Industry Recommendations to the Committee formed to develop roadmap for enhancing domestic Oil and Gas production and sustainable reduction in import dependency by 2030

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Petroleum Federation of India

Contents

1 Introduction

The Ministry of Petroleum & Natural Gas, Government of India ('MoPNG') has constituted a Committee headed by Dr. Vijay Kelkar to prepare a roadmap for enhancing domestic production of oil and gas and sustainable reduction in import dependency by 2030 ('Kelkar Committee'). The Terms of Reference ('ToR') of the Committee are as follows:

- Steps to be taken to enhance domestic oil and gas production from unconventional energy sources;
- Institutional mechanism for appraisal of Indian sedimentary basins to the extent of 75% by 2015 and 100% by 2025;
- Utilization of Oil Industry Development Board (OIDB) cess and other innovative resource mobilization approaches for appraising unexplored/partly explored acreages;
- Development and promotion of indigenous service industry in the exploration and production sector;
- Review of the institutional mechanism to acquire acreages abroad for exploration and production ('E&P') as well as pursuing diplomatic and political initiatives for import of gas from neighboring and other countries with emphasis on transnational gas pipelines;
- Steps to be taken for ensuring adequacy of finances for research and development ('R&D') required for building knowledge infrastructure in E&P activities; and
- Steps to be taken for development of gas transportation infrastructure for establishing a countrywide marketplace.

The MoPNG through the Directorate General of Hydrocarbons ('DGH') has invited comments, suggestions and inputs from the general public, all stakeholders, other persons and entities concerned, on the above ToR of the Committee.

This report includes a compilation of industry suggestions on each element of the ToR released by the Kelkar Committee. Some of the major suggestions on the ToR are listed below:

- Fast-tracking Discovery-to-Delivery by adopting an integrated field development plan that is dynamic and looks at the life cycle of the development of a block vis-à-vis the current

process of individual field development plan for a discovery to reduce our nation's dependence on crude oil imports;

- Provide investment incentives and fiscal concessions to expedite development of marginal fields and application of technologies that improve hydrocarbon recovery factor;
- Expediting the launch of the Open Acreage Licensing Policy which will aid the Government's vision of increasing the area under exploration;
- Distinct and clearly defined role for Resource Owner / Regulator / Policy maker which will lend significant credence to governance of the sector and will be a key enabler;
- Need for the DGH to acquire preliminary data and drill some study wells (a speculative survey) in an unconventional asset prior to awarding the block to E&P companies, in order to establish the prospectivity of the block;
- Allow exploration and development of conventional and unconventional hydrocarbons through a single policy framework – no distinct policy for shale gas / CBM / conventional hydrocarbons;
- Formulation of a comprehensive policy for extraction of unconventional hydrocarbons detailing all aspects such as land acquisition, water usage, marketing rights, pricing, etc.;
- Strategic role by state governments to develop unconventional energy sources;
- Creation of a sovereign fund and active support of the Government for acquiring hydrocarbon assets;
- Increase of Government to Government initiatives to strengthen diplomatic relationships with hydrocarbon rich countries for potential acquisition targets for energy security;
- Clarity on domestic gas pricing to create a favorable investment environment towards development of natural gas market;
- Removal of roadblocks to faster implementation of the proposed transnational gas pipelines;
- Focus on increasing industry-academia interaction for development of the latest technologies for extracting unconventional hydrocarbons;
- Single window clearance for oilfield service companies operating in India; and
- Development of a National Gas Grid for evacuation of gas from remote area.

2 Steps to be taken to enhance domestic oil and gas production from unconventional energy sources

The Unconventional Hydrocarbons Industry is in its nascent stages in India and needs to be nurtured to meet the increasing energy needs of the country. India has substantial reserves of unconventional hydrocarbons and if these are developed properly, India would be able to meet a significant part of the country's rising energy requirements. The major unconventional energy sources which can be developed to meet the energy shortfall are Coal Bed Methane ('CBM'), shale gas, methane hydrates, etc.

In order to enhance domestic oil and gas production from unconventional energy sources, a comprehensive energy policy for the exploration and development of unconventional energy assets should be formulated. Based on the responses received, the following areas need to be considered to develop unconventional energy sources:

a) To establish an entity under the MoPNG (or under Public Private Partnership) to carry out exploration in basins that are unexplored/partially explored to assess the potential. In the areas/blocks that are already under exploration/exploitation, the work can be carried out by the respective companies working in these areas. The data acquired by this entity should be made available in order to be viewed by interested companies.

b) The Government through its regulatory wing (DGH) needs to acquire preliminary data and drill some study wells (a speculative survey) in an unconventional asset prior to awarding the block to E&P companies. This may help in increasing the prospectivity of the areas/blocks and attract investors. Various clearances (namely Environment & Forest clearance, Defence clearance) must be in place prior to allotment of the block/area, as valuable time is lost acquiring these during the exploration work process, which ultimately creates an unnecessary rise in expenditure.

c) It has been highlighted that state agencies (ONGC, OIL, etc.) or other private agencies have a prolific amount of usable information/databases on many of India's sedimentary basins. These data are mostly lying unused in these agencies' archives and are unavailable to interested operators in those areas, even with payment. The MoPNG/DGH could mandate and/or facilitate such data availability on a shared platform in order to be used by genuinely interested operators, on a nominal payment basis for copying charges if required. Several

countries – Australia, Canada, USA, Brazil etc. - maintain public domain data bases of E&P data acquired by operators, where after a certain period of time all geological and well data is submitted at a central depository which can be assessed by the public.

d) Government should work towards a purposeful partnership between Industry and Government. US federal government played a key role in Shale gas development. In late 1970s and early 1980s, federally sponsored research sought to improve ways to extract gas from unconventional formations, such as shale. The energy renaissance was possible by technological innovations resulting from a sustained partnership between the gas industry and the American federal government. Government investment and research worked to drive innovations and cost declines in shale gas extraction technologies

e) Strategic role should be played by State governments to develop unconventional energy sources. Land and water is pivotal for the development of shale gas. To fast-track exploration and development of shale gas resources, and thereby reduce our nation's dependence on imports, government should play a decisive role and procure land for the E&P players. By playing a strategic role in issues pertaining to water management, government will send the right policy signals to potential investors. At the same time, before embarking on development of shale gas resources / other unconventional resources, we should sensitize all key stakeholders.

f) Clarity on domestic gas pricing is an important prerequisite for development of unconventional hydrocarbon resources. While the Rangarajan Committee recommended that their pricing proposal also be applicable to shale gas, this is again a deterrent as cost of production for shale gas could be higher. Shale gas therefore, needs to be kept out of the Rangarajan Committee recommendation. The Dy. Chairman Planning Commission has been reported to have said on 12th April 2013 while addressing a press conference that "India should align domestic energy prices to the international state before exploring shale gas". He further said that "if you are not aligning domestic energy prices to the international prices, then shale gas is far away".

g) The Government must nourish the domestic service industry and National Oil Companies ('NOC') in order to develop the technology and expertise within the country itself.

h) OIDB cess should be made available to R&D institutes of NOCs and Council of Scientific & Industrial Research (CSIR) for developing technologies specific to the Indian environment for exploitation of shale oil and gas and other unconventional hydrocarbons.

i) Incentives in terms of tax breaks and/or R&D investment incentive should be allowed to companies exploring for unconventional hydrocarbon and for service providers in this sector.

j) Granting income-tax holiday: The spirit of fiscal stability clause in terms of the tax holiday under section 80-IB (9) of the Income-Tax Act should be maintained for all blocks bid under the entire New Exploration Licensing Policy (NELP)/unconventional regime irrespective of whether they are for commercial production of crude oil or natural gas. This will provide confidence in investors in the upcoming bid rounds.

k) The following suggestions have been made on the policies related to indirect taxes:

   i. Service tax exemption: E&P of oil and gas by the very nature of this business is highly risky and capital intensive. Application of service tax on the services availed for exploration activities further increases the risk capital and hence at least service tax on these activities should be exempt from service tax.

   ii. Customs and excise duty: Instead of obtaining an Essentiality Certificate for every import, the operator should be given the authority to avail custom duty exemption. The operator can file a return with the DGH any time such authority is exercised to confirm that this is in line with the rules and regulations. The operator should be authorized to avail excise exemptions for domestic purchases (as this amounts to a deemed export).

l) Variable royalty system for unconventional gas: Currently, a flat rate of 10% is levied. Since the production from unconventional gas is in small quantities compared to conventional natural gas production, introducing a sliding scale royalty based on the average production or the average price of gas sold is recommended.

m) Changes in accounting procedure: The accounting procedures in unconventional contracts are an exact replica of Production Sharing Contracts (‘PSCs’) and since there is no concept of cost recovery in unconventional contracts; the Government should make the accounting procedure in unconventional contracts simpler.

n) Blocks may be offered under a unified license wherein any kind of hydrocarbon can be explored by the operators.

o) Granting simultaneous exploitation of conventional and unconventional resources: Due to the exclusivity clause, resulting in different contractual implications, the concept of simultaneous exploitation of a conventional and unconventional resource has not been possible. Thus, in a block/field the existing operator should have first preference to exploit any other hydrocarbon resources such as Underground Coal Gasification (UCG), Shale Gas, and conventional oil and gas under the existing policy framework for that resource. Similarly unconventional resources locked up under pre-NELP, NELP and CBM round development/production stage blocks need to be considered for exploitation of all possible unconventional resources. In the case of overlapping unconventional acreages with pre-NELP, NELP and CBM round blocks there should be an option for the existing operator to have a right of first refusal/nomination options during the bidding process. However, in the case of multiple overlaps the operators with the highest percentage overlap should get preference.

Suggestions related to specific unconventional hydrocarbon resources are provided below:

2.1 Coal Bed Methane (CBM)

33 CBM blocks have been awarded, of which 11 blocks were relinquished or are in the process of relinquishment. Only one block is currently producing commercially. The following issues have been highlighted by industry professionals:

1 Clearances for CBM projects should be given in a strictly time-bound manner. If clearances are not given within a year, these shall be deemed to have been approved.

2 Environmental and rehabilitation policies should be standardized and norms should be stated upfront. All companies engaging in these activities should be required to comply with the norms. This will do away with individual clearances and hence speed up the investment process as well as take away the scope for discretion.

3 Since CBM reserves are found in traditional coal belts, these areas have no pipeline networks. Of the total CBM reserves estimates in the country, around 80% - 90% of CBM reserve areas have no pipeline connectivity. As a result, the CBM operators have to build

the entire gas pipeline at their own cost for gas to reach consumers, which entails additional investment for the producers.

4 Free market pricing was announced at the time of bidding based on which various operators bid, won blocks, entered into contracts, and made investments. This cannot be changed and should be ensured. Any control on prices will discourage investment and production. In this context, the pricing regime suggested for future in the Rangarajan panel report introduces an elaborate system of price control. Acceptance of such pricing framework will drive away fresh investment in future. Free pricing means market forces will decide the pricing and not any formula or Government intervention.

5 Gas utilization policy should not be applicable to CBM industry due to a different production profile of the CBM wells. In the beginning of the project, CBM production volume is small. Production builds up gradually over the years. CBM producers have thus to develop a consumer base to sustain their initial small production. At this level of production, it is not possible to supply to priority sector industries whose demand is large. Small and medium scale units, which have converted to using CBM from other fuels such as coal or furnace oil, cannot suddenly be starved of supplies to meet priority supply obligation as this will have an adverse impact on their operations. Additionally, any allocation earmarked for any buyers/sectors is a clear violation of marketing freedom as provided in the contract.

6 CBM contracts are on royalty and production linked payment (PLP) and not on cost recovery which prohibits increased investment from the private sector.

7 Simultaneous mining of coal and CBM cannot be allowed because this is totally against the contract conditions. Simultaneous mining is a safety hazard. CBM will have to be extracted first, and then coal mining can be done. The CBM industry was developed to extract methane prior to mining so that mining becomes safer. Coal mining before methane extraction will result in the methane escaping from underground seams into atmosphere. This is ecologically harmful, as methane is 21 times more damaging to the environment than carbon dioxide

8 There are hosts of other un-minable coal based energy options such as Coal Mine Methane, Abandoned Mine Methane, etc, which are yet to have a proper guided policy or regulation

in place thereby making their exploration and exploitation impossible. Similarly, there is a huge potential from some other un-utilizable coal based resources such as underground coal gasification, surface coal gasification, coal to liquids technology which should be evaluated and tested for commerciality.

2.2 Shale Gas

1 The contribution from shale oil/gas which has been a game changer in the US has potential in other countries including in India, which should be explored. However, currently there no policy framework, and it cannot be taken further, as the first and foremost requirement is to notify a policy framework including regulatory mechanism relating to the pricing environment and resource management and issues associated with societal challenges. This is even more the case as it has been reported internationally in reviews of shale gas that India has no comprehensive set of rules and regulation relating to exploration and development of its domestic shale resources. This is a pre-requirement for the development of shale oil/gas resources.

2 There is an imminent need for systematic and scientifically collected data for a realistic estimate of the available non-conventional resources (shale gas, shale oil, basin centered/tight gas, oil shales, excluding coal bed methane). In the absence of such systematic data (data base), the result of the policy implementation will be a form of 'boom-bust' cycle, wherein some successes will be met along with much larger instances of failure. This will ensure that industry will be wary for further investment in the sector (except for the National Oil Companies (NOCs) and Public Sector Units (PSUs) which will be advised to continue to demonstrate the questionable success of the policy).

3 The number of wells required for shale gas exploitation would be significantly more than that for conventional hydrocarbons; it may require timely clearance of permissions related to Petroleum Exploration License, environment, land, water availability and disposal etc. Therefore, single window clearance may be institutionalised.

4 One of the probable solutions for meeting land requirements would be to share a part of the royalty/profit with the land owners.

5 To ensure timely and smooth clearances for expeditious E&P activities, an inter-ministerial committee with representation from the DGH, MoPNG, and other concerned ministries (Defense, Environment & Forests) and relevant State Governments should be formed to provide 'In-Principle' approval for the nominated blocks before the process of bidding and tendering. The process of 'In-Principle' approval can be facilitated by environment impact assessment studies conducted prior to opening of new areas for license rounds. This would facilitate a quick and efficient process for granting of actual exploration licenses or leases to the successful bidders. A web-based automated work flow system can be designed to facilitate the overall process. The system will enable accurate and effective monitoring of timelines for various activities and create transparency and reduce the scope for conflict.

6 A policy that promotes investment, through a consortium mode, for systematic efforts to promote a time-bound scientific data gathering effort will serve the purpose. The participating investors in the consortia could either be given fiscal incentives or be given preference at the time of award of acreages, based on the results of these efforts.

7 Coordination from the state/central Government on matters of land and water resource usage: The two key requirements for unconventional resource projects are land and huge volumes of water for stimulation of the reservoir. Maximum support and guidance in matters of land acquisition has become a prerequisite for success in unconventional gas/oil exploration.

8 The water resource report shows the gap between supply of water and demand, including that of agriculture and industry, as 50% by 2030. Therefore availability of water for fracturing is important. Similarly, meeting the water requirement would be critical for areas such as Gujarat, Rajasthan, etc. Some mechanism and/or direct incentives must be extended from the state/central Government in this regard. The Government needs to formulate a comprehensive policy to address the issue of water availability and usage by the shale gas industry. Significant environmental issues need to be addressed as hydro-fracturing may lead to contamination of ground water as a result of spills, faulty well completion or inappropriate disposal into underground injection wells as well as emission of methane, volatile organic compounds, and hazardous air pollutants, needing large fresh water. The award of shale blocks needs to have an inbuilt mechanism of approval to use technology so that hydro-fracturing can be undertaken without getting into a tedious route of approvals.

9 NOCs and other operators for conventional oil and gas should be encouraged to evaluate shale sections while drilling for probable shale oil and gas by carrying out special logging, coring, geochemical and other analysis, processing of geophysical data etc. NOCs and other operators should be compensated for the expenditure incurred for the additional activities related to shale oil and gas exploration

10 Shale gas exploration in India is in R&D stage. Therefore, Government may provide suitable fiscal incentives (as royalty exemption, tax holidays, etc.) to nurture this nascent yet highly potential field so that Indian operators may exploit shale gas in a significant way.

11 Experiences of Shale oil and gas industry of USA may be helpful in development of shale oil and gas in India. Indian Companies and Universities may be encouraged to collaborate with their counterparts in USA for this purpose.

12 There must be parallel actions to develop manpower skill to improve upon and sustain growth in this field. Technical institutions (company owned or academic) should be encouraged for introductions of such courses. This will also accelerate the R&D at grass root level. Mechanism for collaboration with foreign institutes and funding should be placed along with other mainframe policies

2.3 Methane Hydrates

The process of exchange of technology and sharing of information with countries such as Japan and the USA, which are at an advanced stage of research in extracting gas hydrates, at Government level may be established through assigning the responsibility to a core group under the DGH. Japan recently successfully extracted methane hydrate, known as ‘fire ice’, from its seabed. Initial R&D work by the National Gas Hydrate programme by the DGH, suggests gas hydrate presence in Krishna Godavari, Mahanadi and Andaman deep waters in numerous complex geologic settings. Though the future is unknown, the Government should embark on a process of learning and simultaneously draft a policy for this resource with a long-term perspective.

2.4 SYN Gas

The Oil Refining Industry should explore the possibility of pursuing gasification of raw petroleum coke gasification technology for production of SYN gas. The process of producing SYN gas from PetCoke gasification is basically a clean process and also provides valuable feed stock for further usage:

a) Power production (for captive usage within a refinery or that can be fed to the power grid)

b) Production of hydrogen for captive consumption within the refinery complex

c) Production of chemicals such as acetic acid, aldhydes, fertilizers

For example, on considering a petcoke gasification complex with around 1 MMTPA TPD Coke, around 140 MW of power (Net) and 50 KTPA of hydrogen can be produced. The hydrogen can be used for upgrading heavy to very heavy crudes (for example tar sands, bituminous crudes etc).

Alternatively, value-added chemical production can be explored from SYN gas produced from petcoke gasification. Indian refineries are setting up delayed coker units as a viable and robust residue upgrading process and by the year 2015/2017 India is expected to produce around 10 MMTPA to 15 MMTPA of petcoke.

3 Institutional mechanism for appraisal of Indian sedimentary basins to the extent of 75% by 2015 and 100% by 2025

Owing to the introduction of NELP rounds, the country has witnessed an extensive increase in areas under exploration from 11%, due to the interest of both public and private companies. However, to meet the increasing shortfall of oil and gas resources, the Government intends to embark on an aggressive program to increase the area under exploration. Some of the major suggestions to increase areas under exploration are:

1 A shift to a royalty/PLP regime better suited to faster exploration of Indian basins. The clearance of exploration proposals takes unduly long as the Government takes time to appraise the costs and give clearance. Additionally, under the cost recovery system ongoing exploration and daily operations also have delays in clearance of projects. Instead, a royalty/PLP regime could avoid constant monitoring of costs by the Government and frequent disputes on costs and their inclusion.

2 Approximately 51% area has already been offered for exploration of conventional hydrocarbons and approximately 10% is under exploration/production by way of pre-NELP blocks. Nomination areas with ONGC and oil data (2D/3D seismic and wells) acquired by operators during conventional hydrocarbon exploration may be collated and made available online to the operators through registration. This would give a better understanding of the basins and prospectivity. After a certain period of time, all technical data and year-wise expenditure incurred in various blocks should be available for public access, which would enable better analysis by prospective operators.

3 Surface mapping and conceptual models for petroleum systems (including whether petroleum systems are likely to be present or absent) are available for all the sedimentary basins in the country. The impetus to improving the risk inherent to the present understanding of these basins can only come by systematic data acquisition. Presently gravity magnetic data is available for almost all these basins, however for a breakthrough to be achieved the next step has to be in investment for seismic data acquisition along with further parametric geologic data collection. This task if left to established institutions (say national organizations such as Geological Survey of India , National Geophysical Research Institute) or PSUs or the regulator (the DGH) will only result in their either diverting resources from their present mandate or allocating resources which are less useful. The most

important requirement is establishment of a separate institutional mechanism for these efforts. The institution can be easily formulated as an independent self-governed entity with set objectives and funded by the industry, which proposes to derive profits from the results.

4 The DGH or the entity that is proposed to be created under the MoPNG (or Public Private Partnership) should also be assigned exploration of all unexplored/partially explored basins for assessment. Seismic data and other satellite based surveys can be initiated to assess each area. They could drill some study wells in an unconventional asset from their own expenditure. The data should be available for view at a nominal charge and also sale with an adequate profit margin.

5 Setting up of operator friendly procedures and policies for early approval of various activities involved such as budgets, time extension requests, Declarations of Commerciality, Field Development Plans etc. for timely completion of exploration and appraisal activities would help in increasing the area under exploration. Single window clearance and operator friendly process and procedures may be called for to attract investment and technologies in these areas.

6 In the existing scenario, a single agency performs the role of regulator and monitoring activities being performed by the operator, which at times are conflicting, resulting in delays in decisions. Therefore, the possibility of a separate upstream regulator could be explored by the Government.

7 The procedure for determination of gas prices at arm's length should be defined. Natural gas may be treated at par with crude oil for tax purposes in the definition of mineral oil.

8 Expediting an Open Acreage Licensing Policy – To offer exploration acreage round the year to oil companies without waiting for the announcement of the bids will certainly reduce the time required for award of blocks and will accelerate the exploration of Indian sedimentary basins.

9 A special exploration round should be offered by the DGH for exploration in Deccan trap areas for intra-trappean and sub-trappean prospectivity and also marginally explored basins.

10 There should be extensive exploration thrust with advanced data acquisition technology in logistically very difficult basinal areas e.g. Thrust Belt areas, Brahmaputra River Bed areas,

Ecosensitive areas of Assam-Arakan and other basins. Focused exploration efforts in the deep water Bay of Bengal (Bengal Fan) is required to increase the area under exploration.

11 Companies/agencies can be given deemed rights to work on unexplored terrains with the Government facilitating approvals/clearances to generate data. Such data generation costs can be allowed to be recovered with provision of profit/uplift by selling to the Government and/or interested parties in the case of service providers.

12 The Government and seismic contractors can enter into a partnership, with the Government picking up a part of the acquisition costs, with the contractor having the freedom to market the speculative survey data to interested E&P companies. While there is a clear incentive for seismic operators to engage in these surveys and generate profits from sale of data, the Government would benefit from the quality of bids submitted for such acreage. An acreage found to be prospective through the seismic data would command a higher economic value at the time of bidding and would result in better returns accruing to the Government through royalty and profit petroleum. In the case of operating companies, they may be allowed a cost offset where such acquisition costs can be booked against revenue in another producing block or against swapping of the Liquidated Damages for unfulfilled commitments in any other block operated by them.

13 In addition to the DGH, Government should also encourage higher participation by the Geological Survey of India and The National Geophysical Research Institute (NGRI) in appraisal of the Indian sedimentary basins. An integrated approach would be beneficial to all the stakeholders.

14 Marginal discoveries and/or discoveries lying inactive for more than 20-25 years should be re-awarded to interested bidders for development and production.

15 Increasing the industry-university collaboration for developing new technologies and effective utilization of resources: It is imperative that a separate institutionalized mechanism is set up, primarily guided by the industry in which the academia can be seconded for project specific, time bound jobs on a full time basis since focus on unexplored areas is often not possible by corporates engaged in their own E&P priorities. Additionally, in this context, local/national universities should be leveraged with monetary grants for taking up detailed studies with their existing manpower and equipment setups. Data from such studies

should be exclusive to the funding company for the first two years post data gathering and could be open sourced subsequently.

16 Government should facilitate collaboration and coordination of research to expand safe oil and gas development – between Government agencies/environmental groups/the offshore oil and gas industry, academia, and non-governmental organizations. Environmental agencies and other statutory agencies should work closely with the industry to give a helping hand in meeting the norms. They can also liaise with the public to remove fears.

17 The regulator should establish incentives for lessees with non-producing oil and gas leases that will encourage companies to either get their leases into production in a timely manner or relinquish them.

18 No Ring fencing of exploration expenditure may be implemented so that exploration cost is recoverable from other producing assets similar to Australian Petroleum regime. This will give impetus to more exploration in the country.

19 All the exploration data may be made public after four years of its acquisition similar to Australian Petroleum Regime and made it a part of national data repository. It will help in more interest in review of data from various agencies and meaningful exploration work.

4 Utilization of Oil Industry Development Board cess and other innovative resource mobilization approaches for appraising unexplored/partly explored acreages

The oil and gas sector is a highly capital intensive sector which requires substantial investment in the exploration phase. The mechanism for the evaluation of the non-conventional resource base as well as the remaining sedimentary basins would entail high costs, both in terms of the establishment expenditure as well as the data acquisition, processing and interpretation cost. To increase the area under exploration, both public and private sector companies need to embark on an intensive drilling program which would entail large capital expenditure. To meet the investment requirements, the companies would have to explore innovative resource methodologies. Recommendations of major industry players related to this are presented below:

1 Consortia supported projects for basin evaluation: Models of such studies are available in the industry, particularly with American Universities which run large scale consortia supported projects and institutes (ex. Energy & Geosciences Institute of the University of Utah, SPODS program of Stanford University). Consortia members can be from PSU's, Private Industry, Govt. Departments, Agencies and Institutions.

2 Granting infrastructure status for the oil and gas E&P sector:

- The Finance Minister has emphasized infrastructure creation in his budget. The oil and gas industry is vital infrastructure for the economy, providing energy. The oil and gas industry is also critically important since huge imports of energy sources are adding to the country's large current account deficit. This is a cause of concern for the Finance Minister. The upstream oil and gas industry is risk-prone and requires large investments and the gestation period is also long. The Finance Minister has observed "we need new and innovative instruments to mobilize funds for this order of investment". He has made several proposals for making available debt funds for infrastructure projects at low interest rates.

- Infrastructure development fund are to offer funds through take-out finance, credit enhancement and other innovative means, providing long-term low-cost debt for infrastructure projects. Besides this, the aggregate limit for issuing tax free bonds has been raised to Rs. 50,000 crore for 2013-14 from Rs. 25,000 crore in 2012-13.

- The oil and gas industry requires exactly the kind of debt funds that the Finance Minister has accorded for the infrastructure sector. This would be possible only if the oil and gas E&P sector is accorded infrastructure status.

- Government can explore the possibility of arranging funds from domestic banks with provision for lending on soft terms by qualifying lending to E&P sector as "Priority Sector Lending".

3 Effective utilization of Oil Industry Development Board (‘OIDB’) funds:

- Since inception and up to 31 March, 2012, the Central Government has paid an amount of INR 902.40 crore to OIDB out of the cess amount of more than INR 1,04,034 crore. This amount together with internal receipts generated as interest income on loans given to various oil sector companies and short-term investment of surplus funds has contributed to the Oil Industry (Development) Fund accumulating approximately Rs.10,175 crore as on 31 March, 2011.

- Government should transfer the entire amount collected as cess to the OIDB so that it can be utilized for development of oil & gas industry. The OIDB funds so transferred should be utilized to strengthen the DGH, as DGH is one of the OIDB’s Grantee Institutions, and fund research to improve ways to extract unconventional hydrocarbon formations, such as shale gas

- Resources of the OIDB should be available to private sector E&P companies and OIDB membership should be considered for expansion to include private sector companies.

- Major exploration project sponsorship from the funds of the OIDB can be explored as a solution to meet investment requirements (the OIDB in the past has rarely supported Exploration Projects, with exception being the National Gas Hydrates Project).

- OIDB funds should be used for ‘common cause’ purposes like development of common pipelines, data collection, regional surveys etc. The output of the usage of these funds should be of national value in the field of O&G and should be available either free, or at a reasonable price to any company which requires it.

- An extensive regional survey, particularly in offshore areas, geochemical surveys etc. could be undertaken by the Government/Government-authorized companies using OIDB cess or using part of the Petroleum Exploration Licence fees.

- OIDB cess can also be used for extending loans to companies on soft terms specifically towards projects aimed at energy security.
- OIDB lending should be long term loan (for tenor beyond 5 years with moratorium of 3 years). Funding should be available for up to 50% of the estimated cost.
- Cess liability should be abolished so that there is parity between pre-NELP and NELP PSCs

4 Loan from PSU Banks and OIDB for E&P activities should be at concessional rates. Loan should be unsecured and should be repayable on maturity only (even if exploration does not yield results). The banks may be permitted to charge interest at prevailing rates in case there is discovery in the fields.

5 To take care of disposal of drilling waste and avoid contamination of water, common facilities could be created to protect environment related concerns.

6 Steps for resolving the confusion related to Service Tax on Cash call by Operator: In the Oil and Gas sector, different oil and gas exploration companies form a consortium and are jointly awarded a Production Sharing Contract ('PSC') for carrying out Exploration & Production ('E&P') activities. The consortium is typically in the form of Unincorporated Joint Venture ('UJV'). One of the members is appointed as the operator to manage and carry out joint activities on behalf of the consortium. The cost of joint activities is to be borne by the members in the proportion of their participating interest. The operator incurs all the operating costs and recovers the cost from the members in proportion of their Participating Interest. The operator raises the cash call (i.e. request for payment in cash) on other members. The other members pay their respective portion. In the new service tax regime effective from 1 July 2012, scope of service tax has been enhanced by way expanding the meaning of 'service' ['any activity for consideration carried out by one person for another'] and introducing the concept negative list regime. Under negative list regime, only the services specifically covered in the list and exempted are not liable to service tax. Further, an explanation has been inserted to clarify that UJV will be treated as distinct person. The explanation has been reproduced as under: 'An unincorporated association or a body of persons, as the case may be, and a member thereof shall be treated as distinct person' There is no service tax liability with respect to the cash call raised by operator on the members in light of the following:

- The operators provide services to UJV, which is not the subject matter of the present note. However, no services are being provided by operator to the others members or by UJV to the members, accordingly, there is no flow of consideration between JV partners & operator or JV partners to UJV;

- UJV being a separate person carries on the activities on its behalf and there is no service provider and service receiver relationship between UJV and the members;

- Cash call contribution by the members to the UJV is in the nature of capital contribution by each member to the UJV;

In view of the above, it is clearly evident that no service tax is liable on the cash call raised by UJV on the members under the new service tax regime. However, in order to avoid any ambiguity on this issue, a clarification may be provided stating that no service tax would be applicable on the cash call raised by UJV on the members.

7 Developing India as global talent pool for the oil industry:

- Manpower is one of the crucial resources for the oil industry. The global oil industry has always faced a huge shortfall of skilled manpower. India is no different from their counterparts, especially in the constantly changing technological needs of the industry. The Indian Government should expedite its efforts to develop India as global talent hub for the industry with a long-term view. These efforts will play a crucial role not only in providing an in-house economical talent pool but also bringing the best of technology and innovation available worldwide.

5 Development and promotion of indigenous service industry in exploration & production sector

Oil and gas exploration and extraction is as integral a part of infrastructure as other sectors such as electricity generation, electricity transmission and distribution, pipeline projects, etc and hence infrastructure status should be accorded to the oil field service sector. The oil field service sector is known one of the most capital intensive sectors and requires large investment sums for domestic companies to acquire/build technology/equipment, with a long gestation period.

The Government must encourage the domestic service industry and NOC in order to develop technology and expertise within the country itself. Some of the major recommendations to ensure development and promotion of an indigenous service industry in the E&P sector are as follows:

1 Granting infrastructure status to the oil field service sector: Infrastructure status will not only encourage domestic companies to quickly develop technology but will also attract more players to the sector.

2 Single window clearance: Various Government approvals, clearances, NOCs, and licenses are required to be obtained by service companies from different ministries, which takes a long time and incurs huge cost to those companies. Such clearances usually are not only cumbersome but also time-consuming, resulting in idling of the equipment (rigs) as well as the project, which ultimately results in delays of project execution and increases in cost. For example, importing a rig requires various approvals from the Ministry of Home Affairs, Ministry of Defense, OISD, DGH, DG Shipping etc. which again takes effort and time. It is in the interest of both the contractor and operator to have a single window platform, such as through the DGH, who should be assigned to coordinate with all the ministries concerned to get the required approvals, clearances and/or licenses in a timely manner to minimize the schedule. This will allow service providers to mobilize their equipment and crew at an early date to execute projects swiftly with substantially reduced cost and efforts.

3 Availability of priority and economical funding for domestic companies for asset creation: Domestic oil field service companies being small in size are generally not in a situation to invest in upgraded capital intensive assets. The financing cost for Indian service companies is higher as against big foreign companies who generally enjoy lower interest rates overseas.

An economical lending rate with priority status will help Indian companies to invest in technological upgraded equipment and assets.

4 Relaxation of social security norms for expatriates: Indian companies have to hire expatriate on project basis due to skill shortage within the country. Under Indian Government social security norms, Provident Fund needs to be deducted from both employers and employees. Since expatriates come generally on a project basis and are not available to benefit from the provision, Indian companies bear an extra cost on account of employee's contribution as well to retain expatriates for seamless execution of projects, ultimately increasing the project cost. It is suggested PF norms could be done away with to reduce the extra cost burden. Relaxed social security norms for expatriates will help Indian companies to provide oil field services in a cost effective manner and will reduce the expense burden on companies, which do not currently benefit.

5 Continuation of price preference: The Government of India has taken indigenization initiatives/policies, e.g. providing price preferences to domestic service companies against global/International Competitive Bidding (ICB) tenders floated by ONGC, OIL & GAIL, without which it will be very difficult for Indian service companies to withstand the at times unfair competition from big foreign companies, who have been lobbying hard for the withdrawal of such initiatives. Ensuring the continuation of price preference for oilfield services in all areas will encourage domestic companies to further invest in technology to strengthen the indigenization and self-dependency of the oil field sector. Continuation of price preference is also in line with a similar policy of the World Bank to allow price preference to local companies as well as the principle of protecting/supporting local companies/personnel in various countries. Price preference has been rarely used by Indian service companies as a price benefit as it is the Indian companies who have generally been offering lower/competitive prices in their bids. Moreover, whenever said preference has been considered in the past, in the majority of the cases the domestic bidders eventually almost matched the lowest evaluated prices and there has been hardly any extra cash outflow by said E&P Companies. In the period from Apr, 2008 to Mar, 2011, ONGC awarded a total of four contracts under the price preference policy and generally the domestic bidders matched the lowest prices, with the only extra outflow being 0.19 % of the total contract value awarded.

6 Government can explore the possibility of promoting domestic service companies in international markets for carrying out operations in the overseas operatorship blocks of Indian NOCs.

7 Domestic oilfield service companies can independently bid for the international tenders to increase their area of operations.

8 Tax incentive may be given to operators for hiring services from indigenous service providers.

9 The Government can explore the possibility of formalizing the existing research collaboration by authorizing a Nodal Institute to connect Government, industry, academia, and outside experts devoted to developing cutting-edge safety, containment, and response capabilities.

10 Implementing the proposed Petroleum Economic Zone ('PEZ') for E&P service providers: The Petrofed National Working Committee in 2005 had conceptualized a hub for E&P service providers. With the Government having enacted the SEZ Act and with that model being very attractive for international companies to invest in India, it is suggested that this hub be along the lines of a SEZ. This hub may be christened a PEZ. The PEZ(s) would be able to house all categories of service providers to service the E&P sector and is proposed to be granted concessions The determinants for setting up such a PEZ would largely be the following:

- Strong support by the local Government,
- Amount of projected activity of absorption of services in that location,
- Easy access and proximity to an active location,
- Convenience to service the region (neighboring countries),
- Infrastructure including port facility, road, rail links, and airports,
- Robust communication facilities including telephones, network, IT enablement, data transfer network, etc,
- Logistics facilities such as ware housing, material handling, etc.

A location near Mumbai may also be considered to encourage existing companies to expand/relocate to the PEZ. Certain benefits from the Government would be optimal:

- Income-tax holiday should be available to a unit within the PEZ not only for exports but for income from providing services in India;
- Exemption from capital gains and Minimum Alternate Tax;
- Exemption from customs duty on goods/services imported into or exported by the E&P service provider;
- Exemption from excise duty on goods procured from India by the E&P service provider;
- Drawback or any other admissible benefits on goods brought or services provided from India or services provided from outside India;
- Exemption from service tax on taxable services provided to the E&P service provider;
- Exemption from levy of Central Sales Tax Act, 1956 on interstate sales or purchase of goods;
- Exemption from various cess and levies;
- Foreign exchange earnings to domestic earnings received from domestic E&P companies should be considered for NFE+ condition evaluation.

6 Review of institutional mechanism to acquire acreages abroad for exploration and production as well as pursuing diplomatic and political initiatives for import of gas from neighboring and other countries with emphasis on transnational gas pipelines

Economic diplomacy and public diplomacy are two fundamental pillars of energy diplomacy which hinge upon regular visits of high level state functionaries to strengthen bilateral ties and promote international trade. Acquiring gas and oil acreages has become intensely competitive with large energy consuming nations becoming active in implementing strategies for energy security. With China pursuing its objectives of resource acquisition abroad, it has become difficult for Indian companies to match their financial muscle. China is also offering other incentives and large credit lines for related activities. Some of the major suggestions for successfully implementing the agenda of acquiring hydrocarbon assets and for import of gas from neighboring countries through transnational pipelines are:

A. Suggestions to promote acquisition of assets abroad for exploration and production

1 Possibility of creating a sovereign wealth fund: India could create a sovereign wealth fund to aid Indian companies in acquiring acreages abroad. The fund could invest in the equity of Indian companies acquiring assets or extend special loans. Such a fund might be created by drawing down from our foreign exchange reserve and the earnings from the investments could, in fact, provide alternative investment avenues for the country's large exchange reserves.

2 Increasing Government to Government interaction: Government to Government cooperation could play a vital role in furthering overseas asset acquisition. The Indian Government could prevail upon foreign Governments to allot blocks on a nomination basis to Indian PSUs. The Ministry of External Affairs should revive its diplomatic efforts for securing oil and gas resources from countries endowed with such resources, particularly in Africa and the Middle East. A special high-power division should be created for pushing India's agenda for acquisition of energy sources in this region. Currently, although the Ministry has such a wing, the level of activity could be enhanced by putting this under a secretary level official. Sustained diplomatic intervention and follow-up with foreign Governments is required with

regard to efforts by our corporates both in the public sector and private sector to acquire energy deals. It is requested that the commercial attaché at Indian embassies in foreign countries be tasked with proactively assisting Indian E&P companies and help them in building contacts with host Government authorities and relevant departments.

3 Government is encouraging national oil companies to aggressively pursue equity oil and gas opportunities overseas. However, in the interest of nation, it would be prudent to enlarge the ambit by including the private players. For private sector, government can provide non-financial support in the form of facilitating the entire process of acquiring the assets abroad – initiating government-to-government interaction, swifter approval process among others. We should work closely with major hydrocarbon producers to enhance cooperation in the energy field. Working on a shared objectives pertaining to energy security, energy efficiencies will pave way for long-term sustainability.

4 Implementation of the Chinese model of direct Government investments in community development in other countries: This model is extensively been worked on by China with visible success including the building of roads, water and irrigation projects, railways and should be contemplated by India in facilitating direct entry of Indian companies in the energy space of other countries. Additionally, the Government could facilitate an integrated Project Management approach, along the lines of the Chinese model, where investments in E&P are usually accompanied by field development projects such as pipelines/ports and jetties etc. which form an integral part of an upstream project. Private sector E&P companies could also tie-up with PSUs such as Engineers India/BPCL/HPCL to scout for overseas oil and gas assets.

5 India should aggressively enter into shale oil assets in the US and take up leases through PSU E&P companies or take production interests in the producing blocks.

6 NOCs should be encouraged to bid for foreign bid rounds/farm-ins in consortia with other companies.

7 Various large oil and gas companies may join together under the single umbrella of the MoPNG to bid for any international assets for exploration and exploitation in order to bid effectively and avoid internal competition, for the overall interest and energy security of the country.

8 Centralized sharing of data on bid rounds and farm-in/farm-out opportunities in foreign countries could be channelized through the Ministry and made available to Indian Oil & Gas NOCs

9 Some other financial assistance which could be provided by the Government of India for acquisition of hydrocarbon assets abroad is as follows:

- Tax exemption: Dividends from equities in overseas projects should be exempt from taxation.
- Tax credits: Companies should enjoy 3% of overseas investment as tax credit.
- Special loans: Special loans repayment should hinge on the success of the exploration.

B. Suggestions to promote import of gas from neighboring and other countries with emphasis on transnational gas pipelines

Various transnational pipeline options that are currently under consideration in India are:

a) The Iran Pakistan India Pipeline ('IPI')

b) The Turkmenistan Afghanistan Pakistan Pipeline ('TAPI')

Pipeline costs are a function of the distance of the length of pipeline. Scale economies are extremely important and large diameter pipelines can help minimize transportation costs. In the case of LNG substantial costs for liquefaction and re-gasification need to be incurred regardless of the distance traveled. Thus, for short hauls, LNG is at a cost disadvantage.

The pipeline transportation of natural gas is better in terms of cost as compared to LNG. However, in many instances the progress has been very slow due to various geo-political factors. Also the fees being charged by the transiting countries are one of the major factors which sometimes work against the economics of gas transmission by a transnational pipeline. Some of the major recommendations to promote gas import through pipelines from neighboring countries are:

1 While TAPI and IPI are already being looked at, a Myanmar-India pipeline is also an attractive option that needs to be looked at seriously. Myanmar has large reserves of gas and the untapped potential is substantial. Myanmar can offer an attractive option for pipe gas supply considering the shorter distance involved.

2 The Government should effectively take steps to remove the roadblocks to the various proposed pipelines. Transnational pipelines (TAPI, IPI, Oman-India) to secure gas requirements have been on the horizon for many years now, with no concrete results to date. The Government needs to steer them vigorously to finalization.

3 The Import of NG from neighboring countries is suggested to be based on principle of reciprocal exchange of energy. For instance, India may import Gas through land based Transnational Gas pipeline from Iran, Turkmenistan through Pakistan & Afghanistan. In return, India may export Petroleum products & Electricity to Pakistan & Afghanistan through Transnational Petroleum Product Pipeline & Transnational Powergrid. Petroleum products may be exported from India's surplus capacity refineries bordering to Pakistan. Power may be exported from surplus capacity of power generation from cheap gas imported from Iran & Turkmenistan as well as surplus power from India's national grid. This reciprocal exchange of energy may additionally address the political and security concerns for India as associated with gas imports through transnational pipelines.

4 LNG imports are comparatively easy as they do not have the issues of transiting through other countries. The huge shale gas facilities coming up in the US offer an alternate import option for sourcing LNG from the US. Also the US gas is available at Henry Hub ('HH') linked price, which is currently much cheaper, compared to the traditional oil-linked supplies. We need to pursue import of LNG from the US at the current HH prices. At the current level of HH price the import price of LNG from the US would be comparable to piped gas from neighboring countries.

5 The Government should promote investments for the upstream sector in gas rich countries (for LNG back home). Such efforts could be encouraged by a gas swap facility to companies in those countries.

6 The proposed SEZ in Bangladesh to export products to North Eastern (NE) regions should also include option for trans-national pipeline thru Bangladesh or LNG plant. Suitable Gas exchange mechanism may be considered with Bangladesh, Myanmar or other neighboring countries for exchange of gas produced in NE regions. Government should also explore the possibility of connecting Tripura to West Bengal via Bangladesh network. There is no pipeline connectivity to the eastern states namely West Bengal, Bihar, Jharkhand and Orissa. The Jagdishpur – Haldia pipeline of GAIL India Ltd., which would have provided major connectivity with the west & north of India have not seen the light yet. As of date,

there is no substantial source of natural gas in vicinity of East zone. Since 2008, CBM gas is available in small quantity, especially in the coal belt of West Bengal and Jharkhand. M/s. ONGC, GEECL and Essar Oil have started commercial production and expected to ramp up the production in the next few years. The gas is mainly available in Jharia district of Jharkhand and in Burdwan district of West Bengal in the East Zone. A couple of proposal for FSRU (Floating Storage and Regasification Unit) at the coast of West Bengal and Orissa are being actively considered at the moment but may take about five years before it becomes a reality.

- Vast reserve of natural gas has been found in Tripura, estimated to be 82.83 bcm leading towards fast industrialization of the state. As of date ONGC has 73 production gas wells, yielding 1.8 mmscmd of gas. The success rate of ONGC has been phenomenal with the strike rate of 2:1. It is expected that production of natural gas will go up to 4.5 mmscmd by next financial year. Natural gas is proposed to be used for power generation, making Tripura a power surplus state and exporting power to the national grid. Tripura Natural Gas Company Limited is a Joint Venture Company of GAIL and TIDC (A Govt. of Tripura Enterprise). GAIL having major share in the company, is actively involved in CGD business in and around Agartala. The company is presently supplying gas to about 10,000 domestic consumers, 29 SME's and CNG to autos and LMVs.

- Mizoram, a state shares its borders stretch over 123 Km with Assam, 66 Km with Tripura and 95 Km with Manipur. The international border of the state extends over 318 Km with Bangladesh and 404 Km with Myanmar. The state sandwiched between Bangladesh and Myanmar falls under the category 1 'proven commercial productivity zone'. The prognosticated reserves of gas in Mizoram are also expected to be high. Consortium of ONGC (80%) and IOCL (20%) started exploration of gas at Meidum village in Kolasib district located at 130 Km of North East of Aizwal.

- OIL India Ltd. is planning for drilling and testing of five nos. of exploratory wells in NELP-VI block in North East part of Mizoram. The block is situated about 50 Km north of Aizwal and ends 6 Km east of Hnahthial town. The above mentioned scenario in Tripura and Mizoram is expected to produce surplus gas in the region. Due to difficult terrain in the region, it will be not be feasible in immediate future to transport the gas thru pipeline in the states of East, i.e. West Bengal, Bihar, Jharkhand or Orissa.

However, minor connectivity to the Bangladesh Pipeline network may facilitate immediate sourcing of gas to the State of West Bengal and adjacent states

- Transporting gas from Tripura to West Bengal entirely through Indian territory is not yet a feasible proposition. A pipeline of more than 1850 KM would be required, thru difficult terrain which would be clearly infeasible considering the established gas reserve in Tripura at present.

- However, Bangladesh has developed a reasonably extensive network of gas pipelines. Gas Transmission Company Limited in Bangladesh operates about 800 KM of pipeline network. If the extensive pipeline network of Bangladesh is utilized for this purpose, it may be a valuable proposition to bring the excess gas from Tripura and Mizoram to West Bengal.

- To implement the proposed solution, gas from India would enter the Bangladesh pipeline network at Feni in south-east of Bangladesh and an equivalent amount of gas can be taken from Jessore at the west of Bangladesh. Pipeline branches are to be laid from nearest tap-off point at Tripura to Feni in Bangladesh and from Jessore to Kolkata. The distance from Agartala to Feni is about 121 KM and Jessore to Barasat about 99 KM. The proposed CGD network of Kolkata can be connected at Barasat with a city gate station. The total maximum length of connecting to the Bangladesh grid will be about 200 Km, approximately costing Rs. 600 Crores.

7 Steps to be taken for ensuring adequacy of finances for research and development required for building knowledge infrastructure in exploration and production activities

R&D is strongly required for the oil and gas industry as the era of easy oil has come to an end and the latest technologies are required to extract hydrocarbon resources from complex environments. Building knowledge infrastructure in E&P activities would entail substantial capital investment for both the NOCs and private oil companies. Some of the major suggestions to ensure adequacy of funds for the R&D required for building knowledge infrastructure in E&P activities are:

1 OIDB funds could be used for financing R&D projects of Indian E&P companies.

2 The Government should promote collaboration with major countries/companies for acquiring expertise and knowledge.

3 Tax incentives for expenditure incurred for R&D and knowledge infrastructure in E&P could be provided to oil and gas companies. For PSCs under a Profit Sharing Mechanism, expenditures on R&D could also be considered for cost recovery.

4 Key thrust areas for R&D may be identified and a road map may be prepared at Government level in collaboration with global R&D institutes and organizations with exchange of information.

5 International R&D funding needs to be tax exempt. Also, additional incentives should be provided to firms investing significantly in R&D. Foreign companies willing to set up R&D centers in India need to be encouraged. India has the potential to provide human resource in large numbers to R&D and this will be a strong reason for international companies to set up R&D centers if adequate facilities and infrastructure etc. are provided.

6 Research related to ongoing project work in India should be treated as R&D activity and be eligible for the benefits available for R&D investment.

7 Strong R&D facilities for E&P may be set up in IITs, IISc and universities for focused research. This will promote industry-academia interface and will aid in technology development at relatively lower cost.

8 Increasing private participation in out of country missions/delegations: It has been witnessed that bilateral outward/inward visits are only extended to the Government technical team and/or PSUs. Private participation should be encouraged to give a private sector friendly nature to these visits.

8 Steps to be taken for development of gas transportation infrastructure for establishing a countrywide marketplace

Currently the gas pipelines in India are mainly concentrated in the Northern and Western part of the country. Therefore it is of paramount importance that the gas network should also be spread to other parts of the country. Various pipelines have been planned by GAIL and once all these pipelines are completed by 2014, it is expected that pipeline connectivity is expected to increase in India, connecting most of the parts of the country. BPCL along with GSPL, IOC and HPCL have also participated in developing three cross country pipelines, namely the Mehsana Bhatinda Pipeline (1670 km), Bhatinda Jammu Srinagar Pipeline (740km) and Mallavaram Bhilwara Pipeline (1585km). Some of the major suggestions to for developing gas transportation infrastructure in the country are:

1 Four pipelines which were earlier authorized by the Government of India to RGTIL, namely the Kakinada-Haldia, Kakinada – Chennai, Chennai Bangalore –Mangalore and Chennai – Tuticorin pipelines are likely to be put up for bidding by PNGRB. This needs to be expedited. However the Government and local administration need to extend full support to the companies laying pipeline to ensure timely completion. Of late lots of issues have been raised by local people regarding land acquisition, which is affecting the completion of the pipelines. Regulations regarding Right of Use/Right of Way should be made explicit to enable projects of national importance not to be sabotaged by individuals.

2 Interconnection of the major pipelines is another important step to be taken to complete the gas grid. There are various pipelines planned in the future and it will be better to plan the interconnections of these pipelines with the other existing major pipelines. This may require the issue of interconnectivity charges to be addressed by PNGRB in the regulations.

3 Cross country pipelines should be developed with a central gas grid system, which should be well connected to industries, consumers and the City Gas Distribution network.

4 GAIL may be nominated as the nodal company for planning the National Gas Grid taking into consideration the existing pipelines (of GAIL, RIL and GSPC), planned pipelines (for which bidding has been announced by PNGRB), potential sources of availability of gas including import terminals and major markets/consumers of gas.

5 While there is sufficient Gas pipeline infrastructure in the Northern & Western part of India significant investment is required for development of Gas Pipelines in the Southern & Eastern parts of India. Gas availability is required to be ensured to support these infrastructures. Gas availability to consumers can be ensured by construction of LNG import terminals in South & East Coast of India and allocation of Domestic Gas to Eastern & Southern industries of India. Simultaneously, focus also needs to be given to the development of major consuming sectors like Power. The development of gas pipeline infrastructure needs to be done in accordance with the development of the consuming sectors.

6 It may be desirable that PNGRB take sue-Moto notice of need of connecting zones where Shale gas has potential to existing/proposed networks. Creation of additional infrastructure would lead to additional cost, but would facilitate producers to bring their gas to markets which might remain stranded due to lack of connectivity. This would give comfort to producers to bring their shale gas to market without any major problem.

7 Government should facilitate the Viability Gap Funding Scheme for Gas pipelines (including CGD network).

8 Another important factor would be the review of the taxation policies of the Government. Some states have introduced an entry tax for gas being brought from other states. This is in addition to the Central Sales Tax the consumers have to pay. This adds an additional burden to consumers. In some cases, full set off of input entry tax is also not available. Hence, the Government could explore the option of covering natural gas under Goods and Services Tax.

9 While developing infrastructure a uniform Gas Transportation Agreement needs to be adopted by the transporters, which should be consumer friendly and flexible in line with the industry's needs. GTAs should be in favour of both transporter and shipper. Transportation charges should correspond to actual gas supply which will bring active participation of all the entities in the process. There is also a need to draft a Standard or model GSPA and GTA to be adopted by gas industry. It is felt that a mechanism for pooling and swapping of gas/LNG may be put in place in order to avoid double taxation and payment of double transportation charges etc.

10 Clarification on gas pricing methodology: The infrastructure setup is directly linked to the expectation of the operator to optimize its profits from the resource/field. A free, fair and

fast-track pricing approval should be encouraged. The current uncertainty related to pricing needs to be removed to aid investment in infrastructure.

11 Government and Regulator should focus towards development of Markets & Trading of Capacity. Development of natural gas transportation market also remains one of the important steps in the movement of Indian natural gas market towards maturity. At present, the regulations allow capacity trading of pipeline. However, establishment of liquid and transparent primary and secondary markets for trading pipeline capacity still looks distant. Presently In the primary market pipeline companies sell pipeline capacity to gas marketers, CGD companies, or to end users. In the secondary market pipeline companies and the capacity holders (through gas transportation agreement) should be allowed to resell the unused capacity which will improve the overall physical utilization of pipeline

12 The Government should explore the possibility of reviewing the process of approval of the laying of new pipelines by the regulator and the process of tariff determination. The provisions for provisional tariffs and setting off of the difference between provisional tariffs and final tariffs are complex, unworkable and not viable. For example, for shale gas, prior pipeline connectivity is essential as production peaks early. Shale gas development calls for development of a national/local grid around the resource to connect it to the market. Absence of a gas pipeline will lead to flaring of gas.

13 Rationalization of pipeline tariffs: Appropriate tariff recovery is a function of the maturity of infrastructure of the natural gas market in a country. In India, tariff recovery has moved from the earlier "postal tariff" basis to the present "zonal tariff" basis. The former system implied a uniform tariff across the length of the natural gas pipeline meaning no discrimination between customers on the basis of distance or volume. In this system, however, the users far away from the source along the length of the pipeline were allegedly subsidized at the cost of the users that were located closer to the natural gas source. In current "Zonal Tariff" system the tariff remains uniform within a tariff zone and the tariff for a successive tariff zone could be at least equal to or greater than the previous tariff zone. But it has been observed in last few bidding instances entities have quoted skewed tariffs for different zones to score better in the bidding process. Sub normal tariff has been quoted for the first tariff zone which may lead to polarization of industries in first tariff zone. Eventually the consumers situated at furthest point from gas source will share the financial burden of first zone tariff also. Further there is no provision of "tariff review" in the

PNGRB regulation for pipeline for which authorization awarded through bidding. It is very difficult to predict demand, supply scenario for next 25 years. Hence inherent risk is there by taking up pipeline project through bidding which deters many potential investors to enter in to infrastructure business. Hence it is suggested tariff may be quoted for initial period of 5 years and further it may be reviewed and revised by regulator if required.

14 Unbundling of marketing and transportation: Bundled offer of gas marketing and transportation always remains detrimental in terms of efficiency of the system. Though it has been started, but complete unbundling of the activities of transportation and marketing of natural gas has yet not happened in the country. There is immediate requirement to unbundle marketing and transportation activities to ensure further development of natural gas market at a rapid pace. There is also a need for a robust open access code for the natural gas pipelines as it is expected to facilitate pipeline infrastructure sharing and benefit market participants.

15 Land / Row acquisition & Environmental Clearances: Major challenges faced by the pipeline laying companies are in terms of environmental clearances, farmer agitation and land/RoW acquisition. As a solution, preference may be given for laying pipelines parallel to any other pipeline, wherever available, so that the same access roads can be used and less land is restricted. In case of gas pipelines required along the coastal belts, as an alternative the pipeline can take the offshore route with land-fall points at the required consumption centres / feeding centres. A gas pipeline grid may be considered all along the coastal belt in shallow waters near the coast. This methodology can overcome the problem of land availability and other issues to a large extent. The "no-go" areas for laying and operating pipelines, need to identified and publicized up-front by the Government, especially Ministry of Environment & Forests (MoEF) and Ministry of Defence (MoD), so that the operators and the industry is aware of these restrictions

16 Skilled manpower: It has been observed that presently, Indian gas sector lacks skilled workforce by substantial quantum which will be felt more intensively because of increased demand in years to come. Presently oil and gas curriculum/ pipeline engineering is not being taught widely in all the institutions. Hence availability of a strong talent pool from the universities / institutes with specific skill set is the major issue for the sector. It is largely presumed that working conditions in this industry are generally hazardous and that postings are typically restricted to remote locations. This resists talents to take admission in the

courses as well as in the Industry. Therefore, a strong talent development strategy needs to be developed and followed at all levels in an organization. Additional incentive to the workforce may be given to attract the talent.

9 Other suggestions/observations

1 It would also be important to develop Marginal fields' through enabling policy framework. Marginal fields have the potential to make a significant contribution in reducing our nation's dependence on imported oil. Though production is usually negligible from these fields, cumulatively, they can make a significant difference to nation's hydrocarbon production. It is estimated that India has more than 200 marginal fields; less than half are under development. We should provide enabling policy framework so that they can be swiftly exploited and thereby reduce our nation's dependence on crude oil imports. Operators in India should be incentivised to fully exploit these marginal fields much like many governments across the world actively pursuing marginal oil and gas through fiscal incentives. Similar considerations should also be given to Marginal oil & gas wells. For example, according to the EIA, marginal-volume stripper wells make an important contribution to US oil and natural gas production, though they produce very few barrels – average daily production from marginal oil wells was ~ 2.6 barrels and from marginal gas wells was ~20 McF. There are more than 6,00,000 stripper wells in US. For 2009, Oil stripper wells accounted for over 16% of US oil production and Natural gas stripper wells accounted for over 11% of US natural gas production.

2 Consortia-supported projects for basin evaluation could be evaluated. Models of such studies are available in the industry, particularly with American Universities which run large scale consortia-supported projects and institutes (for example The Energy & Geosciences Institute of the University of Utah, the SPODS program of Stanford University). Consortia members could be from PSUs, private industry, Government Departments, agencies or institutions.

3 Engaging academia for low cost areas of exploration studies: Industry-Academia Partnership could be strengthened to develop new technologies to lower the cost of exploration studies.

4 Enhancing Private-Public partnership in the oil and gas sector: All the coal that cannot be mined economically due to high depth should be a candidate for underground coal gasification. The Ministry of Coal can decide the depth of coal seams that could be brought under this scheme.

5 Government can explore the option of having a visibility and presence in the new possible oil and gas frontiers – viz. the Arctic and the Antarctic.

In addition to the suggestions by various industry stakeholders on the ToC of Kelkar Committee, certain entities have also submitted their views on the challenges faced by hydrocarbon exploration sector in North East India and the possible mitigation steps which has been incorporated as Annexure 1 and Annexure 2.

10 Annexure 1: Challenges in Hydrocarbon Exploration & Production in North East India

The North East part of the country is a region endowed with natural resources. Yet, troubled by history & geo-politics, the region has remained one of the most backward regions of the country. Rapid development of the North East region is among the foremost priority of the Government and in view of their strategic significance, the states of the region have been accorded a Special States. A number of special schemes and programmes have been evolved for the region. Various Central Ministers have been mandated to allocate 10% of the plan fund for the development of the North East region.

The North East region has good potential for attracting investment especially in oil & gas exploration & production (E&P). Based on various industry estimates, the Best Estimates for remaining reserves and risked recoverable resources are greater than 6 billion barrels of oil and greater than 70 Trillion Cubic Feet (tcf) gas, of which ~5.75 billion Barrels of oil and more than 21 tcf of gas have been estimated in northeast India alone, in both conventional and unconventional plays.

Both Bangladesh and Myanmar are characterized by very impressive facilities and infrastructure, both onshore and offshore, unlike northeast India. In order to adequately exploit the northeast India oil and natural gas resources, it is imperative to provide the necessary infrastructure and encourage investment with a single-window approval process. Key challenges faced by E&P industry and suggestion to address these challenges are as below:

1 Security:

Challenges:

- Security of manpower and equipment is the biggest concern for any organization which wants to venture in North East (NE) for doing E& P business.
- Frequent blockades and strikes called by various groups hamper timely completion of projects and also lead to cost overruns.

Suggestions:

- State /Centre should provide required security resources for the projects allotted by government of India.

- In case of Private Entities, Security Cover from the concerned State or Central Government should be accessible at reasonable cost and with-in minimum time frame.
- Access to medical or emergency evacuation infrastructure like helicopters/Ambulances should be available with the help of Army or local Security Agencies.
- Access to military medical infrastructure should be allowed in cases of emergencies like accidents and medical urgencies.
- Availability of dedicated security covers at reasonable rates.
- A "Security Mechanism Group" may be set up by the Government for each of the E & P activities in the North East. The Group should have representatives from Central Government, Home Ministry, DoNER, Petroleum Ministry, respective State Government, Police, Intelligence & Army officials.

2 Infrastructure :

Challenges:

- Infrastructure within the NE region is minimal that limits access to large and potential areas for carrying out E&P activities.
- Absence of roads, bridges and rail connectivity to remote locations in the NE states is an impediment for transportation of heavy exploration and production equipments.
- Limited communication infrastructure and absence of gas evacuation infrastructure in NE India.

Suggestions:

- Infrastructure improvement projects (whether by Central Government or State Government) in NE should be time bound and completed to meet schedule deadlines so that definite planning can be done based on these commitments.
- Access to river crossing equipment (whether temporary bridges or ferry) via agency like Border Road Organizations (BRO)/private agency.
- Access to Border Road Organizations (BRO)/private agency for construction of road etc. for reaching remote areas.

- Strengthening of mobile connectivity as well as data transmission & allowing satellite phones to cater to remote regions and emergencies.
- Natural gas pipeline connecting gas fields in North Eastern states of Tripura, Assam, Mizoram and Manipur can bring about rapid development and industrialization of the region, bringing more investment to the region and gives impetus to E&P activity. Employment generation through setting up of industries using natural gas as fuel/feedstock.

3 Statutory Clearances

Challenges:

- Majority of locations fall in the Forest Areas & getting Forest Diversion is complicated & time taking process.
- Forest Diversion is linked to Environmental Clearance (EC), which is yet another time consuming process without any defined approval timeline and delays executionof the work exponentially. EC is granted only after Forest Diversion has been cleared.
- Forest Diversion is also time consuming process and involves long drawn correspondence between the states and the regional office seeking and providing clarifications.
- Wildlife Sanctuaries, National Parks and other protected areas have a large eco-sensitive zone (ESZ) of 10 km. New circular dated 15 March 2011 requires permit to work within 10km of Wild Life Sanctuary. The existing areas within PEL have become out of bounds.
- RFR Act has partial implementation, creating problem in the diversion process.
- Land for Compensatory Afforestation (C.A.) in case of private agencies is a problem as non-forest land is required for C.A. Alternatively a certificate from Chief Secretary is required along with certificate from all the District Collectors (DC) & Divisional Forest Officers (DFO).
- In case of PML, MoEF demands Net Present Value (NPV) for the entire forest area in the Block/Field boundary, instead of NPV for the actual area which is required for the operations. In other words, MoEF is treating Oil & Gas mining at par with other open cast mining where total surface area is disturbed / destroyed. Oil & Gas mining works

sub surface (below the ground) & only very small area is required to be deforested, which in some cases is even less than 1% of the total PML area.

Suggestion:

- Government should ensure that clear guidelines are in place and implemented for land acquisition and before offering the acreage for bidding, defense and national security points / concerns should be well addressed to allow E&P companies to be more rigorous and confident in their project planning and diligence processes before initiating bidding, and avoiding delays at a later stage.
- A single-window mechanism for granting all environmental and other regulatory clearances for carrying out E&P activities is the need of the hour.
- Extending exploration period for existing blocks in the frontier region for a period of 10 years.
- E&P industry should not be treated at par with the other mining Industries& NPV should be calculated on the basis of the actual surface area used.

4 Sub market pricing

Challenges:

- The lack of a natural gas pipeline network in the region, artificially low pricing (60% of APM), low industrialization has led to flaring of natural gas in many small & stranded fields. Gas amounting to ~0.56 mmscmd is flared only in Assam and Arunachal Pradesh (as per latest MoP&NG data). The gas being flared in entire northeast would be even more which is a waste of precious natural resource and potential environmental hazard. Sub-market pricing of natural gas has only obstructed the growth of E&P industry in the region.

Suggestions:

- North East APM price is USD 2.52/MMBTU which is 60% of APM price, rest 40% is paid to national oil companies as subsidy from government budget. This is resulting in a sub market price of the commodity. A level playing field should be provided to the private players operating in north east.

- Policy changes should be made to attract multinational E&P players as done in neighbouring countries like Myanmar which share similar topography as northeast.

11 Annexure 2: Note on inclusion of Oil & Gas Exploration and Production (E&P) Industry as beneficiary of North East Industrial and Investment Promotion Policy (NEIIPP), 2007

1 Under the North East Industrial and Investment Promotion Policy (NEIIPP) 2007, introduced by Department of Industrial Policy & Promotion (DIPP), under the aegis of Ministry of Commerce & Industry, the Government of India has approved a package of fiscal incentives and other concessions for the North East Region of India.

2 Under this policy's point no. (x), certain Industries have been put under a Negative list, which will not be eligible for the benefits under NEIIPP. Sub point No (iv) of Point No. (x) of the Negative List says "Goods falling under the chapter 27 of the first schedule to the central excise tariff Act 1985 (5 of 1986) produced by petroleum oil or gas refineries."

3 Upstream Oil & Gas Industry is being wrongfully treated under Sub point No (iv) of Point No. (x) of the Negative list of NEIIPP. In the case of Exploration & Production (E&P) companies, the activities are limited to exploration & in case of discovery, to extraction of crude oil/gas only with limited processing and no refining. Transportation, Storage, Refining and finally marketing of the various products is taken care of by the petroleum refineries, which are not a part of E&P companies.

4 As the processing or refining of crude oil or gas is done by the petroleum refineries, E&P Oil & Gas companies should not fall under the Negative List of NEIIPP and should be beneficiary of this policy.

5 Considering the above, request DIPP to issue a clarification. Sub point No (iv) of Point No. (x) of the Negative List reads as "Goods falling under the chapter 27 of the first schedule to the central excise tariff Act 1985 (5 of 1986) produced by petroleum oil or gas refineries." It should be clarified that E&P Industry does not fall under this list.

6 Based on the recent media reports, we understand that DIPP has rejected the plea of the E&P industry for benefit under NEIIPP policy, 2007 inter-alia on the ground that E&P companies are not into "manufacturing". It is worth mentioning that the NEIIPP policy inter-alia states that units "which commence commercial production within the 10 year period from the date of notification of NEIIPP, 2007" are eligible. The eligibility is for "production" and not "manufacture".

7 It has been held by various judgments of the Honorable Supreme Court of India that "manufacture" and "production" are two different terms. Whereunder "production" is a much wider term. It is a globally accepted fact that natural resources, which include crude oil and natural gas, cannot be manufactured in a factory. Instead they are produced naturally, in this case by way of extraction from below the earth's surface.

8 Accordingly, it is requested that DIPP be requested to reconsider its decision and clarify that oil & gas E&P industry is eligible for benefits under the NEIIPP 2007.

9 As the E&P Industry is a high risk & high investment sector, and working is difficult in the logistically & socio-politically challenging areas of the North East India, request for/ recommend the following additions/clarifications to the existing NEIIPP:

10 Proposed to be added in Point No. (vii) – Under Capital Investment Subsidy: All investments in Oil & Gas Exploration and/or production, including expenses on Surveys, Drilling, Testing etc. shall be considered as investment in Plant & Machinery (Capital Investment)

11 Proposed to be added in Point No. (viii) – Under Interest subsidy: Interest subsidy @3% for Oil & Gas Exploration, Development and/or Production Industry would be eligible on Project/Term Loans.

12 Proposed to be added as IV, (next to Incentives for Power Generating Industries) in Point No. (xi) –Under Incentives for Service/Other Sector Industries: The Oil & Gas Exploration, Development and/or Production Industry will be eligible for benefits under NEIIPP 2007, as applicable to other Industries.