findings

Overall, then, RON is seen to have the strongest direct influence on fuel economy. The main benefit of uniformly-available fuels with higher minimum RON is that it allows LDV manufacturers to design their vehicles for the improved fuel. A four to five point increase in RON would support

design changes that would yield a 2% improvement in fuel consumption over a typical regulatory drive cycle. For existing LDV in use, there will be a more modest benefit to fuel consumption and performance, as shown in Table 3. The picture is more complicated for MON, as MON's effect on engine performance is strongly influenced by the engine operating point as well as the engine design.

Octane No. Low	High	Improvement in Fuel Cons.	Torque	Notes
86.8 RON	98.2 RON	-0.5 -0.9% per +1 OI*		Used aggressive cycles, not regulatory cycles
92.5 RON	106.5 RON	-4% per +1 RON		BSFC, S = 10 for all fuels
91.9 RON	98.4 RON	0 to -1% per +1 RON		on NEDC
81.6 MON	85.3 MON	0% per +1 RON		on NEDC
83.8 RON	103.1 RON		+0.8 to +1.3% per +1 RON	At fixed points; also improved acceleration times
82.2 MON	100 MON		+0.7 to +1.3% per -1 MON	At fixed points
91.9 RON	99.7 RON			-0.4% acceleration time per +1 RON
83.0 MON	87.6 MON			-0.5% acceleration time per +1 OI
90.0 RON	99.6 RON		+0.5% per +1 RON	Reference fuels

(*: OI = octane Index)

Table 3. Summary of octane effects on fuel consumption and performance.

Conclusions

From the roadmap and literature review results, Ricardo draws the following conclusions:

- » Internal combustion engines are expected to remain the primary form of propulsion to 2025 and beyond.
- » Future GHG emissions and fuel economy targets worldwide will require significant changes in engine technology over the next 10 to 15 years. These changes will include down speeding, boost, and direct injection; all of which are expected to become commonplace.
- » A higher minimum fuel RON will facilitate the performance of the engine technologies that are being implemented now, and that are expected over the next several decades, including:
 - » Direct injection
 - » Turbocharging and other boost systems
 - » Higher compression ratios



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- High TAN, sour oil processing
- Heavy-oil conversion
- Hydrogen balance / management
- Maintenance and reliability
- Middle distillate developments
- Operational flexibility and availability

PETROCHEMICALS

- Alternative feedstocks

- Bio-based petrochemicals
- Catalysts developments
- Corrosion mitigation and best practices
- Emerging technologies
- Energy efficiency and optimization
- Maintenance and reliability
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- Olefins optimization
- Polyethylene developments
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The Annual PetroFed Oil & Gas Industry Awards

Awards Scheme

PetroFed Award Scheme, Instituted in 2007, aims at promoting excellence through healthy competition and to recognize and nurture talent and excellence in Oil & Gas Industry in India. The scheme was regularly reviewed by top functionaries and experts in this sector and the changes made to merge with changing scenario in all the fields of Oil & Gas sector management. The scheme has structured formats in various categories, with prescribed evaluation methodology to ensure fair and equitable approach for all participants.

Currently there are two broad categories of awards ; 'Corporate' and 'Individuals' with total 15 awards (12 in Corporate and 3 in Individual category). Entries are reviewed and evaluated by an 'Award Committee' consisting of eminent personalities with vast experience in Oil & Gas Industry and specific domains. The committee presents the evaluation to a Jury and winners are announced as per the verdict. Each award carries a trophy and a citation. Winners of the awards under the categories of 'The Woman Executive of the Year', 'Innovator of the Year-Individual' and 'Innovator of the Year-Team' receive cash component in addition to the trophy and citation.





Awards 2015

Function to give away the Awards 2015 to the winners for their performance during 2014-15 was organized on 8th August 2015 at Hotel Hyatt Regency , New Delhi. Shri K. D. Tripathy , Secretary to the government of India , Ministry of Petroleum & Natural Gas presented the awards. Eminent personalities , CEOs , Chairman , Board Members , Senior Executives of the Industry , Ministry officials and Veterans of the Oil & gas sector joined the function to cheer the winners.

Beside Shri K. D. Tripathy as Chief Guest, Sunjay Sudhir, Jt. Secretary (IC), MoP&NG, Govt. of India, B. Ashok, Chairman, PetroFed and Chairman, IOCL, D.K. Sarraf, CMD, ONGC Ltd., Sashi Mukundan, Regional President & Head of Country (India), BP, P. Raghavendran, Vice Chairman, PetroFed & President (Refinery Business), Reliance Industries Limited, Dr. Yasmine Hilton, Chairman, Shell Companies in India, Prabhat Singh, MD & CEO, Petronet LNG Limited, Utpal Bora, CMD, Oil India Limited, M.K. Surana, CMD, HPCL, L.K. Gupta MD and CEO, Essar Oil Limited, amongst other distinguished guests attended the ceremony.

New elements added to the gala awards evening in this year with the aim to bring more vibrancy to the awards function. A report on survey , initiated by PetroFed in association with ICRA on "Impact of Soft Global Crude Oil Prices on Indian Oil & Gas Industry", was released. Dr. Yasmine Hilton, Chairman, Shell India gave a keynote speech. A panel of CFOs from Petroleum Industry in India and discussed on the 'Implications of GST on Oil & Gas Sector'. PetroFed and EYE ON have released the results of their one-month long investor index and market survey on 'India's Hydrocarbon Sector' at the Annual PetroFed Awards ceremony.

While exhorting the industry captains present to strengthen the country's oil & gas sector, Shri Tripathi congratulated the companies in the private sector and the public sector as well as the individuals who received the awards. All awardees were presented a trophy and a citation.



Eye On – PetroFed conduct survey on reforms and investment climate in Oil & Gas Sector of India

82.8% of the industry rates current investment conditions in India as positive, with an even higher number, 84.6% seeing them remaining so for the coming year. 89% and 92.3% of those surveyed think that investment opportunities will exist in the mid- and long-term respectively.

Ministry of Petroleum & Natural Gas has embarked on a set of aggressive reforms since 2014, to improve sector governance and facilitate much-needed investments across the country's hydrocarbons value chain, especially in the upstream and infrastructure areas. Shifting to Hydrocarbon Exploration Licensing Policy (HELP), an improved contractual and fiscal model to boost investment and E&P activities in up-stream sector; new gas pricing formula to increase the price of domestically produced gas and encourage further monetization of the country's gas reserves; Pricing and marketing freedom has also been given for gas produced from HP/HT reservoirs and deep water and ultra deep water areas; de-regulation of diesel and Direct transfer of subsidy on domestic LPG are a few major reforms to name here. Besides, initiatives have also been taken for the benefits of consumers of petroleum products. Actions for making available LPG, a cleaner fuel to women using bio-mass have also been launched.

A one-month long survey by EYE ON and PetroFed was conducted to assess the overall investment climate in India and the set of oil & gas sector reforms and the sector climate. With 214 respondents from across the sector's value chain and both the public and private sector, the survey provides the view of the industry's sentiment vis-à-vis investment conditions in the sector at present.

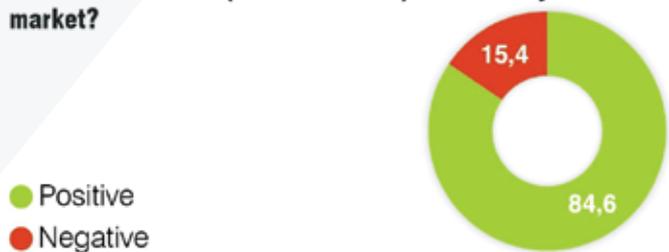
Survey has found that 82.8% of the industry rates current investment conditions in India as positive, with an even higher number, 84.6% seeing them remaining so for the coming year. 89% and 92.3% of those surveyed think that investment opportunities will exist in the mid and long-term respectively.

In Oil & Gas Sector, the survey indicates that the policy moves have succeeded in restoring trust and confidence in the governance of the hydrocarbon sector, with 85% of the industry estimating that policy reforms have brought more transparency to the industry. Over 95% of the industry deems the new policies to be pro-business. It is however noticeable that 47.3% of respondents still think that this pro-business approach retains a few restrictions. Sector growth is expected to be positively impacted, with over 93% of those surveyed expecting the hydrocarbon sector to grow in the next five years. With diesel price de-regulation, government burden of subsidy has reduced. 36.8% respondents feel that government will be able to spend more on infrastructure

building and social sector. OMCs may now be able to invest more in existing and new assets. This fact may be the outcome of earlier era of subsidised products where reimbursement from the government were not regular causing burden on these companies to arrange finance from external resources.

Industry feels that the best ways to decrease dependence on oil imports by 10% by 2022 is to have additional private investment in the upstream sector. 34.1% of those surveyed expressed this. 25% of respondents would like to see exploration activities being further encouraged. In this direction, nearly 80% of respondents responded positively to the policy of switching from profit sharing to revenue sharing model of HELP. Survey demonstrate a strong industry will to improve the ease of doing business (approvals and licensing, reduction in bureaucracy etc.) in India's hydrocarbons sector.

What are your expectations for the investment conditions over the short term (next 12 months) in India's hydrocarbons market?



The current gas sector challenges, along with the country's commitment at the United Nation's Paris climate conference in December 2015 to cut carbon emissions, has pushed the Indian government to bring in sweeping policy changes to give a thrust to the domestic gas market. Beside introduction of reforms in E&P and Gas Pricing as mentioned above, government has also placed mechanism for the benefits of user industry such as Power and Fertilizers.

PetroFed and EYE ON survey shows a large majority of respondents of an opinion that developing a gas-based economy is the most efficient way to curb CO2 emissions in India. The industry has been responsive to the pricing policy move, with only 8% not expecting any change as a result of a new gas pricing formula. Indeed, up to 38.6% of those surveyed are expecting increased investments in the gas sector from now on. Almost a third of respondents also expect the same policy move to finally help monetising deep water and HP/HT gas reserves. A sweeping 63.3% of industry leaders agreed on the necessity of developing the country's infrastructure to further accelerate gas usage and increase the share of gas in the country's energy mix.



Share of Gas in India's energy basket is 6.5% compared to world's average of 24%. States like Gujarat with 25% share defy the national trend. Government has announced a series of policy reforms to enhance the availability of gas. Petroleum Industry in India is making efforts to expand the markets and make this eco friendly fuel available to consumers .

-Dipanshu Roy

Gas Market in India

The flourishing economy has brought India to the center stage of global energy demand, almost doubling (775 Mtoe, 2013) its energy consumption since 2000 (441 Mtoe). India, the third largest energy consumer in the world is further set to witness an upswing in energy demand as our economy prospers in near- to mid-term. According to 'India Energy Outlook 2015' (IEA) report which was released recently, India will account for 25% rise (amounting to ~1100 Mtoe) in its energy demand by 2040 higher increase than any other country in the world.

At the same time, India has been engrossed with the challenges of energy security and meets climate targets in line with India GHG emission reduction commitments by up to 35% from the 2005 level by 2030. To achieve this target in terms of CO2 mitigation switch to gaseous/renewable fuels, improving energy efficiency seem to be a low hanging fruit. Sh. Narendra Modi, Hon'ble Prime Minister of India has envisioned for reducing our import dependency by 10% through 2022 while providing inclusive growth for all. This in turn will require diversification of India energy basket and Natural gas an economical and environment friendly fuel appears to be an attractive option.

Natural Gas was widely accepted as the fuel of the 21st century – till a few years ago. India was also upbeat about the prospects of natural gas and the role it could play in bolstering the economic growth. The natural gas transportation infrastructure in the form of new pipelines and augmentation of existing pipelines capacity was planned. The estimated demand in the country far exceeded the domestic production and hence a slew of LNG import infrastructure and regasification facilities were proposed.

As far as India's gas industry is concerned, India has observed a notable growth during last decade, however, despite this the gas accounts for only 6.5 % of total energy consumption as against global average of 24% attributed to issue like mismatch of infrastructure with natural gas supply in country, tariff policy, market linked 'reasonable & affordably' pricing, taxes (customs duty, VAT, CST), etc. Some developed states such as Gujarat have defied this average, having successfully exploited the potential of natural gas as an abundant, clean and cost-efficient fuel. The share of natural gas in Gujarat's energy basket is 25%, higher than the global average.



Shri Dharmendra Pradhan, Hon'ble Minister of State (I/C) for Petroleum and Natural Gas launching the Gas4India Campaign



Shri Dharmendra Pradhan, Hon'ble Minister of State (I/C) for Petroleum and Natural Gas with the Gas4India team at the launch of the Gas4India Campaign, Delhi

Recent initiatives by Government of India

The recent policy announcements by government have bolstered confidence in investors. The Central Government, over the past two years, has taken a number of steps for development of the hydrocarbon industry in the country. Some of the measures include HELP, which has been notified on 30th March 2016, Marketing and Pricing freedom for new gas production from Deepwater, Ultra Deepwater and High Pressure-High Temperature, Policy for grant of extension to the PSCs of 28 small and medium sized discovered blocks, Policy for early monetization of hydrocarbon discoveries, New Domestic Natural Gas price Guidelines, 2014, Appraisal of about 1.5 million sq. km. un-appraised area of the Indian Sedimentary Basins.

The Government has also taken measures for Re-assessment of Hydrocarbon Resources, setting up of National Data Repository and has made policy interventions for Exploration and exploitation of Shale Gas/Shale Oil, Exploration in the Mining Lease (ML) areas after the expiry of exploration period, Non-exclusive Multi-client Speculative Survey for assessment of unexplored sedimentary basins has been operationalized.

#Gas4India

In an order to reach a gas-based economy and to change public perception towards gas as being available, affordable and cleaner, the Ministry of Petroleum & Natural Gas desired that a national campaign, 'Gas4India' could be initiated by the industry bodies and associations to enhance the awareness on the use of a natural gas. The Ministry desired that Petroleum Federation of India (PetroFed) along with Confederation of Indian Industry (CII) and Natural Gas Society (NGS) should actively steer the campaign.

The objective of the campaign is to develop linkages in public perception with regards to (i) air quality, 24X7 electricity supply, public health, to build an economic case for increased use of natural gas, (ii) evolve a coalition to explore probable solutions of any kind for benefits of natural gas and advocate for adoption of those solutions.

Shri Dharmendra Pradhan, Hon'ble Minister of State (I/C) for Petroleum and Natural Gas on September 06, 2016, officially launched the #Gas4India campaign to popularise the use of natural gas in India.

Shri K.D. Tripathi, Secretary, Ministry of Petroleum & Natural Gas, Shri B.C. Tripathi, Chairman & Managing Director, GAIL, Shri Ashutosh Jindal, Joint Secretary, MoPNG, and representatives of various natural gas related companies in India were present at the formal launch of the campaign in New Delhi. Speaking at the launch, Shri Pradhan appreciated this collaborative effort of the Indian natural gas Industry, and lauded its support to the Government's endeavor to harness natural gas for maximum benefit for the people of this country. He stated that it is indeed a 'first-of-its-kind' creative project, and that the entire nation is eagerly looking forward to its success. Shri Pradhan also assured the organizers of the full support of the Ministry of Petroleum and Natural Gas in this venture to reach clean energy to the common man for the benefit of the nation.

#Gas4India is a unified cross-country, multimedia, multi-event campaign to communicate the national, social, economic and ecological benefits of using natural gas as the fuel of choice to every citizen who uses, or will use in the near future, gas in any way - to cook, travel, light their homes, and power their businesses. The year-long campaign also hopes to connect with youngsters, who will inherit this nation, and inform them about this cleaner, greener fuel of the future. The #Gas4India campaign will include social engagement via Twitter, Facebook, YouTube, LinkedIn and its official blogsite, as well as hyper-local, offline events to directly connect with consumers through discussions, workshops, and cultural events.

In line with the Government of India's vision to develop a gas-based economy and related interventions and initiatives, public and private sector companies such as GAIL, BP, Shell, Cairn, IOCL, ONGC, Petronet LNG, IGL, MGL, Adani Gas, Gujarat Gas and the City Gas Distribution (CGD) industry have joined hands to promote the natural gas sector.

A virtual secretariat has been formed for directing the campaign with representatives from PetroFed, CII, NGS, Gail, Shell, BP and each team member has been assigned in the Secretariat with a specific task where they take full responsibility.

Oil & Gas in Media

MoP&NG seeks uniform taxes on LPG for domestic and commercial use

Ministry of Petroleum & Natural Gas (MOP&NG) has approached Ministry of Finance for uniform taxes on cooking gas (LPG) sold to all types of consumers in order to block diversion of cylinders meant for domestic use.

There are no taxes on the gas cylinders meant for domestic use while commercial users have to pay a basic customs duty of 5 percent, additional customs duty of 8 percent and a central excise duty of 8 percent.

In addition to central taxes, commercial users have to pay local levies imposed by states. All these duties together make commercial LPG more expensive.



About 90 percent of the total LPG consumed in the country is used by households, although it is suspected that some subsidised cylinders meant for household use are diverted for commercial purpose.

The consumption of domestic non-subsidised cylinders has also sharply risen, giving rise to suspicion that some of these cylinders might be getting diverted to commercial use since there is a major price difference between the two types of cylinders due to incidence of taxes.

The MOP&NG wants to put an end to these incentives for diversion by having the same price for all cylinders for domestic or commercial use.

India has about 17 crore domestic LPG consumers and plans to add 10 crore consumers in three years as lower oil prices keep cooking gas more affordable and the government's fuel subsidy burden lighter. LPG consumption in the country grew 8.6 percent in 2015-16 from that in the previous year.

Petroleum sector could face over ₹2.4 lakh crore impact of project delays

The price due to unwanted delays in implementation of oil and gas projects could be a staggering over ₹ 2.4 lakh crore through 2040, according to a study by Project Management Institute (PMI), a research and education institution.



The Mumbai-based institute said in a report on project management practices in the oil and gas sector that country faces the humongous cost overruns and additional investment outlay over 2015-40 period if the existing project implementation scenario in the petroleum sector continues to prevail. The report was based on a survey of industry professionals.

The oil and gas sector has witnessed an average delay of 1.5 years in implementation of projects with average cost escalation of 6.2 percent in the past, according to the PMI report. An average of 15-month delay has been noticed in projects worth ₹ 100-999 crore each while the delay increases to 18 months in projects worth ₹ 1,000 crore and more.

Also, an average cost overrun of 6.9 percent has been noted in projects worth ₹ 1,000 or more across all PSU petroleum projects.

Delays in petroleum projects occur at two stages The Planning Stage and The Execution Stage. At the planning stage, delays occur due to lack of detailed planning, poor risk management and lack of flexibility. Issues like change of scope of work, procurement delays and manpower allocation occur at the execution stage, the report stated.



The report said only 25 percent of the surveyed oil and gas companies had a dedicated independent risk management vertical and only 28 percent of the respondents mentioned about organizational practice of drawing detailed response plan for each of the major identified risks.

The report, released today, also talks about cost overruns occurring due to lack of planning, or continuous growth in a project's scope and lack of management skill. "The Oil and Gas sector is expected to create a huge investment opportunity of \$542 billion by 2040. We believe this can be achieved by improving the project management practices, identifying the gaps in organizational structure, practices, skill sets etc," said Raj Kalady, Managing Director at PMI.

He added there is a need to look at ways to bridge the gaps in project management through better organizational planning and manpower capability building. India is the 4th largest consumer of oil and petroleum products in the world with 216 million metric tonnes per annum (MMTPA) of refining capacity.

Policy to unlock ₹ 2.5 Lakh crores oil & gas investment: BP India Head

Policy announcements in the oil and gas sector this year will help unlock ₹ 2.5 lakh crores investment and aid in domestic gas production, said Sashi Mukundan, Chairman CII National Committee on Hydrocarbons and BP India head.

Decisions like giving pricing freedom to gas produced from difficult fields like deep water will help unlock 10-15 trillion cubic feet of reserves, he said.

Investment in exploration, development of discovered reserves, enhanced oil recovery schemes and technology will be ₹ 2.5 lakh crores to ₹ 3 lakh crores by 2022.

"Had a close-door interaction with Confederation of Indian Industry on 'Gas roadmap for India; Perspective on Way Forward'. I assured of transparent and progressive policies of Government which would help create a developed gas



economy," the Minister said in a facebook post later.

Mr. Mukundan said "there is potential to double India's domestic gas production and increase oil production by around 15 percent in the next 5-7 years with the caveat that policy levers and fiscal incentives needed to unlock potential of India's hydrocarbon reserves are put in place. The good news is that cognizant of the need for policy reforms in the sector, the Government has already implemented some key policy initiatives."

Emphasising on the role natural gas will play in reducing import dependence and addressing the climate challenge, gas has a very high input multiplier and induces greater production activity in the economy. With policy interventions share of natural gas in the energy basket can increase to 15 percent by 2030 from current 7 percent, he said.

Panel begins work on preparing blueprint for refining capacity

An expert panel has begun work on drafting blueprint for raising India's oil refining capacity by 2040 with a view of not just meeting demands of the fast expanding economy but also to capture export market.



The 12-member Working Group for preparing Approach Paper for enhancing refining capacity by 2040 began work by asking public and private sector refiners to present their plans for capacity expansion and asked for domestic demand assessments to be made.

The panel headed by Additional Secretary in the Oil Ministry and include representatives of public and private sector refiners including standalone refineries. Expansions underway will raise the refining capacity to about 260 MT by 2018.

India has a refining capacity of 232.066 million tons, which exceeded the demand of 183.5 MT in the 2015-16 fiscal. According to International Energy Agency (EA), this demand is forecast to reach 458 MT by 2040. Considering a conservative fuel demand growth of 4 percent, the present capacity will be insufficient and new capacity will be required in next few years.

Due to parallel progress in other varieties of energy, mix in 2040 could be entirely different from what it is today. Also, new capacities in petroleum refining will depend upon aggregation of demand from different petroleum derived products, which itself depends upon substitution by other forms of energy and government policies.

Working Group to assess primary energy requirement for 2040 as also likely technological developments in different energy fields. It would then develop primary energy mix with breakup in terms of gas, oil, coal, nuclear, solar, hydro and biofuel.

Low oil prices hurting investment and energy efficiency - IEA

Reduction in investment and energy efficiency measures due to the prolonged period of lower oil prices has been observed all over the world.

International Energy Agency (IEA) review reveals the current oil price environment has also boosted the share of oil produced in the Middle East. It found investments in the oil sector declined last year and in 2016, the first consecutive two-year drop in three decades.

The Oil & Gas sector has cut more than \$300 billion (£271bn) in spending in two years or 42% of the total, with North America having accounted for around half the drop. The report also point out oil supply in the Middle East has reached "historically high levels", exceeding 31 million barrels per day accounting for 35% of global oil supplies, the highest level since 1975.

The IEA also reveals lower oil and fuel prices are hurting energy efficiency trends in some nations, particularly the transportation sector "where they have given a boost to the sale of sport utility vehicles". IEA review states: "Consumers have moved away from energy efficient vehicles that they favoured when oil prices were higher. In the United States, SUV sales are now 2.5 times higher than light duty vehicles. In China, SUV sales are four times higher than light duty vehicle sales."

India seeks stake in Canadian oil, gas fields

India sought stakes in Canadian oil and gas fields and crude oil supplies as it sought to deepen energy ties with one of the largest energy supplier. India also sought Canadian investment and participation in the ongoing auction of small and marginal discovered oil and gas fields. Oil Minister Dharmendra Pradhan co-chaired the 3rd India-Canada Energy Dialogue with James Gordon Carr, Minister of Natural Resources of Canada where both sides discussed aspects of bilateral energy sector engagements. These included, inter-alia, Indian investments in Canadian upstream sector, sourcing of crude and technologies from Canada, and the recently launched Discovered Small Fields Bidding Round. Canada has some of the world's most advanced



technologies in the hydrocarbon sector. Both sides also discussed regulatory best practices in the hydrocarbon sector, collaboration in the field of technology, including R&D, shale gas and gas hydrates technology and clean fuel technology. Participation of Canadian oil and gas companies is invited to actively participate in Indian hydrocarbon sector infrastructure projects, including the gas sector. Both agreed to work towards enhancing understanding of policies, programs and regulatory practices in both countries, to promote and facilitate greater two-way trade and investment in the oil and gas sectors, including clean technology applied to the sector, for mutual economic benefit.

First LNG Facility in Haldia

The Haldia Dock Complex under Kolkata Port Trust has recently earmarked about 10 acres of land in the vicinity of Haldia Oil Jetty No. 1 for a period of 30 years for setting up of LNG storage facilities, with permission to lay pipelines and install unloading arms through tender cum auction.

The project will be undertaken on land lease model by granting lease of land by middle of December, 2016. LNG facilities are expected to be developed within 24 months from date of allotment of land.

This is an important development in context of the recent efforts of the Ministry of Shipping to reduce logistics cost and achieve the COP21 targets on cutting down pollution by introducing the use of LNG as fuel for barges.

Use of LNG is expected to save around 20 percent on fuel. Carbon Dioxide emissions are likely to get reduced by 20-25 percent and nitrogen/sulphur oxide emissions by 90 percent.



The government is therefore taking measures to facilitate the movement of LNG and its storage at places situated along the inland waterways.

The efforts to introduce LNG as barge fuel is part of the overall efforts to promote transport on inland waterways and coastal shipping. Inland Water Transport (IWT) is a cost effective and environment friendly system and a lot of importance is being accorded to it since the last two years. Work is already on for construction of terminals and other activities to facilitate navigation on river Ganga under the Jal Marg Vikas.

The Ministry of Shipping has been regularly holding discussions with Petronet LNG Ltd. (PLL) and Inland Waterways Authority of India (IWAI). PLL is in the process of preparing a Detailed Feasibility Report for setting up LNG facilities at Haldia, Sahibganj, Patna and Ghazipur on NW-I (Ganga) as per an MoU signed by them with IWAI during the Maritime India Summit in Mumbai in April this year.

The construction of LNG barges at Indian shipyards would be entitled to the 20 percent subsidy through the ship building subsidy scheme whose guidelines have already been released by the Shipping Ministry.



World's Most Expensive Oil Project Could Finally Come Online

One of the world's largest oil projects could soon come online, bringing a rush of new supply that could delay the oil market balance.

The Kashagan oilfield is years behind schedule, but the massive project could soon begin operations. Located in the Caspian Sea in Kazakhstan, the oil field was supposed to come online a decade ago, but the uniquely complex project has bedeviled its owners – Eni, Exxon, Shell, Total and the Kazakh government. Evaluation of \$50 billion plus makes economic returns is questionable. In October, that objective could finally be realized. The companies estimate that Kashagan could result in 370,000 barrels per day coming online within the next year, which, if true, could delay the balancing of the global oil market. However, all international agencies do not share the same optimism. Woodmac doesn't expect Kashagan to hit that threshold until 2026 at least.

Kashagan began with great promise. It was one of the largest oil discoveries in some four decades when it was made in 2000, but it has been an enormous headache for its owners. That is because of the extraordinary challenges that it poses: The field is located thousands of feet below the Caspian Sea; Eni and its partners had to setup manmade islands to drill through; they have to deal with sea ice in the winter; and the field is also rife with poisonous hydrogen sulfide gas.

Indeed, projects like Kashagan would no longer make it in today's oil market. Projects that take years, cost tens of billions of dollars, and present extraordinary development challenges have almost uniformly been scrapped by oil companies around the world. Of the \$1 trillion in spending reductions made by the industry between 2015 and 2020, the megaprojects were the first to go.

Kashagan is a uniquely complex project. It is also likely to be the last of its kind for many years.

IOC announces ₹ 1.80-trillion investment plan in next 6 years

Indian Oil Corporation plans to investing ₹ up to 1.80 trillion across verticals , refinery expansions, new petrochemical projects which are coming up and expenditure being incurred on natural gas, besides some exploration blocks that the company is actively looking at in next six years. The company is also in talks with foreign entities to co-invest in the investment that includes setting up a mega refinery in coastal Maharashtra.

About ₹ 50,000 crores will be invested in setting up refining capacity where it plans to add at least 24 million tonnes per annum over the next five years, followed closely by marketing infrastructure including new plants, new terminals, LPG import infrastructure and pipelines. Besides this, it has also earmarked sums for investments in petrochemicals and natural gas.

The state-run company will be investing ₹ 15,000 crores in the current fiscal and will accelerate to over ₹ 25,000 crores each over the next two fiscals, it has budgeted for a ₹ 72,000 crores investment over the next three years.



The ambitious project to set up the largest refinery project in the country in coastal Maharashtra is on and the state government has shown six potential sites where it can come up. IOC, which is taking leadership in the project that is estimated to cost ₹ 1.76 trillion, will be holding a 50 percent stake in the refinery while the remaining will be split evenly between its sister companies HPCL and BPCL. It is looking for a 15,000-acre land parcel to set up the refinery, he said, adding that a third of it will be reserved for green zone.

The technical specifics of the project, including the fuel to be refined and which products to be done has already been prepared in consultation with EIL (Engineers India).



Push for Gas-based economy: Big expansion for gas pipelines & LNG regasification infrastructure

Sh. Dharmendra Pradhan, Hon'ble Minister of Petroleum and Natural Gas addressed a workshop in Bangalore where he announced that for the first time ever in the country; Government of India will be spending from its budget on augmenting gas pipeline infrastructure. In addition to building the new gas pipeline, he mentioned India is also increasing its gas regasification capacity from 21MMT to 55MMT, and this increased capacity of 34MMT will enable to push more gas in the market. Minister referred the KG basin, which is a major gas reserve, as the "North Sea for India". He also spoke about the Gujarat case, where the gas share is 26%, higher than the world share at 24%, and aspiration to replicate that across India.

The third workshop held today is a part of the project supported by British High Commission conducted by PetroFed together with consulting companies IHS Markit and ICF. The workshop was attended by CEOs and senior leaders from the Oil & Gas industry covering the entire gas value chain. In his address, Hon'ble minister touched on several points from climate change, gas infrastructure and pipelines, domestic gas supply, gas economics and innovative technology to boost gas share in India's energy mix.

Minister stated that Bangalore is a city where everything starts, and that Bangalore is a good starting place for creating new gas markets. He began his address on the climate note saying that India is not the most polluting country. He highlighted that India has committed to carbon emission reduction in the COP21 summit and that gas will play a key role in India to combat climate change. On augmenting gas distribution, GAIL has approximately 15,000 km pipeline laid out for gas transport and plans to build another 15,000 km gas pipeline.

In his address to the technology companies; minister mentioned the technological innovations, and new mechanisms for India, for eg: Caterpillar developing an economical technology to replace currently used diesel by gas in DG sets. He also stressed on the need for developing India specific models like Bio CNG, waste to gas, Syn gas from coal, etc. are the other areas to be looked for innovative economic solutions. He also mentioned that there will be enough market to absorb new volumes of gas in India in form of new anchor customers like new 100 smart cities, rather than only relying on the traditional anchor segments like power and fertilizer. Further, the urban areas are fast expanding and developing a market for gas, replacing LPG and will help enable channel the LPG in rural areas where women use animal waste and firewood for cooking, which is a big health hazard.

On gas economics, he commented that government would be willing to consider exempting LNG from import duty like crude oil, given that gas is a clean and environmental fuel and without a doubt will help reduce emissions. He addressed to all the participants in the workshop to make an actionable plan and stressed on implementation and hitting the market rather than an intellectual discussion only or a societal debate. He also advised the group that a successful implementation strategy is one where all parties are aligned and onboard, hence it is important to convince all stakeholders across the gas value chain.

Earlier, the Deputy High Commissioner of United Kingdom, Mr. Dominic McAllister complimented Government of India on the amazing economic pace and significant policy and regulatory reforms.

Energy PSUs may fund India's Nuclear Energy Expansion Plans

Indian Railways and state-owned companies in energy sector including Oil and Natural Gas Corporation, Indian Oil Corporation and NTPC Ltd. could soon be funding the country's nuclear energy expansion programme.

State-run Nuclear Power Corporation of India Ltd. (NPCIL) is in talks with cash-rich public sector undertakings in energy sector and the national transporter to float joint ventures for setting up nuclear power plants across the country.

NPCIL is looking at leveraging equity from cash-rich PSUs in line with its targets to increase nuclear power generation in the country to 63 GW from the current installed capacity of 6,780 MW.

It is setting up another 6,700 MW through projects that are under various stages of construction. Besides land availability and technology sharing issues, NPCIL is faced with the challenge of procuring low-cost finance. The company currently executes nuclear reactors through a mix of debt and equity, budgetary support and debt financing from the technology sourcing country.



The Atomic Energy (Amendment) Act 1962 was amended in January 2016 to expand the definition of a government company providing for creation of joint ventures that are majority owned by NPCIL while other state-run companies own 49%. At present only two PSUs – NPCIL and Bharatiya Nabhikiya Vidyut Nigam Ltd. under the administrative control of the Department of Atomic Energy – are authorised to set up nuclear power plants in the country. They are responsible for design, construction, commissioning and operation of thermal nuclear power plants.

NPCIL had earlier floated joint ventures with NTPC, IOC and Nalco to set up nuclear power plants but the plans hit a roadblock as the law prohibits such joint ventures.

Jharkhand becomes first state to launch DBT in Kerosene

Jharkhand has become the first state in the country to launch the ambitious Direct Benefit Transfer in Kerosene (DBTK) scheme, the petroleum ministry said in a statement today.

The scheme aims at eliminating subsidized Kerosene from the supply chain for better targeting of beneficiaries, eliminate pilferage and black-marketing and cut down adulteration of the cheap cooking and lighting fuel with diesel.

Jharkhand has initiated roll-out of the scheme in four identified districts -- Chatra, Hazaribagh, Khunti and Jantara – beginning 1 October. Under the DBTK Scheme, Public Distribution System (PDS) kerosene is being sold at non-subsidised price and subsidy, as admissible, is being transferred to consumers directly into their bank accounts.

The statement also clarified the government's initiative is aimed at rationalising subsidy based on the approach to cut subsidy leakages but not subsidy. The DBTK scheme, which works on the lines of a similar programme for LPG subsidy, was initially to be rolled out across 40 districts in nine states from 1 April 2016.



However, lack of bank accounts and their seeding with Aadhaar numbers coupled with problems in creating biometric database of beneficiaries had pushed back the launch of the ambitious plan to introduce DBTK.

Under the scheme, consumers pay the non-subsidized price of kerosene at the time of purchase. Subsequently, the amount of subsidy is directly transferred to the bank account of the beneficiary. In order to avoid any inconvenience to the beneficiaries during the initial purchase through payment of un-subsidised price, an initial amount of subsidy is credited to all eligible beneficiaries.

Hon'ble minister Sh. Dharmendra Pradhan had earlier said the centre is hopeful of covering at least 33 districts in nine states in 2016-17 calling it "A substantial leap forward in the reform process".

In a bid to incentivize states to implement DBTK, the states are given cash incentive of 75 percent of subsidy saving during the first two years, 50 percent in the third year and 25 percent in the fourth year. The scheme is being launched in Punjab, Rajasthan and Gujarat.

Haldia Petro gets permission to enter fuel retailing

Haldia Petrochemical has received government go-ahead for fuel retailing, becoming the eighth player to enter the business, which is controlled by the three state-owned marketing firms IOCL, HPCL and BPCL.

The company is expected to set up nearly 50 retail outlets in the first phase in West Bengal including places such as Purbi Midnapore, Paschim Midnapore, Bankura and Purulia districts. In the next phase it will expand to other areas including Howrah and Hooghly.

Current retail market players will witness more competition in the oil retailing space, especially in the eastern part of the country where the presence of private players is very thin. The four private players, including Shell and MRPL, have recently returned to the retailing business after the government allowed public sector marketing companies to sell auto fuel at prices linked to global prices. The prices are now adjusted fortnightly based on the movement in global crude rates.

Haldia Petrochem is the first company to get a nod for fuel retailing after the return to market-determined rates. The current policy allows a company investing ₹2,000 crore in exploration and production, refining, pipelines and terminals to seek permission for marketing of transportation fuel, including petrol, diesel and aviation turbine fuel.

Three Agreements/MoUs signed between India and Russia in the Hydrocarbon sector; India-Russia Annual Summit held at Goa

Minister of State (I/C) for Petroleum & Natural Gas Shri Dharmendra Pradhan received the President of Russia Mr. Vladimir Putin on his arrival at Goa for the India-Russia Annual Summit and the 8th BRICS Summit. Sh. Pradhan also participated in the delegation level talks at the level of Prime Minister of India and President of Russia. During the talks, Sh. Pradhan highlighted the ongoing cooperation between India and Russia in the Hydrocarbon Sector, including the acquisition of 23.9% stake in Vankorneft and 29.9% in Taas-Yuryakh by an Indian Consortium of IOCL, OIL and BPCL and acquisition of 15% and 11% stake by OVL in Vankorneft from Rosneft Oil Company of Russia. While the Indian Consortium has completed all formalities related to acquisition of its stakes, Cabinet level approvals on both sides have been obtained for acquisition of 11% stake by OVL and the deal is expected to complete by end of October 2016.



In the presence of Prime Minister of India and President of Russia, following three Agreements/MoUs were signed between India and Russia in the Hydrocarbon sector:

- MoU between Engineers India Ltd. and Gazprom on the Joint Study of a gas pipeline to India and other possible areas of cooperation;
- Cooperation Agreement in the area of Education and Training between ONGC Videsh Ltd. and Rosneft Oil Company; and
- Programme of Cooperation (PoC) in the Field of Oil and Gas for the period 2017-18. The PoC was signed by Sh. Pradhan on the Indian side and Mr. Alexander Novak, Minister of Energy from the Russian side.

Both India and Russia agreed to further work towards enhancing their bilateral engagement in the hydrocarbon sector to make it a two way trade.

Cabinet approves acquisition of 11 percent stake in JSC Vankorneft by ONGC Videsh Limited

The Cabinet Committee on Economic Affairs, chaired by the Prime Minister Shri Narendra Modi, has given its approval to an acquisition by ONGC Videsh Limited (OVL) for 11% stake in JSC Vankorneft from M/s Rosneft Oil Company (Rosneft), the National Oil Company (NOC) of Russian Federation (Russia). Rosneft operates Vankor fields, with Vankorneft, its wholly owned subsidiary.

OVL will be paying an amount of US \$ 930 million for acquiring 11% stake in Vankorneft.

The acquisition of stake in Vankorneft will provide 3.2 Million Metric Ton of Oil Equivalent (MMTOE) to OVL by 2017. It will also provide an opportunity to Indian public sector Oil and Gas companies to acquire new technologies from Rosneft. Recently, an Indian Consortium comprising of Oil India Limited (OIL), Indian Oil Corporation Limited (IOCL) and Bharat Petro Resources Limited (BPRL) acquired 23.9% stake in Vankorneft at a cost of US \$ 2020.35 million which will give them 6.56 MMTOE.



Earlier in May 2016, ONGC Videsh Ltd. (OVL) completed the formalities on acquisition of 15% stake in Vankorneft at a cost of US \$ 1.284 billion which gave OVL 4.11 MMTOE.

Cabinet approves revision of ethanol price for supply to Public Sector Oil Marketing Companies

As a measure to introduce new price system for ethanol supply to OMCs, the Government on 10th December, 2014 decided that the delivered price of ethanol at OMC depots would be fixed in the range of ₹. 48.50 per litre to 49.50 per litre including Central/State Government taxes and transportation charges.

This resulted in increased supply of ethanol to OMCs. With change in sugar and oil prices in the markets, existing mechanism was reviewed afresh.

The Cabinet Committee on Economic Affairs, chaired by the Prime Minister Shri Narendra Modi, has approved the mechanism for revision of ethanol price for supply to Public Sector Oil Marketing Companies (OMCs) to carry out the Ethanol Blended Petrol (EBP) Programme.

Under the new system, for the next sugar season 2016-17 during ethanol supply period from 1st December, 2016 to 30th November, 2017, the administered price of ethanol for the EBP Programme will be ₹.39/- per litre.

Additionally, charges will be paid to the ethanol suppliers as per actuals in case of Excise Duty and VAT/GST and transportation charges as decided by OMCs.

If the need arises to increase/reduce the retail selling price of Petrol by Public Sector OMCs, then such increase/reduction would proportionately factor in the requirement of maintaining the fixed cost of purchase of ethanol during the Ethanol supply year.

The prices of ethanol will be reviewed by Government at any time during the ethanol supply period that is from 1st December, 2016 to 30th November, 2017 depending upon the prevailing economic situation and other relevant factors.

The revision in ethanol prices is expected to facilitate the continued policy of the Government in providing price stability and remunerative prices for ethanol suppliers.



OPEC to cut oil production – will it give relief to over-supply market ?

OPEC 14 after meeting at Algiers announced the decision to maintain production between 32.5 – 33 million barrels per day (mb/d). The details will be worked out in November meeting at Vienna. Analysts are sceptical about the impact of this cut on oil price.

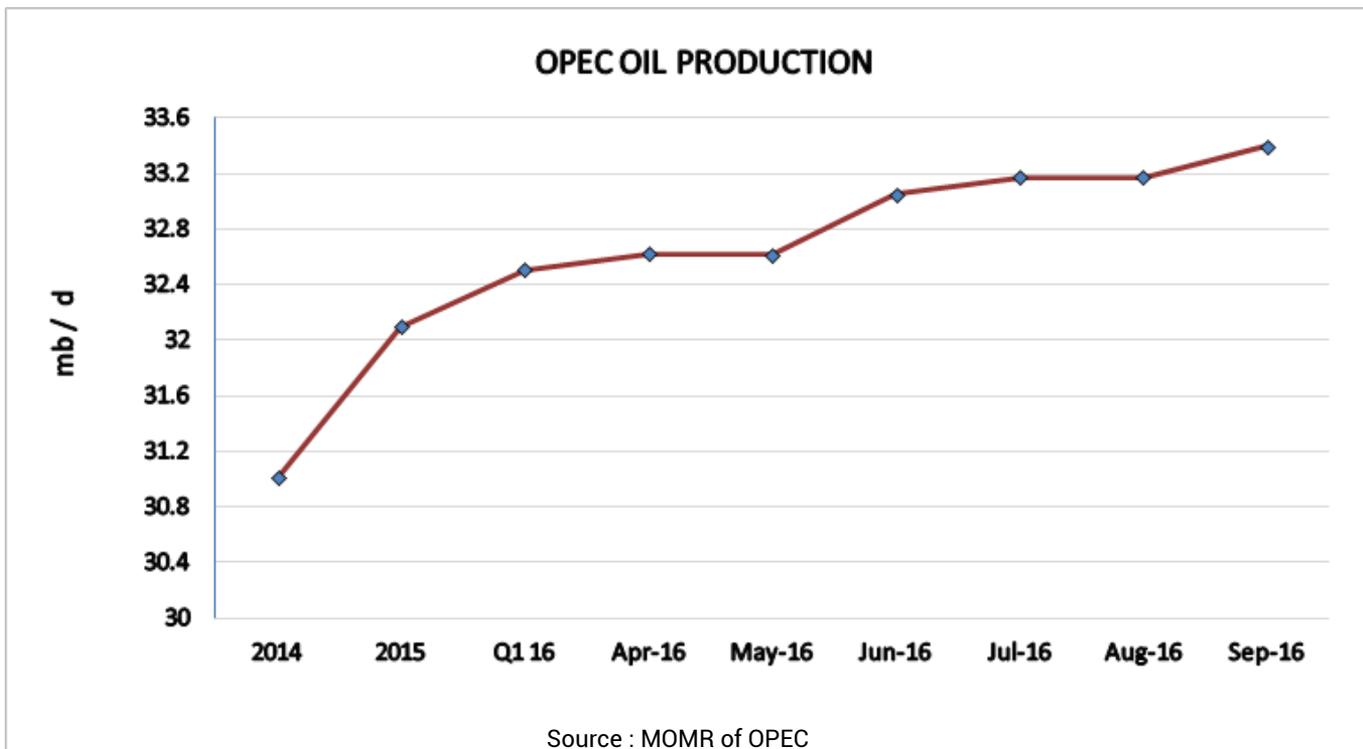
N.K. Bansal

Two years after discussing many issues, OPEC finally announced, in Algiers on 29th September 2016, a provisional deal to cut (or limit) production of crude oil to 32.5 to 33.0 mb/d. First such decision in last eight years may end the pump-at-will production policy of OPEC members. However, the final and finer details including nation-wise quota will be worked out in the meeting at Vienna at the end of next meeting.

OPEC nations have been producing over 33.2 mb/d crude (August 2016) an increase of about 7% over average of 31.01 mb/d in 2014. The increase was regular over the entire period and is currently at the highest. In case the of range set in Algiers, the decrease in production will be between 0.2-0.7 mb/d. with 0.5 as mid point.

With the announcement, oil prices soared to almost over 6%. Brent crude rose from 45.97 \$ / bbl. on 27th Sept. to 49.06 \$ / bbl. on 29th Sept. It crossed 50 \$ /bbl mark on 3rd October and currently on 11th October trading over 53 \$ / bbl.

Lot of apprehensions have been expressed over this provisional deal to be detailed in the November 2016 meeting at Vienna.





Brent Crude Price Trends (Source : Nasdaq)

Intention of Iran , now out of sanctions , to continue the increase in production to saturation level, normalising production in Nigeria and Libya after severe set backs , past history of OPEC nations not adhering to allotted quota decided in OPEC are some of the factors. Even in the recent past , Saudi Arabia, the lead producer made its intentions clear not to cut production and face the risk of losing market share. Companies producing Shale Oil in USA suffered due to sharp decline in price are also gearing up with cost effective measures. Report suggest that a price over 50 \$/bbl may encourage some of the well established players to restart production activities, posing threat to conventional oil producers. Even in conventional oil , field from Kashagan may start production in 2017. Conflict between Iran and Saudi Arabia is also a factor that has the potential to change the scenario.

Another factor that may impact the deal is shrinkage of demand in short term (2016 , 2017) . Supply Demand Balance given in the OPEC MOMR of October 2016 indicate that with Non-OPEC production and NGL from OPEC , the requirement of conventional oil from OPEC itself to fill the gap will be in the range decided by OPEC in Algiers.

	2013	2014	2015	1Q 16	2Q 16	3Q 16	4Q 16	2016	2017
World Demand	90.7	91.7	93.2	93.5	93.7	95.1	95.3	94.4	95.6
Non-OPEC supply + OPEC NGL	59.0	61.5	63.1	63.2	61.7	62.4	63.0	62.6	63.0
Supply from OPEC	31.2	31.0	32.1	32.5	32.8	33.2	32.3	31.8	32.6

Source : MOMR of OPEC , September 2016

Overall, a list of factors, both from OPEC and Non –OPEC corridors , are likely to counterbalance the impact of the announced OPEC cut, if the market is left free.

As immediate impact , in spite of all the factors mentioned above , rise of oil prices at least for a fortnight after the announcement forced revisiting of the feeling that the OPEC is the entity in oil markets which can create ripples . It however started showing downward trends from 12th October 2016 . Markets seems to adopt 'wait and watch' approach . With many counter balancing factors ready to exhibit their influence , rise in price to old levels of post 100 seems to be distant landmark. However price in the range of 50-60 \$ / bbl may prevail in the short term. Price of Indian Basket also crossed the limit of 50 \$ per barrel (50.14 \$ / bbl) on 12th October 2016 with lower level of 49.37 \$ / bbl next day.

India to go to BS VI norms from April 2020 MORTH issue final notification

Government while deciding BS VI emission norms implementation from 1st April 2020, by passing BS V, considered the requirements of Indian Refiners for quality parameters of commercial BS VI gasoline and diesel while meeting the environmental objectives.

On 16th September 2016, Ministry of Road Transport & Highways (MORTH) issued gazette notification no. 651 for BS VI vehicular emission norms and corresponding quality specifications of commercial gasoline and diesel fuels, The rules in the notification will be effective from April 2020. Earlier, government decided to transit to BS VI regime directly from BS IV and implement BS IV PAN India from 1st April 2017. Government, citing urgent need to regulate vehicular emissions more stringently and control the deteriorating air quality particularly in large cities, overruled the demand of automobile industry to postpone the implementation date.



Specifications of commercial gasoline and diesel under BS VI regime were under discussion for quite some time. MORTH issued two draft notifications on 27th November 2015 and 19th February 2016 respectively inviting comments / objections from the public.

Stakeholders like Refineries, Automobile Manufacturers and their associations, Petroleum Federation of India (PetroFed) and Society of Indian Automobile Manufacturers (SIAM) have been discussing and conveying their views to the Government of India.

Gasoline

Auto Industry has been demanding 95 RON along with BS VI regime from 1st April 2020. Indian refiners, however, expressed the views that BS VI norms can be met with 91 RON. European Union norms also provide flexibility to adopt 91 RON with Euro VI emission norms. Moreover switching to 95 RON from April 2020 will call for addition of units for the conversion of LPG to gasoline resulting in higher deficit of this product which the country may not be able to meet through import due to infrastructural constraints. Implementation of conversion projects, at this stage, will also result in delay beyond April 2020. In the final notification of 16th September 2016, Government retained 91 RON and 81 MON respectively, i. e. at BS IV quality levels specified in IS 2796: 2014.

Diesel

Auto Industry demanded higher flash point of 42° C instead of current-specification of 35° C which is in vogue in India since many decades. Refiners were of the view that flash point has no impact on emission quality and hence retention of 35° C will continue to give flexibility of maximising diesel production in the country. Flash point of minimum 35° C has been maintained in the final notification. Refiners accepted the suggestion of SIAM to reduce poly aromatic hydrocarbons (PAH) from 11% to 8%, maximum.

In case of density, the earlier specification of 820-845 kg. per cubic meter has been revised to 845 kg. per cubic meter maximum allowing refiners a greater operational flexibility in the production of diesel.

Government also retained relaxation in Aromatic Contents of Gasoline (40% max.) and Cetane Number (48 min.) of Diesel from North East Refineries processing Assam crude oil till April 2023.



Commercial Specifications of BS Gasoline – (E 10)

Characteristics	Unit	BS IV (IS 2796:2014, fifth revision , Table 4)		MORTH Final Notification Dated 16 th Sept 2016 (Annex.- IV U)	
		Regular	Premium	Regular	Premium
Color, visual		As decided by refiners/ marketers		Orange	Red
Density @ 15°C	Kg/m3	720-775		720-775	
Distillation:					
a) Recovery up to 70°C (E 70)	% volume	10-55 (summer) 10-58 (other months)		10-55 (summer) 10-58 (other months)	
b) Recovery up to 100°C (E100)	% volume	40-70		40-70	
c) Recovery up to 150 °C(E150), min	% volume	75		75	
d) Final Boiling Point (FBP), max	°C	210		210	
e) Residue, max	% volume	2		2	
Research Octane Number (RON) min		91	95	91	95
Motor Octane Number (MON) min		81	85	81	85
Gum Content (solvent washed), max	Mg/100ml	4		4	
Oxidation Stability, min	Minutes	360		360	
Sulphur, total, max	Mg/kg	50		10	
Lead content (as Pb), max	g/l	0.005		0.005	
Reid Vapour Pressure (RVP) @ 38°C, max	kPa	67		67	
Vapour Lock Index (VLI)					
a) Summer, max		1050		1050	
b) Other months, max		1100		1100	
Benzene Content, max	% volume	1		1	
Copper Strip corrosion for 3 hrs @ 50°C, max	Rating	Not more than 1		Class 1	
Olefin content, max	% volume	21	18	21	18
Aromatics content, max	% volume	35		35	
Oxygen content, max	% mass	3.5		3.7	4.5
Oxygenates content					
a) Methanol, max	%volume	-		3	
b) Ethanol, max	% volume	9.75+ 0.25		10	
c) Iso-propyl alcohol, max	% volume	-		10	
d) Iso-Butyl alcohol, max	% volume	-		10	
e) Tertiary-butyl alcohol, max	% volume	-		7	
f) Ethers containing 5 or more carbon atoms per molecule, max	% volume	-		15	
g) Other oxygenates, max	% volume	-		8	
Water tolerance of gasoline-alcohol blends, temperature for phase separation	°C , Max.				
a) Other than winter months		10			
b) Winter		0			
Engine intake system cleanliness		Report MFA Used			

NE Relaxation:

BS-VI: Aromatic content – 40 of volume max up to 01.04.2023

BS IV: The same to be included in BS-IV specifications for which BIS has been approached.

Commercial Specifications of Diesel Fuel

Characteristics	Unit	BS IV (IS 1460:2005, fifth revision , Annex C)	BS VI MORTH Final Notification Dated 16 th Sept 2016 (Annex.- IV V)
Ash, max	% mass	0.01	0.01
Carbon Residue (Ramsbottom) on 10% residue, max		0.30	0.3
Cetane number (CN), min		51	without additives
Cetane Index (CI), min		46	51
Distillation:			46
95% vol. recovery at °C, max	°C	360	
Flash point:			360
a)	°C	35	
Kinematic Viscosity @ 40 °C	cst	2.0-4.5	35
Density @ 15 °C, max	Kg/m ³	820-845	2.0-4.5
Total Sulphur, max	Mg/kg	50	845
Water content, max	Mg/kg	200	10
Cold filter Plugging point (CFPP)			200
a)	°C	18	
b)	°C	6	18
Total contaminations, max	Mg/kg	24	6
Oxidation Stability, max	g/m ³	25	24
Polycyclic Aromatic Hydrocarbon (PAH), max	%mass	11	25
Lubricity, corrected wear scar diameter @ 60 °C, max	um (microns)	460	8
Copper strip corrosion for 3 hrs @ 50 °C	Rating	Not worse than No. 1	460
FAME content max-	% v/v		Class -1
			7.0

NE Relaxation: Cetane Number 48 min. till 01.04.2023



Paris Agreement on Climate Change India ratify the agreement

On 5th October 2016, 75 nations including three major countries USA, China and India, contributing to about 59.5 % of green house gases, ratified or acceded to the Paris agreement paving way for its enforcement from 4th November 2016 .

FACT SHEET



India ratified the Paris agreement on climate change on 2nd October 2016, the day of birth anniversary of Mahatma Gandhi. The instrument of rectification was deposited in the United Nations (UN). Paris agreement was adopted in December 12th, 2015 and India signed the agreement on 22nd April 2016 in New York. As of 5th October 2016, 190 states and European Union have signed this agreement. 75 parties have ratified the agreement or acceded to the agreement. Major among them are United States, India and China. While 75 parties who have ratified or acceded to the pact contribute about 59.5% of green gases, US, India and China contribute 17.9%, 20.1% and 4.1% (total 42%) respectively.

Direct link between average global temperature and concentration of greenhouse gases is well established. With rise in population, economies, shrinking green covers have resulted in increase in greenhouse gases and rise in global temperature. Release of first report by intergovernmental panel on climate change (IPCC) in September 2013 brought following facts:

- From 1880 to 2012, average global temperature increased by 0.85 degree Celsius, with decline in grain yield. Global temperature by the end of this century will exceed 1.5 degree Celsius
- From 1901 to 2010, the global average sea level rose by 19cm as oceans expanded due to global warming and ice melt. Average sea level will be 40-63cm by 2100.

In March 2014, IPCC published second part of its report. The report started raising concern among policy makers and public alike Paris climate conference (COP21) in December 2015 where 195 countries adopted the 1st ever international legal framework, is the outcome of this global concern.

Article 21, paragraph 1, of Paris agreement lay that the agreement shall enter into force on 30th day after the date on which at least 55 parties accounting for at least 55% of the total greenhouse gas emissions have deposited their instruments of ratification, acceptance, approval or accession with (UN) depository. With 75 states and 50% greenhouse gas contribution on 5th October 2016, the agreement will enter into force on 4th November 2016.

The focus of Paris agreement is to build a strong international framework to mitigate the threat of global temperature rise beyond 2 degree Celsius. In fact, efforts will be made to limit the increase to 1.5 degree Celsius. In this direction, the ratification by US, India and China is very encouraging and will set the momentum. India has declared that its laws, development agenda with cleaner technology roadmap and resources management, etc. will be as per the context in which agreement is ratified. Earlier on 1 October 2015, India submitted its Intended Nationally Determined Contribution (INDC), including the targets to:

- lower the emissions intensity of GDP by 33% to 35% by 2030 below 2005 levels,
- increase the share of non-fossil based power generation capacity to 40% of installed electric power capacity by 2030 (equivalent to 26–30% of generation in 2030), and
- create an additional (cumulative) carbon sink of 2.5–3 GtCO₂e through additional forest and tree cover by 2030.

For 2020, India has earlier put forward a pledge to reduce the emissions intensity of GDP by 20% to 25% by 2020 below 2005 levels.

Once the agreement enters into force on 4th Nov 2016, at state level and at international level , governing mechanism and development plans to implement and achieve the objectives and monitoring of the agreement will be launched. The first meeting of nations under the agreement will be held during next climate conference (COP22) at Marrakesh in Morocco from Nov 7th, 2016.

Paris agreement implementation is post 2020. Prior to this date, developed countries will continue to pursue their collective goals as per Kyoto Protocol.



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OUR NEW PLANT AT NAGOUR (RAJASTHAN)



PETROTECH - 2016

Theme: Hydrocarbons to fuel the future: Choices & Challenges



PETROTECH-2016 Core Group members

The PETROTECH series of International Oil & Gas Conference and Exhibition is a biennial platform for national and international experts in the oil & gas industry to exchange views and share knowledge, expertise and experiences. Being held for over two decades, PETROTECH-2016 is the 12th edition of the flagship event of the bustling Indian hydrocarbon sector that is a must-attend one in this part of the globe.

The mega event aims to explore areas of growth in petroleum technology, exploration, drilling, production and processing, refining, pipeline transportation, petrochemicals, natural gas, LNG, petroleum trade, economics, legal and human resource development, marketing, research & development, information technology, safety, health and environment management in the oil & gas sector. As the prime showcase of India's hydrocarbon sector, this mega event attracts technologists, scientists, planners and policy makers, management experts, entrepreneurs, service providers and vendors in order to catalyse achievement of global energy security.

PETROTECH-2016 is being organized under the aegis of the Ministry of Petroleum & Natural Gas, Government of India, and coordinated by Indian Oil Corporation Limited, a Fortune 500 company. Over the years, the PETROTECH series of conferences has gathered momentum and emerged as a movement uniting the upstream, midstream and the downstream sectors.

Each PETROTECH conference has been unique in its approach while ubiquitous in its aim to provide cleaner, greener and sustainable energy solutions. It has garnered an enviable reputation in the international circles as one of the coveted forums for the global hydrocarbon industry. With a plethora of topics and technical sessions, the 2016 edition will not only sow the seeds of a vibrant future but also engage everyone in a memorable and eventful three days of extravaganza in India's national capital.

Each PETROTECH conference and exhibition has been themed specifically to reflect the key issues affecting the industry and the path that leads to growth in the near future not only for India which is hungry for energy but also the global players participating in India's growth and progress.

ABOUT THE EXHIBITION

The PETROTECH exhibition will be held at the Pragati Maidan in New Delhi. The PETROTECH-2016 Exhibition is one of the biggest oil & gas exhibitions held in this part of the world, with participation of nearly 600 exhibitors from over 50 countries covering 15000 square metres of exhibition area at the sprawling Pragati Maidan in New Delhi. This year's Exhibition is expected to be much grander in scale with participation from more overseas companies and 15 country pavilions. Exclusive pavilions have been planned to showcase initiatives in 'Make in India' and Renewable Energy. Exclusive and dedicated pavilions are being carved out for the upstream, downstream and international exhibitors.

The top oil & gas companies across the world such as BP, GE, IndianOil, ONGC, HPCL, BPCL, OIL, Cairn, GAIL, Schlumberger, Honeywell, etc. have already booked space at the PETROTECH-2016 Exhibition. Country pavilions from Russia, China, Canada, and many more have also confirmed.

PETROTECH will provide opportunities for promotions of organizations, products and services in the following sectors:

- Oil and Gas
- Engineering equipment manufacturers and provider
- Information technology
- Research and Development
- Telecommunications and Instrumentation
- Alternative Energy
- Commercial Service Providers for Oil and Gas sectors
- Engineering and Construction Companies
- Environment Concern and pollution control
- Petrochemicals
- Safety and Chemicals industries
- Training and Human Resource Development
- Industry Bodies

CONFERENCE DATES: December 5-7, 2016

VENUE: The Conference will be held at Vigyan Bhavan- a premier convention centre in New Delhi.

Statistics

India: Oil & Gas

Domestic Oil Production (Million MT)

		2013-14	2014-15	2015-16	April- September 2016	
					Qty.	% of Total
On Shore	ONGC	6.71	6.07	5.82	2.94	33.18
	OIL	3.47	3.41	3.23	1.60	18.06
	Pvt./ JV (PSC)	9.41	9.06	8.81	4.32	48.76
	Sub Total	19.59	18.54	17.86	8.86	100
Off Shore	ONGC	15.54	16.19	16.54	8.09	85.52
	OIL	0	0	0	0	0.00
	Pvt./ JV (PSC)	2.66	2.73	2.55	1.37	14.48
	Sub Total	18.2	18.92	19.09	9.46	100
Total Domestic Production		37.79	37.46	36.95	18.32	100
	ONGC	22.25	22.26	22.36	11.03	60.21
	OIL	3.47	3.41	3.23	1.6	8.73
	Pvt./ JV (PSC)	12.07	11.79	11.36	5.69	31.06
Total Domestic Production		37.79	37.46	36.95	18.32	100

Source : PIB Release/PPAC

Oil Import - Volume and Value

	2013-14	2014-15	2015-16	April-September 2016
Quantity, Million Mt	189.2	189.4	202.1	106.4
Value, INR '000 cr.	864.88	687.42	415.36	214.3
Value, USD Billion	143	112.7	64.4	32.01
Average conversion Rate, INR per USD	60.48	61.00	64.50	66.95

Source : PPAC

Oil Import - Price USD / Barrel

	2013-14	2014-15	2015-16	April-Sept 2016
Brent (Low Sulphur - LS- marker)	107.5	85.43	47.46	45.69
Dubai	104.58	83.77	45.63	43.17
Low sulphur-High sulphur differential	2.88	1.4	1.68	2.1
Indian Crude Basket (ICB)	105.52	84.15	46.17	44.06
Av. Dubai Oman prices (High Sulphur - HS- marker)	104.62	84.03	45.78	43.59
ICB High Sulphur share %	69.9	72.04	72.28	71.03
ICB Low Sulphur share %	30.1	27.96	27.72	28.97



Refining

Refining Capacity (Million MT on 1st April 2016)

Indian Oil Corporation Ltd.	
Digboi	0.65
Guwahati	1.00
Koyali	13.70
Barauni	6.00
Haldia	7.50
Mathura	8.00
Panipat	15.00
Bongaigoan	2.35
Paradip	15.00
Total	69.20

Chennai Petroleum Corp. Ltd.	
Chennai	10.50
Narimanam	1.00
Total	11.50

JV Refineries	
DBPC, BORL-Bina	6.00
HMEL,GGSR	9.00
JV Total	15.00

Bharat Petroleum Corp. Ltd.	
Mumbai	12.00
Kochi	9.50
Total	21.50

Hindustan Petroleum Corp. Ltd.	
Mumbai	6.50
Visakhapatnam	8.30
Total	14.80
Other PSU Refineries	
NRL, Numaligarh	3.00
MRPL	15.00
ONGC, Tatipaka	0.07

Total PSU Refineries Capacity	135.07
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Private Refineries	
RIL, Jamnagar	33.00
RIL, (SEZ), Jamnagar	27.00
Essar Oil Ltd., Jamnagar	20.00
Pvt. Total	80.00

Total Refining Capacity of India 230.066* (4.62 million barrels per day)

* Not include capacity of 6000 TMT of Cuddalore refinery of Nagarjuna.

Source : PPAC/CHT

Crude Processing (Million MT)

PSU Refineries	2013-14	2014-15	2015-16	April-September 2016
IOCL	53.13	53.59	57.19	31.73
HPCL	15.51	16.18	17.23	8.52
BPCL	22.97	23.18	24.09	12.58
CPCL	10.63	10.78	9.63	5.57
MRPL	14.65	14.68	15.6	7.68
NRL	2.61	2.78	2.52	1.24
SUB TOTAL	119.5	121.19	126.26	67.32

JV Refineries	2013-14	2014-15	2015-16	April-September 2016
HMEL	9.27	7.34	10.71	5.50
BORL	5.45	6.21	6.4	3.27
SUB TOTAL	14.72	13.55	17.11	8.77

Pvt. Refineries	2013-14	2014-15	2015-16	April-September 2016
ESSAR	20.2	20.49	19.11	10.50
RIL	68.03	68.04	69.44	34.85
SUB TOTAL	88.23	88.53	88.55	45.35

	2013-14	2014-15	2015-16	April-September 2016
All India Crude Processing	222.45	223.27	231.92	121.44

Source : PIB Release

Crude Capacity vs. Processing - 2016-17 April-September 2016

	Capacity On 01/04/2016 Million MT	% Share	Crude Processing Million MT	% Share
PSU Ref	135.07	58.71	67.32	55.43
JV. Ref	15	6.52	8.77	7.22
Pvt. Ref	80	34.77	45.35	37.34
Total	230.07	100	121.44	100

POL PRODUCTION (Million MT)

	2013-14	2014-15	2015-16	April-September 2016
From Refineries	216.44	217.08	227.9	118.05
From Fractionators	3.87	3.65	3.38	2.06
Total	220.31	220.73	231.28	120.11

DISTILLATE PRODUCTION (Million MT)

	2013-14	2014-15	2015-16	April-September 2016
Light Distillates, MMT	58.81	59.54	63.60	34.47
Middle Distillates , MMT	112.85	113.41	118.31	60.51
Total Distillates, MMT	171.66	172.95	181.91	94.98
% Distillates Production on Crude Processing	77.17	77.46	78.43	78.21



INTERNATIONAL PRICE EX SINGAPORE, (\$/bbl.)

	2013-14	2014-15	2015-16	April-September 2016
Gasoline	114.31	95.45	61.72	53.42
Naphtha	100.22	82.22	48.54	42.61
Kero / Jet	121.23	66.62	58.17	54.32
Gas Oil (0.05% S)	121.99	99.44	57.63	53.91
Dubai crude	104.58	83.77	45.63	43.17
Indian crude basket	105.52	84.16	46.17	44.03

CRACKS SPREADS (\$/ bbl.)

	2013-14	2014-15	2015-16	April-September 2016
Gasoline crack				
Dubai crude based	9.73	11.68	16.09	10.25
Indian crude basket	8.79	11.29	15.55	9.39
Diesel crack				
Dubai crude based	17.41	15.67	12	10.74
Indian crude basket	16.47	15.28	11.46	9.88

Source: PIB

Gas

Gas Production/Consumption/Import

	2013-14	2014-15	2015-16	April-September 2016
Net Gas Production (MMSCM)	34574	32693	31138	15191
LNG Imports (MMSCM)	17728	18536	21309	12722
Import Dependency (%)	34	36	41	46
Total Gas Consumption (MMSCM)	52302	51229	52447	27913

Domestic Gas Price (\$/mmbtu)

Period	Domestic Gas Price (GCV Basis)	Price Cap for Deepwater, High temp High Pressure Areas
November 14 - March 15	5.05	-
April-Sept 15	4.66	-
Oct 15 - March 16	3.82	-
April-Sept 16	3.06	6.61
Oct 16 - March 17	2.5	5.30

Source: PPAC

News from Members

Payment of differential royalty to State of Assam by ONGC and OIL

Public Sector Upstream Oil companies, i.e. Oil India Limited (OIL) and Oil and Natural Gas Corporation Limited (ONGCL) made a payment to the Government of Assam, towards differential royalty on pre-discount price for the period from 01.02.14 to 31.03.16. The amount paid by OIL is ₹ 1,149.24 crores and the amount paid by ONGC is ₹. 300.64 crores. The cheques were handed over by the CMDs of ONGC and OIL to the Hon'ble Chief Minister of Assam, Sri Sarbananda Sonowal, at New Delhi, in the presence of Sri Dharmendra Pradhan, Hon'ble Minister of State (I/C) for Petroleum and Natural Gas among other dignitaries and senior officials from Ministry of Petroleum and Natural Gas (MoP&NG), ONGCL & OIL.



The handing over of Differential Royalty Cheque by Shri Utpal Bora, CMD, OIL to Sri Sarbananda Sonowal, Hon'ble Chief Minister of Assam

OIL adopts three orphaned Rhino calves in flood hit Kaziranga

Oil India Limited (OIL), under its Corporate Social Responsibility initiatives, has adopted three orphaned Rhino calves which are being looked after by Wild Life Trust of India (WTI)'s, Centre for Wild Life Rehabilitation and Conservation located near Kaziranga in Panbari Borguri, Bokakhat, under Golaghat District in Assam. In the recent devastating floods in Assam, Kaziranga National Park has been severely affected and a lot of wild animals have lost their lives, while quite a few have been rescued by local people, NGOs and Forest officials.

A cheque of ₹. 3.00 Lakhs (Rupees Three Lakhs) only was ceremoniously handed by Shri Bhaskar Khaund, Executive Director (HR), OIL to Shri Vivek Menon, Executive Director & CEO, WTI, at OIL' s Corporate Office in NOIDA, Uttar Pradesh as an initial amount to take care of immediate needs of the three Rhino calves.



Rescued Rhino Calves at the WTI's Centre for Wildlife rehabilitation and conservation in Bokakhat near Kaziranga National Park

IndianOil and GAIL sign MoU for taking equity stake in upcoming Dhamra LNG terminal

Indian Oil Corporation Limited and GAIL (India) Limited have signed an MoU with Dhamra LNG Terminal Private Limited (DLTPL) for taking equity in the 5 MMTPA capacity LNG Receiving, Storage and Regasification Terminal being put up at Dhamra Port, Odisha. As per the MoU, DLTPL shall be an equal Joint Venture of IndianOil and GAIL on one hand and Adani Group on the other. IndianOil and GAIL would acquire 39% and 11% equity respectively in DLTPL with the balance 50% being held by Adani group. Going forward, IndianOil and Adani group will each divest 1% of their respective stake to a credible financial institution which will then have 2% stake in the terminal. Apart from equity, IndianOil and GAIL intend to book regasification capacity of 3.0 and 1.5 MMTPA respectively in the terminal.



Signatories exchanging the MoU documents in the presence of Shri Dharmendra Pradhan, MoS(Ic), MoPNG



20th Refinery Technology Meet brings world energy technocrats on a single platform

The Centre for High Technology (CHT), a satellite organisation of Ministry of Petroleum & Natural Gas, Government of India, in association with Indian Oil Corporation Ltd., org Gasification; Hydrogen Management; Refinery Optimisation and Margin Improvement; Energy/Process Efficiency and Yield Improvement and Operational Excellence and Novel & Best Practices. Around 180 technical papers and some interesting case studies were presented by technical experts from refining sector from India and abroad. On the sidelines of the event, an exhibition showcased a wide range of innovative technologies, products and services by reputed vendors, consultants and service providers like DuPont, Forbes Marshall, CRI, Linde, among others.



Shri Ajay Sawhney, Additional Secretary, MoP&NG, inaugurating the 20th Refinery Technology Meet at Gandhinagar, Gujarat on September 7, 2016.

Utpal Bora takes over as CMD, OIL

Shri Utpal Bora has taken over the charge of Chairman and Managing Director of Oil India Limited (OIL), India's second largest National Exploration & Production Company, on 18th July 2016. Shri Bora has a rich and varied experience of over 33 years in the E&P Sector. He served in various capacities at ONGC Ltd. including OVL, the international branch of ONGC in activities related to artificial lift, well completion, testing, well control, reservoir management, crude transportation/quality assurance for refinery receipt, work over operations of onshore and offshore fields, planning, technical cell and at OVL he was specifically engaged in framing of policy directives and its implementation, co-ordination with national oil company of Venezuela, PDVSA under projects like Petrocarabobo and San Cristobal.



Shri Utpal Bora assumed the charge of CMD, OIL

10th Cairn India Annual General Meeting

Cairn India Limited's (CIL) 10th Annual General Meeting (AGM) was held in Mumbai. Shri Navin Agarwal, Cairn India, Chairman, said, "We envisage multiplying our gas production by four times, which will support resource maximization from the Rajasthan block. The expected ultimate recovery from the Raageshwari Deep Gas field has been upgraded by over 25%. This was a result of successful application of hydro frac technology and better reservoir management. With this, Cairn India has successfully placed the largest frac in India."



Shri Navin Agarwal, Cairn India, Chairman, addresses the 10th Cairn India AGM in Mumbai.

IndianOil reports net profit of ₹8,269 cr. against ₹6,591 cr. of Q1 2015-16

IndianOil reported a net profit of ₹8,269 crores for the quarter ended 30th June, 2016 as compared to a profit of ₹6,591 crores in the corresponding quarter of 2015-16. The income from operations for the quarter ended 30th June, 2016 was ₹1,07,201 crore as compared to ₹1,13,743 crores in corresponding quarter of 2015-16 and despite better physicals, the decrease is purely because of fall in international prices in current period. The Board of Directors has recommended bonus shares in the ratio of one equity shares of ₹10/- for one existing equity share of ₹10/- each out of accumulated reserves.



Shri B. Ashok, Chairman, IndianOil shares Corporation's Q1 financial results for FY 2016-17 at IndianOil's Corporate Office in New Delhi.

IndianOil and USTDA sign agreement to promote cleaner fuels in India

The U.S. Trade and Development Agency (USTDA) and IndianOil will jointly work to explore cleaner fuels. USTDA awarded a grant to IndianOil to analyse options for optimising its refining operations to produce cleaner fuels, which will help the company improve efficiencies and reduce emissions at its refineries, as well as meet environmental standards. An agreement was signed by Shri Sanjiv Singh, Director (Refineries), IndianOil and Mr. John M. McCaslin, Minister Counsellor for Commercial Affairs, Embassy of the United States of America in New Delhi on September 22, 2016. The feasibility study will include market, technical, economic and financial analysis of advanced technologies in order to help IndianOil identify solutions for converting refinery by-products into cleaner chemical products and / or fuels. This project follows IndianOil's participation in a USTDA reverse trade mission that brought Indian energy officials to the United States for meetings and site visits, focused on refinery modernisation.



Shri Sanjiv Singh, Director (Refineries), IndianOil and Mr. John M. McCaslin, Minister Counsellor for Commercial Affairs, Embassy of the United States of America during agreement signing ceremony

Honeywell appoints Ashish Gaikwad as MD of Honeywell Automation India Limited

Honeywell Automation India Limited announced that Shri Ashish Gaikwad has been appointed as its Managing Director effective from October 1, 2016. Gaikwad succeeds Shri Vikas Chadha, who was recently named president, Honeywell India. Speaking about the appointment, Shri Suresh Senapaty, Chairman, HAIL, said, "HAIL has a 25-year legacy in India, in developing and manufacturing technologies that serve a diverse and extensive customer base across verticals including oil and gas, power, metals, pharmaceuticals, chemicals, mining, infrastructure, IT/ITeS, telecom, banking, healthcare, hospitality, automobiles, defense, aerospace, transportation, and the residential sector".



Shri Ashish Gaikwad

India's largest Solar Run community safe drinking water plant at Sewniwala, Barmer

Barmer has got yet another feather in its cap as country's largest solar based community drinking water project starts functioning at village Sewniwala. Cairn India under a Memorandum of Understanding (MoU) with Public Health and Engineering Department (PHED) of Rajasthan is establishing clean water plants across Barmer District. The first plant based on this pioneering initiative and India's largest solar operated community based RO Plant, has been installed at Sewniwala in Baytu Tehsil. The solar plant will generate a power of 5KW and store the same in batteries, which can be used for 8-10 hours of plant operations. The water from this plant will be sold at 25 paise per litre to the local community.



India's largest solar operated community based RO Plant has been installed at Sewniwala in Baytu Tehsil.



PetroFed Events



Conference on 'Executing Organisational Strategy: Leveraging the Power of Project Management'

PetroFed and PMI Organisation Centre Pvt. Ltd. jointly organised a one day conference on 2nd September 2016 on project management in Oil & Gas Industry. Theme of the conference was 'Executing Organisational Strategy: Leveraging the Power of Project Management.'

Dr. R. K. Malhotra, DG PetroFed delivered welcome address, Mr. Raj Kalady of PMI set the context of the conference and stated that the Skill deficiency is the cause of all other issues delaying projects.

Executives from IOC, ONGC, GAIL, EIL, Petronet LNG, Amec Foster Wheeler, Technip, FLOUR Daniel India, L&T addressed the conference.



Dr. R. K. Malhotra presenting the certificate

Interactive Session on 'Deliberating Oil Markets'

PetroFed organised an interactive session on 'Deliberating Oil Markets' in association with Shell on July 26, 2016 at New Delhi. The session witnessed presence of Hon'ble Minister, Secretary, Ministry of Petroleum and Natural Gas, Govt. of India and Senior Industry officials.

Mr. Chris Midgley, General Manager, Oil Market Analysis spoke about future energy Dilemma including affordable energy supply; energy security and mitigate emissions of greenhouse gases for developing economies of countries like India.

Mr. Mike Muller, Vice President, Shell Trading and Supply Crude shared his thoughts on initiatives Indian Refiners can put in place to enhance their competitiveness in this dynamic environment.

The presentations were followed up by an insightful Q&A session.



Mr. Chris Midgley, General Manager, Oil Market Analysis making his presentation on the Uncertainty in the Global Markets.

Workshop on Impact of GST on Oil & Gas Sector

PetroFed organised a workshop on the impact of Goods & Services Tax (GST) on the Oil and Gas Sector in association with its knowledge partner, EY on July 12, 2016 at New Delhi. The workshop was organized primarily with the objective of understanding the challenges the industry would face with the implementation of GST in its current form.

Mr. Abhishek Jain, Tax Partner, Indirect Tax Services, EY made a lucid presentation covering various issues the new GST law will throw up before the Oil & Gas sector. This was followed by a panel discussion with eminent members from the industry Sh. V. S. Krishnan, former CBEC Member Service Tax; Sh. A.K. Sharma - Director (F) IOC; Sh. R.K. Garg - Director (F) PLL; Ms. Bela Mao - Tax Director, Shell; Sh. R. Ganapathi Subramanian, Sr. V.P. Tax, RIL and Sh. Kartikeya Dube-Tax Director, BP. The Panel discussion was moderated by Mr. Harishankar Subramaniam, Tax Partner & National Leader, Indirect Tax Services, EY.



Workshop on Impact of GST on Oil & Gas Sector

Stakeholder Workshops for 'Accelerating India Gas Market' Project

PetroFed organised 2nd Gas Stakeholder Workshop on 23rd August, 2016 in association with the project partners IHS Markit and ICF at India Habitat Centre, New Delhi. The workshop saw presence of Additional Secretary and Joint Secretary from MoP&NG, First Secretary (Energy and Climate); British High Commission, Gas market stakeholders, etc.

The session saw deliberations on the suggested policy framework to facilitate the infrastructure development, expand existing markets and create new markets for enhancing gas share in the India's energy basket.

The 3rd gas stakeholder workshop was organized by IHS Markit, ICF & PetroFed on 23 August, 2016 in Bengaluru. The workshop saw presence of Hon'ble Minister and Joint Secretary (marketing) from MoP&NG, CEOs and senior leaders from the Oil & Gas industry covering the entire gas value chain.

The workshop was organised to recommend steps for facilitating infrastructure development, expand existing markets and create new markets.

Shri Dharmendra Pradhan, Hon'ble Minister of Petroleum and Natural Gas stated that Bengaluru is a good starting place for creating new gas markets. India has committed to carbon emission reduction in the COP21 summit and gas will play a key role to achieve the same. Hon'ble Minister also suggested the group to make actionable plan and successful implementation strategy to enhance gas share.

The Deputy High Commissioner of United Kingdom, Mr. Dominic McAllister complimented Government of India on the amazing economic pace and significant policy and regulatory reforms. IHS Markit, ICF and PetroFed made a presentation on the need for Creating New Markets while expanding the current markets through supportive policy push.

The 4th gas stakeholder workshop on 'Raising the Voice of Gas – Building Gas Hub' was organized by HIS Markit, ICF and PetroFed on October 13, 2016 at PDU Campus, Gandhinagar, Gujarat.

The workshop was organized to recommend steps for facilitating building gas hub and obtain views on unbundling of gas infrastructure.



Ms. Frances Hooper, First Secretary – Energy & Climate, BHC welcoming the participants.

PetroFed signs MoU with TERI to undertake a study on Climate Change Risks

TERI and PetroFed signed an MoU on October 13, 2016 to undertake a study on 'Climate Change Risks: Preparedness for Oil & Gas Sector' in the presence of Shri Dharmendra Pradhan, Hon'ble Minister of State (I/C) for Petroleum & Natural Gas and Sh. K.D. Tripathi, Secretary, MOP&NG at the National Media Centre, New Delhi. Dr. R.K. Malhotra, DG, PetroFed and Dr. Ajay Mathur, DG, TERI signed the MoU.

The study will provide a comprehensive analysis of how the oil & gas sector should prepare itself in view of growing challenges of climate change. This would also include, what the sector would need to do in order to contribute to achievement of India's INDC targets for Oil & Gas sector.



Shri Dharmendra Pradhan, Hon'ble Minister addressing at the signing ceremony of the MoU



Expert Workshop on 'Getting Ready for the GST Regime'

With GST law under formation, an "Expert Workshop" was held on October 13, 2016 at Hotel Eros, Nehru Place, as a part of the series of workshops that have been conducted by PetroFed for GST.

This half day workshop that had been conducted in knowledge partnership with Deloitte basically focused on the operational aspects of GST implementation. Comprising of a specific congregation of industry members who are associated with the ground level implementation of GST, this direct and focused discussion enabled industry members to deliberate at the issues at the ground level.

The overview and approach to the program was provided by Mr. Hemal Zobalia, Tax Leader – Energy & Resources – Deloitte. Mr. Y. Parande, Advisor, Tax – Indirect Tax, Deloitte provided his insights on the key challenges and approach from a governance perspective.

The presentation session was essentially divided in to two portions - Challenges faced by Upstream/ Service providers/ Natural Gas Distribution companies and Challenges faced by downstream Companies. Both these sessions were headed by Mr. Anoop Kalavat.



Shri Hemal Zobalia delivering the closing remarks

Workshop on 'Changing Exploration Landscape of India: Breakthrough Ideas'

A workshop on the 'Changing Exploration Landscape of India: Breakthrough Ideas' was organized by PetroFed on September 28, 2016 to delve into the challenges and opportunities in the Indian E&P sector. As the demand for oil & gas is bound to grow, India needs to look forward to the increases in domestic production as well, failing which the pressure on imports would further escalate.

A number of policy reforms have been ushered in the recent past. Going forward, new ideas are required on the ground to change the flat production of oil and gas scenario in the country.

The speakers, panelists and participants deliberated on key issues ranging from prospects of new discovery, understanding the basins based on the reprocessed data and interpretation, hydrocarbon potential in Andaman basins, focused exploration of Mesozoic, etc.



Shri S. Rath, Director (E&P), PetroFed moderating the CEO Panel.

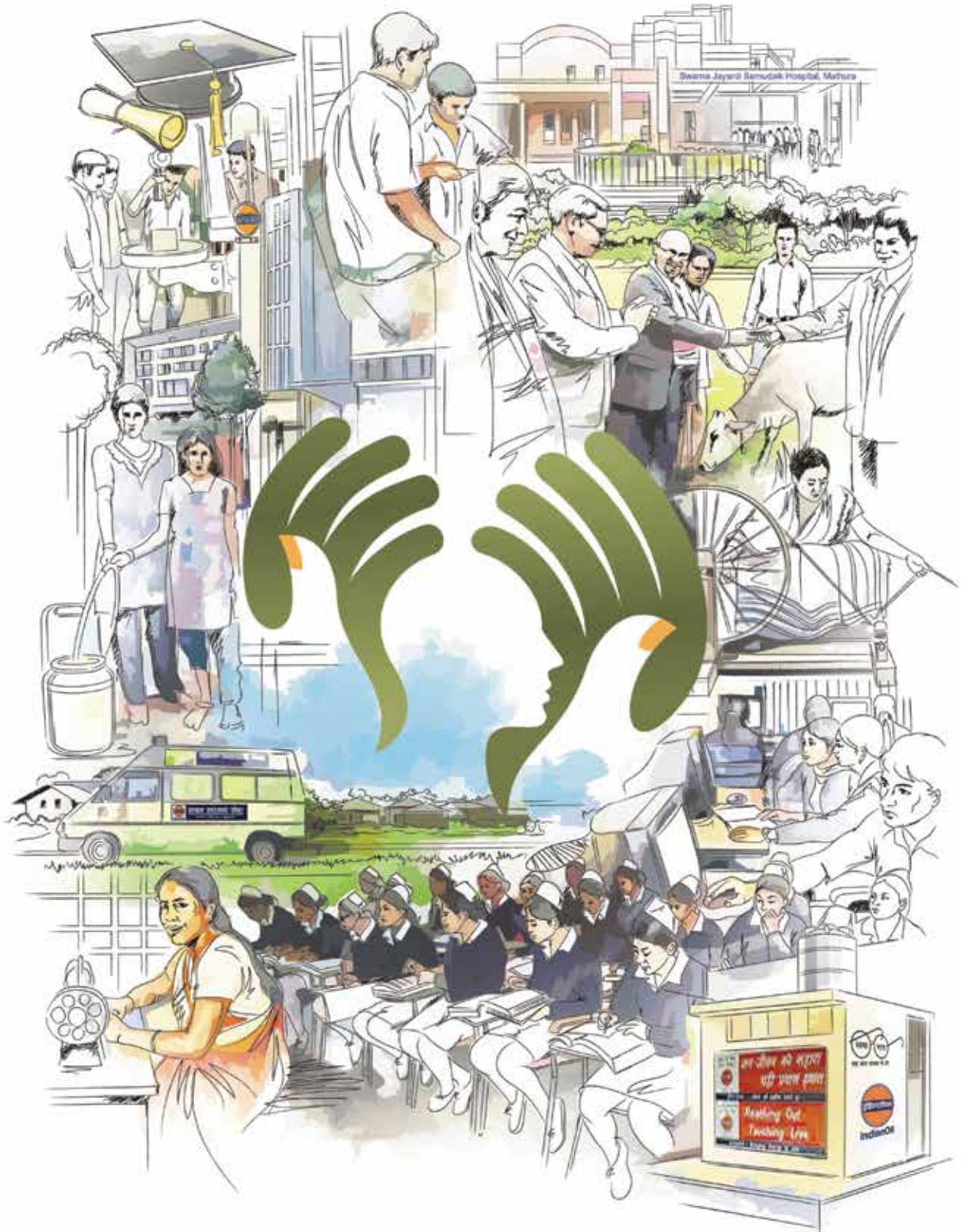
Training Program on "Analysing Oil Markets: Global Perspective"

PetroFed and JBC Energy Asia jointly organised a three days training program on "Analysing Oil Markets : Global Perspective" from 28th to 30th September 2016 at Hotel Eros in New Delhi . Program covered all issues related to oil and refining in the global scenario. Program attracted good participation from member companies.

Mr. Richard Gorry of JBC Energy Asia explained over 3 days, the issues like demand-supply, geopolitics, technological development, pricing, non-conventional sources of Oil & Gas, environmental considerations etc. , their impact on oil and refining industry and outlook .



Mr. Richard Gorry, Managing Director of JBC Energy Asia



Committed to Creating a Better Tomorrow



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