



**THE JOURNAL OF FEDERATION OF
INDIAN PETROLEUM INDUSTRY**

Voice of Indian Oil & Gas Industry



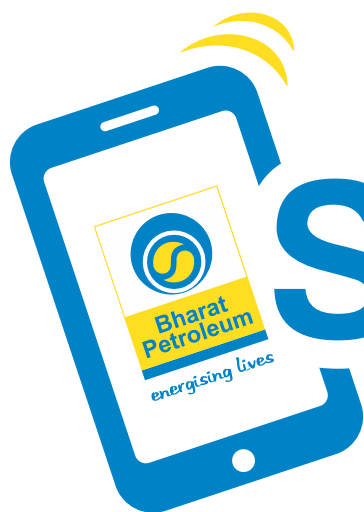
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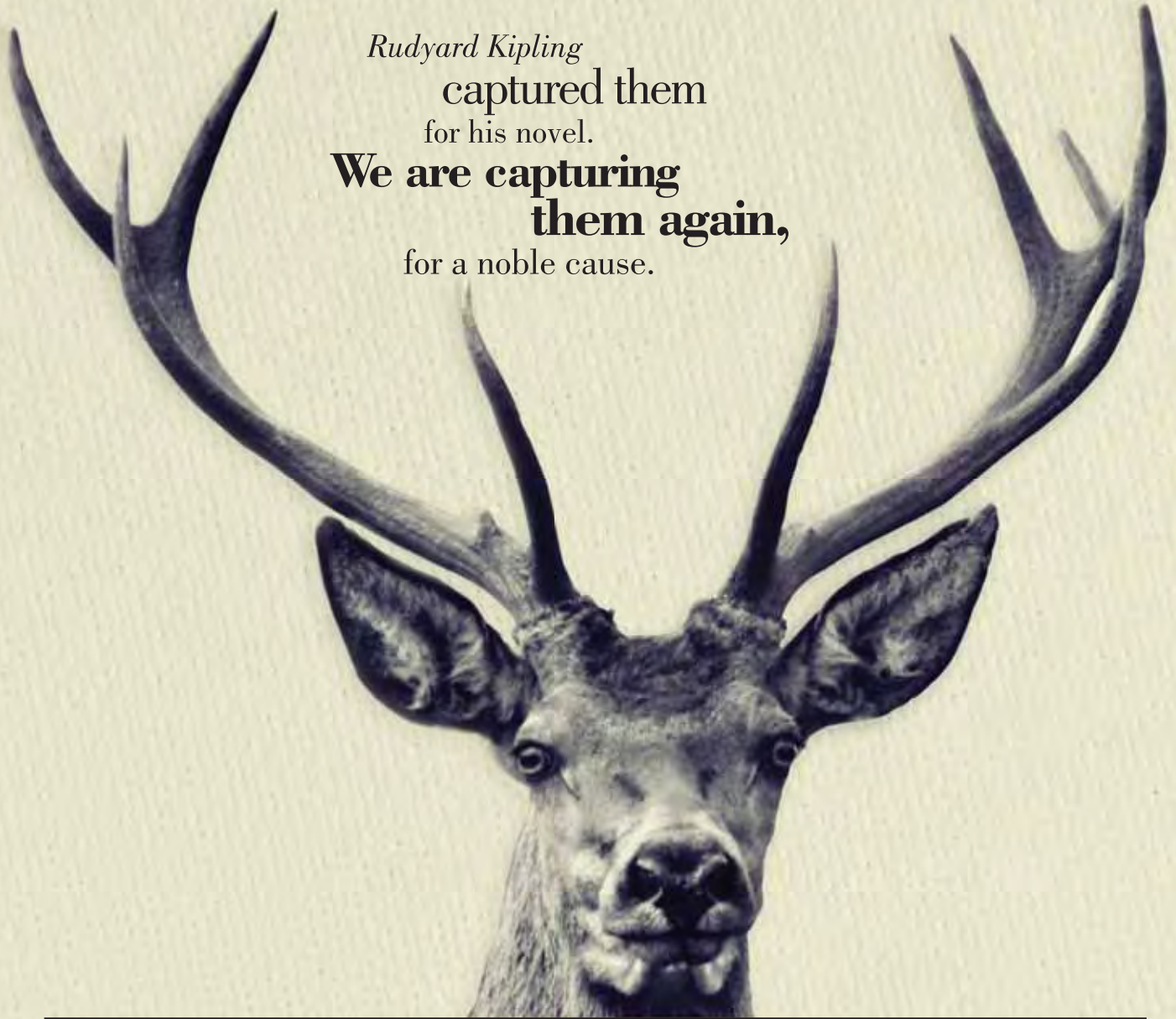


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“ONGC Eastern Swamp Deer Conservation Project”



a CSR Initiative by ONGC to protect this rare species
from the verge of extinction.

*Eastern Swamp Deer or Barasingha (*Rucervus duvaucelii ranjitsinhi*), currently found in Assam is on the verge of being wiped away. This is truly sad for a wonder that once magnificently captured renowned author Rudyard Kipling's imagination in his novel “The Second Jungle Book”.*

ONGC stepped in to turn the tables on its possible extinction, and just at the right time.

The first phase involved carrying out baseline population estimates, study of habitat, veterinary intervention, genetic study and awareness campaign. Manas National Park was identified as the new site for its translocation - a separate viable location essential for conservation.

The translocation of 19 Swamp Deer from Kaziranga National Park to Manas was a big task. Its herculean nature drove the second phase as wildlife experts from South Africa, executed the process. By artificially creating their natural habitat inside Conical Booms, 19 Swamp Deer were then translocated. Soon the addition of 6 new fawns in the herd was a reason for celebrations.

The third phase is underway to translocate another 20 Swamp Deer to ensure the sustainability of the project.

For ONGC, it is the beginning of good things to come. Driven to preserve and save the endangered species from extinction, the entity is committed towards the true beauty of nature.



Oil and Natural Gas Corporation Ltd.

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From the Desk of the

Director General

On July 01, 2017 the biggest tax reform that India has seen post-Independence was ushered in. However, the exclusion of Crude Oil, Natural Gas, Motor Spirit, High Speed Diesel and Aviation Turbine Fuel from the gambit of GST has far reaching implications on the oil Industry. Fundamentally, the \$2.4-trillion economy is attempting to transform itself by doing away with the internal tariff barriers and subsuming central, state and local taxes into a unified GST. The rollout has renewed the hope of India's fiscal reform program regaining momentum and widening the economy. However, the adverse impact on the Oil and Gas sector which now has to comply with both the existing tax regimes and the GST framework has serious concerns for our industry. Oil producers, refiners and marketers are set to take a hit of over Rs 22,000 crore a year because of the exclusion of the five petroleum products. With Petroleum constituting 26-30 per cent of the states' gross domestic product on an average, the GST is now levied on less than 70 per cent of state GDP. In a bid to bring much sought relief, Shri Dharmendra Pradhan, Minister of Petroleum & Natural Gas and Skill Development & Entrepreneurship has urged the Ministry of Finance to consider bringing petroleum products under the gambit of GST.

Key decisions of the government seem to indicate its commitment towards the hydrocarbon industry. With the approval to acquire 48.243 line kilometers (LKM) 2D seismic data for appraisal of Indian sedimentary basins, the domestic production of Oil and Gas is bound to be propelled.

At the World Petroleum Council which was held in Istanbul this year, Shri Dharmendra Pradhan, Minister of Petroleum & Natural Gas and Skill Development & Entrepreneurship addressed the plenary session stating that rising middle class of emerging Asian countries like India will drive the demand

for energy both in terms of electricity and cooking and transportation fuel. He mentioned that as incomes rise, the demand for petrochemicals will also increase and that the energy consumption of India alone is expected to double by 2035. He also emphasized the importance of "Responsible Price" for crude oil for countries like India which would allow it to provide energy to the common people.

Representing Federation of Indian Petroleum Industry at WPC, I moderated the workshop on Carbon Emissions Management: Upstream and Downstream Practices while briefing the august audience on our industry initiatives as well as the policy strategies undertaken by the government towards the same. In another session on Bio-fuels, I spoke on the "Growing Demand for Energy and the Environment: The Role of Biofuels," at WPC. While emphasizing the growing importance and need of biofuels I informed that the current biofuel market size in India is about \$ 1 billion and with plans to expand the same to \$7.5 billion by 2022, India indeed has the capability to be big producer and a giant market.

Our annual Awards Ceremony was held this year on August 07, 2017 and was indeed one to go down memorably in the pages of history of this organization. This year the awards ceremony was re-christened under the name of FIPI Awards signifying the merger of Petroleum Federation of India with Petrotech Society and hence emerging as the single unanimous voice of the Oil and Gas Industry. Before awards distribution, FIPI was honored to have hosted the talk of Mr. Ashish Bhandari, CEO, South Asia, Baker Hughes, A GE Company who spoke on the growing relevance of "Internet of Things" and its impact on the Oil and Gas Industry. We also had amongst ourselves, Mr. Hans-Paul Bürkner, Global Chairman of BCG who highlighted the 'Global Trends & Implication for Oil & Gas Industry.' Addressing the audience,

Secretary MoPNG stated that the Indian Oil and Gas Industry is set to experience more reforms in times to come.

With Union Minister Nitin Gadkari asserting that the government is serious in promoting electric vehicles and that electric fleet comprising buses, taxis and auto rickshaws will be on roads by the end of this year, Oil Industry is indeed at very challenging yet interesting cross roads today. In Europe, total cost of ownership of an electric vehicle is already close to most internal combustion engine cars. With rapid improvements in battery technologies, cost of ownership of an EV may fall further. However, the scenario seems hazy considering the fact that presently we have only 206 community charging stations across India. It implies that there is a significant chance of an EV owner getting stranded unless the required infrastructure of fast charging stations is also built up.

As per BP projected scenario, the number of electric cars will rise significantly from 1.2 million in 2015 to around 100 million by 2035 (6% of the global fleet), yet the impact of growth of electric vehicle mitigating oil demand is much smaller. Statistics claim that a 100 million increase in electric cars will reduce oil demand growth by 1.2 Mb/d. By comparison, this is around a 10th of the impact of the gains in vehicle efficiency. Overall it seems that the increase in

demand for car travel from the growing middle class in emerging economies will overpower the effects of improving fuel efficiency and electrification, such that global liquid fuel demand for cars will rise by 4 Mb/d.

While traditional cars may not disappear, the final resolve would lie in the fact that a cheaper, cleaner and safer car will inevitably win over the market. The Oil Industry in India will have to go the way of Total and Norway's Statoil which are now aiming to be "energy companies" focusing on all forms of energy, including solar and wind. It is heartening to note that major Oil refining and marketing companies have also started looking at various options and some of them are already working on solar power, battery development and also on fast charging systems.

FIPI will continue to play an active role in studying the changing scenario of the Oil and Gas Industry. In view of the concerns over GST, we at FIPI will continue in our efforts to resolve the issue with the concerned authorities. While the government itself is in the transitionary stage of implementation of GST and is grappling with the bottlenecks that it seems to be facing every single day our endeavor is to make sure that the Oil and Gas Industry is not kept out of this new tax regime for long.



Dr. R. K. Malhotra
Director General

Federation of Indian Petroleum Industry



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 hydrocarbon sector with global linkages.
- ★ A healthy and strong interface with government, legislative agencies and regulatory bodies.
- ★ Create value for stakeholders 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.fipi.org.in

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Finance

Multilateral Instruments and India - Unveiling a New Era in International Tax Jurisprudence Background



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India's focus on tax practices of multinational companies

India follows a source-based taxation system for non-residents who are taxed in respect of income arising / accruing / received in India. Over the years, India has taken various legislative and administrative steps to protect its tax base. Indian tax authorities have also been very vigilant in scrutinising the tax positions adopted by non-residents in India for preventing the leakage of tax revenue. This has often resulted in uncertainty on the tax front and consequently litigation for non-residents, especially for multinational companies such as Vodafone and Cairn, who have been fighting litigation battles with the Indian tax authorities in the Indian Courts.

Global focus on tax practices of multinational companies

Interestingly, India is not the only country wherein multinational companies are facing the heat from tax authorities; globally, companies such as Apple, Google and Starbucks have been subject to public scrutiny for having a low or at times even nil tax bills, despite earning revenues that exceed the total revenues of some sovereign countries.

Base erosion and profit shifting (BEPS) action plans

Governments globally, especially in developed countries, have sought to curb tax avoidance, especially by multinational

companies, and augment tax revenues in the face of global economic slowdown. The Organisation for Economic Co-operation and Development (OECD) has been at the forefront of the global fight against tax avoidance, introducing 15 action plans focused on addressing specific tax BEPS strategies (the BEPS project). The BEPS action plans involve targeted measures aimed at –

- Addressing tax challenges in the digital economy
- Neutralising the effects of hybrid mismatch arrangements, which exploit differences in the tax treatment of an entity or instrument in different countries to achieve double non-taxation
- Addressing tax treaty abuse, including treaty shopping, which results in the grant of tax treaty benefits in situations not intended by the tax treaty countries
- Addressing artificial avoidance of Permanent Establishment (PE)
- Improving dispute resolution and arbitration
- Limiting base erosion via interest deductions and other financial payments
- Ensuring transfer pricing outcomes are in line with value creation
- Requiring disclosure of aggressive tax planning
- Developing a multilateral instrument

Multilateral Instrument

Colossal efforts and time would have been spent if all the countries were to negotiate and amend their respective bilateral tax treaties to give effect to these action plans. In order to save time, Action plan 15 of the BEPS project required various countries to execute a common international agreement known as a multilateral instrument (MLI) to amend their respective individual tax treaties at one go for effectively addressing tax avoidance in a truly global and concerted effort.

Although India is not a member of the OECD, it is an active participant in a group of 100 countries, which have come together in the development of the MLI. In June 2017, along with 66 countries, India signed the MLI in Paris, seeking to amend 1,103 tax treaties globally, including 93 Indian tax treaties. Some of the key aspects of the MLI are as follows :

The MLI is an instrument containing amendments to be made to the bilateral tax treaties by the treaty countries to give effect to the BEPS action plans dealing with –

- Hybrid mismatch arrangements
- Tax treaty abuse
- Artificial avoidance of PE
- Dispute resolution and arbitration

Mere signing of the MLI by a country does not result in an automatic amendment of its bilateral tax treaties. Signatory countries are required to specify their bilateral tax treaties, which they propose to be amended, pursuant to the MLI.

The MLI provides the signatory countries with flexibility in applying its provisions. However, the signatory countries are required to apply certain *de minimis* provisions, which form the bedrock of the BEPS action plans. For example, all the treaties will include a preamble stating that the treaty seeks to eliminate double taxation and does not aim to provide any opportunity for double non-taxation or reduced taxation through tax evasion or avoidance.

The bilateral tax treaties can be amended pursuant to the MLI only upon both the treaty countries agreeing to apply the amendments proposed by the MLI in a like manner; for example, if India opts to apply a specific provision of the MLI to a bilateral tax treaty and its tax treaty partner also opts to apply the said provision, only then can the bilateral tax treaty be amended. However, if the tax treaty partner does not apply the said provision of the MLI to the bilateral tax treaty, then such a treaty will not be amended.

The OECD expects that the signatory countries will take some time to complete the internal procedures (such as legislative approvals) required to amend their tax treaties and the first batch of amended tax treaties will take effect only in 2018.

Indian perspective

India has proposed to make several amendments in its tax treaties by adopting the MLI provisions, some of which are mentioned below.

Dual residency of non-individual persons

If a person other than an individual, is a tax resident of India and another country then under the Indian tax treaties, it is deemed to be a resident of the country where its place of effective management (POEM) is situated.

MLI proposes that instead of the POEM test, the residential status shall be determined by the competent authorities of both the countries through mutual agreement procedures.

If the residential status cannot be determined by mutual agreement procedures, the benefits of tax treaty shall not be available except to the extent and in the manner as may be agreed upon by the competent authorities.

Object of tax treaties

The MLI provides that the object clause of the tax treaty would mandatorily state the following :

- The tax treaty seeks to eliminate double taxation.
- The tax treaty does not aim to provide any opportunity for double non-taxation or reduced taxation through tax evasion or avoidance.

The MLI also provides an option to the signatory countries to include the “development of economic relationship and enhancement of co-operation” as one of the objects of the tax treaty.

The object clause of the tax treaty is referred to by the courts to decide whether a person can claim tax treaty benefits.

In this context, it is important to note that India has opted to not adopt the optional provision dealing with the promotion of economic development, as one of the objects of the tax treaty.

Anti-abuse provision – Principal purpose test

The MLI mandates the inclusion of a principal purpose test in all the tax treaties. This test provides that the tax treaty benefit shall not be granted in cases where one of the principal purposes of any transaction was to obtain a tax treaty benefit (unless such a grant of benefit was in line with the object of the tax treaty).

This provision is similar to the existing general anti - avoidance provisions under the Indian Income-tax Act, 1961

Anti-abuse provision – Simplified limitation of the benefit clause

India has opted to apply a simplified limitation of the benefit clause, which restricts access to Tax treaties for persons other than “qualified persons.” The following are defined to be “qualified persons:”

- Individuals, state or political sub-divisions
- Companies whose shares are regularly traded on recognised stock exchanges
- Entities with at least half of their shares held by qualified persons for half the days in a 12-month period
- Residents engaged in active business, etc.

Agency PE

The MLI provides for tightening of the agency PE conditions. As per these provisions, an agent will be deemed to be a PE of a principal, if such an agent fulfils one of the following conditions :

- Habitually concludes contracts
- Plays a principal role leading to the conclusion of contracts that are routinely concluded without modification (as against merely concluding contracts in the existing treaties)

India has chosen to apply this provision.

Splitting up of contracts

In case of building / construction / installation projects, a contract is often split between different entities belonging to the same group/ common owner to avoid the creation of a PE for the group as a whole.

In order to curb this practice, the MLI provides for aggregation of the connected activities of closely related enterprises for determining the time spent on building site/ construction / installation projects and connected activities at the same site. India has chosen to apply this provision.

Arbitration

India has not adopted the arbitration provisions provided in the MLI.

Concluding thoughts

India has chosen to apply most of the provisions of the MLI, which is not surprising given that these provisions mirror the positions consistently taken by India in favour of source-based taxation.

It is also interesting that some of India's trade partners, such as the United States of America, United Arab Emirates and Brazil are not signatories to the MLI, and consequently, India's bilateral treaties with these countries may not be affected by the MLI.

While it is expected that more countries will sign the MLI, the efficacy of the MLI and its impact on the Indian tax treaty network shall be determined only when India's tax treaty partners ratify the MLI and have consensus-ad-idem on India's positions.

Views are personal.



Issues in Income-tax due to implementation of GST



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Goods and Services Tax (GST), the biggest tax reform of the country is now live. As this new born child takes its first breath and adjusts to the new world, Indian citizens (being the mother) will put in new systems, softwares, etc. required for the new child to nurture and grow, and in return this child on maturity shall help the family (nation) to grow into an economic powerhouse. Being the first child, the mother also needs some time to adjust and manage the new child, and hence the father (the Government of India) is assisting the family by providing relaxation in statutory filings so that both the mother and child can adjust with the change in their lives.

There is plethora of guidance and material on migration to GST and tools required for regular compliances. Now that we are live and moving towards the year end, it is worthwhile for the mother to envisage if she needs to plan and take care of any future exigencies (impact on income-tax). In this article, we have attempted to cover income-tax implications arising on account of GST, which may be applicable to the general public at large.

Software purchase / upgradation costs

GST has warranted purchase of new softwares and/or upgradation of existing softwares right from accounting to supply chain. Changes were required at each department of the organization and significant acquisition/upgradation costs have been incurred by organizations for migration to

GST. It would be worthwhile to analyse whether expenditure on software purchase/upgradation are allowed as tax deductible expenditure in the year of incurrance or the said cost needs to be capitalized and claim depreciation thereon.

The characterization of substantial expenditure incurred by a tax payer as a capital or revenue expenditure has been a matter of dispute before the tax authorities. The Courts in India have laid down certain principles for characterizing payments as revenue or capital in nature. Purchase of new softwares for migration to GST can be characterized as capital expenditure on which depreciation is to be claimed by organizations. However, characterization of upgradation cost will depend upon the level of improvement made in the system, quantum of expenditure incurred, additions of new module to existing systems and the benefit envisaged as a result of such system upgrade. Based on examination of aforesaid aspects, one needs to consider as to whether the upgradation costs can be considered as revenue expenditure or capital expenditure.

Organizations may have also incurred costs for doing an impact analysis on its functions, software, product, supply chain, warehousing and distribution network, etc. It is important to analyse whether the aforesaid impact analysis was integral to any upgradation cost and if yes, how have organizations treated this expenditure for the purpose of computing tax.

It can be appreciated that aforesaid exercise requires perusal of facts, and hence this aspect needs to be in detail to understand income-tax implications.

Whether tax is required to be deducted at source on GST portion of invoice

Withholding tax provisions of India requires payer to deduct tax on certain payments (for e.g. payment of professional fees, payment to contractors, payment of commission, etc.) and deposit the amount of tax with the Government on monthly basis. For e.g. if a professional service provider raises an invoice of Rs. 100 and levies taxes of Rs. 15 on it, the payer is required to withhold tax @ 10% on such invoice.

There was a considerable debate on the point as to whether tax is required to be deducted on the service tax portion of the invoice, i.e. whether the payer is required to deduct tax on Rs. 100 or Rs. 115 in the aforesaid case. It was contended by the taxpayers that service tax does not constitute income as provided in the provisions of the Income-tax law, and hence tax should not be withheld on the service tax portion. With a view to address such concerns, the Central Board of Direct Taxes ('CBDT') had issued a circular that tax is not required to be deducted on the service tax portion of the invoice.

To provide further clarity, the CBDT has recently issued a similar Circular clarifying that GST levied on services should be ignored while computing the amount of tax to be deducted at source. However, one may have to check whether the aforesaid Circular covers invoices for supply of goods as well as services (i.e. composite invoices). In pre-GST era, organizations levied service tax, VAT, works contract tax based on the prescribed rules & rates while raising a composite invoice involving supply of goods and services. Under the GST regime, composite invoices are now subject to single tax, i.e. GST. An issue arises whether GST levied on such composite invoices is also to be ignored while computing the amount of tax to be deducted at source, as provided for in the aforesaid Circular. The Circular issued, appears to have provided relaxation only for GST levied on services. It needs to be examined whether GST levied on composite invoices can be characterized as GST for services, or sale of goods or both. Depending on its characterization, it needs to be determined whether GST on such invoices can be excluded while computing the amount of taxes to be deducted at source.

Though, aforesaid issue does not seem to be material, however, short-deduction of taxes on invoice value may lead to disallowance of expenditure and consequently a tax outgo for the payer. Further, payer may be subject to recovery proceedings for short deduction of taxes and may also be required to pay interest and penalty on the amount of short deduction.

Similar issue can arise while collecting taxes at source. The provisions of taxes to be collected at source are similar to the provisions of tax deducted at source, with the exception that under the provisions of taxes to be collected at source, the recipient of the amount needs to collect taxes on the invoice value and deposit it with the Government. The CBDT had earlier issued a Circular in the context of taxes to be collected at source to state that excise duty needs to be included while computing the amount of tax to be collected at source. In light of the recent Circular in the context of GST, which is brought to provide clarity on taxes to be deducted at source it needs to be analysed whether the same can be applied in the context of taxes to be collected at source and whether tax is required to be collected only on the invoice value and not on the tax amount.

Impact due to fair valuation as per IND-AS

In India, for number of years companies followed Accounting Standards issued by the Institute of Chartered Accountants of India. To address the complexities of the changing environment and to bring consistency in financial reporting, a need was felt to move towards global standards on financial reporting. Accordingly, the Government of India introduced IND-AS to be followed by Indian companies meeting certain financial criteria.

IND-AS accounting requires a company to fair value their books to reflect the true financial position of the company, i.e. the transactions are recorded based on its substance, rather than on its form. Phase – I of IND-AS was applicable from FY 2016-17 for Companies having net-worth of more than INR 500 crore. IND-AS under Phase – II will now apply to all listed Companies and Companies having net-worth of INR 250 crore or more. Such Companies will be required to fair value their receivables, payables including purchases and sales. There is a probability that under the IND-AS provisions, the invoiced value of the goods/services may be higher or lower than the sales value recorded in the books of account as per IND-AS. In such a scenario, Companies may be required to prepare a reconciliation for the amount reflected in the books of account and amount reflected on the invoice on which GST is paid and the amounts reported in GST returns. As GST law is evolving in India, in absence of jurisprudence, one may need to consider whether taxpayers are required to pay additional GST on the difference between the amount reflected on the invoice and the amount recorded in financial statements which are prepared based on IND-AS. Also, from income-tax perspective, taxpayers may be required to examine whether this excess payment of GST will be allowed as a tax deductible expenditure.

Interest and Penalties under GST law

Under Indian Income-tax law, it is a settled position that penalties or any such payment made for breach of any law is an inadmissible expenditure. However, certain statutory payments which are compensatory in nature can be claimed as a deduction. It needs to be examined whether interest and penalties under the GST law can be argued to be compensatory in nature and hence admissible for deduction. Under various Sales Tax Act, several Courts in the past have held that amounts paid under specific sections under such Act being penal in nature are inadmissible for deduction while computing taxable income under the Income-tax Act. Similarly, certain penalties paid under the Customs Act as well are inadmissible for deduction. However, interest paid under Sales Tax and Customs Act are admissible for deduction. In view of the above, one may need to analyse whether interest and penalties paid under the GST law are admissible for deduction under the Income-tax law.

Deduction for payment on actual basis

As per the provisions of the Income-tax law, deduction for certain taxes shall be allowed only on actual payment basis. Generally, taxes other than income taxes are allowed as a deduction on payment hereto such as service tax, VAT, etc. Under the GST regime, certain class of taxpayers are not eligible to claim credit for GST paid for e.g. companies operating in the upstream Oil and Gas sector (i.e. crude oil & natural gas) as the sector currently is not covered under the GST regime. Such companies may not be able to claim credit of GST paid on inputs or input services. Accordingly, tax paid on such input shall be required to be debited to the profit and

loss account. Deduction for such taxes may be subject to actual payment of tax, and hence organizations shall be required to track payment made to vendors before claiming deduction for the input tax recorded in the profit and loss account.

Loss of input tax credit

Taxes paid under erstwhile indirect tax regime such as excise duty, octroi may not be eligible for set off / refund in certain cases on account of inadequate documentation, etc. Further, a taxpayer may lose credit for GST paid in cases where goods are lost, stolen, destroyed or written off or disposed off by way of gift or free sample. It needs to be examined whether loss of aforesaid input tax credit can be treated as an expenditure eligible for deduction for the purpose of income-tax where the taxpayer has lost the right to claim credit on account of operation of any law or on account of circumstances beyond his control. Whether such loss can be claimed as a revenue expenditure incurred for the purpose of business?

As discussed above, GST is an evolving law in India. In absence of jurisprudence, one may need to draw an analogy from the existing decisions pertaining to the previous indirect tax laws such as sales tax, service tax, customs law, etc., and take positions backed by documentation while computing the income-taxable under the Indian Income-tax law. Further, because of different treatments followed in accounting standards, manner of availment of credit, etc. it is advisable for a taxpayer to prepare reconciliations on the amount of revenue and expenditure recorded in the profit and loss account vis-à-vis the details provided in various GST returns.

The information contained herein is of a general nature and is not intended to address the circumstances of any particular individual or entity. No one should act on such information without appropriate professional advice after a thorough examination of the particular situation.



Energy

Energy is About Quality of Life of Bottom of Pyramid People



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Introduction

Every country in the world has energy system that serves the economic structure of that country. Both the energy system and the economic structure are dynamic in their functioning and remain in state of evolution all the time. Primary factors that shape energy system in a country are its natural endowment, types of energy that are consumed by various economic agents, (namely, households, industry and transport) production, import and export, and distribution of all types of energy. Besides many other factors, two exogenous factors impact the energy system of every country; namely technological development and policy regulation. Among the latest factors that are causing disruption in the energy system in all countries are: (i) commitment to environmental protection, adoption of clean energy and mitigation of green house gas emission and (ii) switch to low energy intensive application, improving efficient use of energy.

Countries struggle to upgrade their energy systems to fully support current and future requirements of energy security and access, sustainability and economic growth. All of this takes place against a backdrop of economic power (and associated energy demand) shifting from developed to developing countries; political power shifting from the nation state to sub-national and supra-national entities; and

processes of innovation broadening from large incumbent firms to agile newcomers. This is shifting the shape of the geopolitics of energy and changing the vocabulary used to describe it. While traditional issues of energy such as commodity price volatility and physical security of supply remain salient, the elements of the energy transition, including a focus on clean energy, require policy makers to look beyond static approaches.

Indicators of Balanced Energy System

There are studies to show that energy consumption and GDP are interlinked, with four hypotheses about the direction of causality between energy consumption and GDP.

- i. Hypothesis of neutrality holds that there is no causality (in either direction) between these two variables.
- ii. Energy conservation hypothesis holds that there is evidence of unidirectional causality from GDP growth to energy consumption.
- iii. Growth hypothesis suggests that energy consumption drives GDP growth.
- iv. Feedback hypothesis suggests a bidirectional causal relationship between energy consumption and GDP growth.

This linkage of late has been disrupted primarily due to: (i) shift of energy type from Liquid to Gas – mostly in countries in European Union, (ii) alteration in the economic structure – income shift to service sector, dominated by digital technology, (iii) countries adhering to commitment to environmental concern that decarbonizes the energy system; commitment expressed in Intended nationally Determined Contribution (INDC) given to UNFCCC at COP 21 Paris in December 2015.

World Energy Council observes, 'since 1990, most countries have experienced a close relationship between energy intensity and income (measured in economic output per capita), with increasing income tending to improve energy intensity. Over that period, global gross domestic product (GDP) per capita has risen by almost two thirds, while energy intensity has improved by almost a quarter. Interestingly, the relationship changes according to income levels: the richer the country, the larger is the energy intensity improvement with increasing per capita income. In developed countries, energy intensity has improved faster than developing countries, in part because energy efficiency has had a higher policy priority, with the gradual broadening and deepening of energy efficiency regulation ensuring continued energy savings. Economic restructuring and saturation effects play a

role, alongside energy efficiency, but correcting for change in economic structure with a decomposition analysis does not change the picture significantly.'

While the pressures and possibilities for change in energy architecture are at a historic height, what is less clear is the shape the transition will take. What will the new energy architecture look like? What enabling environment will create the most effective transition towards an energy architecture needed to meet tomorrow's energy requirements both globally and for different countries? How can we ensure that the new architecture goes further to underpin the sometimes competing needs of economic growth and development, environmental sustainability, and energy access and security? Therefore, there is a need to monitor some relevant indicators to have a balanced approach to energy system. This paper in later part has used two such indicators:

- i. 'Energy Trilemma Index' devised by World Energy Council
- ii. 'Energy Architecture Performance Index' devised by World Economic Forum

Energy Consumption & Economic Status of Countries

Aggregate energy consumption data for most countries and world at large on time series basis would reflect a secular increase. The energy system responds to the economy's requirement through a chain of supply, beginning with exploration and production, refining, transportation, trading, storage, secondary distribution and final consumption.

Consumption takes place in industries as fuel and feedstock, in transport system as fuel and in households for cooking, lighting and heating and cooling.

World in 2015 consumed 13147 MTOE (Million tonnes oil equivalent) energy; showing CAGR 2.5% over 50 years (from 1965 to 2015). Though consumption in the global aggregate terms is showing a consistent increase, there is lot of unevenness in the availability of energy to people living in different countries. As energy basket composition is undergoing changes in countries, so is energy availability and consumption pattern is changing amongst countries. The share of consumption by 35 OECD countries (as economic block) shifted from the level of 71% during 1960s to 42% in 2014 and 2015. USA which in 2015 consumes 17% of world total energy consumption, did consume twice the percentage (34%) in 1965. The reverse happened in countries like China and India, whose share in world energy consumption was 4% and 1% respectively (in 1965) have ascended the percentage share to 23 and 5, respectively (in 2015). That shows there has been dispersion of energy consumption amongst the countries.

World Energy Council estimates that 1.2 billion people, 16% of the world's population, are still without access to electricity and 2.7 billion people, almost 40% of global population, are without having access to clean cooking facilities. Even with the policy initiatives pronounced by countries through INDC at Paris in December 2015, there will be still large number of people without access to modern energy services, as shown in Table 1.

Table 1: Population without access to modern energy services (million people)

	Without access to electricity			Without access to clean cooking facilities		
	2014	2030	2040	2014	2030	2040
Africa	634	619	489	793	793	708
Sub Saharan Africa	633	619	489	792	823	708
Developing Asia	512	166	47	1875	1458	1081
China	0	0	0	453	244	175
India	244	56	0	819	675	450
Latin America	22	0	0	65	56	52
Middle East	18	0	0	8	8	7
World	1186	784	536	2742	2345	1849

Source: World Energy Outlook 2016, International Energy Agency, pp. 92

Energy Poverty and Economic Poverty

The energy system and challenges are unique for each country. Further, the transnational nature of both energy markets and environmental sustainability issues necessitate a view that extends past the country level. It is generally known that energy poverty is one of the causes of economic poverty. This has been examined and has been validated by analyzing data of countries, clustered under regional and

economic blocks, from 1990 till 2015 from World Bank source. [4] Per capita energy consumption in LDCs (Least Developed Countries, as per UN classification) is 313 kgoe (KG Oil Equivalent) in a year (average of 25 years: 1990 to 2014). This is the least among the regional and economic blocks of countries (Table 2). That is followed in ascending order by countries in South Asia at 425 kgoe (India 455 kgoe) and Sub-Saharan Africa at 675 kgoe.

Table 2: Energy Indicator: Per Capita Energy Consumption (kg of oil equivalent)

Regional / Economic Blocks of Countries (World Bank Classification)	1990	2014	Annual Average of 25 years (1990 to 2014)	Standard Deviation	CAGR (%)
High Order					
North America	7665	7042	7628	339	-0.34
High Income Countries	4584	4745	4896	177	0.14
OECD Countries	4240	4140	4406	153	-0.1
European Union	3441	3080	3433	138	0.44
Middle Order					
Middle East & North Africa	1194	2365	1712	338	2.77
East Asia & Pacific	1015	2137	1446	374	3.02
Latin America & Caribbean	1044	1337	1187	106	0.99
Middle Income Countries	977	1405	1063	178	1.46
Low Order					
Sub Saharan Africa	691	701	675	13	0.06
South Asia	333	576	425	74	2.22
Least Developed Countries (UN Classification)	295	359	313	21	0.82
India	351	637	455	87	2.41
World	1661	1929	1722	113	0.6

Source: World Bank Open Data, www.data.worldbank.org

The above levels of low per capita energy consumption stand sharp contrast to world average of 1722 kgoe, annual average of last 25 year. The highest energy consumption block (of countries) is North America at 7628 kgoe, followed by 4896 kgoe of High Income countries, 4406 kgoe of OECD countries, 3433 kgoe of European Union and 3312 kgoe of Europe & Central Asia. (Table 2)

Country block in the middle order of average annual per

capita energy consumption is MENA (Middle East & North Africa) at 1712 kgoe, followed by East Asia & Pacific at 1446 kgoe, Latin America & Caribbean at 1187 kgoe and Middle Income Group at 1063 kgoe. (Table 2)

This order of per capita energy consumption by country blocks exactly coincide with indicators of economic poverty as shown in Table 3 & 4. Economic poverty is represented by two variables: (i) Percent of population below poverty line (at

\$ 1.90 a day @ 2011 ppp), and (ii) Percent of urban population living in slum.

The highest percentage of population living below poverty line in 2013 (expenditure of \$ 1.9 a day @ 2011 ppp) is in the

block of 'Low Income Countries' at 46.17%, followed by Sub-Saharan Africa at 40.99% and South Asia at 15.09%, against world level at 10.67%. (Table 3)

Table 3: Poverty headcount ratio at \$1.90 a day (2011 PPP) (% of population)

Regional / Economic Blocks of Countries (World Bank Classification)	1990	2010	2011	2012	2013
High Order					
Europe & Central Asia	1.93	2.89	2.64	3.39	2.15
Middle Order					
East Asia & Pacific	60.23	11.11	8.44	7.12	3.54
Latin America & Caribbean	15.84	6.46	5.98	5.55	5.4
Middle Income Countries	42.75	16.12	13.42	12.07	9.81
Low Order					
Low Income Countries	66.86	52.07	50.05	48.07	46.17
Sub Saharan Africa	54.28	45.68	44.06	42.6	40.99
South Asia	44.58	24.58	19.85	17.51	15.09
World	34.82	15.55	13.5	12.41	10.67

Source: World Bank Open Data, www.data.worldbank.org

Same order is followed when percentage of urban population living in slum in 2014 is taken as indicator of economic poverty. Highest country block is 'Low Income Countries' at 65.21%, followed by Sub Saharan Africa at 55.28% and South Asia at 30.57%. (Table 4)

Table 4: Population living in slums (% of urban population)

Regional / Economic Blocks of Countries (World Bank Classification)	1990	2005	2007	2009	2014
Middle Order					
East Asia & Pacific	46.69	33.13	30.6	28.95	25.8
Latin America & Caribbean	35.45	25.42	24.76	-	20.46
Middle Income Countries	45.93	33.69	31.97	31	27.13
Low Order					
Low Income Countries	75.37	69.76	67.13	66	65.21
Sub Saharan Africa	67.09	60.83	58.29	56.97	55.28
South Asia	56.62	39.81	37.3	34.8	30.57

Source: World Bank Open Data, www.data.worldbank.org

Per capita energy consumption (in Table 2) shows that country block in middle order and low order are showing better growth. CAGR (25 years: 1990 to 2014) of per capita energy consumption of East Asia & Pacific shows highest increase at 3.02%, followed by Middle East & North Africa block showing increase at 2.77%, Sub Saharan Africa at 2.22% and Middle Income Countries at 1.46%.

Energy for the Bottom of the Pyramid People

Energy Trilemma Index of World Energy Council

The Energy Trilemma Index ranks countries in terms of their likely ability to provide sustainable energy policies through the following three dimensions:

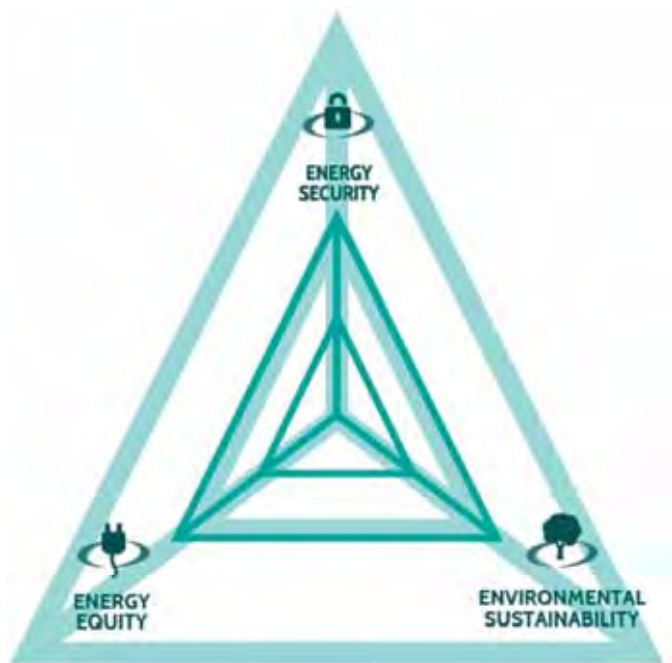
- i. **Energy security:** the effective management of primary energy supply from domestic and external sources, the reliability of energy infrastructure, and the ability of participating energy companies to meet current and future demand.
- ii. **Energy equity:** the accessibility and affordability of energy supply across the population.
- iii. **Environmental sustainability:** the achievement of supply and demand-side energy efficiencies and the development of energy supply from renewable and other low-carbon sources.

The Index rank measures overall performance and the balance score highlights how well a country manages the trade-offs between the three competing dimensions: energy security, energy equity, and environmental sustainability. The best score 'A' is given for a very high performance. Countries with good results are awarded with the score 'B'. High performers receive the score 'AAA' while countries that do not yet perform well receive a 'DDD' score. The assessment is done for 125 countries. If these 3 factors are not balanced and the overall score is not improved, then the country runs the following risks:

- a. **Not meeting the demand:** Securing energy is critical to maintain and drive economic growth. Meeting rising demand for energy enable the expansion of all sectors of the economy including agriculture, transport, manufacturing, construction, health and social services.
- b. **Not delivering social benefits:** Energy must be accessible and affordable at all levels of the society. The shift from primary energy to electricity is a key feature of modern society and increased energy access is strongly correlated to growth in education, life expectation and economic development.
- c. **Minimizing environmental impacts:** The impact of energy production and energy use on the environment must be minimized in order to combat climate change as well as the implications of local air and water pollution.

2016 edition of Energy Trilemma Index (of World Energy Council) has ranked geographical regions and GDP groups which bring out the central proposition of this paper that countries with higher GDP are also high in energy equity scale in terms of accessibility to electricity and to clean cooking fuel. (Table 5)

Following the improving trend in per capita consumption (CAGR for 25 years) of country blocks in middle and lower order, there has been improvement in poverty indicator of these blocks of countries over the years, as seen in Table 3 & 4.



Source: World Energy Council

Table 5: Energy Equity Indicators across Geographical Regions and GDP Groups

Geographical Region	GDP Per Capita	Industrial Sector	Population with access to electricity (%)	Access to clean cooking fuel (%)	
	PPP US\$	(% of total GDP)		Rural	Urban
Asia	21313	31.1	88	46	75
Europe	32390	25.4	100	75	85
Lat. Am & Caribbean	13203	31.7	92	54	85
Middle East & N. Africa	37417	46.2	97	94	95
North America	39141	27.8	100	84	95
Sub Saharan Africa	5628	26.2	37	16	50
GDP Group #					
Group I (> 33,500)	54608	31.9	98	88	88
Group II (14,300–33,500)	22818	32	97	76	87
Group III (6,000–14,300)	10999	31.1	89	47	83
Group IV (< 6,000)	3360	24.7	47	13	49
Global Average	22937	30.1	84	57	78

Source: World Bank Open Data, www.data.worldbank.org

Countries have been grouped on the basis of GDP per capita, US\$ per annum

Table 6 presents the energy equity ranking of 10 countries, selected at interval of 10 out of 125 countries, prepared by World Energy Council, in order of overall Trilemma Index 2016. The energy equity ranking of each country for 3 years

has been juxtaposed with select indicators (of energy poverty) to show that countries with higher overall ranking are those having higher energy equity ranking and higher energy access indicators.

Table 6: Alignment of Energy Equity Indicators with Energy Trilemma Rankings – Select Rank Countries

Country	Overall Energy Trilemma Rank out of 125 countries	Energy Equity Rank out of 125 countries			Score on Energy Equity	GDP Per Capita	Energy Intensity	Population with access to electricity (%)	Access to clean cooking fuel	
	2016	2014	2015	2016		PPP US\$	(kgoe per \$)		Urban	Rural
Denmark	1	15	13	10	A	46635	0.07	100	NA	NA
U.K.	11	12	7	8	A	41325	0.05	100	95	95
Canada	22	5	14	11	A	44310	0.13	100	95	95
Australia	31	7	5	6	A	47824	0.08	100	95	95
Columbia	41	79	81	80	A	13801	0.05	97	95	95
Mexico	52	64	72	71	B	17277	0.07	99	95	61
Philippines	61	91	90	92	C	7359	0.05	83	76	34
Iraq	74	52	54	53	B	14895	0.05	98	95	91
Sri Lanka	81	93	96	96	C	11739	0.05	85	66	15
India	91	95	93	93	C	6089	0.09	75	77	14

Energy Architecture Performance Index by World Economic Forum

World Economic Forum has devised a composite index, Energy Architecture Performance Index (EAPI), as a

measure of 3 key indicators of a country's energy system, which are again split into 18 sub indicators. EAPI index ranks 127 countries in descending order and gives score to the 3 key indicators on a scale of 0 – 1.

3 Broad Index	What the sub indices indicate
Economic Growth and Development	This sub-index measures the extent to which a country's energy architecture adds or detracts from economic growth
Environmental Sustainability	This sub-index measures the environmental impact of energy supply and consumption
Energy Access and Security	This sub-index measures the extent to which an energy supply is secure, accessible and diversified

Table 7 presents the energy access and security ranking of 10 countries, selected at interval of 10 out of 127 countries, prepared by World Economic Forum, in order of overall EAPI index of 2017. The 'Energy Access & Security Score' of each country for 4 years has been juxtaposed with 'Economic

Growth & Development Score' and overall 'EAPI Score' to show that countries with higher overall 'EAPI Score' and higher 'Economic Growth & Development Score' are those having higher 'Energy Access & Security Score'

Table 7 A: Alignment of Energy Equity Economic Development Score in Energy Architecture Performance Index (Score: 0-1)

2017 EAPI Rank	Country	2014			2015		
		EAPI Score	Economic Growth & Development Score	Energy Access & Security Score	EAPI Score	Economic Growth & Development Score	Energy Access & Security Score
1	Switzerland	0.72	0.73	0.82	0.80	0.71	0.89
11	Portugal	0.65	0.62	0.77	0.73	0.61	0.86
21	Hungary	0.64	0.53	0.78	0.71	0.57	0.83
31	Czech Republic	0.60	0.50	0.84	0.67	0.52	0.88
41	Turkey	0.57	0.53	0.73	0.63	0.54	0.81
51	Israel	0.58	0.61	0.73	0.65	0.61	0.80
61	Cuba	-	-	-	-	-	-
71	Malta	0.46	0.48	0.54	0.58	0.62	0.62
81	Nigeria	0.50	0.34	0.76	0.59	0.43	0.76
87	India	0.48	0.49	0.54	0.51	0.50	0.61

Note: EAPI – Energy Architecture Performance Index

Source: 'Global Energy Architecture Performance Index Report 2014', World Economic Forum, December 2014, 2015, 2017

Table 7 B: Alignment of Energy Equity Economic Development Score in Energy Architecture Performance Index (Score: 0-1)

2017 EAPI Rank	Country	2016			2017		
		EAPI Score	Economic Growth & Development Score	Energy Access & Security Score	EAPI Score	Economic Growth & Development Score	Energy Access & Security Score
1	Switzerland	0.79	0.72	0.88	0.80	0.74	0.88
11	Portugal	0.73	0.60	0.85	0.74	0.63	0.85
21	Hungary	0.70	0.58	0.81	0.71	0.62	0.79
31	Czech Republic	0.68	0.55	0.88	0.69	0.58	0.88
41	Turkey	0.66	0.57	0.79	0.66	0.59	0.78
51	Israel	0.63	0.56	0.81	0.65	0.60	0.84
61	Cuba	0.62	0.74	0.62	0.63	0.63	0.64
71	Malta	0.60	0.64	0.61	0.58	0.60	0.61
81	Nigeria	0.58	0.43	0.76	0.57	0.39	0.75
87	India	0.53	0.51	0.61	0.55	0.54	0.72

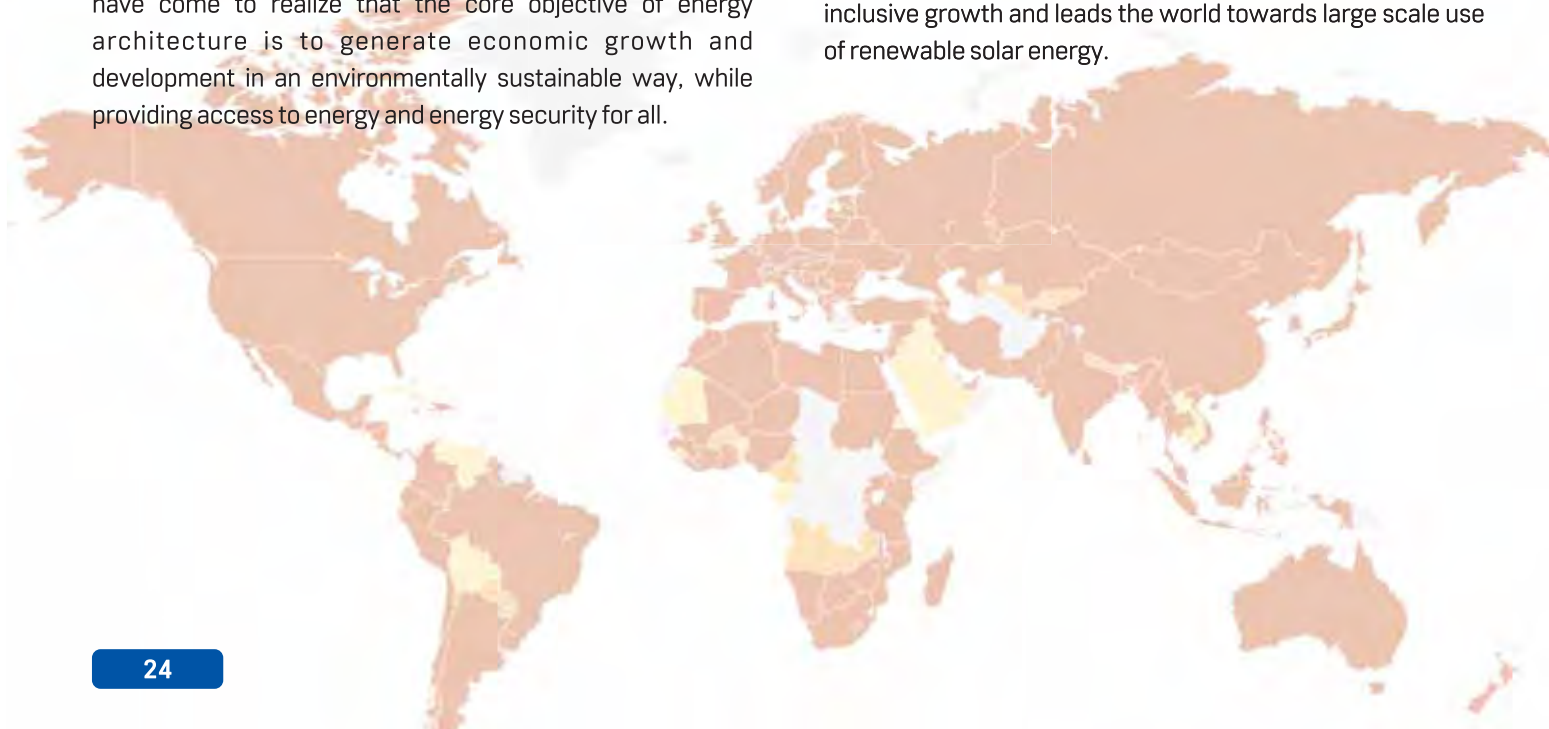
Note: EAPI – Energy Architecture Performance Index

Source: 'Global Energy Architecture Performance Index Report 2014', World Economic Forum, December 2014, 2015, 2017

Conclusion

Disruptive trends are emerging in energy horizon, which will create a fundamentally new world for the energy industry, characterised by lower population growth, radical new technologies, greater environmental challenges, and shift in economic and geopolitical power. These underlying drivers will re-shape the economics of energy. World policy makers have come to realize that the core objective of energy architecture is to generate economic growth and development in an environmentally sustainable way, while providing access to energy and energy security for all.

Economic growth of around 7.5% makes India the fastest growing G20 economy. The acceleration of structural reforms, the move towards rule based policy framework and low commodity prices have provided a strong growth impetus. India sets an example that it has embraced sustainable energy trajectory and assures its citizens inclusive growth and leads the world towards large scale use of renewable solar energy.



Synergy in Energy



Sashi Mukundan

Regional President & Head of Country-India
BP Group

A National Energy Policy (NEP) for our country has been long overdue. The draft document was released in June 2017. It shares the key policy directives to provide energy for economic growth in a responsible way. It provides for energy access to all segments of the country and society. And the guiding principle - as the visionaries of this document say - is to define the role of Government as a facilitator rather than an active player in the sector.

As the iterations progress in the crafting of the energy policy and further regulatory interventions are planned, I have a few suggestions.

Safety is key and should be addressed on priority as we, as a country produce, transport or consume all forms of energy.

Affordability, as we all know, is driven through the development of a competitive market place. This requires access, availability, and choice to the consumer. It will also require bringing efficiency in the market place by providing access to existing infrastructure.

A clear and immediate plan is required for the suggested unbundling content and carriage for all forms of energy.

Regulatory plans are needed to ensure commerciality of energy options to support real and sustainable energy forms. India, through this NEP, should seek to leapfrog in this transition to a low carbon world. In doing so, it should incentivize efficiency programs, next-generation solutions, and cutting-edge R&D work.

In the domain of Oil and Gas where I have some experience, I would like to suggest two key interventions. The first around a change in mindset and, the second, around specific interventions to encourage unconventional at scale. It is

important to recognize that Exploration and Production is not a perfect science and so the focus must be to encourage activities by incentivizing speed, risk taking, and infrastructure/data sharing. Intent should be delivering the contract in spirit and do whatever it takes to speed activities at scale. On Shale and CBM exploration, a rethink along the lines of land access through royalty sharing, as in the US, would help ease access and build scale. Enhanced Oil Recovery (EOR) is another program that needs immediate attention and an aggressive push by carving out mature fields for state-of-the-art technology applications by inviting experienced players. The prize here is very large. A 1% increase in recovery is 500 million barrels or \$25 billion of additional domestic production!

The role of Gas in the energy equation has never been stronger and clearer. In NEP, Gas is a key pillar as it is not only a clean and better fuel but also helps in the transition to a low carbon energy world. Developing a gas based economy will require including gas and gas-based infrastructures in development models for transport, electricity, cooking and heating, smart cities, industrial corridors and in replacing liquid fuels. Linkage to natural markets is possible if the railway and national highway 'right of way' is used to lay natural gas transportation system.

'Gas Hubs' with infrastructure, supply source and demand center should be encouraged around key supply source or demand center to build economies of scale (Gujarat is an example). Unbundling of content and carriage and open access are key to bringing efficiency, competition and penetration of markets.

The most heartwarming progress in energy is when it provides electricity to villages and remote areas. To provide affordable power to all will need more efficiency and open access to encourage competition and optionality to consumers. Assurance is needed to ensure the renewable power options being pursued are reliable and will be available. Electrification across India will need broad linkages to further drive efficiency. Examples being reviving existing gas to power and linking to demand clusters for fuel and power, renewable supply intermittency normalization, industrial and residential energy demand clusters as anchor to penetrate wider and deeper.

Mobile and remote fuelling are areas where regulatory framework is urgently required. This will bring access and affordability across urban, and rural areas and highways. The Indian consumer is looking for support to Electric Vehicle (EV) penetration in the development model of new smart cities. This will be a game changer in city transportation. Globally, Bio-fuels are moving to the next generation, which includes 'waste to energy' options. It includes renewable natural gas fuel or biomethane from landfills and municipal solid waste conversion to biofuels. One can keep listing. There are so many areas where synergy in energy will be the flag-bearer of change.

Views are personal.

Environment

Green Growth and Sustainable Development



Himanshu Arora

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The year 2016 was the hottest year in 137 years of record keeping and the third year in a row for record-breaking heat, according to the World Meteorological Organisation. The year 2017 is observing same significant climate change impact across the planet, even without a strong El Niño in 2017. These observations are challenging the limits of our understanding of the climate system.

We have witnessed two important historical events:

Climate Change Agreement in Paris and the adoption of the Sustainable Development Goals. This has earmarked a global roadmap towards a low carbon, resilient and a sustainable future responding to environmental challenges and climate change risks. India in its Intended Nationally Determined Contribution (INDCs) has pledged to curb its emission intensity of its Gross Domestic Product by 33 to 35 per cent compared to 2005 levels, by 2030, and of achieving 40 per cent cumulative electric power installed capacity from non-fossil fuel based energy resources by 2030.

These efforts towards climate change mitigation are built around three elements — reduction in emissions intensity, or emissions per unit of GDP, an increase in forest cover, and a greater role for green industry.

INDIA'S INDC TARGETS

Intended nationally Determined Contributions (INDC)

To reduce the mission intensity of its GDP by 33 to 35 per cent by 2030 from 2005 level.

To achieve about 40 per cent cumulative electric power installed capacity from non-fossil fuel based energy resources by 2030 with the help of transfer of technology and low-cost international finance including from Green Climate Fund (GCF).

To put forward and further propagate a healthy and sustainable way of living based on traditions and values of conservation and moderation.

To build capacities, create a domestic framework and international architecture for quick diffusion of cutting-edge climate technology on India and for joint collaborative R&D for such future technologies.



To create an additional carbon sink of 2.5 to 3 billion tons of CO₂ equivalent through the additional forest stand tree cover by 2030

To better adapt to climate change by enhancing investments in development programmes in sectors vulnerable to climate change, particularly agriculture, water, resources, Himalayan region, coastal regions, health and disaster management

To mobilize domestic and new & additional funds from developed countries to implement the above mitigation and adaptation actions in view of the resource required and the resource gap.

To adopt a climate friendly and a cleaner path than the one follow hitherto by others at the corresponding level of economic development.

Image source: India's INDC target, www.selflearn.co

Green growth means fostering economic growth and development, while ensuring that natural assets continue to provide the resources and environmental services on which our well-being relies. Green growth involves rethinking growth strategies with regard to their impact(s) on environmental sustainability and the environmental resources available to poor and vulnerable groups.

We need green growth because risks to development are rising as growth continues to erode natural capital. If left unchecked, this would mean increased water scarcity, worsening resource bottlenecks, greater pollution, climate change, and unrecoverable biodiversity loss.

Green growth for developing country like India lies beyond the fight against poverty and climate change. It starts from improving the people's wellbeing to tackle resource scarcities. The current economic system at developing countries serves no longer a purpose, as it is inequitable, inefficient and unsustainable in resource use and its distribution. India being a developing country is most vulnerable to climate change and it also faces severe threats from energy, food and water insecurity and extreme weather risks.

All these factors undermine the country's development because of its potential economic and social impacts of environmental degradation. India being the second largest populated country has chosen a development agenda comprising of future growth and poverty reduction goals. If India will follow the conventional economic growth patterns, it will increase the emissions and thus will result in more intensive use of natural resources. India is determined to follow the path of Green Growth where social and ecological development along with economic development is essential for equitable and inclusive growth.

Over the next two decades, India is expected to grow at a rate of 7 to 8 per cent. And during that same period, it will build approximately 80 per cent of the physical assets—including infrastructure, commercial and residential real estate, vehicle stock, and industrial capacity—that will constitute the India of 2030. India has already taken steps to curb expected increases in GHG emissions, including launching efforts to increase the efficiency with which it uses resources, reduce consumption, and accelerate the adoption of clean technologies.

Yet even if most of its planned improvements are implemented, India's GHG emissions will still increase by a multiple of about 3.5 in 2030 compared with 2005 levels, from 1.6 billion to 5.7 billion metric tons of carbon dioxide equivalent (CO₂e).

Under the backdrop of India's green growth aspirations, quest for energy security and improving energy access, a target of 175 GW of renewable energy by 2022 is set that will result in abatement of 326 million tons of CO₂ equivalent/year. India has already undertaken plans to create a vibrant manufacturing base for renewable energy technologies, creating additional jobs, promotion of R&D, etc. Responding to continuous vulnerability to energy price shocks, India became the first country to set up a ministry dedicated to Renewable Energy in 1992.

The government policy initiatives such as enactment of the Electricity Act, 2003 along with Integrated Energy Policy, 2006 laid out the principles that would enable a rapid scaling up of non-conventional energy resources.

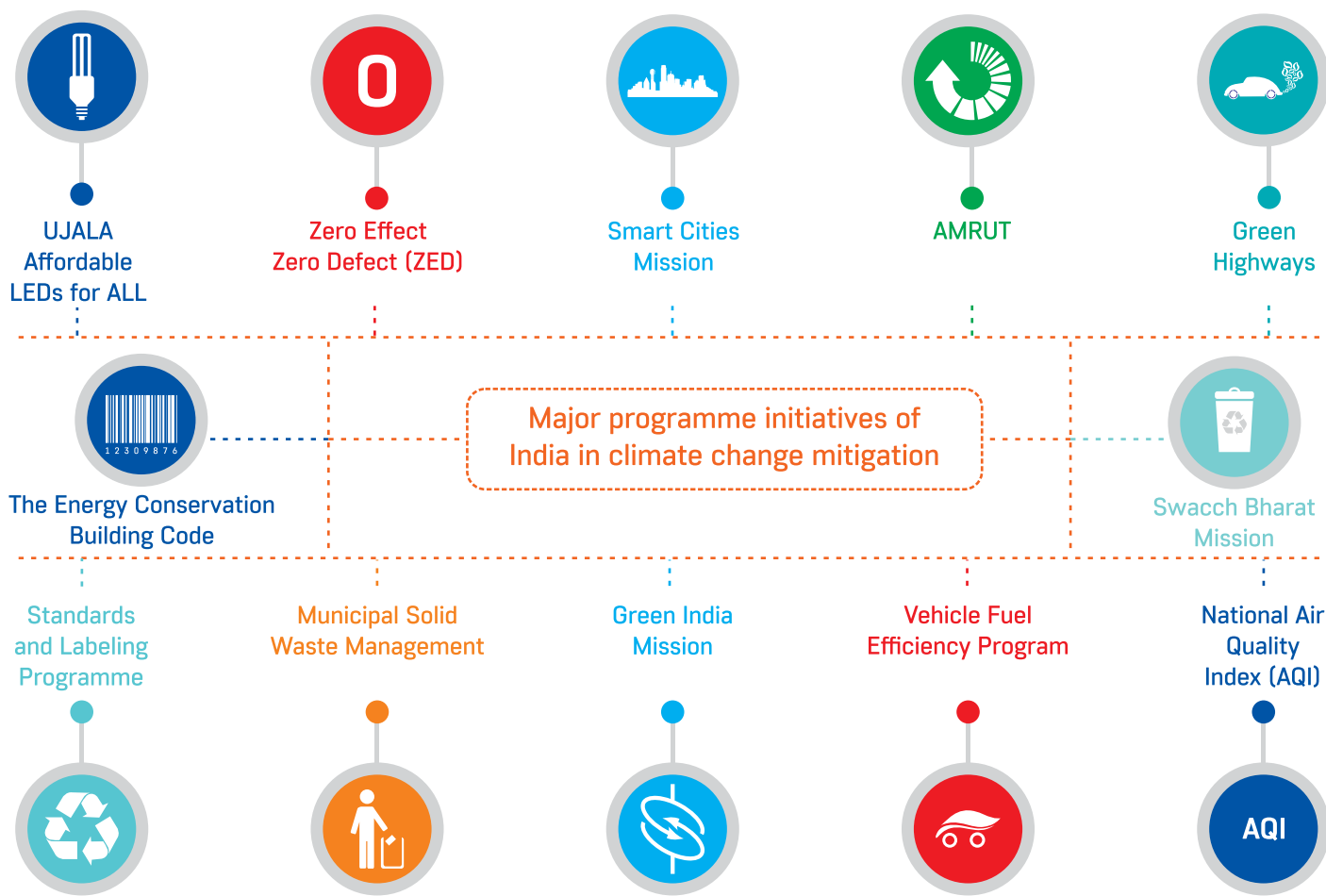
Under the National Action Plan on Climate Change (NAPCC), a series of Market Based Instrument (MBIs) such as feed-in tariffs, generation-based incentives, manufacturing-linked incentives, preferential tax treatment, etc. were rolled out to incentivize the renewable energy generation, R&D promotion and to stimulate demand. Besides this, other financial support instruments such as National Clean Energy Fund, Renewable Regulatory Fund (RRF) and National Adaptation Fund on Climate Change has been set up.

The market based instrument like Performance, Achieve and Trade (PAT), Renewable Purchase Obligation (RPOs) and Renewable Energy Certificate (RECs) schemes are integrated frameworks announced by Indian government to support the greening of industries.

Recognizing the need for creating an enabling environment for green growth, various industry led initiatives are taken such as energy efficient LED lighting (UJALA), appliance labeling (Standards & Labeling Program), super efficient fans, Vehicle Fuel Efficiency Program, Energy Conservation Building Code and Zero Effect - Zero Defect (quality assessment tool for Micro, Small and Medium Enterprises (MSMEs), etc.

To achieve Sustainable Consumption and Production, concrete action plan like Smart Cities Mission, National Heritage City Development and Augmentation Yojana (HRIDAY), Atal Mission for Rejuvenation and Urban Transformation (AMRUT), Swachh Bharat Mission, Skill India initiative, Dedicated Freight Corridors, Green Highways, Inland Water Transport, mass transit, bio-fuels has already been launched.

Measures like National Air Quality Index, Zero Liquid Discharge, National Air Quality Index (AQI), Municipal Solid Waste Management guidelines implemented to control emissions and reduce pollution.



Though being committed for Green India, many achievements had not come without hurdles. There are number of challenges such as absence of incentives like interest rate subvention, extended credit lines for export purposes and working capital provisions. It has also been noted from the development growth trajectory that although there are low-cost financing for the promotion of the green industry but there was no guarantee on the the procurement of power from Renewable Energy generating stations, resulting in low response to state schemes like RPOs and RECs. The important reason behind incentives for not getting delivered stands out to be lack of supporting infrastructure such as roads, railways, shipping, power, etc. and difficulty in overall ease of starting and running businesses in the country. R&D facilities are specifically lacking, and the investment from the private sector towards innovation in green industry is rather missing. Policies in support to make manufacturing attractive are missing to make the country on Green Industry path. Although lot of initiatives are being taken to make the renewable energy more affordable and available to every corner of the country, a set of enabling environment for the green industry to took off is still missing from the policy initiatives, industry participation, civil society contributions etc.

A preliminary estimate suggests that at least USD 2.5 trillion

(at 2014-15 prices) will be required for meeting India's climate change actions between now and 2030 and it could only be possible only if we follow Mahatma Gandhi's words "Earth provides enough to satisfy every man's needs, but not every man's greed."

Green growth is necessary. As per World Bank report, the cost of environmental degradation at US \$80 billion annually, or equivalent to 5.7% of GDP in 2009, environment could become a major constraint in sustaining future economic growth. Further, it may be impossible or prohibitively expensive to clean up later. Green growth is affordable. Model simulations suggest that policy interventions such as environmental taxes could potentially be used to yield positive net environmental and health benefits with minimal economic costs for India.

Green growth is desirable. For an environmentally sustainable future, India needs to value its natural resources, and ecosystem services to better inform policy and decision-making especially since India is a hotspot of unique biodiversity and ecosystems.

Green growth is measurable. Conventional measures of growth do not adequately capture the environmental costs, Therefore, it is imperative to calculate green Gross Domestic Product (green GDP) as an index of economic growth with the environmental consequences factored in.

Impact of Oil and Gas Industries on Coastal Environment



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Director
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Alak Desai

Introduction

The article deals with the importance and significance of environmental jurisprudence in relation to pollution caused by Oil and Gas Industries as a result of oil spills, drill cuttings, etc. in the territorial water, contiguous zone and exclusive economic zone and consequences and liabilities arising therefrom, specifically in the Indian context.

Coastal Environment and Marine Pollution – General Understanding

'Coast' refers to the meeting point of land and sea. 'Coastal Environment' may be defined as an area lying at the interface between land and sea. This results in a special environment where the marine and terrestrial areas influence each other. The term 'Coastline' is normally used to refer to the narrow strip around the country where land and coastal waters come into direct contact. India has a coastline of approximately 7500 km.

The definition of pollution was introduced in Article 1, paragraph 1(4) of the UN Convention on the Law of the Sea, 1982 wherein 'pollution of coastal and marine environment' has been defined as 'the introduction by man, directly or indirectly, of substances or energy into the marine environment, including estuaries, which results or is likely to result in such deleterious effects such as harm to living resources and marine life, hazards to human health, hindrance to marine activities, including fishing and other legitimate uses of the sea, impairment of quality for use of sea water and reduction of amenities.'

Primary Causes

The following are the primary causes of Marine Pollution:

- Sewage and effluents
- Oil spills

- Plastic debris
- Non-point source/ Fertilizers, Pesticides and Agrochemicals
- Heavy metals and trace elements
- Biological pollution

Effect of Oil Industries on Coastal Environment

The impact of Oil and Gas industries on coastal environment ranges from affecting the seabed and the air quality present therein to the marine wildlife. The discharge of waste oil, or oil spills lead to formation of layer of oil on top of sea water, which results in blocking the diffusion of Oxygen inside water leading to reduction in level of dissolved Oxygen and microbial concentration in sea water, thereby killing the flora and fauna in the water.

Off-shore Drilling and Construction Activities

The construction and drilling activities of oil wells not only leads to noise pollution, but also causes loss of vegetation which further decreases the availability of habitat for aquatic animals and also affects their nutrient cycles extensively.

Often, as a result of accumulation of food, night lighting, flaring of gas near drilling platforms and rigs, aquatic birds are attracted to such platforms and rigs. The construction activities and oiling and incineration by the flare at offshore drilling platforms have affected the mortality rate and the breeding nature of seabirds, especially in North-west Atlantic region.

Release of Drill Cuttings into Sea Water

Release of contaminated and polluted drill cuttings by oil companies into the sea or areas adjacent to sea is another factor which contributes to ecological imbalance in the coastal environment. For instance, in the North Sea, such discharge of polluted drill cutting has caused appreciable ecological change of the flora and fauna in the bottom

sediment of the sea. These drill cuttings lying below the oil and gas exploration platform become major latent hazards to the coastal environment during the decommissioning process.

Noise Pollution during Drilling and Construction Activities

Activities during both development phase and production phase contribute to noise pollution. These activities include conduction of seismic surveys, construction of platforms and other facilities, drilling and production, and transportation of materials. The noise produced during seismic surveys for the purposes of exploration is approximately 250 decibels and is known to have a severe effect on the marine ecosystem. Certain animals do not have the capacity to survive more than certain decibels of sound, leading to the death of these animals. Further, this particularly has a negative effect on cetaceans who are known to use sound as a means to navigate and communicate. The blasts that are used during the exploration and production activities of oil, damage the guts and ears of the mammals and also of the swim bladders in fish.

Marine Oil Spill

Marine oil spill is a major cause of pollution which includes the release of crude oil from tankers, offshore platforms, drilling rigs and wells, as well as spills of refined petroleum products – gasoline and diesel and heavier fuels used by large ships in the seas. The general impact of the oil spill is that it spreads in the water depending on its relative density and composition and the oil slick formed as a result may remain cohesive or may break up in the case of rough seas. Waves, water currents and wind force the oil slick to drift over large areas, impacting the open ocean, coastal areas, and marine and terrestrial habitats in the path of the drift. Oil that contains volatile organic compounds partially evaporates, losing between 20 and 40 per cent of its mass and becomes denser and more viscous (i.e. more resistant to flow).

Over a period, oil waste weathers (deteriorates) and disintegrates by means of photolysis (decomposition by sunlight) and biodegradation (decomposition due to microorganisms). The oil spill waste reaches the shoreline or coasts and interacts with sediments such as beach sand and gravel, rocks and boulders, vegetation and terrestrial habitats of both wildlife and humans, causing erosion as well as contamination. It has a definite impact on fish, marine mammals, birds, coastal marshes, mangroves, wetlands, wildlife habitats and their breeding ground.

India relies heavily on its marine environment for trade and commercial operations. The Indian coast is becoming increasingly vulnerable as there is significant increase in all types of oil tankers/ bulk carriers/ container ships passing through the Indian Ocean, likely to lead to oil spills on the Indian Coast, a cause of major damage to the marine ecology.

Instances of Marine Oil Spills in India

Case Study 1

A massive oil spill occurred off the Indian coast due to the collision of a LPG tanker. As a result of the oil spill, Zinc, Lead and Arsenic were released into the sea water which were non-biodegradable and in heavy concentration. As reported, these heavy metals are difficult to be removed by the process bio-remediation. The said incident has been reported to the National Green Tribunal.

Case Study 2

Two cargo ships collided off the Indian coast, leading to an oil spill which spread quickly through the coastline. Around 300 to 400 cargos were spilled in the sea. The chemical dispersants that break the oil into small droplets settled at the bottom of the sea and affect marine life. The oil slick reportedly entered the Mangrove belt too. The case was taken up before the National Green Tribunal and the damage to the coastal, marine ecology caused due to a few such incidences has led the NGT to impose the principle of 'polluter shall pay'; and hold the companies liable for the environmental damage.

Marine Pollution – Legal Framework

The increasing concern for the condition of our seas and oceans has led to the formation and development of various legal regimes at national and international levels. The regimes aim to address a variety of problems including pollution, with importance given to pollution caused by oil spills.

Art. 253 of the Constitution empowers the Parliament to make laws implementing India's international obligations as well as any decision made at an international conference, association or other body. Over a period of time, India has ratified the United Nations Convention on the Law of the Sea and has also agreed to the '1992 Declaration on Environment and Development' (Agenda 21). The significant features of Agenda 21 in relation to the marine environment are developing and increasing the chances of marine living creatures, the preserving of ecologically sensitive areas, keeping a check and strict enforcement with respect to fishing activities, bettering the living standards of coastal populations or communities, maintaining the health of the marine environment and solving issues of critical uncertainty and climate change. Some of the other international regimes adopted and or ratified by India include the International Convention for the Safety of Life at Sea, 1974; The International Convention on Civil Liability for Oil Pollution Damage; and The International Convention for the Prevention of Pollution from Ships (MARPOL) which is the most significant international convention tackling with the control and prevention of pollution of the marine environment by ships.

Domestic Laws

Constitution of India

The Right to healthy environment has been held to be a Fundamental Right, included in 'Right to Life' as enshrined under Article 21 of the Constitution of India that is read as 'No person shall be deprived of his life or personal liberty except according to procedures established by law'. The Article carefully uses the word 'person' which does not include flora and fauna in the ambit of its meaning. However, the 'person's' 'Right to Life' would arguably include a right to healthy environment. The right to healthy environment as fundamental right of a citizen, was first discussed in Charan Lal Sahu v. UOI, where the Apex Court held that 'the right to life and liberty also includes the right to healthy environment free from hazardous pollutants'.

In Vellore Citizens Welfare Forum vs. Union of India and Ors, the Apex Court dealt with the right of a citizen to healthy environment. It was held in this case that Article 21 of the Constitution of India guarantees the protection of life and personal liberty which includes right to fresh air. The Court observed that the 'precautionary principle' and the 'polluter pays principle' have been accepted as a part of the law of the land.

The "Polluter Pays" principle was interpreted by the court to mean that the absolute liability for harm to the environment extends not only to compensate the victims of pollution but also the cost of restoring the environmental degradation. Remediation of the damaged environment being a part of the process of "Sustainable Development" and as such polluter is liable to pay the cost to the individual sufferers as well as the cost of reversing the damaged ecology.

In Subhash Kumar vs. State of Bihar and Ors, the court held that right to live is a fundamental right Under Article 21 of the Constitution and it includes the right of enjoyment of pollution free water and air for full enjoyment of life. If anything endangers or impairs that quality of life in derogation of laws, a citizen has the right to have recourse to Article 32 of the Constitution for removing the pollution of water or air which may be determined to the quality of life.

Articles 48A and 51A (g), were laid by the 42nd amendment of the constitution in 1976 and though these provisions are elicited, the Directive Principles are considered complementary to the fundamental rights. In various cases dealing with environmental issues, the courts have relied on Article 48A and interpreted it as a principle imposing "an obligation" on the government including the courts, to protect the environment.

The Water (Prevention and Control of Pollution) Act, 1974

Section 2(e) of this Act defines "Pollution" as such contamination of water or such alteration of the physical,

chemical or biological properties of water or such discharge of any sewage or trade effluent or of any other liquid, gaseous or solid substance into water (whether directly or indirectly) as may, or is likely to, create a nuisance or render such water harmful or injurious to public health or safety, or to domestic, commercial, industrial, agricultural or other legitimate uses, or to the life and health of animals or plants or of aquatic organisms.

The Act provides for the formation of regulatory authorities with powers and functions to advise the government on matters of water pollution, organize programmes for prevention of pollution, inspect sewage or trade effluents, amongst other issues and also imposes a penalty on entities contravening the provisions of this Act.

The Environment (Protection) Act, 1986

The primary object of the Act of 1986 was to implement the principle of the United Nations Conference on Human Environment held at Stockholm in June, 1972. The decline in environmental quality has been witnessed by increasing pollution of different forms and a general legislation of environmental protection was enacted with primary objective of protecting the environment and to ensure proper check and balances for the protection of the same. Section 2(a) of the Environment Protection Act, 1986 reads as under: "environment" includes water, air and land and the inter-relationship which exists among and between water, air and land, and human beings, other living creatures, plants, micro-organism and property.

The above definition provides an insight into the legislative intent of giving a very liberal construction to the Statute itself which would practically apply in all matters and events relating to environment.

National Green Tribunal Act, 2010

The term environment (as defined in Section 2© of the Act) for the purpose of this Act includes water, air and land and the inter-relationship, which exists among and between water, air and land and human beings, other living creatures, plants, micro-organism and property. The tribunal has jurisdiction on all those matters that arise out of the execution of The Water (Prevention and Control of Pollution) Act, 1974; The Water (Prevention and Control of Pollution) Cess Act, 1977; The Forest (Conservation) Act, 1980; The Air (Prevention and Control of Pollution) Act, 1981; The Environment (Protection) Act, 1986; The Public Liability Insurance Act, 1991; and The Biological Diversity Act, 2002.

The tribunal established under this Act may pass an order under section 15 to provide for relief and or compensation for the environmental damage that has arose due to the marine or coastal pollution under the enactments mentioned in Schedule 1. The tribunal may ask for the restitution of the coastal environment in such an area and the restitution and

compensation to the victims of the pollution and for the environmental damage is only in addition to the relief payable under the Public Liability Insurance Act, 1991. The tribunal also has the authority to divide the compensation or relief to be paid under separate categories specified in schedule II in order to provide compensation or relief to the victims of the pollution as well as to restore the environment which has taken the toll due to the pollution. The tribunal while passing any orders or awards is required to take the principles of the precautionary principle, the polluter pays principle and the principle of sustainable development into consideration.

Public Liability Insurance Act, 1991

Section 2(a) of this Act defines 'accident' as an event involving a fortuitous, sudden or unintentional occurrence while handling any hazardous substance resulting in continuous, intermittent or repeated exposure to death, or injury to, any person or damage to any property but does not include an accident by reason only of war or radioactivity. The phrase 'damage to property' could also include the damage caused to the environment or water and the organisms living in it and hence the damage to coastal or marine environment could also be covered under this section.

The Environment Relief Fund is established by the Central Government under Section 7A of this Act which shall be utilised for paying relief under the award made by the Collector as per the provisions of this Act.

Plastic Waste (Management and Handling) Rules, 2016

"Waste management" under Section 3(y) of this Act means the collection, storage, transportation reduction, re-use, recovery, recycling, composting or disposal of plastic waste in an environmentally safe manner. This Act successfully lays down provisions for "Extended producer's responsibility" which means that the responsibility of a producer for the environmentally sound management of the product until the end of its life. Assignment of such responsibility on the producer could act as an incentive for the prevention of waste generation, promote recycling and support advancements in product technology towards being environment friendly.

Wetlands (Conservation and Management) Rules, 2016

These rules have been made as a result of India signing the Ramsar Convention, the Convention on Wetlands signed at Ramsar, Iran in 1971. Under section 2(l) "wetland" refers to ecosystems located at the interface of land and water and wherein water plays a dominant role in controlling plant and animal life and associated ecosystem processes and the wetlands mean an area of marsh, peatland or water; natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine

water, the depth of which at low tide does not exceed six meters and includes all inland and coastal waters such as lakes, reservoirs, tanks, backwaters, lagoons, creeks, estuaries and manmade wetlands, but does not include river channels and paddy fields and as notified in the Schedule. The activities prohibited in wetlands notified under these rules are reclamation of wetlands, and conversion for non-wetland uses; any diversion or impediment to natural water inflows and outflows of the wetland; any activity having or likely to have an adverse impact on ecological character of the wetland however, in exceptional cases, any change to the above shall be subject to prior approval of the Central Government.

While management plans are to be prepared for Wetlands in coastal area, these plans shall ensure that traditional uses of wetlands, which are harmonized with its ecological character are not curtailed.

Wildlife Protection Act, 1972

The Act provides for the protection or aims to conserve wild animals, plants, birds and deals with matter that are related therewith or are incidental thereto. There is a specific provision (section 58(1)) under this act that deals with the offences done by companies and penalises them in the case of any breach of the provisions under this Act.

The Territorial Waters, Continental Shelf, Exclusive Economic Zone and Other Maritime Zones Act 1976

It is under this Act that the Union is granted exclusive rights and jurisdiction to conserve and protect the marine environment and to prevent and keep a check on the marine pollution. Further, under Section 15 of this Act, the Central Government has the power make rules for preservation and protection of the marine environment and prevention and control of marine pollution for the purposes of this Act.

The Chemical Accidents (Emergency, Planning, Preparedness and Response) Rules, 1996

Under section 2(f) of these Rules, "major chemical accident" means, an occurrence including any particular major emission, fire or explosion involving one or more hazardous chemicals resulting from uncontrolled developments in the course of industrial activity or transportation or due to natural events leading to serious effects both immediate or delayed, inside or outside the installation likely to cause substantial loss of life and property including adverse effects on the environment. In the cases of such major chemical accidents, these rules call for the establishment of central and state crisis groups which will deal with such emergencies swiftly in order to minimize the impact of the accidents.

The Prevention and Control of Pollution (Uniform Consent Procedure) Rules, 1999

These Rules are applicable to industries specified in Schedule VIII which includes oil refineries (Mineral oil or Petro refineries) and they demand for authorization or consent to be taken from the specific department (State Board or Committee) in cases of where the industries are producing hazardous waste.

Indian Coast Guard Act, 1978

The Act provides for the constitution and regulation of an Armed Force of the Union. It has been established for the purpose of securing the maritime zones of the country with a view to protect the maritime interests in such areas. It has been specified under Section 14 (1) that it will be the duty of the Coast Guard to protect by functions of such measures, as it thinks fit, the maritime and other Coast Guard national interests of India in the maritime zones of India. Such measures include measures necessary to preserve and protect the maritime environment and to prevent and control marine pollution.

Coastal Zone Regulation Notification

The Coastal Zone Regulation Notification was issued in 1991 in India, under the EPA, 1986 for regulation of activities in the coastal area by Ministry of Environment and Forests. The Notification aims at protecting and improving the quality of the coastal environment along banks of creeks, estuaries, backwaters and rivers subject to tidal fluctuations is CRZ.

The need of such a notification for our marine ecosystems arose as India has a long coastline of 7516 km, ranging from Gujarat to West Bengal and two island archipelagos (Andaman Island and Lakshadweep). Our coastal ecosystems provide protection from natural disasters such as floods and tsunamis to the 250 million people who live in our coastal areas and the Coastal waters provide a source of primary livelihood to 7 million households. Thus, our coastline is both a precious natural resource and an important economic asset, and we need a robust progressive framework to regulate our coast.

The notification lays down certain prohibitions and also exceptions to prohibitions. Prohibited activities include setting up of new industries (except those which are directly related to the water front or which directly need foreshore facilities) and expansion of existing industries. In most of these areas, an area of 200m from the High Tide Line (HTL) has been declared a no development zone. Several restrictions have been imposed for carrying out development in the area between 200m to 500m from the HTL. These measures have been adopted to protect fragile ecosystems which exist in the area and are vital for sustaining the ecological balance.

According to Coastal Regulation Zone notifications, it is divided into 4 zones:

CRZ I- Refers to the ecologically sensitive areas and only exploration of natural gas and extraction of salt are permitted in these areas.

CRZ II- Areas form up to the shoreline of the coast, that have already been developed upto or close to the shoreline.

CRZ III- includes rural and urban localities, that are relatively undisturbed and those which do not belong to either Category - I or II. Only certain activities relating to agriculture and public utilities allowed here.

CRZ IV- includes the aquatic area up to the territorial limit (12 nautical miles) and the coastal stretches in the Andaman & Nicobar, Lakshadweep and small islands, except those designated as CRZ-I, CRZ-II or CRZ-III. Fishing and allied activities are permitted in this zone.

Programmes and Policies

Apart from the various legislations and penalties that are given by the Government, there have been and are various programmes and policies drafted by the government for the companies and authorities, agencies to follow to curb pollution in the coastal areas. Some of them are as follows:

Coastal Pollution Control Series (COPOCS) programme – started in 1982 by CPCB, the aim was to assess the level of pollution in the coastal areas.

Coastal Ocean Monitoring and Prediction Systems (COMPAS Project) - implemented from 1991, the purpose was to assess the health of coastal waters and facilitate management of pollution-related issues.

Land Ocean Interaction in the Coastal Zone – This was started for integrated management on coastal environment and an Integrated Coastal and Marine Area Management was introduced.

National Oil Spill Disaster Contingency Plan of 1996 – India is a party to the United Nations Convention on the Law of the Sea (UNCLOS) and has an obligation to protect and preserve the marine environment. The responsibility for co-ordination of marine oil spills at sea was transferred to the Coast Guard from the Directorate General of Shipping. About 70% of the world oil demand is ferried along the Indian coastline. The Indian Coast Guard is designated as the competent national authority for oil spill response in the maritime zones of India. The primary objective of this plan is to:

- Develop appropriate and effective systems for the detection and reporting of spillage of oil.
- To ensure prompt response to prevent, control, and combat oil pollution.

- To ensure that adequate protection is provided to the public health and welfare, and the marine environment.
- To ensure that appropriate response techniques are employed to prevent, control, and combat oil pollution, and dispose of the recovered material in an environmentally accepted manner.
- To ensure that complete and accurate records are maintained of all expenditure to facilitate cost of recovery.

It mandates that all major ports in India should have basic, minimum equipment, like inflatable booms and oil skimmers, to tackle oil spill.

As per this plan, the Port authorities are responsible for action within port limit; Oil industries in and around their area of operations; Coastal state PCB for frontier tidal zones, beaches and up to death beyond which CG ships and craft cannot operate; Coast guard responsibilities lies beyond port limits; and DGICG has overall responsibility for appropriate response to oil spill incidents.

Projects Undertaken by India with United Nations Development Programme (UNDP)

India has undertaken various projects in collaboration with UNDP for the purposes of coastal and marine biodiversity conservation with special focus on the East Godavari River Estuarine Ecosystem (EGREE) on the east coast in the State of Andhra Pradesh and the Sindhudurg Coastal and Marine Ecosystem (SCME) on the west coast, in the State of Maharashtra with the aim to conserve biodiversity and to address any threats or concerns in these areas.

Case Law

In a case decided by the National Green Tribunal, questions of public importance and significance of environmental jurisprudence, in relation to pollution caused by sinking of ship and oil spill in the Territorial Water, Contiguous Zone and Exclusive Economic Zone of the country (India), consequences and liabilities were raised.

A ship carrying coal, diesel and fuel oil for and on behalf of an Indian company sank approximately 20 Nautical Miles from the Indian coast and an oil spill occurred in the sea. Continuous trail of oil leak from the ship was observed upto 12 Nautical Miles; very thick oil slick up to one nautical mile; and a thick layer of oil upto 2 Nautical Miles was also observed. The rate of oil spill was 7 to 8 tonnes per day as per the information of the Coast Guard. As a result of the oil spill, there has been severe damage to mangroves and marine ecology along the coast.

The respondents in this case were, the State of Maharashtra along with the state Pollution Control Board, the state

Maritime board, independent shipping companies and the owner of the port amongst others. It was held that “the damage caused by pollution, cannot be computed in terms of money with exactitude and precision. This has to be on the basis of some hypothesizing or guess work as is necessary to be applied in such cases. For instance, the damage caused to the aquatic life, mangroves, sea shore and tourism are incapable of being computed exactly in terms of money. The mangroves were destroyed as a consequence of the oil spill. The pollution is diverse and has serious impact on marine environment. This pollution is a continuing one and does not come to an end with the pronouncement of this judgment.”

Respondents were penalized with monetary consequences; and were held liable to pay environmental compensation to the Ministry of Shipping, Government of India in terms of Sections 15 and 17 read with Sections 14 and 20 of the National Green Tribunal Act, 2010, for causing marine environmental pollution by sinking of the ship in the Contiguous Zone of Indian waters at 20 Nautical Miles off the coast; and the navigation company was held liable to pay environmental compensation for dumping coal in the seabed and causing pollution of marine environment.

Insight

Offshore oil and gas exploration activities and instances of oil spills are categorically the most common and harmful causes of marine pollution. While it is believed that the impact of spills from tankers is a much bigger threat, the Deepwater Horizon disaster is considered to be one of the worst oil spills in the history, surpassed only by the 1991 Gulf War oil spill in Kuwait. Introduction of oil into water is severely damaging the aquatic ecosystems and consequently the coastal environment. Some of the significant effects of exploration and production activities on the flora and fauna include the disturbance of their habitats, displacement of animals and plants in areas where construction activities are carried out and restraint of these areas for migration.

It would be beneficial for the Oil and Gas industry as a whole to initiate activities towards undertaking extensive and in depth research to study the marine ecosystems in areas where exploration activities are conducted or proposed to be conducted; and where there have been instances of oil spills in the past, to understand the consequences of such activities and spills. Committees may be formed, with industry wide participation to ascertain uniform standards to be maintained during the development and operation of an oil rig. The Committees may be equipped to play an effective role in case of oil spills, from either tankers or rigs, and to deal with the disaster and crisis management.

Gas

Small Scale LNG Opportunities



Upinder Kumar

Chief Manager (Technical)
Small Scale LNG Business Development Team
Petronet LNG Limited



Mukta Das

Senior Manager (Finance)
Small Scale LNG Business Development Team
Petronet LNG Limited



Karan Manchanda

Senior Officer (Technical)
Small Scale LNG Business Development Team
Petronet LNG Limited

Small scale LNG is a new market segment for usage of LNG as fuel for industries without pipeline connectivity, automobiles (like buses, cars, autos) etc. LNG as a fuel to industries not connected with pipelines is very well established in India.

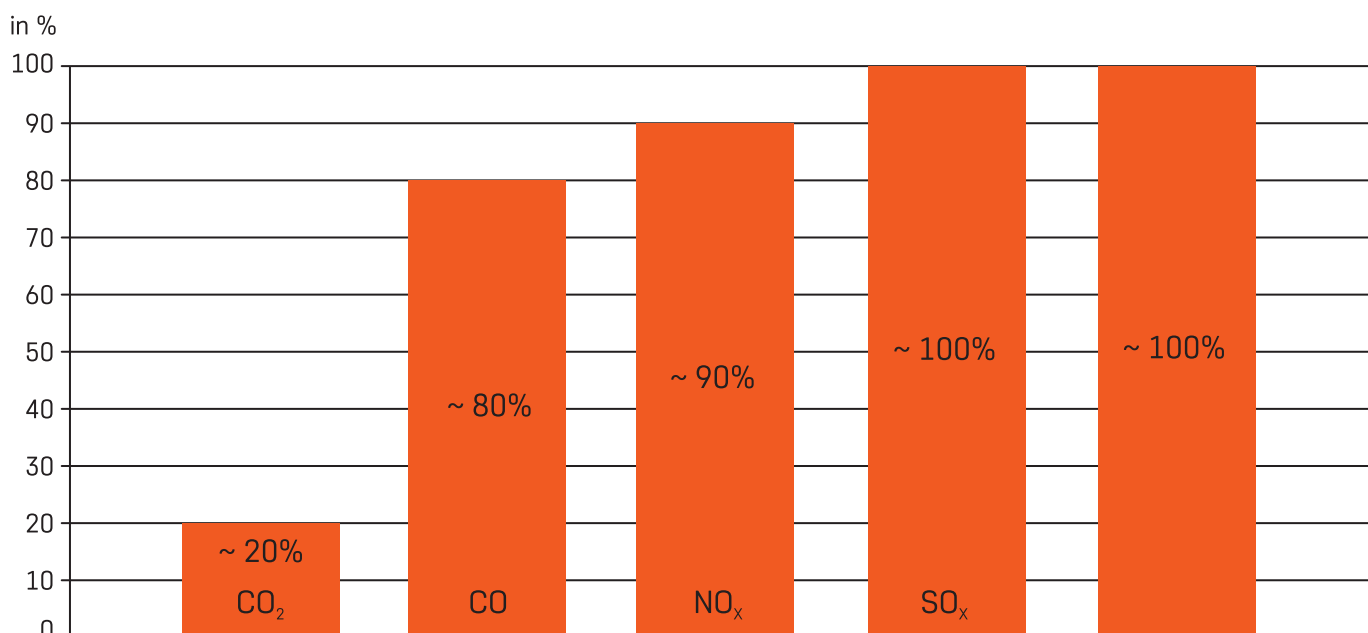
The use of LNG as an automotive fuel offers opportunities to establish a clean way to cater the transport market. Areas for use of LNG as an automotive fuel are:

- Medium & Heavy Commercial trucks
- Intercity/interstate buses.

Drivers for LNG as an Automotive Fuel

The major drivers for use of LNG as an automotive fuel are:

- Lower emissions compared to diesel



Source : Gas-und Wärme-Institute e.V. (GWI), Essen

Combustion of LNG (natural gas) reduces particulate emissions to almost zero. Especially in densely populated areas in India, like Delhi, particulate emissions is a matter of concern and governments and regulators are taking action to reduce particulate emissions.

- Price Competitiveness of Natural Gas

This fuel will lower the cost of operating commercial vehicles as diesel, being a refined product, is always available at a higher cost than LNG. As per our estimates, there is a 20 % savings.

LNG- Indian Scenario

Indian LNG market on a broad scale has been a success, with four major LNG terminals operating in the country that is Dahej, Hazira, Dabhol and Kochi. The said LNG terminals fulfil nearly 45% of the gas demand of the Country. The RLNG from these terminals is supplied via pipelines majorly to bulk/on route customers.

LNG road tankers supply LNG in liquid form to customers not connected via pipeline. LNG truck loading facility is available both at Dahej and Kochi LNG terminals operated by Petronet LNG Limited (PLL).

Further, other upcoming terminals and other operating terminals also have plans of setting up LNG truck loading bays for supply of LNG to customers.

LNG as automotive fuel for M&HCVs (Trucks and Buses)

The situation of LNG availability in the country is quite impressive and it is being currently used by industries not connected to pipelines. LNG also offers perfect case for usage as an automotive fuel due to its various advantages over Diesel and CNG.

LNG Over Diesel

To diversify from the current utilization of LNG and to tap the new growth market, PLL has plans to introduce LNG as a fuel for commercial vehicles.

India being a growing economy has a constant increase in commercial vehicle fleet. About 200,000 trucks are added on the Indian roads every year. It will be beneficial for the Country to increase usage of this green fuel. LNG, being the purest form of natural gas, can easily be stored in liquid form in cryogenic vessels. This fuel will lower the costs of operating commercial vehicles.

LNG Over CNG

LNG also has various advantages in comparison to CNG.

CNG is stored in fuel tanks at a pressure of 250 Bar. Energy

density (energy stored per unit volume) of CNG is also very low. In spite of large fuel tanks, vehicle can only run for short distance before re-filling. This makes CNG non-viable for:

- Medium & Heavy Commercial trucks
- Intercity/ interstate buses.

Development of LNG as Automotive Fuel in India

Based on above factors, India needs to develop a chain wherein LNG can be used as an automotive fuel. This involves following activities:

- Regulatory aspects of LNG as an Automotive fuel
- Infrastructure development, i.e. installing LNG dispensing stations across various locations in Country.
- LNG fuelled truck/buses development, by vehicle manufacturers.

Regulatory aspects of LNG as an automotive fuel

When Petronet embarked upon this initiative to introduce LNG as an Automotive Fuel in India, it realised that the relevant regulatory framework did not exist in the Country. With the support of the Ministry of Petroleum and Natural Gas, efforts were initiated to bring in the requisite legislation. The Ministry of Road Transport & Highways and the Ministry of Commerce were approached for the purpose. It is a matter of immense satisfaction that all the relevant stakeholders responded to the requirements and provided quick approvals.

Amendments in Central Motor Vehicle Rules (CMVR):

- To recognize LNG as an automotive fuel like CNG to facilitate Vehicle Registration - This exercise has been completed and LNG has been recognized as an Automobile Fuel on 27 June, 2017.

Amendments to Static and Mobile Pressure Vessel Rules (SMPV):

- In August 2016 an Expert committee was formed by PESO to study and give recommendation for formulation of new rules for setting up LNG Dispensing Stations.
- After detailed deliberations, the committee proposed various amendments in the Schedule IV of the SMPV Rules which deals with LNG Storage, Handling, Transportation, Operation, Maintenance and Dispensing.
- On 17th July 2017, Gazette Notification of Draft Rules has been published for Public Consultation process.

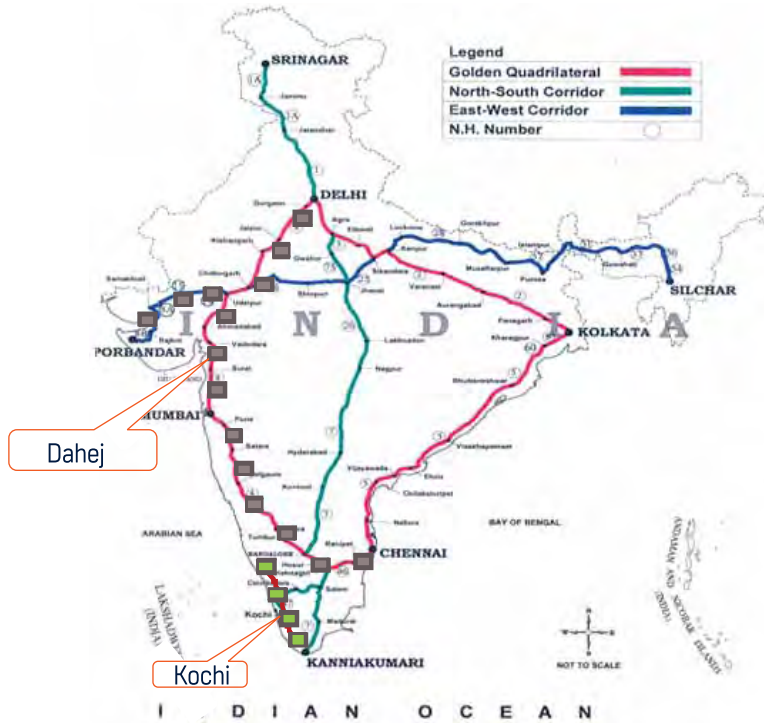
LNG Dispensing Infrastructure development

PLL, along with all OMCs and CGD Companies, is planning to develop LNG Dispensing infrastructure in a phased manner as shown under:

LNG dispensing infrastructure - Project Plan

Phase 1: Pilot

NATIONAL HIGHWAYS DEVELOPMENT PROJECT



Phase 1

Delhi - Mumbai - Mundra

Length - 1400 Kms
No. of Stations - 10

Mumbai - Bangalore - Chennai

Length - 1350 Kms
No. of Stations - 6

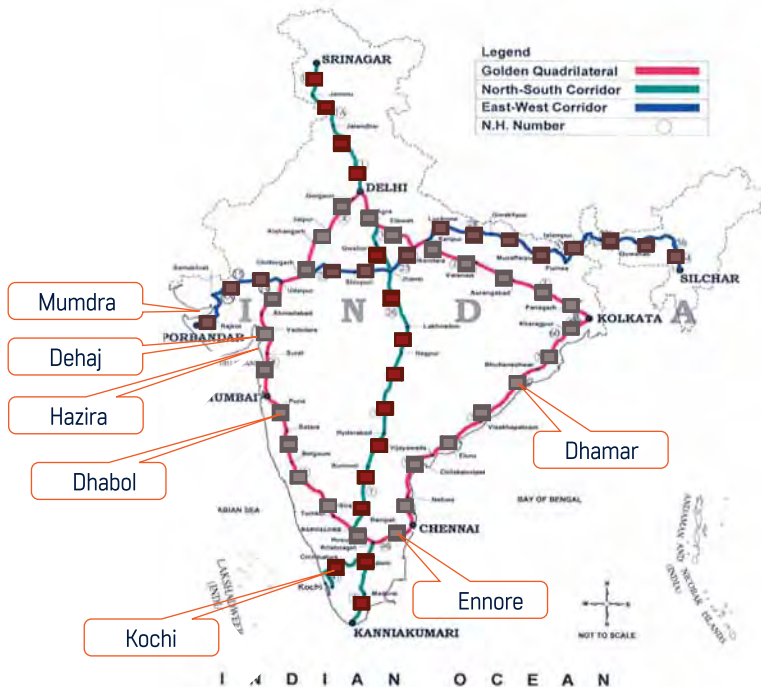
Mangalore - Trivandrum

Length - 620 Kms
No. of Stations - 4

Total - 20 Stations

Phase 2 : Top 5 Freight Corridors

NATIONAL HIGHWAYS DEVELOPMENT PROJECT



Phase 2

Golden Quadrilateral

Length - 6000 Kms
No. of Stations - 80
(40 on both sides of road)

North - South Corridor

Length - 4000 Kms
No. of Stations - 50
(25 on both sides of road)

East - West Corridor

Length - 3300 Kms
No. of Stations - 40
(20 on both sides of road)

Total - 170 Stations

Phase 3 : Pan India

Class	Length (km)
Expressways	1,000 km
Total National Highways	100,087 km
State Highways	154,522 Km
Major and other district roads	2,577,396 km
Rural & other roads	1,433,577 km
Total (approx.)	4,266,582 km

Phase 3

Pan India

Length – 4,266,582 Kms

No. of stations planned– 1000 (in a period of 5 years after completion of Phase 2).

Additional stations will also come up to provide LNG dispensing infrastructure as the demand increases.

Manufacturing of vehicles

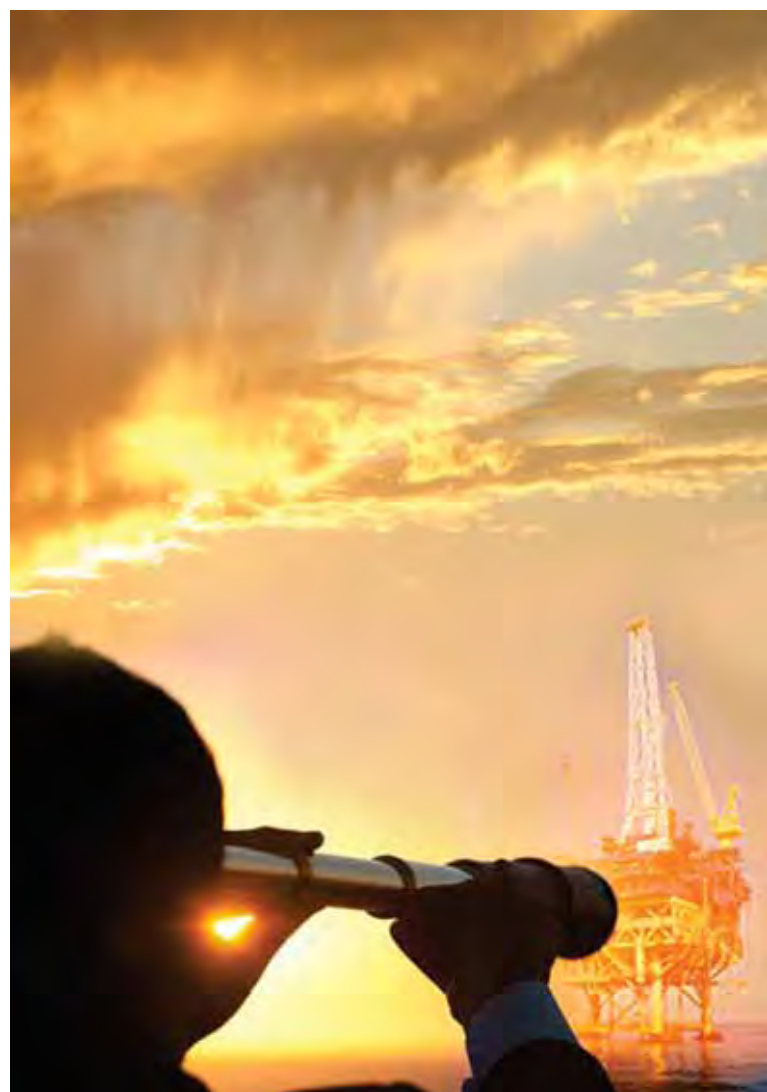
Petronet has been in constant touch with the vehicle manufacturers in India. Responding to the requirements, M/s Tata Motors manufactured the first LNG-fuelled bus in India which was showcased in Trivandrum (Kerala) in November 2016. Petronet is now in the process of procuring a few staff buses to run as a demonstration of this fuel.

Efforts are also on to introduce buses on interstate routes alongwith the State Roadways Corporations and heavy duty trucks on selected routes.

Conclusion

The concept of small scale LNG is around 8 years old in India with expertise in all fields related to LNG like LNG loading, transportation, setting up of LNG satellite stations, etc. As the demand for natural gas increases in industries, LNG is the easiest route of transportation to areas which are not connect via pipeline.

Further, with the growing environmental concerns, it is also projected that LNG would be most suitable fuel for commercial vehicles as it will help in reducing the pollution levels of the Country for road transportation.



Natural Gas Penetration in India – Challenges Ahead

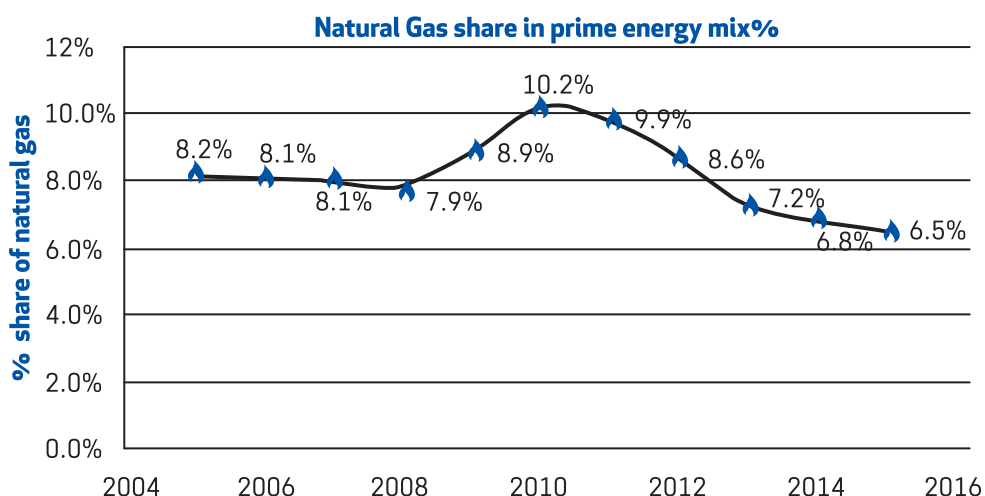


Ankit Gupta

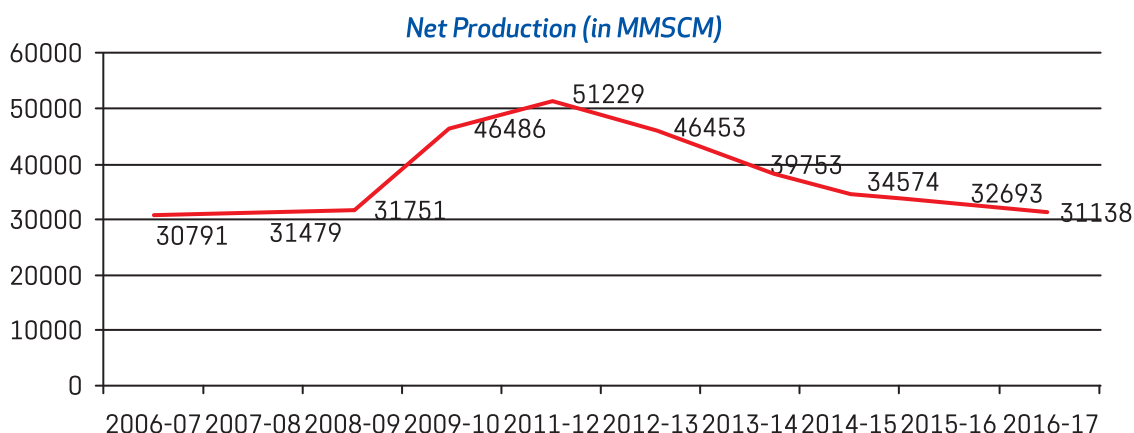
Deputy Director (Gas)
Federation of Indian Petroleum Industry

The Indian economy is passing through a healthy growth path, leading to increase in energy consumption in the country. India’s energy consumption grows by 4.2% per annum, which is faster than all major economies in the world. However, it has been observed that Indian energy basket is mostly dominated by coal which is having a percentage share of ~58% in the primary energy mix. Even if we look at the global consumption pattern of coal, India stands 2nd after China and accounts for 10.6% of the total coal consumption across globe.

Against worldwide average of natural gas consumption ~25% of primary energy mix, India stands pretty low at around 6.5% in the year 2015. It may also be noted that the share of natural gas in India’s energy mix has been constantly declining since 2010 from 10.2% to the current level in spite of increasing demand of energy in India.



Production of natural gas in India has not been as per the projections and has shown a downward trend with domestic production falling from 51230 MMSCMD in 2010-11 to 31138 MMSCMD in 2015-16 which is a 40% reduction in production of natural gas since 2010-11



Source : Petroleum Planning & Analysis Cell (MoP&NG)

In order to understand that how the Indian gas economy can grow faster by expanding and diversifying existing markets, creation of new markets, improving last-mile access to consumers, and to develop appropriate regulatory framework that can support and enable gas market growth, British High Commission engaged Federation of Indian Petroleum Industry (FIPI erstwhile PetroFed) jointly with IHS Markit and ICF to undertake a study on Accelerating India's Transition to Gas by Enabling Increased Market Access to promote an increase in the share of gas in the primary energy mix closer to world average levels.

During the course of the study, various aspects were touched upon to consider penetration of natural gas / LNG in Indian market. The current gas market in India is at 129 MMSCMD, which is estimated to grow under two scenarios:

- a) 282 MMSCMD till 2035 when there is no specific push available from government, no INDC targets and with no mandate to use gas in transportation.
- b) 596 MMSCMD till 2035 when there is strong government push for use of gas, 100% commitment to meet the INDC targets and with mandate to use gas in transportation.

The current prices of imported gas when compared with coal used in power sector having a potential to act as an anchor load, makes the power price unaffordable for the end customer. One of the other reasons related to taxation in India also dampens the economics of gas. In India there is a high variability of taxes on gas, ranging from 2% to 26% across states with no advantages being given to gas as a cleaner fuel. It may be noted that if we consider the health aspects and the same are factored in the cost, gas can be more competitive than coal.

Typically we compare with the numeric figures regarding percentage share of natural gas in primary energy basket of other countries, which somehow is not the right way to compare as such countries have a huge demand of natural gas for heating purposes during cold weather condition. India in particular should take examples from countries like China and Brazil as these economies have growth trajectories and oil- and gas-importing needs similar to India's. In China, gas provides 5.9% of the primary energy mix, while in Brazil it provides 12.6%. This is comparable to India's current 6.5% gas share of primary energy and its ambition to reach 15% as articulated by the government. Over 2000–15, India's gas sector grew 93%, while gas in China and Brazil took off at more dramatic rates of 681% and 335%, respectively.

Both the countries have certain examples of best practices of state support to the gas sector which is both from anchor customers and in new markets. China has a national and provincial level policy support for LNG trucks by providing subsidies towards subsidies in capital expenditure. They also

have established gas fired power markets for peaking power tariffs. Brazil also offers best practices for market-based growth in the gas sector based on using gas as a fuel to meet the intermittency of its dominant hydropower source.

Indian Gas Infrastructure and Market

Indian gas market can flourish once affordability of imported LNG towards anchor load customers is ascertained or some level of policy issues come into play towards use of cleaner fuel in India. There are some solutions on which the country has to work for to improve affordability like

- a) To harmonize taxation for gas & products, government at the policy level
- b) One has to consider the utility of using clean fuel for power generation and consider health cost analysis as an important aspect
- c) Also India needs improvement in terms of creating infrastructure for getting better connectivity & improved gas distribution.

Historically, the power and fertilizer sectors in India were the largest consumers of gas. Based on this and other factors, these sectors received priority in gas allocation. Refinery and CGD have been growing sectors in the past decade and have become major consumers. The market for gas, however, has become stagnant because of a lack of policy support for gas in power, delay in revival of old fertilizer plants, regulatory uncertainties surrounding the CGD sector, and poor-connectivity of refineries. Expanding the current gas market is important to increase the gas share in primary energy mix and solutions like having 24x7 power (peaking power policy), implementation of distributed gas based power generation system, revisions in CGD bidding criteria, etc. can help in developing a better market scenario.

The existing natural gas pipeline infrastructure in India is under-developed compared with some developed countries. The existing network of approximately 17,000 km of natural gas transmission pipelines with a capacity of around 430 MMSCMD has been developed mainly by companies with access to gas (GAIL, GSPC, RIL). This network is expected to expand to around 31,000 km with a design capacity of 782 MMSCMD by the end of the 13th five-year plan (2022) with a nationwide gas grid and more uniformed pipeline network coverage in place. However it may be noted that the average pipeline utilization in the country is mere 40%. With the pipeline bidding parameter which highlights that the pipeline capacity should be at 60% in year 1 which should progressively reach to 100% in 5th year is leading to loss to the players who are investing in putting up gas pipeline.

If we take examples of important pipelines like Chainsa-Jhajjar-Hissar the submitted tariff was reduced by almost 07

times due to standard laid down process for calculating tariff and not considering the average actual business potential of the area. Similar story is for Dadri-Bawana-Nangal pipeline and Kochi – Kootanad pipeline where the investor is not able to secure returns when laying such gas pipeline. With low capacity utilization for the pipeline laid leading to dismal returns on capital invested, pipeline bidding / laying strategy has to be changed to focus on laying of gas infrastructure.

It is imperative to re-examine the existing regulatory regime's allocation of rights to develop the natural gas grid, keeping in view the challenges faced by the regulator in the bidding process and the slow pace of development in the past few years.

The country should also look towards creation of a gas hub which should be tailor made for Indian market conditions, physical infrastructure, and energy ambitions. An Indian hub will operate in a world of the 2020s and 2030s that is linked by global LNG trade. It will look very different from hubs that developed elsewhere in the world (such as the United Kingdom and the United States) when their gas networks served isolated domestic markets. An isolated network-based spot market for gas can resemble network-based electricity spot markets; a globally linked LNG spot market is likely to look more like the world oil market.

We have to understand that in order to frame natural gas as a potential fuel in primary energy basket, there is a need that all National Plans and Policies should work in tandem. It is noticed that currently many areas work in silos with limited coordination among themselves. It has been noticed that Central Electricity Authority which recently came out with their Draft National Electricity Plan have a limited focus on

capacity addition / utilization of the power plants which are based on natural gas as a fuel.

Also it is observed that the aspect of distributed gas based power generation has not been touched upon. With some region facing regular outages and paying a high price for electricity generated from diesel based generators, would like to adopt for distributed gas based power generation system.

Conclusion

In order to develop the gas market in India, various policy level decisions are required to be taken up by the government which focuses primarily on laying robust gas pipeline infrastructure, promoting gas usage in existing as well as new markets as a mandate to promote use of clean fuel. The following recommendations provide an overview of the steps which needs to be taken to promote gas usage in India:

1. Developing a long term roadmap for Indian gas market with industry as well as government as a stakeholder
2. Improve affordability of gas by harmonizing taxes and also to recognize the true value of clean fuel by comparing health impact caused by other fuels
3. Considering the gas market of India, transition to full market pricing and to establish an Indian gas hub as a price reference point should be a target
4. Establish gas-based clean air mandate guidelines for public transport, replacing polluting fuels and also to incentivize distributed gas generation for grid reliability
5. PNGRB to act as a facilitator to develop pipeline network by providing necessary regulatory changes.



Oil & Gas in Media

Ministry of Petroleum & Natural Gas celebrates World Biofuel Day 2017

On 10th August 2017, Ministry of Petroleum & Natural Gas celebrated the World Biofuel Day 2017. Minister of Petroleum and Natural Gas, Shri Dharmendra Pradhan said



that the objective of “World Biofuel Day” is to sensitize youths, farmers and other stakeholders about the benefits of biofuel and seek their involvement in Biofuel programme of the Government. These efforts should be taken up on a public campaign mode, he added. Shri Pradhan said that a roadmap on the use of biofuels will help in achieving the target of 10% reduction in import dependence laid down by the PM. Import dependence is above 80% presently. Promoting biofuels creates jobs, fosters economic growth, supports farmers and helps improve energy security for country.

Shri Pradhan said that the Ministry will be coming out with the Biofuel Policy soon. The policy will be taken into consideration various facets like Role of Government, Return on investment, Minimum Assurance, etc. Recently Ministry of Petroleum and Natural Gas has been made responsible for Biofuel Policy. The Minister said that both the Ministry of New and Renewable Energy and Ministry of Petroleum and Natural Gas will be working towards more utilisation of biofuels.

Shri Pradhan said that approx \$2 Billion is being invested by the Government Companies by way of R&D on Second Generation (2G) Biofuel Refineries across the country. Ways are being explored on conversion of urban, rural waste to fuel; use of waste/barren lands for cultivation of feedstock for 2G biofuels. The Minister said that the potential for the bio fuel industry in India would be around Rs 1 Lakh Crore in the next 1 to 2 years.

In this column, our effort is to present some of the recent major events/activities on Oil & Gas sector. Different media channels are covering each of these activities/events with a different perspective and information. Our endeavor is to present the readers, a comprehensive overview of each event/activity at one place. FIPI is not giving its own view and analysis in these events/activities which are presented here as on date of writing for this column.

Bio-fuel production has been steadily rising due to various measures taken by the government. From 15 crore litre of bio-ethanol produced in 2012-2013, current production is 111 crore litre of bio-ethanol.

The demand of bio-ethanol right now is around 318 crore liter and it is expected to go up to 440 crore liter by 2022. First-generation ethanol will not be able to meet such a demand. Therefore, focus towards 2nd and 3rd generation ethanol is essential. The country annually produces around 120-160 million tonne of surplus bio-mass. If this feedstock is converted to bio-ethanol, that would result in over 2,500-3,000 crore litre of bio-ethanol which is more than enough to meet demand India's three Oil Marketing Companies (OMCs) are currently setting up 12 second-generation ethanol plants across 11 states including Punjab, Haryana, Uttar Pradesh, Madhya Pradesh, Bihar, Assam, Odisha, Gujarat, Maharashtra, Karnataka and Andhra Pradesh. The plants will collect agriculture waste from farmers and convert it into bio-ethanol, increasing the farmers' earning from the same produce and the same land. The estimated investment for these bio-refineries stands at around Rs 10,000 crore. The bio-refineries are expected to produce around 35-40 crore liter of ethanol annually, contributing towards the ethanol blending programme.

The Minister of Road Transport & Highways and Shipping Shri Nitin Gadkari on the occasion of Bio-fuel Day, stressed upon the importance of biofuels as cost effective and environment friendly substitutes to conventional fuels. He said that besides bringing down pollution, biofuels produced indigenously from agricultural waste, plants like bamboo, non-edible oilseeds, or municipal waste will help reduce the country's huge import burden. In addition, it will also generate employment and boost the economy of rural areas, including the North East and the barren wastelands of the country. In this context, Shri Gadkari said, a Biofuel Policy will be a major milestone in the socio-economic development of the country.

Shri Gadkari also announced that he would ask the Finance Minister to reduce the GST on bio-diesel from the current 18 percent to 5 percent.



Talking about the transport sector the Minister said that the automobile growth in the country is an unsustainable 22 percent. So efforts are on in a big way to promote public transport based on cheaper and greener biofuels and electricity. India has brought in the necessary regulations for flexi engines. Nagpur city is running 55 buses on 100 percent bio ethanol and another 50 on Bio CNG derived from methane from sewage water. This is in addition to a 200 strong fleet of electric taxis and autos. The shipping and inland waterways sectors too are gearing up for running ships and barges on methanol.

India despatches First Diesel Consignment to Myanmar

Symbolising the growing hydrocarbon engagement between India and Myanmar, the first consignment of 30 MT of High Speed Diesel was sent on 4th September 2017 from India to Myanmar by land route. Numaligarh Refinery Ltd. (NRL), which has been supplying HSD to Bangladesh, despatched the first diesel consignment in two trucks through NH 37 across the Moreh Custom Check Point in the state of Manipur on the Indian side and Tamu Custom Check Point on the Myanmar side.

NRL has entered into an agreement with Parami Energy Group of Companies for the supply of diesel and collaboration in the retail petroleum sector of Myanmar. NRL refinery, situated at 420 km from the India-Myanmar border, is ideally suited to supply diesel to Northern Myanmar where connectivity is a challenge, particularly in the rainy season. Ken Tun informed media that Parami Energy will import between 10 to 20 trucks of High Speed Diesel from NRL every day for three months before India takes a call on whether to go for a pipeline to transport diesel to Myanmar. Supply of diesel consignment to Myanmar is another step in realizing the vision of Prime Minister Shri Narendra Modi to enhance hydrocarbon synergy with neighbouring countries as well as promoting India's Act East Policy. Minister of Petroleum and Natural Gas Shri Dharmendra Pradhan visited Myanmar in February this year during which he discussed opportunities for collaboration in the Oil and Gas sector



including setting up of LNG terminal, retail marketing, refurbishment of refineries, participation in upstream sector and capacity building. ONGC Videsh Ltd. (OVL), GAIL India Ltd. and Oil India Ltd. have assets in the upstream sector as well as pipelines. In their effort to strengthen the oil and gas engagement, more Indian companies are planning to set up their offices in Myanmar soon. OVL has an office in Yangon. NRL has already exported 1700 MT of Paraffin wax to Myanmar. It was a special privilege for India to contribute hand made wax candles to the 2500 year old Shwedagon Pagoda earlier this year.

India to import US crude for first time, delivery in October 2017

India, the world's third-largest oil importer, has sealed a first deal to import crude oil from the US and the shipment is expected to touch Indian shores in October. The deal, by state-owned Indian Oil Corp. (IOCL), comes within weeks of Prime Minister Narendra Modi's visit to the US when President Donald Trump talked of his country looking to export more energy products to India.

IOCL bought 2 million barrels of crude oil from North America comprising 1.6 million barrels of US Mars crude and 400,000 barrels of Western Canadian Select. US Mars is a heavy, high-sulphur grade which will be processed at IOC's newest refinery at Paradip in Odisha. Given the current international oil markets where the differential between Brent (the benchmark crude or marker crude that serves as a reference price for buyers in western world) and Dubai (which serves as a benchmark for countries in the east) has narrowed. Even after including the shipping cost, buying US crude proved to be very cost competitive and so IOCL bought one very large crude carrier (VLCC) cargo through a tender from the spot (or current) market. The company will buy more crude from the US if the market conditions remain favorable for such purchases.

Price trends of Brent, Dubai and WTI (West Texas Intermediate) crude of USA when compared for July 2016 to July 2017 period clearly gives the trend where WTI crude price came below Dubai crude from December onwards and remain almost one USD per barrel lower till recent past. Indeed oil companies in India may opt for USA crude as long as price remain attractive even after discounting freight cost. The IOCL move has already led to more purchases by other Indian refiners. State-owned Bharat Petroleum Corp. Ltd. (BPCL) too tendered to buy one million barrels of crude either for loading on August 16-September 5 or delivery on September 26- October 15.

But for importing crude from the US, IOC had to take special permission from the shipping ministry. Indian government policy provides for purchases of crude oil to be made on condition that the shipping will be done by the Indian carriers (Free on Board or FOB basis where the buyer arrange for ships to ferry the oil). However, in case of US, this was not possible as VLCCs can't load on US ports and crude has to be

first loaded on small ships and at high sea the same is put on a VLCC. So, IOC obtained permission to buy the cargo on a delivered basis where the seller arranges for the ships. Every time we decide to buy US oil, IOCL will have to take this permission. The cargo contracted will be delivered at Paradip refinery in the first week of October.

Indian refiners are joining their Asian counterparts to diversify their crude slate following the narrowing of the Dubai spreads against West Texas Intermediate (WTI) and Brent prices in the wake of OPEC/non-OPEC production cut deal. IOCL is looking at five to six grades of US crude, including Mars crude, for future purchases.

Minister of Petroleum & Natural Gas leads the Indian Delegations at 22nd World Petroleum Congress, Istanbul

Indian delegation under the leadership of Minister of Petroleum & Natural Gas, Shri Dharmendra Pradhan participated in the 22nd World Petroleum Congress at Istanbul from July 9 - 13, 2017. The participation was all around in all the activities of congress; from Chairing the sessions to presentation of papers, poster sessions and showcasing Indian Oil & Gas sector in the exhibition.

Minister of State, Shri Dharmendra Pradhan chaired a Ministerial Session on the subject "Current Economic Strategies in Indian Oil & Gas Sector". He also chaired a Plenary Session on "Supply and Demand Challenges for Oil, Gas and Products" at the 22nd World Petroleum Congress at Istanbul, Turkey.

Addressing the plenary session, Shri Pradhan said that rising middle class of emerging Asian countries like India will drive the demand for energy both in terms of electricity and cooking and transportation fuel. As incomes rise, demand for petrochemicals the raw materials for several of the lifestyle products will also increase. Giving example of India, he said that the energy consumption is expected to grow to almost double by 2035. India is the only country where the demand will continue to rise for more than a decade.



Shri Dharmendra Pradhan, Minister of Petroleum & Natural Gas, met his counterpart, the Turkish Energy Minister Mr. Berat Albayrak at the 22nd World Petroleum Congress at Istanbul, Turkey

He flagged the importance of "Responsible Price" for crude oil for countries like India which would allow it to provide energy to the common people. He underlined that in today's oversupplied market, it is important for producers to understand the perspective of consumers and demand centres and the changes that have taken place in these demand centres.

As the security of supplies is an important factor for consumers, security of demand is equally important for producers. On the sidelines of Congress, Shri Dharmendra Pradhan held bilateral talks with Turkish Energy Minister, Mr. Berat Albayrak during which issues of bilateral energy cooperation including in renewable energy were discussed. The two Ministers agreed that they need to work together on few concrete projects in coming period in areas like E&P and downstream sectors. They also agreed to work together in third countries. Later, the Minister launched an event on Hydrocarbon Exploration & Licensing Policy (HELP) as a part of process of promoting the upcoming Oil & Gas bidding rounds in India. The event was attended by Mr. Bob Dudley, Group CEO, BP; Mr. Daniel Yergin Vice President IHS Markit; Mr. Fatih Birol, Executive Director of IEA; Dr. Sun Xianseng, Secretary General, IEF and other Officials.

Addressing the gathering Minister highlighted that India has opened up 2.8 million square kilometer of area for the investors and extended the commitment of the Government to give a red carpet welcome to the investors. He highlighted the regular growth in the GDP of India compared to the global slowdown along with several transformal reforms and innovative campaign by the Government. Minister stated that India has brought a modern progressive, investor friendly and world class policy, Hydrocarbon Exploration Licensing Policy (HELP) for the next bidding round.

Minister also informed the gathering other reforms in exploration and production sector. They range from gas price reforms; higher prices for gas produced from high temperature high pressure fields and difficult fields; reform in Production Sharing Contracts for on-going contracts; marketing and pricing freedom for Coal Bed Methane; extension for Pre-NELP blocks; launching National Seismic programme to complete 2D seismic survey of 52% of remaining sedimentary basins, etc.

Minister invited the investors to come forward and invest in the Oil & Gas sector of India and become partner in the next round of global growth.

In the Congress, ONGC was entrusted with the responsibility of setting up the Indian Pavilion under the aegis of the Ministry of Petroleum & Natural Gas. The Pavilion was designed around the theme "A billion people.... a billion opportunities". Built on an area of more than 2000 sq. ft. the exhibit consisted of kiosks representing ONGC, OIL, GAIL, HPCL, BPCL, IOCL, EIL, DGH and Invest India.

Shri Dharmendra Pradhan, Minister of State (I/C) for Petroleum & Natural Gas inaugurated the Pavilion on July 10,

2017. Among the notable visitors were Mr. Fatih Donmez, Undersecretary of the Ministry of Energy and Natural Resources, Turkey and Besim Sisman, Chairman & CEO of Turkish Petroleum AO.

Rosneft Led Group Close Essar Oil Acquisition Deal

Rosneft, on 22nd June 2017, announced the closure of acquisition deal of 49% stake in Essar Oil. Trafigura and United Capital Partners, who acquired another 49 % stake also announced the closure of the deal. Since October 2016 when the deal was made, it took ten months time for approvals from the lenders of Essar Oil and in-house reviews of Rosneft. Essar received approvals from all 20 lenders after it agreed to prepay part of the loans.

On 15th October 2016, Rosneft, Russia's state controlled oil major with two partners acquired approx. 98% stake in India's second largest private oil company Essar Oil in an all cash deal valued at 12.9 billion USD. The deal included two sale – purchase agreements; first the sale of 49% to Petrol Complex Pet Ltd. (a subsidiary of PJSC Rohnert Oil Company) and second the sale of the remaining 49% to Kesani Enterprises Company Ltd., owned by a consortium led by Trafigura and United Capital Partners with both the partners sharing their stake equally. While the valuation of Refinery is Rs. 72800 crores (\$10.9 billion), Rs. 13300 crores (\$ 2.0 billion) will be paid for port storage and import / export facilities in Vadinar Port. The remaining 2% is held by minority shareholders of Essar Oil.

Essar Oil, a part of Ruias owned business empire , operates a 20 million Mt per annum capacity refinery at Vadinar in Gujarat. In addition, company has a captive powder plant and port & terminal facilities.

The deal is the largest foreign acquisition in Indian Refining sector and the largest outbound deal of Russia. Signed on the side-lines of meeting of BRICS leaders in Goa in 2016, the deal will strengthen the relationships between the two countries.

The deal is considered to be a strategic move at company as well as national level on both sides. With such deal, Rosneft is achieving its objectives of geographical diversification to a rising economy and increasing the numbers of strategic partners. However some of the Russian financial institutions offered different opinions and termed this deal more of political nature.

According to the media reports, about \$ 5 billion debt of Essar Oil, Vadinar Port and Power plant will be transferred to the buyers. Another \$ 5.0 billion would go into deleveraging holding company. A part of the proceed will be used to restructure the debt of Essar Steel Ltd.

Merger of ONGC and HPCL

During the 2017-18 budget session of the Parliament, Finance Minister announced the proposal to merge PSUs in Oil & Gas sector to create integrated public sector oil majors

which will have better capacity to match with national and international oil majors. This was with considerations that such integrated companies will have better synergy for performance across value chain in this sector and capacity to manage higher risks. Oil companies were asked to examine and give their options.

The first in the series is the merger of ONGC, an upstream PSU and HPCL, a downstream PSU. For the information of our readers, Government shareholding in HPCL is 51.11% (519230250 Shares) and that in ONGC is 68.07% (both as on 31st March 2017 closing).

The Union Cabinet on July 19, 2017, gave, in-principle, approval for acquisition of government's 51.11 % stake in oil marketer Hindustan Petroleum Corporation Ltd. (HPCL) by state run exploration and production company Oil and Natural Gas Corporation Ltd. Earlier, ONGC forwarded a proposal to the government to acquire HPCL. Cabinet also approved the setting up of a special ministerial panel chaired by Minister of Finance and Minister of Petroleum & Natural Gas and Skill Development, Dharmendra Pradhan and Minister of Transport and Water resources Nitin Gadkari as members. According to media reports, ONGC will not have to an open offer to minority shareholders of HPCL as government holding is being transferred to an other state run firm with no change in ownership.

ONGC Board on 21st August 2017, while approving purchase of 51.11% of government stake in HPCL, also constituted a committee of Directors to examine various aspects of the deal and give recommendations to the Board. ONGC has initiated the process of appointment of advisers for the deal. Department of Investment and Public Asset management (DIPAM) is also appointing consulting firms and investment bankers to handle the sale. DIPAM is also looking to appoint adviser for this sale and a law firm having experience in merger. ONGC – HPCL merger is a two stage process. In first stage, HPCL will acquire MRPL, a refinery and petrochemicals company with ONGC stake of 71.63 % and HPCL with 16.96 %. This of course is subject to approvals of the Boards of HPCL and MRPL. The other stage is the takeover of government stake of 51.11 % in HPCL by ONGC.

This will consolidate the refining and marketing business with HPCL and ONGC can focus on E&P. At present ONGC is producing around 21 MMT crude per year (58 % of indigenous production) and 22100 MMSCM per year gas (71.6 % of indigenous production) HPCL including Bhatinda Refinery of HMEL has refining capacity of 24.8 million MT per annum. With addition of 15 million MT per annum of MRPL, ONGC will own 39.8 million MT per annum (MMTPA) capacity which is 17 % of total refining capacity of India. This company will also become third largest refiner in India after IOCL (69.2 MMTPA) and Reliance (62 MMTPA). ONGC will have control over about 14500 petrol pumps of HPCL which are about 25 % of pumps in India.

In its filing to BSE, ONGC stated that the company is looking at raising Rs. 25000 crore debt to part finance the deal which is

valued Rs. 37500 crores at the current share price of HPCL. After the board approval, ONGC seek the approval of shareholders in AGM on 27th September 2017. It is understood that ONGC will evaluate all options from taking bridge loan from domestic and foreign banks or issue bonds in India or overseas. Final solution could be a mix of more than one option. Company may not sell stakes in Indian Oil and GAIL which may be at appropriate time to replace the debt. ONGC will also get fund from the sale of shares of MRPL to HPCL. Along with this fund and cash with company, ONGC will finance the balance amount for purchase of government stake valued at 37,500 crores today.

After ONGC buys government stake, HPCL will become a subsidiary of India's largest oil producer and its board will continue to be in place. ONGC will have to complete the acquisition of HPCL within this financial year.

IndianOil and Odisha Government Resolved Paradip Refinery Tax Incentives

Indian Oil Corporation Ltd. (IOCL) and Odisha Government resolved their disputes over Value Added Tax (VAT) incentive to Paradip Refinery. The announcement to this effect was made on August 19, 2017 after the meeting of political leaders, Shri Dharmendra Pradhan, Minister for State (I/C), Petroleum & Natural Gas and Shri Naveen Patnaik, Chief Minister, Odisha in the presence of senior executives from State, Centre and IOCL on August 18, 2017. Minister for State (I/C), Petroleum & Natural Gas, Shri Dharmendra Pradhan in his statement said "Both sides have reached an agreement and found an amicable solution for the impasse on the Paradip Refinery issue."

Top executives from both sides, the Chief Secretary of Odisha and Secretary, Ministry for Petroleum & Natural Gas under the guidance of political leadership took lot of initiatives to sort out the issues and pave the way for further progress of Odisha State as well as commercial and strategic interests of IOCL.

Tax Incentives - Past

Tax incentive issue of Paradip Refinery has faced many ups and downs in the past. It was first announced in December 1998, in order to attract a large investment in the State by making the project economically viable. Odisha Government granted Sales Tax deferment to 9 MTPA refinery of IOCL at Paradip for a period of 11 years.

Odisha Government withdrew this incentive in February 2000. This withdrawal was in accordance with National Policy under which no new sales tax incentive was allowed for any industry after January 1, 2000. Odisha Government could not get the Paradip Refinery status changed to 'ongoing project' and gave a new package of incentive for refinery project. This package envisage the issue of bonds of 7 years tenure with 5% coupon rate yielding regular return for a period of 11 years from the date of commercial production by IOCL in lieu of the sales tax payable by the company.

However, this package did not elicit positive response from IOCL as it was providing substantially less relief compared to the concession granted earlier.

IOCL – Odisha Government MoU

In February 2002, the then Minister of Ministry of Petroleum & Natural Gas, Shri Ram Naik requested State Government to restore the earlier incentive to make project viable. The incentives were restored and an MoU between IOC and Odisha Government was signed on February 16, 2004. The Odisha Government granted sales Tax deferment to IOCL for a period of 11 years from the date of implementation of the project. The sales tax dues to be treated as interest free loan to IOC repayable from the 12th year of the commencement of the production. This was to make the large investment attractive in the state by making project economical viable.

The project was also exempted from the payment of central sales tax from octroi and entry tax levied on the machineries and equipment procured for the venture, electricity duty, royalty on sands and other duties whose combined worth was about Rs. 2254 crore. The deferment of sales tax for the refinery alone was Rs. 4412 crore.

According to MoU, the starting date of project was 4th February 2000 and completion of project was scheduled for 2009-10.

Shri Atal Bihari Vajpayee, the then Prime Minister of India laid the foundation of Refinery on May 27, 2000. Subsequently the configuration and the capacity of the project were revised to 15 MMTPA capacity and the implementation of the project started. The project was completed in September 2015 and Prime Minister of India Shri Narendra Modi dedicated this Refinery to the Nation on 7th February 2016.

Withdrawal of Incentives

Odisha Government in February 22, 2017 withdrew incentive of VAT / Sales Tax deferment. The withdrawal of incentive as per Odisha Government, was due to unilaterally enhancing the capacity of oil refinery to 15 Million tonne and delay of six years in the implementation of project due to which the state government lost substantial revenue.

IOCL, however, contested their views and filed a petition in Odisha High Court challenging withdrawal of the tax incentives and placement of the tax recovery notice on the corporation.

Odisha High Court passed an order to "Keep in abeyance" the demand notice of VAT recovery from Indian Oil Corporation Ltd. A division bench of High Court ordered the formation of a high-level working group under the chairmanship of Union Petroleum & Natural Gas Ministry to look into the concerns raised by the government of Odisha and IOCL within two months.

Present Settlement

Under the new resolution, Odisha Government will provide Rs. 700 crore interest free loan to IOCL annually for 15 years

as Viability Gap Funding (VGF) starting 2016-17. This will be given in four equal installments in each quarter and IOCL will repay the loan amount from the 16th year onward.

IOCL will deposit applicable VAT on product sold including tax not paid in 2015-16, 2016-17 and 2017-18. The tax for these 3 years will be paid immediately. The media reports state that Odisha Government has agreed to waive interest/penalty for VAT withheld by IOCL.

After the Refinery became operational in December 2015, the VAT payable for 2015-16 comes to approximately Rs. 210 crore. For 2016 -17 and 2017-18 the figure workout to approx. Rs. 2200 and 2400 crore respectively. For future, this amount will go up as more products are sold in the state. Reports indicate that IOCL will pay this amount of approx. Rs. 4800 crore within current quarter. This will not impact the profitability as it is accounted under the head of deferred tax.

Media reports quoting experts, suggest different opinions about the impact of this approach. One opinion is that the company's cash flow will reduce by about Rs. 6000 crore; the other school of thoughts, by significant majority, acknowledge this approach positively as it opens up the way for progress for IOCL as well as State Government. In the long run, both the parties are going to gain substantially in terms of economic and commercial developments.

Actions Ahead

After the deal, IOCL plans to go full stream with the expansion of Paradip Refinery capacity by 5 million tonnes a year as well as set up polypropylene plant and mono-ethylene glycol production facility in 4-5 years. IOCL envisage the investment of about Rs. 52000 crore in Paradip Refinery for these expansions and are configuring production.

IOCL will withdraw a legal challenge moved at the Odisha High Court against the state government's decision to withdraw the incentive. A joint petition will be filed in the Odisha High Court informing about the resolution.

RIL - BP Combine to Invest Rs. 40,000 crore in Oil & Gas Production in India

At a joint press briefing on 15th June 2017, held by Mukesh Ambani, Chairman of RIL and Bob Dudley, Group Chief Executive of BP Plc, the UK-based energy giant, announced that their companies will be jointly investing Rs. 40,000 crore to develop three hydrocarbon projects that would see RIL achieve a gas production of 30-35 million standard cubic meter per day (mscmd) over the next three to five years – a production level that RIL hopes will sustain for the next seven to eight years. These projects include development of the R-Series deep water gas fields in the KG-D6 block in the Krishna-Godavari basin, off the eastern coast of India.

RIL – BP Partnership

In 2011, BP p.l.c. (BP) signed the relationship framework and transactional agreements to acquire 30% stake in 23 Oil & Gas production sharing contracts, including the producing KG D6 block from Reliance Industries Limited (RIL) for an

aggregate purchase consideration of \$7.2 billion, plus completion adjustments. Apart from the consideration, BP to pay future performance payments of up to \$1.8 billion based on exploration success that results in the development of commercial discoveries. Future performance payments and combined investment could amount to \$20 billion.

In addition, the agreement also included the formation of a 50:50 joint venture by both the companies for the sourcing, marketing of gas and to accelerate the creation of infrastructure for receiving, transporting and marketing of natural gas in India.

With 60 % stake RIL (10% stake with NIKO) continued to play the role of operator under the production sharing contracts, whose blocks lie in water depths ranging from 400 to over 3,000m. The partnership combined the BP's deep-water exploration and development capabilities with Reliance's project management and operations expertise. The assets included 23 Oil & Gas production sharing contracts, including the producing KG D6 block, which are located in the Krishna-Godavari (KG) basin, India. The transaction implies deal values of \$80,000 per boe of daily production, and \$359.72 per acre of land.

The deal originally covered 23 blocks as against the final deal of 21 blocks announced in June 2017. With respect to the remaining two blocks, there are ongoing discussions between RIL and the Indian Government with a decision expected at a later date.

Since formation of this partnership in 2011, the two companies have invested over INR 10000 crore (US\$1.6 billion) in deep water exploration and production in the period to May 2017. In addition to the D55 gas discovery announced in 2013, the partnership has combined BP's technology and skills with RIL's execution and operational capability to sustain production from the geologically complex reservoirs in D1D3 and D26 fields on Block KGD6. This has included the deployment of world-leading technologies for production from deep-water gas fields for the first time in India.

Revival Plans

After a seven-year gap for more investment in India's potentially explosive gas economy, both the partners, RIL and BP announced to infuse Rs. 40,000 crore in the once-prolific deep water gas fields of the Krishna-Godavari (KG) D6 block on the country's east coast. The investments will be over the next three to five years. The renewed agreement between the two companies will also include exploring non-conventional energy sources such as advanced low-carbon fuels and renewable energy, apart from investing in downstream businesses, including retail fuel outlets.

The four satellites (D 2, 6, 19 and 22) and the other two finds (D29 and D30), D-34 (R-Series) and MJ gas discoveries, are the ones on which this investment of Rs. 40000 crore will be made to improve the declining production from KG-D6 block. The development of the six satellite finds are being taken up together while D-34 or R-Series and D-55 (MJ) would have separate development plans.

The government had in 2012 approved a USD 1.529 billion plan to produce 10.36 million standard cubic meters per day of gas from four satellite fields of block KG-DWN-98/3 (KG D6) by 2016-17. The four fields have 617 billion cubic feet (17.5 billion cubic meter) of reserves and can produce gas for eight years.

Policy Intervention

After the initial investment of Rs. 10000 crore, the companies did not invest citing uncertainty over gas pricing. The big investment announcement follows increasing confidence in the policy and pricing regime for natural gas. Since November 2014, gas prices have been partially linked to markets: The prices are capped as per a formula linked to spot market prices in select global hubs, and on a biannual basis, the prices are revised.

As per current policy, gas price of USD 5.56 per million British thermal unit (see box) prevails for yet-to-be developed gas finds in difficult areas like the deep sea. RIL-BP combine do not plan to alter the USD 3.18 billion investment plan for D-34 or R-Series gas field in the same block, which was approved in August 2013. About 12.9 mmscmd of gas for 13 years can be produced from D-34 discovery, which is estimated to hold recoverable reserves of 1.4 trillion cubic feet. A separate development plan for the MJ find would be submitted by mid-2018.

Expanding the Horizon

RIL and BP will expand their existing partnership for strategic cooperation on new opportunities across India's energy sector. Under the agreement the two companies will jointly explore options to develop differentiated fuels, mobility and advanced low carbon energy businesses in India, as India transitions to a low-carbon world.

The companies expect to collaborate, in addition to the conventional transportation and aviation fuels retailing, on unconventional mobility solutions, addressing electrification, digitization and disruptive mobility trends. Together, these collaborations will seek to address the mobility needs of urban, rural/farm, industrial/commercial, and highway consumers in India, applying the leading capabilities of both partners.

EESL and IndianOil, BPCL & HPCL sign MoUs for distribution of Energy Efficient appliances

Energy Efficiency Services Limited (EESL), under the Ministry of Power, signed a Memorandum of Understanding (MoU) with Oil Marketing Companies (OMCs) under the Ministry of Petroleum & Natural Gas (MoPNG) for distribution of energy efficient appliances under the flagship Unnat Jeevan by Affordable LEDs and appliances for All (UJALA) scheme. According to the agreement, Oil Marketing Companies- IOCL, BPCL and HPCL will take up distribution of LED Bulbs, LED Tube lights and energy efficient Fans from select retail outlets across the country. The distribution of



these energy efficient appliances will be conducted in a phased manner across these select outlets. In the first phase, distribution will commence from the states of Uttar Pradesh and Maharashtra.

The MoUs were signed with Indian Oil Corporation Limited (IOCL), Hindustan Petroleum Corporation Limited (HPCL) and Bharat Petroleum Corporation Limited (BPCL) in the august presence of Shri Piyush Goyal, Minister of State (I/C) for Power, Coal, New & Renewable Energy and Mines, and Shri Dharmendra Pradhan, Minister of State for Petroleum and Natural Gas here. Shri K. D Tripathi, Secretary, P&NG, Shri Ashutosh Jindal JS(M), MoP&NG, Shri Sanjeev Singh, Chairman, IOCL, Shri B.S Canth, Director (Marketing), CMDs of other oil companies and channel partners of OMCs were also present during the ceremony.

As part of the MoUs, EESL will make the entire upfront investment for ensuring availability of the products at the outlets and no upfront capital cost will be borne by the OMCs barring manpower and space.

Bhumi Pujan of 5-MMTPA Dhamra LNG Terminal

The Bhumi Pujan of the 5-MMTPA (million metric tonnes per annum) LNG (Liquefied Natural Gas) Regasification Terminal at Dhamra Port, Odisha, was performed by Shri Dharmendra Pradhan, Hon'ble Minister of Petroleum & Natural Gas, Government of India, at the project site, amidst loud cheering & enthusiasm of over 6,000 people gathered to witness the historic occasion.



Shri Dharmendra Pradhan, Hon'ble Minister of Petroleum & Natural Gas lighting the ceremonial lamp to formally inaugurate the Bhumi Pujan ceremony in the presence of dignitaries.

Shri KV Singhdeo, MLA Patnagarh (Bolangir); Shri Manmoham Samal, former Minister (Revenue), Govt. of Odisha; Shri Bishnu Sethi, Former MLA Chandbali; Shri Sanjiv Singh, Chairman, IndianOil; Shri BC Tripathi, CMD, GAIL; Shri Karan Adani, CEO, Adani Port & SEZ Ltd., and senior officials from the oil industry were also present at the ceremony.

Indian Oil Corporation, GAIL (India) Ltd. and Adani Group are joining hands to set up the terminal at Dhamra port for receipt, storage and regasification of LNG. The Terminal, being built at an estimated cost of Rs. 6,000 crore, is expected to be commissioned by the year 2020-21. It will cater to city gas distribution networks and industrial hubs in Bhubaneswar, Cuttack, Angul, Sambalpur, Jharsuguda and Rourkela in Odisha. Thirteen districts of Odisha, that is, Sundargarh, Deogarh, Sambalpur, Angul, Dhenkanal, Khorda, Cuttack, Jajpur, Bhadrak, Kendrapara, Jagatsinghpur, Puri and Jharsuguda will benefit from the pipeline passing through the State.

Addressing the gathering after unveiling the foundation stone plaque of Dhamra LNG Terminal, Shri Pradhan said the terminal will play a significant role in the development of eastern India. "Hon'ble Prime Minister has charted a roadmap for the growth of eastern India and stated that India can't be developed without integration of its eastern arm into the mainstream economy. Dhamra LNG Terminal is a gift from Hon'ble PM Modi to change the narrative of Odisha & bring back its past glory."

The LNG terminal would also meet the gas requirements of three oil refineries of IndianOil situated in Barauni, Haldia and Paradip. The three fertiliser plants at Barauni, Sindri and Gorakhpur, which are being revived by the Government of India, will also benefit from the terminal.



FIPI Oil & Gas Awards - 2016



The most prestigious award for petroleum industry in India 'FIPI Oil & Gas Industry Awards – 2016' ceremony was organised by Federation of Indian Petroleum Industry (FIPI) on August 8, 2017 to recognise and honour excellence and best practices in the Oil & Gas Sector. The winners of the awards were felicitated by Shri K.D. Tripathi, Secretary, Ministry of Petroleum & Natural Gas (MoP&NG). FIPI Awards got overwhelming response with over 90 entries received. After the scrutiny by the Award Committee and final Verdict of the Jury on FIPI Awards, 11 awards were given in 10 categories.

Speaking on the occasion, Secretary, MoP&NG said that this event has become an eagerly awaited occasion to celebrate and recognise the achievements of the Oil and Gas industry in India. "The FIPI awards (erstwhile PetroFed awards) motivate Oil and Gas sector to excel in the performance".

Shri D.K. Sarraf, Chairman, FIPI & CMD, ONGC welcomed the distinguished guests and winners and shared the vision and mission of FIPI. He highlighted that in a short period, FIPI organized a number of events related to various sectors of Oil & Gas Industry and champion its concern with other stakeholders.



Lighting of the Lamp by Dignitaries



Shri K.D. Tripathi, Secretary MoPNG and Guest of Honour for the event addressing the Guests



Shri D.K. Sarraf, Chairman, FIPI and CMD ONGC welcoming the august gathering



Recipient of Oil & Gas Pipeline Transportation Company of the Year – Indian Oil Corporation Ltd.



Reliance Industries Ltd. (SEZ) Refinery recipient of Refinery of the Year with Sustained Excellent Performance Award



Hindustan Petroleum Corporation Ltd. - recipient of Oil & Gas Marketing Company of the Year Award

FIPI Congratulate the Winners of

- Responsibly Growing Corporate of the Year
- Exploration & Production - Company of the Year
- Most Improved Refinery of the Year
- Refinery with Sustained Excellent Performance
- Oil & Gas Pipeline Transportation - Company of the Year
- Oil & Gas Marketing – Company of the Year
- Project Management (Rs.500 - 2000 crore) Company of the Year
- Human Resource Management - Company of the Year
- Environmental Sustainability - Company of the Year
- Innovator of the Year-Team
- Woman Executive of the Year

Dr. R.K. Malhotra, Director General, FIPI briefed about the FIPI Awards Scheme. He expressed his gratitude towards the FIPI Awards Jury and committee members for spending their valuable time for their recommendations and selection of the winners.

During the awards ceremony, Shri Ashish Bhandari, CEO – South Asia, Baker Hughes, a GE Company, delivered a talk on ‘21st Century O&G Company: The Upcoming Digital Revolution’ and Mr. Hans-Paul Burkner, Global Chairman, BCG on ‘Global Trends & Implications for Oil & Gas Industry’. The talks were well received by the participants.

While proposing the Vote of Thanks, Shri Sanjiv Singh, Co-Chairman, FIPI and Chairman, IOCL congratulated the winners of this prestigious award and said that Digital transformation of the Oil & Gas sector is a game changer and would be benefitting the industry at large. The ceremony was attended by more than 200 participants including CEOs/ Directors, Senior Executives and Veterans of Oil & Gas Industry.



Dr. R.K. Malhotra, Director General, FIPI briefing about the Awards Scheme



Shri Ashish Bhandari, CEO – South Asia, Baker Hughes, a GE Company, delivering talk on ‘21st Century O&G Company: The Upcoming Digital Revolution’



Mr. Hans-Paul Burkner, Global Chairman, BCG delivering talk on ‘Global Trends & Implications for Oil & Gas Industry’



Awards ~ 2016



Shri Sanjiv Singh, Co-Chairman FIPI and Chairman, IOCL delivering the Vote of Thanks

Hindustan Petroleum Corp Ltd.
Oil India Ltd.
Indian Oil Corporation Ltd. - Bongaigaon Refinery
Reliance Industries Ltd. – SEZ
Indian Oil Corporation Ltd.
Hindustan Petroleum Corporation Ltd.
Bharat Petroleum Corporation Ltd. & Engineers India Ltd.
GAIL(India) Ltd.
Oil & Natural Gas Corporation Ltd.
Indian Oil Corporation Ltd. - R&D Centre
Ms. Sabitha Natraj, Head of Corporate Communications (SR), Indian Oil Corporation Ltd.



Bharat Petroleum Corporation Ltd. & Engineers India Ltd. together received the Project Management Company of the Year Award



Oil India Ltd., recipient of Exploration & Production Company of the Year Award

FIPI Oil & Gas Awards - 2016



IndianOil Bongaigaon Refinery - recipient of Most Improved Refinery of the Year Award



GAIL (India) Ltd. recipient of Human Resource Management Company of the Year Award



Oil and Natural Gas Corporation Ltd., recipient of Environmental Sustainability Company of the Year Award



IndianOil, Research & Development Centre recipient of Innovator of the Year Award



Recipient of Responsibly Growing Corporate of the Year Award – Hindustan Petroleum Corporation Ltd.



Ms. Sabitha Natraj, Head, Corporate Communications (SR), Indian Oil Corporation Ltd. receiving Women Executive of the Year in the Oil & Gas Industry Award

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FIPI EVENTS

12th Program on 'Modern Practices in Petroleum Exploration'

Federation of Indian Petroleum Industry in association with Keshava Deva Malaviya Institute of Petroleum Exploration (KDMIPE), ONGC organized 12th Program on 'Modern Practices in Petroleum Exploration' from September 04 – 06, 2017 at Dehradun.

The objective of this Industry – Academia Workshop is to have a two-way interaction between practicing managers and the learned faculty of academic institutions on Exploration and Petroleum Industry and to enrich knowledge on both the sides.



The Program was conducted by experts from ONGC and designed for the teaching faculty of Engineering Colleges, Universities, Industry members as well as students from institutes to make them aware of the developments happening in the oil and gas arena. Participants from various Educational Institutes and Oil & Gas Companies attended the program.

The topics covered during the program include global E&P policies, technologies in drilling, geology, geochemistry, etc.

Training program on 'Energy Trading, Risk Management and Pricing'

A three day training program on "Energy Trading, Risk Management and Pricing" was organized by Federation of Indian Petroleum Industry (FIPI) from 12th to 14th September 2017. Mr. Johannes Benigni, the Chairman and Founder of JBC Energy Group conducted the program and was attended by 30 professionals from the Oil & Gas Industry.

The program talked about the basic principles of risk management which can be applied within organizations, the roles of various departments in the risk management process, understanding of the most common types of risk that are faced by companies and to learn how companies identify, monitor, control and report risk in the energy and commodity trading environment. Further, the role of derivatives was discussed in detail for managing trading and pricing risks. Concepts such as Mark-to-Market, Value at Risk, Stress Testing concepts and the role these play in managing trading risk were also discussed at great length.



The program also gave insights into various calculations used in energy price formation and the methodologies used by price reporting agencies along with investigating the inter-relationships between energy prices in different parts of the world. The training program was concluded with distribution of completion certificates for the program and vote of thanks by Mr. N K Bansal, Director (Oil Refining & Marketing), FIPI.

8th Industry Educational Program - 'A Focus on Energy Innovation'



Federation of Indian Petroleum Industry in collaboration with University of Alberta, Canada organized the 8th Industry Educational Program from 20th – 26th August 2017 at University of Alberta, Edmonton, Calgary, Canada. This program was organized under the umbrella of MoU signed with University of Alberta in December 2007. This was the eighth program in series.

19 senior executives from various major Oil & Gas Companies viz ONGC, OIL, NRL, IOCL & HPCL participated in the program.

Content of the 8th Industry Educational Program was focused around the theme of "Energy Innovation" with special reference to heavy oil extraction, syncrude & conventional oil production and processing, application of Nano Technology, EOR, Sustainability, Technology Innovation & trends in usage in the Oil & Gas services, Technical Innovation & Technological Developments in the Petroleum Transportation sector, etc.

Program was designed for the benefit of all the three streams: Upstream, Downstream, Midstream. One week program covered areas like Tight (shale) production; Enhanced Oil Recovery; Carbon Capture - Utilization and Storage; Nanotech applications in Petroleum sector; Canada's Oil Sands and visits were also arranged to Suncor Refinery; Alberta's Industrial Heartland; C-FER Technologies; Syncrude Research Centre; Centre for Visualization and Simulation; In Situ Combustion Research Lab; Nova Chemicals Centre for Applied Research.

The key take away for the participants was practical understanding for Innovation at work place, and continuous innovation is the key to sustainability of business we are in.




95% of the participants rated the program as very good / excellent which signifies the importance of the industry attraction to the Study Tour.



GAIL (India) Limited



BRING ABOUT A **REFRESHING CHANGE**

-  Switch to Natural Gas, a Greener Fuel
-  Use Public Transport
-  Ensure Pollution-Free Air



#HawaBadlo



News from Members

GAIL

GAIL CSR Rating

GAIL (India) Limited has been conferred with the prestigious 'Economic Times 2 Good CSR Rating' in the 'All-Round Excellence' category, the only Public Sector Undertaking to earn the recognition.



(From left to right) Ms Vandana Chanana, GAIL Executive Director (Corporate Communications & CSR) and Mr. P K Gupta, Director (Human Resources) receiving the certification from Mr. Jaco Cilliers, Country Director, United Nations Development Program and Ms. Nishi Vasudeva, Ex-CMD, Hindustan Petroleum Corporation Limited.

GAIL CMD Shri B C Tripathi launches Start-up Portal

Chairman and Managing Director Mr. B C Tripathi (centre) launching GAIL (India) Limited's Start-up initiative titled 'Pankh' in the presence of Directors and senior officials. The initiative has a corpus of Rs. 50 crore for investing in Start-ups and providing mentoring to them in core and non-core areas of the company



IndianOil

IndianOil's INDMAX technology bags Excellence Award at World Petroleum Congress

At the recently concluded 22nd edition of the World Petroleum Congress in Istanbul, Turkey, IndianOil bagged the WPC Excellence Award for its innovative and ground-breaking INDMAX technology. The award was presented to Mr. Sanjiv Singh, Chairman, IndianOil, and Dr. SSV Ramakumar, Director (R&D), by Mr. Abdullah bin Hamad Al Attiyah, former Deputy Prime Minister & Minister of Energy and Industry, Qatar.

Developed by IndianOil's R&D Centre, the INDMAX technology is highly suitable for heavy crude oil feeds contaminated with metals. IndianOil had set up an INDMAX pilot plant of 0.1 million metric tonnes per annum (MMTPA) capacity at its Guwahati Refinery in the year 2003. Thereafter, a full-size (4.17 MMTPA) unit was incorporated at its state-of-the-art Paradip Refinery commissioned in March 2016.



Petroleum Minister inaugurates BS-VI Emission Testing Facilities at IndianOil's R&D Centre

Mr. Dharmendra Pradhan, Minister of Petroleum & Natural Gas inaugurated the BS-VI Emission Testing Facilities at IndianOil's R&D Centre in Faridabad. Mr. K D Tripathi, Secretary, MoPNG; Mr. Sanjiv Singh, Chairman, IndianOil; Dr. SSV Ramakumar, Director (R&D), IndianOil, and other senior officials accompanied the Minister on his visit to the various research facilities on the R&D Centre campus.

The R&D facilities inaugurated are designed to test all types of fuels, such as petrol, diesel, ethanol-blended petrol, bio-diesel, CNG, LNG, Hydrogen-CNG and 2G-ethanol blends, to ensure that they meet the superior BS-VI norms that are to be implemented across the country by April 2020. In addition to generating emission data, the facilities will also evaluate the fuel blends for energy efficiency and engine durability.

Addressing the senior scientists at the R&D Centre, Mr. Pradhan exhorted them to ensure that the benefits of their research and innovations reach the common man and benefit him in every possible way. Complimenting them for developing a nano-additised battery for use in e-rickshaws, with better efficiency and longer life than commercially available batteries, he urged them to take its benefits to the market at the earliest.

Mr. Pradhan lauded the efforts of IndianOil R&D in commercialising Indane Nanocut - the industrial version of LPG for the metal-cutting industry. He took keen interest in the Centre's R&D efforts in new process and product technologies like OCTAMAX, intelligent instrumented pipeline inspection gauge (IPIG), 2G-ethanol and the various catalysts developed for refinery and petrochemical plant operations. Evincing keen interest in the comprehensive research

facilities of the R&D Centre, Mr. Pradhan hoped that IndianOil would take a quantum leap in alternative and renewable research arenas in the next 3-4 years.

Earlier, welcoming the Hon'ble Minister, Mr. Sanjiv Singh, Chairman, IndianOil, briefed him on the multifaceted research programmes of the R&D centre and their successful adoption in the Company's business verticals.

IndianOil's R&D Centre, established in 1972, is the country's foremost centre of excellence in downstream petroleum R&D. With a portfolio of over 550 active patents in India and abroad, the Centre lends the much-needed backend support to the Company in the form of proprietary research and commercialisation capabilities in lubricants, refinery processes & pipelines operations, fuel additives, catalysts, alternative & renewable energy sources, engine testing, materials sciences and environmental sciences.

First cargo of IndianOil's crude oil imports from USA loaded

In a big leap aimed at diversifying its crude oil sources and boosting the country's energy security, IndianOil has begun crude oil imports from the USA. The first cargo of high-sulphur 'Mars' crude oil was loaded recently from St. James Port on 'Bergitta' vessel, which will tranship to another vessel 'New Prosperity.' This ship will sail from the US Gulf Coast after loading full cargo of 2.0 million barrels and is expected to reach Paradip in Odisha by 1st October 2017.

IndianOil bought the second cargo of 1.9 million barrels of US crude oil (Mars and Eagle Ford grades) for delivery at Vadinar, Gujarat by early Nov. 2017.



Mr. Dharmendra Pradhan, Minister of Petroleum & Natural Gas inaugurating the BS-VI emission test facilities at IndianOil's R&D Centre in Faridabad. Also seen (from L to R) are Dr. SSV Ramakumar, Director (R&D), IndianOil; Mr. Sanjiv Singh, Chairman, IndianOil; and Mr. KD Tripathi, Secretary, MoPNG.



Hon'ble Minister with senior functionaries in front of the Hydrogen-fuelled bus at IndianOil's R&D Centre in Faridabad.



OIL INDIA

OIL Wins 'Asia Best CSR Award 2017' in two categories: 'BEST EDUCATION PROJECT' & 'BEST CSR PRACTICES'

Oil India Limited (OIL), India's second largest National Exploration & Production Company, was conferred with the 'Asia Best CSR Award 2017' during the 7th Asia Best CSR Practices Awards 2017 on 2nd August, 2017 at Le Meridian Singapore, Sentosa organized by CMO Asia. The award is Asia's highest recognition of CSR for creating significant and positive impact on the lives of people around the Company. Oil India has bagged the award under two categories, 'Best Education Project' and 'Best CSR Practices'.



Shri Tridiv Hazarika, CM (CSR & CC) & Ms. Nayana Madhu Dutta, SR PAO (CSR), OIL received the award on behalf of the company. This award endorses Oil India's philosophy of giving back. The award recognises the company's progressive Corporate Social Responsibility (CSR) practices that has catalysed improvement in Human Development Index (HDI) in OIL's operational areas through educational interventions aimed at Creating Shared Values. Under its CSR initiatives, the Company has embarked upon massive programmes of education, health, skill, sports, livelihood and infrastructure development, an attempt to invest technology with a human face.

Oil India Limited launches Start-Up Initiative

Oil India Limited (OIL), the second largest national E&P Company in the country, launched its Start-Up initiative by entering into agreements with two North-East based Start-Up ventures, at Guwahati, on 18th July, 2017. CMD OIL, Shri Utpal Bora signed the MoU's on behalf of OIL, along with Prof. Prasanna, Dean IIT Guwahati, and the Directors of the two Start Up Companies, Innotech Interventions Pvt. Ltd. and RD Grow Green Ltd.

The MoUs were signed in the presence of the Hon'ble Minister for Industries, Govt. of Assam, Shri Chandra Mohan Patowary, who was the Chief Guest at the ceremony. Director (Operations), OIL, Shri P.K. Sharma, Director (E&D), OIL, Dr. P. Chandrasekharan and RCE, OIL, Shri B. P. Sarma, along with a host of dignitaries and senior officials of Oil India Limited were present on the occasion.

As envisaged by the Hon'ble Prime Minister, Shri Narendra Modi and in line with the Start-Up initiative of Govt. of India, the Board of Oil India Limited (OIL) in its 469th meeting held on 30.09.2016, approved a Rs. 50 crore OIL Start-Up fund to foster, nurture and incubate new ideas related to oil and gas sector. The action plan was made towards implementation of Start-Up scheme of OIL in an effective manner. The OIL Start-Up fund was specifically created to encourage innovation and entrepreneurship in north east part of India.

Thereafter, steps have been taken by the Company towards implementation of the Start-Up initiative. Initially, it was preferred to limit the Start-Ups in about 5-6 areas from medium to long term perspective. In the immediate short term, it has been decided to look into the prospects of engaging and encouraging already existing start-ups in the following identified areas:

Addressing environment concerns, particularly by treatment of drilling fluid and produced formation water etc.; Monetising flared gas in satellite fields; Renewables; Ageing pipelines issues; Enhanced Oil Recovery (EOR).



BPCL

BPCL Inks MoU with MoP&NG

BPCL signed a Memorandum of Understanding (MoU) with MoP&NG for the financial year 2017-18 on 4th July, 2017 at New Delhi. The MoU was signed by Mr. K. D. Tripathi, Secretary, (Petroleum & Natural Gas) and Mr. D. Rajkumar, C&MD, BPCL in the presence of MoP&NG officials, Smt. Urvashi Sadhwani, Sr. Adviser and Mr. Ashutosh Jindal, Joint Secretary (Marketing) along with Mr. R. Ramachandran, Director (Refineries), Mr. V. Anand, ED (P&I), Mr. M.A. Khan, CGM (Coordination) and other BPCL officials. BPCL has been consistently awarded an 'Excellent' rating for annual performance against MoU from the commencement of the MoU system, and is committed to moving ahead with even better performances in the years ahead.



BPCL Signs MoU with KIIT-TBI

BPCL signed a MoU with Kalinga Institute of Industrial Technology's (KIIT)'s Technology Business Incubator (KIIT-TBI) on 5th September 2017, to promote innovative and technology driven start-up companies.

It will help both KIIT-TBI and BPCL in proper selection of Start-up Ideas, their evaluation, timing of entry and exit & other key activities relating to investing in start-up ventures. BPCL will consider providing seed capital to Start-up companies incubated at KIIT-TBI in order to accelerate product development/market validation and scale-up. BPCL will preferentially utilize the products/technology developed by Start-ups on chargeable basis in any of its business verticals.

The agreement was inked in the presence of Mr. R. Ramachandran, Director (Refineries), Mr. Manohar Rao, ED-HSSE & Biofuels, Mr. Arvind Krishnaswamy, CGM, Strategy and Dr. Mrutyunjay Suar, CEO of KIIT-TBI.



Dr. Mrutyunjay Suar, CEO of KIIT-TBI and Mr. Arvind Krishnaswamy, CGM, Strategy, BPCL exchange agreements while Mr. R. Ramachandran, Director (Refineries) and Mr. Manohar Rao, ED (HSSE & Biofuels) look on.



Statistics

INDIA: OIL & GAS

Domestic Oil Production (Million MT)

		2013-2014	2014-15	2015-16	2016-17	April-June 2017	
						Qty.	% of Total
On Shore	ONGC	6.71	6.07	5.82	5.93	1.51	34.32
	OIL	3.47	3.41	3.23	3.26	0.84	19.09
	Pvt./ JV (PSC)	9.41	9.06	8.81	8.40	2.05	46.59
	Sub Total	19.59	18.54	17.86	17.59	4.40	100
Off Shore	ONGC	15.54	16.19	16.54	16.28	4.14	89.42
	OIL	0	0	0	0	0	0.00
	Pvt./ JV (PSC)	2.66	2.73	2.55	2.14	0.49	10.58
	Sub Total	18.2	18.92	19.09	18.42	4.63	100.0

Total Domestic Production		37.79	37.46	36.95	36.01	9.03	100
	ONGC	22.25	22.26	22.36	22.21	5.65	62.57
	OIL	3.47	3.41	3.23	3.26	0.84	9.30
	Pvt./ JV (PSC)	12.07	11.79	11.36	10.54	2.54	28.13
Total Domestic Production	Sub Total	37.79	37.46	36.95	36.01	9.03	100

(Source: PIB/PPAC)

Oil Import - Volume and Value

	2013-14	2014-15	2015-16	2016-17	April-June 2017
Quantity, Million Mt	189.2	189.4	202.1	181.15	53.70
Value, INR '000 cr.	864.88	687.4	415.36	431.62	121.34
Value, USD Billion	143	112.7	64.4	66.70	18.81
Average conversion Rate, INR per USD	60.48	61.00	64.50	64.71	64.51

(Source:PPAC)

Oil Import - Price USD / Barrel

	2013-14	2014-15	2015-16	2016-17	April-June 2017
Brent (Low Sulphur - LS- marker) (a)	107.5	85.43	47.46	48.65	49.28
Dubai (b)	104.58	83.77	45.63	46.98	49.72
Low sulphur-High sulphur differential (a-b)	2.98	1.66	1.83	1.67	0.10
Indian Crude Basket (ICB)	105.52	84.15	46.17	47.16	49.87
ICB High Sulphur share %	69.90	72.04	72.28	71.03	72.38
ICB Low Sulphur share %	30.1	27.96	27.72	28.97	27.62

(Source:PPAC/OPEC)

REFINING

Refining Capacity (Million MT on 1st April 2017)

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	1.50
Total	12.00

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

Bharat Petroleum Corp. Ltd.	
Mumbai	12.00
Kochi	12.40
Total	24.40

Hindustan Petroleum Corp. Ltd.	
Mumbai	7.50
Vishakhapatnam	8.30
Total	15.80
Other PSU Refineries	
NRL, Numaligarh	3.00
MRPL	15.00
ONGC, Tatipaka	0.10
Total PSU Refineries Capacity	139.50

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 234.5* (4.7 million barrels per day)

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

(Source:PPAC)

Crude Processing (Million MT)

PSU Refineries	2013-14	2014-15	2015-16	2016-17	April-June 2017
IOCL	53.13	53.59	57.19	65.19	17.52
HPCL	15.51	16.18	17.23	17.85	4.49
BPCL	22.97	23.18	24.09	25.36	6.34
CPCL	10.63	10.78	9.63	10.25	2.59
MRPL	14.65	14.68	15.6	15.97	4.03
NRL	2.61	2.78	2.52	2.69	0.70
Sub Total	119.5	121.19	126.26	137.31	35.67

JV Refineries	2013-14	2014-15	2015-16	April 2016-March 2017	April-June 2017
HMEL	9.27	7.34	10.71	10.52	0.82
BORL	5.45	6.21	6.4	6.36	1.78
Sub Total	14.72	13.55	17.11	16.88	2.60

Pvt. Refineries	2013-14	2014-15	2015-16	April 2016-March 2017	April-June 2017
ESSAR	20.2	20.49	19.11	20.92	5.13
RIL	68.03	68.04	69.44	70.17	17.49
Sub Total	88.23	88.53	88.55	91.09	22.62

Pvt. Refineries	2013-14	2014-15	2015-16	April 2016-March 2017	April-June 2017
All India Crude Processing	222.45	223.27	231.92	245.28	60.89

(Source: PIB Release/PPAC)

Crude Capacity vs. Processing

	Capacity on 01/04/2017 Million MT	% Share	Crude Processing Million MT April-June 17	% Share
PSU Ref	139.50	59.49	36.67	58.58
JV. Ref	15.00	6.40	2.60	4.27
Pvt. Ref	80.00	34.12	22.62	37.15
Total	234.50	100.00	60.89	100

Pol Production (Million MT)

	2013-14	2014-15	2015-16	2016-17	April-June 2017
From Refineries	216.44	217.08	227.9	238.96	60.04
From Fractionators	3.87	3.65	3.38	4.29	1.06
Total	220.31	220.73	231.28	243.25	61.1

Distillate Production (Million MT)

	2013-14	2014-15	2015-16	2016-17	April-June 2017
Light Distillates, MMT	58.81	59.54	63.60	67.53	18.48
Middle Distillates , MMT	112.85	113.41	118.31	122.54	30.41
Total Distillates, MMT	171.66	172.95	181.91	190.07	48.89
% Distillates Production on Crude Processing	77.17	77.46	78.43	78.46	80.29

International Price Ex Singapore (\$/bbl.)

	2013-14	2014-15	2015-16	2016-17	April-June 2017
Gasoline	114.31	95.45	61.72	58.11	61.30
Naphtha	100.22	82.22	48.54	47.22	48.65
Kero / Jet	121.23	66.62	58.17	58.42	60.58
Gas Oil (0.05% S)	121.99	99.44	57.63	58.93	61.68
Dubai crude	104.58	83.77	45.63	46.98	49.72
Indian crude basket	105.52	84.16	46.17	47.16	49.87

(Source: PIB/PPAC/OPEC)

Cracks Spreads (\$/ bbl.)

	2013-14	2014-15	2015-16	2016-17	April-June 2017
Gasoline crack					
Dubai crude based	9.73	11.68	16.09	11.13	11.58
Indian crude basket	8.79	11.29	15.55	10.95	11.43
Diesel crack					
Total Distillates, MMT	17.41	15.67	12	11.95	11.96
Indian crude basket	16.47	15.28	11.46	11.77	11.81

(Source: PIB/PPAC/OPEC)

GAS

Gas Production/Consumption/Import

	2013-14	2014-15	2015-16	2016-17	April-June 2017
Net Gas Production (MMSCM)	34574	32693	31138	30848	7828.68
LNG Imports (MMSCM)	17728	18536	21309	24686	5929.32
Import Dependency (%)	34	36	41	44	45
Total Gas Consumption (MMSCM)	52302	51229	52447	55534	13758

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 15 - September 15	4.66	-
October 15 - March 16	3.82	-
April 16 - September 16	3.06	6.61
October 16 - March 17	2.50	5.30
April 17- September 17	2.48	5.56

(Source:PPAC)

Gas Production (Qty in MMSCM)

	2015-16	2016-17	April-June 2017
ONGC	21177	22088	5729
Oil India	2838	2937	724
Private/Joint Ventures	8235	6872	5729
Total	32250	31897	12182

	2015-16	2016-17	April-June 2017	
Onshore	Natural Gas	8844.61	9293.88	2457.09
	CBM	392.87	564.59	144.95
	Total	9237.48	9858.47	2602.04
Offshore		23011.74	22038.23	5455.89
	Sub Total	23011.74	22038.23	5455.89
Total	32249.22	31896.7	8057.93	
(-) Flare loss	1120.22	1048.7	229.25	
Net Production	31129	30848	7828.68	

	2015-16	2016-17	April-June 2017
Net Production	31129	30848	7828.68
Own Consumption	5822.27	5856.01	1403.68
Availability	25306.73	24991.99	6425

Availability

	2015-16	2016-17	April-June 2017
ONGC	16076.12	17059.52	4547
Oil India	2313.89	2412.09	595
Private/Joint Ventures	6916.72	5520.38	1283
Total	25306.73	24991.99	6425

Consumption

	2015-16	2016-17	April-June 2017
Total Consumption	46694.73	49677.99	12354.32
Availability	25306.73	24991.99	6425
LNG Import	21388	24686	5929.32

(Source:PPAC)



Conquering Newer Horizons

With a legacy traversing three centuries from the successful commercial discovery of crude oil at Digboi in 1889 and Independent India's first oil field in Naharkatiya - all in the north eastern state of Assam - Oil India Limited was born on 18th February, 1959 to increase the pace of exploration in Northeast India.

Dogged determination of some of the finest oil & gas explorers and a committed workforce has enabled OIL to expand its pan India presence and spread its wings overseas with footprints in countries such as Libya, Gabon Nigeria, Sudan, Yemen, Venezuela, USA, Bangladesh, Mozambique, Russia and Myanmar.

Today, as a Navratna PSU, Oil India Limited is fully committed to achieve the co-created vision of becoming "the fastest growing energy company with Global Presence" with special emphasis on carrying out its duties as a responsible corporate citizen.

Setting the right pace globally

CIN : L11101AS1959GOI001148





ऑयल इंडिया लिमिटेड


(भारत सरकार का उद्यम)

Oil India Limited

(A Government of India Enterprise)



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**Bringing together creativity and
technology to create new possibilities**

Every day, new innovations or new technologies are changing the way we work and live. With Innovation as one its core Corporate Values, IndianOil is embracing new technologies and adapting to change to deliver better products and services to its clients in an efficient and environment-friendly manner. As we celebrate 2017 as the year of Innovation & Technology, we renew our efforts towards building a better tomorrow.



2017
Year of
**INNOVATION
& TECHNOLOGY**