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REVIEW OF UPSTREAM COMMERCIAL STRUCTURES AND INSIGHTS FROM GLOBAL PRACTICES

The Boston Consulting Group

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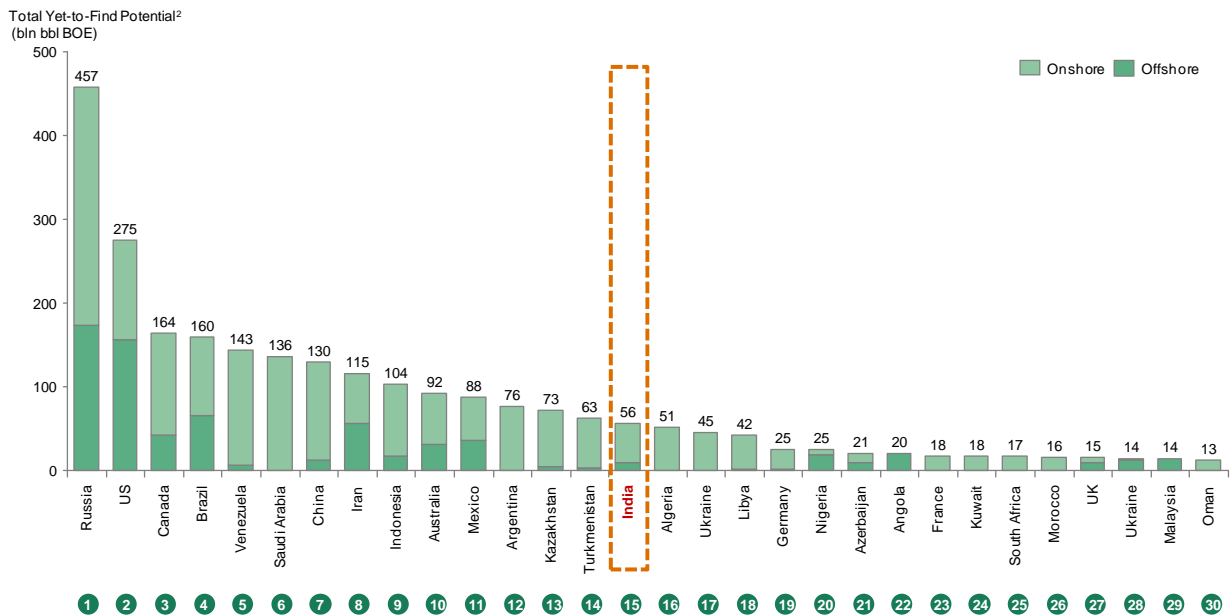
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INTRODUCTION

1.1 Overview of the Indian E&P sector

India is an attractive Exploration and Production (E&P) location with significant yet-to-find reserve potential (approximately 56 billion BOE¹), as shown in Exhibit 1.1 Further, a large proportion of this potential is expected to be onshore which, due to its relative ease of extraction, adds to the country's attractiveness from prospectivity point of view.



1. Expected ultimate recoverable reserves based on mathematical probabilistic models and geological surveys. Based on assets that have no discoveries as of date
Source: Rystad

Exhibit 1.1: India's yet-to-find reserve potential places it in the top 15 of the world

At the same time, the issue of energy security has never been more important as India's dependence on crude oil imports to meet the rising domestic demand has been increasing steadily over the past decade (Exhibit 1.2).

¹ Barrel of Oil equivalent

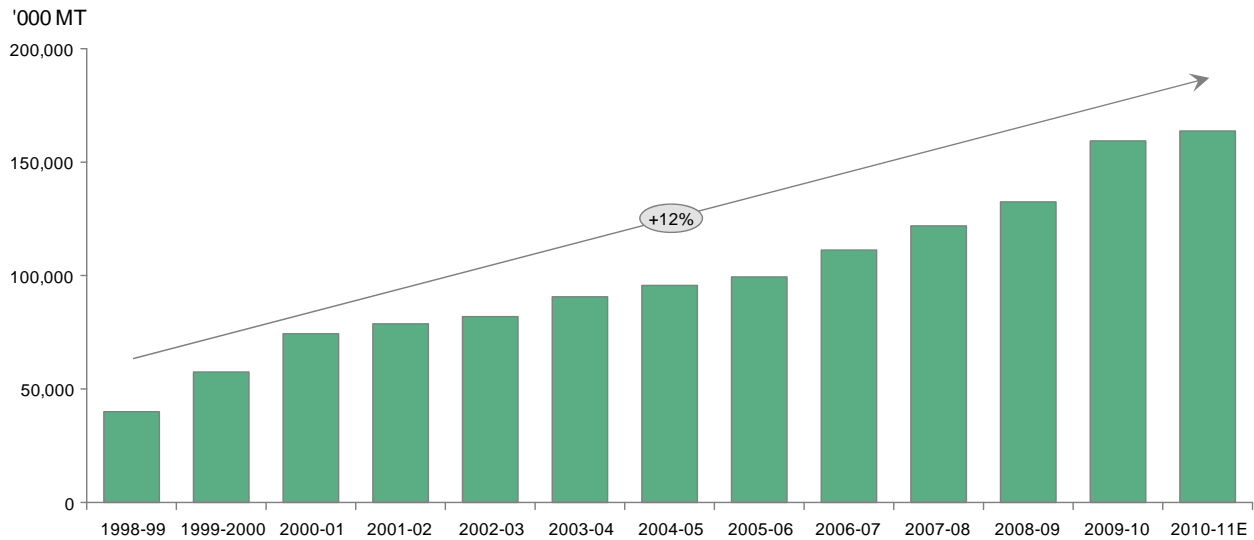
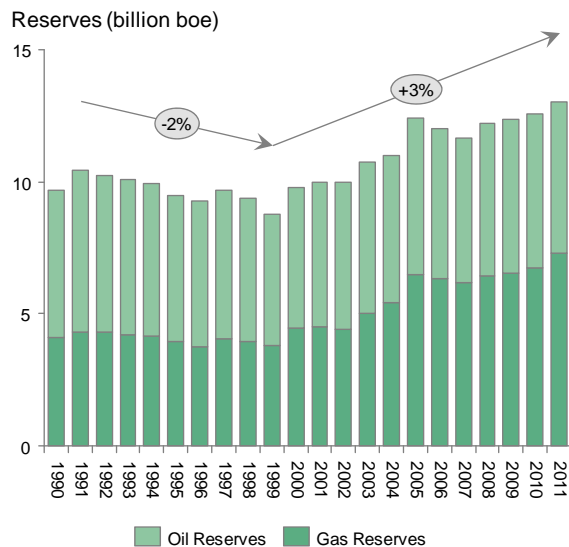


Exhibit 1.2: Net import of crude has risen consistently over the past decade

India adopted the currently prevailing Production Sharing Contract (PSC) structure in 1991-92, and the New Exploration Licensing Policy (NELP) came into effect in 1999-2000. The move toward PSC was driven by the need to create a regulatory regime which would help attract private investments into the sector.

While only 28 blocks were awarded in the pre-NELP era, licenses for 248 blocks have been given to more than 70 companies since the onset of the NELP era in 1999. Of the total 3.14 million square kilometers of sedimentary basin area, 2.15 million square kilometers have already been licensed (which equals 10 out of 26 producing basins in total). Significant progress has been made since 1999 in adding reserves as well as production, as shown below in Exhibit 1.3.

India, Reserves Growth, 1990-2011, billion boe



India, Production Growth, 1990-2011, million boe

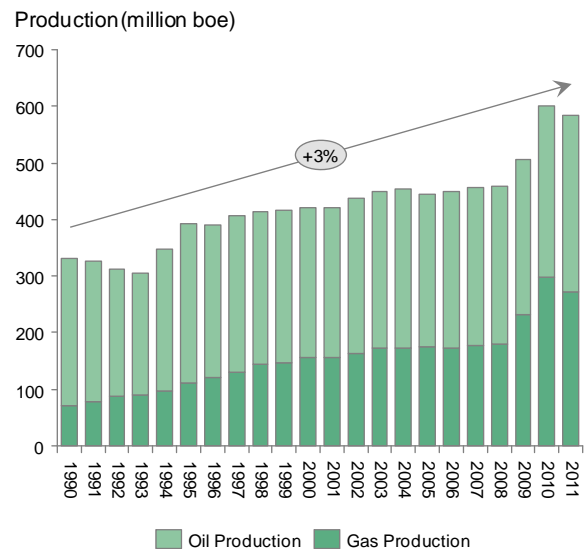


Exhibit 1.3: Growth in reserve base and production for India

Despite the progress, there are some reasons for concern. Well-explored basinal area has increased marginally from 16 percent to 22 percent of total area in the last 15 years. In contrast, over the past nine years, the area under exploration in Colombia has increased eight-fold² (125,000 square kilometer in 2003 to 1,000,000 square kilometer in 2011). Additionally, there is declining interest in NELP auction rounds – in NELP IX, only 23 out of the 34 blocks on offer were awarded (refer to Exhibit 1.4 below). Participation by international players remains low, with only 12 percent of the total acreage and about 7 percent of total contracts awarded to foreign players till date.

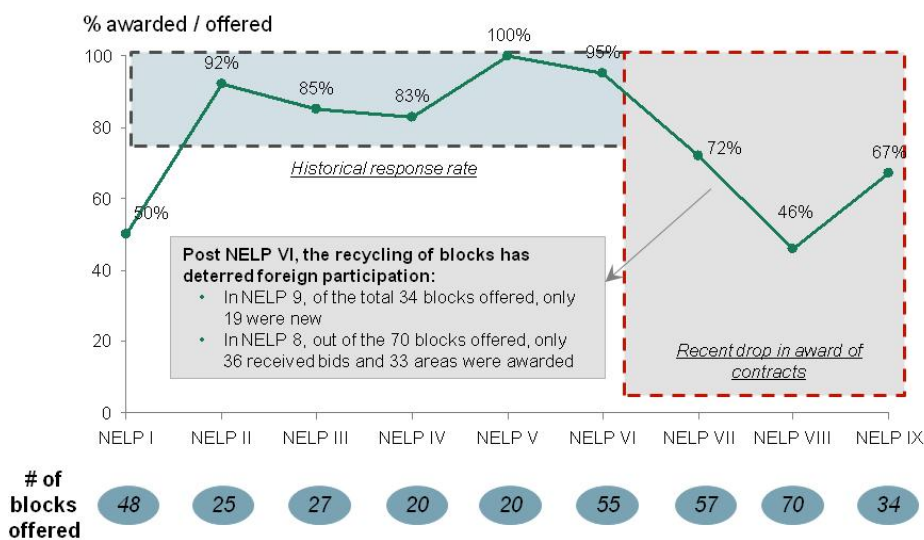
In addition to low and declining interest in bidding, the current regime has come under criticism on several fronts. Operating companies are complaining of long delays (in clearances and operational decision making), and the resultant cost and time overruns. From the government's point of view, the current structure has resulted in a huge administrative burden of conducting cost audits and budget approvals due the fact that government's take is dependent on cost recovery claimed by operating companies. The source of concern has been disputes arising between the government and operating companies on matters of cost recovery, especially for big investments which ultimately impact the profit pie to be split. The key drivers of the dispute are information asymmetry between the two parties (with the operator having more technical information about the field), and the

² <http://www.investorplace.com/2012/01/ecopetrol-colombias-quiet-energy-giant/>

potentially misaligned incentives to manipulate the profit pie to be split. These disputes need to be managed and addressed with adequate technical capacity and capability in the government, which is also constrained with limited technical staff in the Directorate General of Hydrocarbons (DGH).

The above concerns have led to the government re-evaluating the upstream fiscal regime for future rounds of licensing, to minimize the challenges going forward and incentivize expeditious exploration and production activities.

of blocks put up for bidding has significantly increased, but awarded blocks have not kept pace



- 249 blocks awarded out of 360 offered
- Active participation from private domestic players with ~40% of acreage
- Large proportion of acreage awarded to ONGC
- Only ~12% of the acreage awarded to foreign players
- No international companies in NELP IX

Exhibit 1.4: Blocks offered and awarded in all NELP rounds

1.2 Objectives and approach of the study

1.2.1 Objectives

While re-evaluating options for the future, the Ministry of Petroleum and Natural Gas (MoPNG) considered it helpful to develop a clear understanding of the global context and practices associated with commercial agreements between governments and operators for the exploration of a country's/ region's natural resources; and to draw insights, implications and best practices relevant to the Indian context. Accordingly, MoPNG has requested the Boston Consulting Group (BCG) to conduct a



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study to understand the practices followed in upstream regimes around the world and draw implications for India. Specifically, the project scope includes the following:

- Understand the context of the upstream E&P regime and the government’s objectives in India.
- Review the existing commercial agreements, such as PSCs, concessions/ royalty-tax structures, service agreements and joint ventures, prevalent globally
- Draw insights from international practices and specific implications for the Indian context.
- Develop options for suitable commercial structure for future agreements between the government and interested operators.
- Identify the key foundational enablers for a successful and sustainable upstream regulatory regime in India.

1.2.2 Approach

The engagement was conducted over a 9-week period and consisted of two modules:

Module 1 - A global benchmarking exercise

The BCG team conducted a detailed study to understand key aspects of upstream commercial agreements globally. Based on an objective selection approach (refer to Appendix 4.1 for details), 10 countries were shortlisted for in-depth study and benchmarking. These include Colombia, Malaysia, Angola, Brazil, Norway, Nigeria, China, Egypt, Indonesia and U.S. (specifically Gulf of Mexico). For the selected countries, primary research (interviewing BCG’s global upstream experts, other external specialists and selected international regulators) was carried out. Extensive secondary research was also conducted, with respect to studying key terms and conditions underlying existing commercial agreements (refer to Exhibit 1.5 for details).

Ministry	Indian Private Industry
<ul style="list-style-type: none"> • Mr. Jaipal Reddy, Minister, MoPNG • Mr. GC Chaturvedi, Secretary, MoPNG • Mr. Giridhar Aramane, Joint Secretary, MoPNG • Mr. Atul Patne, Deputy Secretary, MoPNG • Ms. Rashmi Aggarwal, Director, MoPNG • Mr. R. N. Choubey, Director General, DGH 	<ul style="list-style-type: none"> • Mr. Sashi Mukundan, Country Head, BP India • Mr. PMS Prasad, Executive Director, RIL • Mr. Rahul Dhir, CEO, Cairn India • Mr. Ajay Khandelwal, CEO, Jubilant Energy • Mr. Ashu Sagar, Secretary General, AOGO • Mr. Swagat Bam, SVP-E&P, RIL • Mr. Rajeev Kumar, VP, BP India • Mr. Jayant Sethi, GM Proc & Supply Chain, Cairn • Mr. Vikash Jain, Head Legal, Jubilant Energy • Mr. Mike Walsh, Director Legal, Cairn India



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Indian Public Sector Undertakings (PSUs)	Other Experts
<ul style="list-style-type: none">• Mr. DJ Pandian, Principal Secretary (Energy), Gujarat• Mr. Umesh Srivastava, PSC Advisor, GSPC• Mr. Sunil Srivastava, Chairman, OIL• Mr. R. S. Sharma, ex-Chairman, ONGC• Mr. S.V. Rao, Director (Exploration), ONGC• Mr. DK Sarraf, Chairman OVL• Mr. Dulal Haldar, VP, OVL	<ul style="list-style-type: none">• Dr. Vijay Kelkar• Mr. Aramando Zamaro , Ex-Director General, ANH, Colombia• Mr. Harald Ibrek, Statoil• Ms. Marina Taib, Petronas• Mr. Jefferson Edwards, Shell• Mr. Jay Park, Partner, Norton Rose law firm, Canada• Mr. Jatin Aneja, Partner, Amarchand Mangaldas & Co• Mr. Sunjay Joshi, Former JS (E), IAS

Exhibit 1.5: List of experts and important stakeholders interviewed

A separate report "Benchmarking report" has been prepared covering module 1.

Module 2 – Synthesis of benchmarking exercise to develop implications for India

In addition to studying the regimes in force in other countries, it was very important to understand in detail the current Indian context and to ensure that the learnings and insights from global case studies were adapted to the Indian context. Accordingly, primary interviews were conducted with all the key stakeholders in India including the Ministry (MoPNG), Indian PSUs, upstream private sector companies and international oil companies. These interviews helped understand the current context, key stakeholder objectives and concerns. Finally, the insights from the benchmarking exercise were combined with interview findings to synthesize a set of recommendations for a more robust future of upstream oil and gas sector in India.

This report focuses on the deliverables of module 2.



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2 STAKEHOLDER OBJECTIVES AND CONCERNS IN CURRENT E&P REGIME

2.1 Key issues facing India's E&P sector

In this section, the key issues mentioned briefly in Chapter 1 have been discussed in detail.

- **Long delays in clearances of blocks:** One of the major issues holding back expeditious E&P activities in awarded blocks is the delay in granting of clearances from various ministries, such as Ministry of Defense, Ministry of Environment and Forests, and state governments. These delays range from months to even years in several cases. According to reports, including media reports, up to 80 blocks (both onshore and offshore) have been affected due to non-availability of licenses from various agencies like Ministry of Environment and Forests and Ministry of Defense. These delays are costly, given the capital intensive nature of the business.

The uncertain timelines caused by these delays affects investment decisions made by operators, and often lead to significant cost and time overruns. Also, delays could sometimes result in the operator missing a deadline committed under the contract (leading to imposition of penalties), which triggers lengthy disputes with the government. There have been instances, albeit rare, where, international oil companies have relinquished their blocks and/or quit operations in India altogether³.

- **Differences between oil companies and government in interpretation of contractual conditions (and limited recourse for resolution):** Another key issue which has become prominent over the last few years is the impasse in decision making on certain matters in the Management Committee (MC)—which involve either technical matters or issues relating to cost recovery. These issues are typically related to different interpretation of PSC clauses by the two parties, situations not envisaged in the PSC or, difference in technical opinion. As an example, in case of liquidated damages for unfinished work, the assessment of the value of unfinished work may differ between the oil company and the government. Similarly, in doing cost audit, the government/ DGH and the oil company may not agree on the rationale for a particular expenditure.

In case of lack of consensus among members of the MC, current provisions allow for dispute resolution through invocation of the “sole expert” clause, or referral for arbitration. In practice, these dispute resolution mechanisms have not proven effective for a variety of reasons. The two parties have not been successful in agreeing on the sole expert, and thus the clause is seldom used. The oil companies are hesitant to get into arbitration because they perceive it as a time-consuming and long-winded process.

³ For example ENI recently had to surrender its blocks, after it became clear that 1/3 of its Rajasthan block fell under protected 'desert forest'. The company also did not get the permission to drill in its Andaman and Nicobar Island blocks due to the proximity of the block to a rocket stage impact zone. The company has stated a change of strategy and is expected to quit its operations in India.



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- **Administrative burden on the government:** Cost recoveries, which are inherent to PSCs, make it necessary for the Government to actively monitor the expenditures on a regular basis. The MoPNG and its technical arm, DGH, are expected to play the very important and time-intensive role of monitoring and administering PSCs. The increase in the headcount in the Ministry and DGH has not kept pace with the increasing number of E&P contracts. DGH continues to be staffed with personnel on a deputation basis, and has not been able to significantly strengthen its capacity and technical expertise. This has resulted in an enormous administrative burden on the government which is becoming increasingly difficult to manage.
- **Manual system for managing workflows in execution of PSCs:** The current system of scheduling management committee meetings, sharing the agenda and noting the minutes of meetings is manual and paper-based. In the past, there have been issues relating to alignment of calendars for scheduling the meetings, establishment of the date for approval of key decisions, timely signing of minutes of the meeting etc. In other cases, when incomplete or inadequate information is submitted along with the application, it unnecessarily increases the cost and administrative burden on the government and its agencies. These issues have been a source of conflicts in the past, and addressing them is very important for maintaining the sanctity of the contract.

Considering the issues highlighted above, the current system needs to be re-evaluated in the context of India's future needs, the objectives of the Indian government and objectives and needs of investors while investing in the country. The following section lays out the objectives for the various stakeholders—government and investors—in India's upstream regime, and has been synthesized from detailed discussions with investors and the government.

2.2 Government and investor objectives

Based on discussions with key stakeholders in the government, government's objectives from upstream regulatory structure are as below:

1. **Incentivizing effective E&P:** Given the huge burden on the exchequer due to import of crude oil and natural gas, government's foremost objective is to ensure optimal exploitation of natural resources in an expeditious manner.
2. **Attracting private investor interest in India's E&P sector:** A large amount of capital investment is needed to maximize exploitation of India's hydrocarbon base. Given the risky nature of the E&P business, the government would like to minimize its capital exposure to exploration activities and attract significant private-sector (domestic and international) investments.



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3. **Extracting fair share from profits:** While making profits is not its foremost objective, the government would like to ensure it gets its fair share of the earnings generated from exploitation of natural resources– in line with the country's prospectivity and the regulatory environment.
4. **Minimizing administrative burden:** Last not but the least, given its recent experience and its limited capacity to get into detailed operational and technical matters pertaining to development of fields, the government would like to limit its extensive involvement in operations of each of the blocks, and reduce administrative burden going forward.

Similarly, discussions with oil companies operating in the country—ranging from private entities to PSUs, domestic to foreign—surfaced four primary objectives which are considered by investors while evaluating E&P investments in any country:

1. **Ability to monetize natural resources:** Investors want to be able to sell the hydrocarbons at market prices, since pricing determines a large part of the project's Net Present Value (NPV). The investors also want to be able to show hydrocarbon reserves in their books, as this drives the company's valuation.
2. **Fiscal stability:** Since the investor puts in the risk capital – based on assumptions concerning fiscal terms of the contract over the project's lifespan –it is critical from the investors' point of view to have predictable and stable fiscal terms over the duration of the contract.
3. **Attractive financial returns vis-à-vis risks:** Investors seek returns which are commensurate to the risks involved in the project. Hence, they look for higher returns in case of deepwater fields or frontier fields, as compared to onshore or shallow-water fields.
4. **Efficient governance mechanism:** An efficient governance mechanism is the key to ensuring efficient development of the field. Any delays impact the cash flows, and hence the returns for an investor.

The first objective is important and a key driver of decision making for the investors. However, further evaluation has not been taken up on this subject, given the current scope of the project (which excludes issues and policies relating to pricing of hydrocarbons).



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3 RECOMMENDATIONS FOR INDIA

Though NELP rounds, starting from 1999, have been successful in attracting investments to a reasonable extent, there is a need for reevaluating the fiscal regime to address investor concerns and meet the stakeholders' objectives as outlined in Chapter 2.

Accordingly, and based on our in-depth study of global practices followed in upstream E&P sector, as well as a robust understanding of objectives and concerns of different stakeholders in India, we have developed recommendations for India's upstream sector focused on three key areas:

- **Contractual structure** – Suitable structure for India, keeping in mind the objectives of the government and investors, as well as the current Indian context and stakeholder concerns.
- **Foundational enablers** – Irrespective of the structure of commercial contracts, it is imperative to strengthen a set of key foundational enablers that are essential for the success of E&P regime.
- **Long-term strategy** – Additionally, there is an urgent need for developing a comprehensive strategy for data collection to improve India's prospectivity, in order to attract international private investments over the long term.

3.1 Contractual structure for India

Following a review of empirical data from across the world, four main fiscal regimes used by oil- and gas-producing countries could be distinguished:

- I. Production sharing contracts (PSC)
- II. Concessions, also called Royalty/ Tax regime
- III. Service agreements
- IV. Joint ventures

Upon detailed evaluation of the four regimes in the Indian context, it is apparent that service agreements and joint ventures are not desirable for India. Service agreements require governments to invest risk capital and thus have been successful only in countries with high prospectivity. They are also less efficient since the operator has little incentive to minimize costs as the operator's compensation is on a cost-plus basis. On the other hand, joint ventures require hydrocarbon ownership to be shared with the oil company, require the government to invest its share of risk capital and put high administrative burden on the government. The two alternative options available



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for India, therefore, are the current regime of Production Sharing Contracts (PSCs) or a Adjusted concession / revenue sharing regime⁴.

As a concept, PSC has inherently attractive features for investors and the government. For the oil companies, PSC entails several attractive features:

- Concept of cost recovery and profit sharing is attractive as it enables companies to recover their investments in exploration and production before profits are shared with the state. This early recovery of costs provides a significant boost to their internal rate of return (IRR), which is an important driver of investment decisions.
- Additionally, PSCs improve the risk-reward trade-off of making investments in India where there is relatively poor perception of prospectivity and limited data available for the vast majority of basins. Under uncertain prospectivity, cost recovery offers investors the guarantee of recovery of capital before profits are shared.
- Last but not the least, in case of marginal or small fields, PSC provide a more rewarding regime for investors than front-loaded, revenue based royalties.

For the Government as well, PSC has attractive features:

- The hydrocarbon title continues to be with the state, and the government is able to exercise control on domestic consumption (which is important for an oil importing country).
- Additionally, participation in Management Committee gives the government operational control in the field development activities and expenses, thus enabling the government to have a considerable influence on key decisions related to prudent practices and expeditious development of fields.

Despite the benefits that the PSCs bring to both parties, the implementation of this fiscal regime has faced many challenges in India's current context (as discussed earlier). These include the huge administrative burden for MoPNG and DGH, cost and time overrun for projects due to delays in clearances and operational decisions, and disputes and impasse in decision making. It is thus clear, that in order to have a successful and dynamic upstream environment in India, changes need to be made in the current contractual structure. Few key changes required relate to ways to promote greater efficiency in decision making, strengthened dispute resolution mechanisms, strengthening of technical capability of government's technical arm – DGH.

⁴ Royalty / tax regime refers to concessionary regime, difference being the ownership of hydrocarbons which are transferred to the oil company in a concession system while in royalty / tax regime, it is retained by the government. In our report this is represented by "Adjusted Concession Regime", with the government retaining the ownership of the hydrocarbons



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On the other hand, concession or tax/ royalty structure has worked well in many countries. Therefore, we analyzed four alternative models for India's future upstream regime:

1. **Production Sharing Contracts (status quo)** – refers to the current PSC contractual structure with its existing governance processes and institutions
2. **Adjusted PSC regime** – refers to the current PSC regime with some changes to the contract structure, some new terms to attract more investments (refer to section 4.2 for details on the suggested improvements), as well as all the foundational enablers implemented (refer to section 3.2 for details on the recommended foundational enablers)
 - a. Improvements in structure – including introduction of graded penalty clause, clarity on contractual gray areas.
 - b. New terms, including appropriate provisions, to attract investments in frontier blocks, as well as clarity on extensions.
3. **'Classical' concession regime** – refers to the classical concession system with fixed (typically ad valorem) royalty and taxes. By its very nature, this system eliminates the need for cost audits and budget approvals by the government and thus significantly reduces the administrative burden on the government. However, this system does suffer from perception of lack of fiscal stability by investors, given experience around the world that government in countries with concession systems often change fiscal terms over time (due to changing oil prices) when they feel they are getting small share of revenues generated.
4. **Adjusted concession regime** – refers to the classical concession system with the few modifications to the fiscal terms to ensure that the terms are stable and transparent upfront. Additionally, all the foundational enablers are implemented (section 3.2).
 - a. Royalty is not fixed but varies based on production (could be incremental production or cumulative production). Such a regime ensures increased government take as the production increases.
 - b. High price participation – This is a term that refers to additional government take in case the oil price rises beyond a predefined threshold. An introduction of this provision minimizes the incentive for the government to raise taxes in case of windfall gains in times of increasing oil prices.

In order to decide the preferred regime for the future, we evaluated each of these regimes with respect to the objectives of the government and of investors (Exhibit 3.1). Adjusted PSC is more attractive than the current PSC regime due to the efficiency of the governance mechanism and operational flexibility for the operators. Similarly, adjusted concession regime offers advantages over the classical concession structure with respect to fiscal stability. Thus, the two regimes –adjusted PSC and adjusted concession regime – are equally favorable for the stakeholders. However, adjusted concession regime reduces the government's administrative burden and also provides higher

operational flexibility to the oil company. Given that the adjusted concession regime meets these two key objectives better (than the adjusted PSC regime); we found it to be preferred option for India going forward.

Adjusted PSC and royalty-tax regime are equally attractive however, royalty-tax has low administrative burden

Objectives and boundary conditions		PSC (status quo)	PSC (adjusted) ¹	Classical Concession	Concession (adjusted) ² ✓
Govt. objectives	• Fair government revenue share	<i>Balanced govt share can be engineered in any regime</i>			
	• Attract Investor Interest / minimize risk capital				
	• Minimize government administrative burden				
	• Incentivize effective E&P				
Investor objectives	• Stable and predictable fiscal regime				
	• Attractive fiscal terms	<i>Balanced operator share can be engineered in any regime</i>			
	• Efficient governance mechanism				
	• Operational flexibility				
Overall	• Overall attractiveness for India				

Exhibit 3.1: Comparison of different regimes on government and investor objectives

3.2 Foundational enablers for India's upstream regime

While the concession regime is expected to help reduce the government’s administrative burden and provide the desired operational flexibility to the oil companies, key foundational enablers still need to be put in place in order for the proposed concession regime to work effectively in India. These enablers are intended to expedite the E&P activities, streamline associated processes and create an improved investment environment for the oil companies. The four key foundational enablers are:

- Ensure timely and smooth clearances
- Strengthen the capacity and capability of DGH
- Bolster dispute settlement provisions
- Institute web-based workflow for greater transparency and accountability

The following sections explain in detail the current context of the issue being discussed, best practices observed in other countries and recommendations for each of these four enablers.

3.2.1 Ensure timely and smooth clearances

As discussed in Chapter 2, delays in obtaining licenses and clearances from a number of ministries have become a key issue in India's upstream regime.

International best practices suggest that the time between the awarding of the contract and the signing of the Exploration License typically ranges between three months to a year⁵. Best practices with regard to smooth clearances for energy blocks include:

- Preconsultation between the regulator and respective ministries before blocks are tendered (e.g. Norway, Columbia).
- Structured environmental impact assessments: In Norway, the Ministry has taken the responsibility for environmental impact assessments prior to opening of new areas for petroleum activities. The ministry submits the assessment, as well as potential ways of addressing the issues, for consultation to the concerned authorities and also makes the proposed program available to the public on the Internet.
- Informal interaction forum for industry representatives and ministries: In Columbia, there is an informal forum organized between industry representatives and the relevant ministries to address technical questions and remove bottlenecks associated with key issues.

Recommendations:

1. Create an inter-ministerial committee to provide “in-principle” approval for the nominated blocks before the process of bidding and tendering

The inter-ministerial committee could have representation from DGH, MoPNG and other concerned ministries (Defense, Environment and Forests, etc.), as well as relevant state governments. The process of "in-principle" approval can be facilitated by environment impact assessment studies conducted prior to opening of new areas for license rounds. The requirements for conducting impact assessment should be made very clear and structured upfront so that no requirements which may cause delay later are missed or ignored. Only blocks that have received "pre-approval" would be put up for bidding in license rounds by DGH. Upon awarding of the block to the winning party, the granting of the actual exploration license or lease would hence be a quick and efficient process.

2. Impose strict timelines for granting of exploration and mining licenses, following the signing of contract and submission of field development plan respectively

Following the constitution and smooth functioning of the inter-ministerial committee, the government should define strict timelines for granting of Petroleum Exploration License (PEL)

⁵ Source: industry interviews



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and Mining Lease (ML), a delay beyond which would be considered as an excusable delay for the operator. The specified timeline is the aggregate timeline (say, 90 days) within which the approval needs to be granted. Such aggregate timeline would include the time required for evaluation of the application, request for additional information, queries and clarification of these queries. Define a shorter timeline within the above time frame (say, 30 days) to raise and resolve all the queries and clarifications by the government or the oil company. This will ensure that queries cannot be raised at the last minute and will ensure sanctity of the aggregate timelines.

3.2.2 Strengthen the capacity and capability of DGH

The PSC regime puts significant administrative burden on the government. The adjusted concession regime reduces the role of the state and DGH in the monitoring and administration of the operations and also removes the onerous burden of cost audit and approval. Nevertheless, DGH will continue to play an important part in reviewing and approving key milestones—including the annual work program, appraisal programs, declarations of discovery, development and production plans, proposals for relinquishment, abandonment plans, etc. DGH, therefore, needs to be strengthened in order for it to play its role effectively in the Indian context.

Recommendations:

1. **Enhance the capacity of DGH through increased staffing:** The strength of DGH needs to be enhanced, keeping in mind the current and desired levels of E&P activity in India. As a case in point, Malaysia has a near 400-strong regulator (Petronas Carigali)⁶ to oversee a PSC regime with about 80 contracts.
2. **Make DGH appointments permanent to ensure institution building:** It is recommended at least a part of DGH strength be made on permanent appointment. This will enable systematic training and grooming of DGH staff, and ensure higher motivation and productivity. Structured career paths will need to be defined for talent management and retention.
3. **Strengthen training curriculum for DGH staff:** A structured training curriculum, including technical and managerial topics, needs to be developed for DGH personnel. Some best practices that can be adopted into the Indian context include mandating knowledge transfer from the operators to DGH staff and sending personnel on training to international oil companies.
4. **Enable DGH to hire international experts (as required) on contractual basis:** In the past, DGH has sought partnerships with several international agencies such as U.S. Department of Energy, Norwegian Petroleum Directorate and Alberta Research Council of Canada for

⁶ Based on discussion with the Malaysian regulators



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various projects. For example, DGH signed a memorandum of understanding (MoU) with NPD in 2005 to establish a system for National Data Repository (NDR), resource estimation and electronic management of resources. DGH can potentially benefit from actively leveraging its existing partnerships, and adding relevant partners in a seamless manner on need basis.

3.2.3 Bolster dispute resolution provisions

While PSC is considered to be a comprehensive and well-written contract, it is impossible to define every clause precisely and specifically enough to take care of each individual field case and scenario. Even in an adjusted concession regime, the need for a strong dispute resolution process cannot be undermined. In this context, oil companies and other stakeholders have clearly emphasized the urgent need to strengthen the overall dispute resolution mechanisms and provisions.

Recommendations:

- **Enable use of existing “sole expert” clause more effectively:** Discussions with key stakeholders indicate that the existing “sole expert” clause is not used often today as the concerned parties typically cannot agree on the sole expert. Interactions with legal experts suggest that a set of independent internationally renowned oil experts / institutions (say, a group of 10) should be prequalified by the government to enable reaching a quick decision by both parties. In the event of a conflict, where both sides need to agree on a sole expert, one party can shortlist three experts from the pre-qualified list and the other party can select one from the shortlisted three.
- **Strengthen dispute settlement by creating a standing tribunal in addition to current arbitration mechanism:** The government can consider creating an independent standing E&P Dispute Settlement and Appellate Tribunal (DSAT)—comprising a panel of dedicated senior officials—that would adjudicate between the state and oil company to resolve disputes which cannot be settled through sole expert. This tribunal, if constituted, should be given appropriate legal powers – with its judgment being binding, and subject to appeal only in the Supreme Court.
- **Define clear roles, responsibilities and KPIs for each upstream institution:** It is recommended that the roles, responsibilities and objectives of each institutional entity (including both MoPNG and DGH separately) be clearly defined and monitored through transparent and measurable key performance indicators (KPIs). Processes to monitor performance periodically against the KPIs will need to be subsequently defined specifically.



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3.2.4 Institute web-based workflow for greater transparency and accountability

In the current regime, a number of approvals and clearances are needed to carry out successful exploration and production of hydrocarbons which add to delays in progress of different activities. As governments in different countries are moving toward a streamlined interface for the workflow, they have been successful in improving efficiency and managing the amount of information.

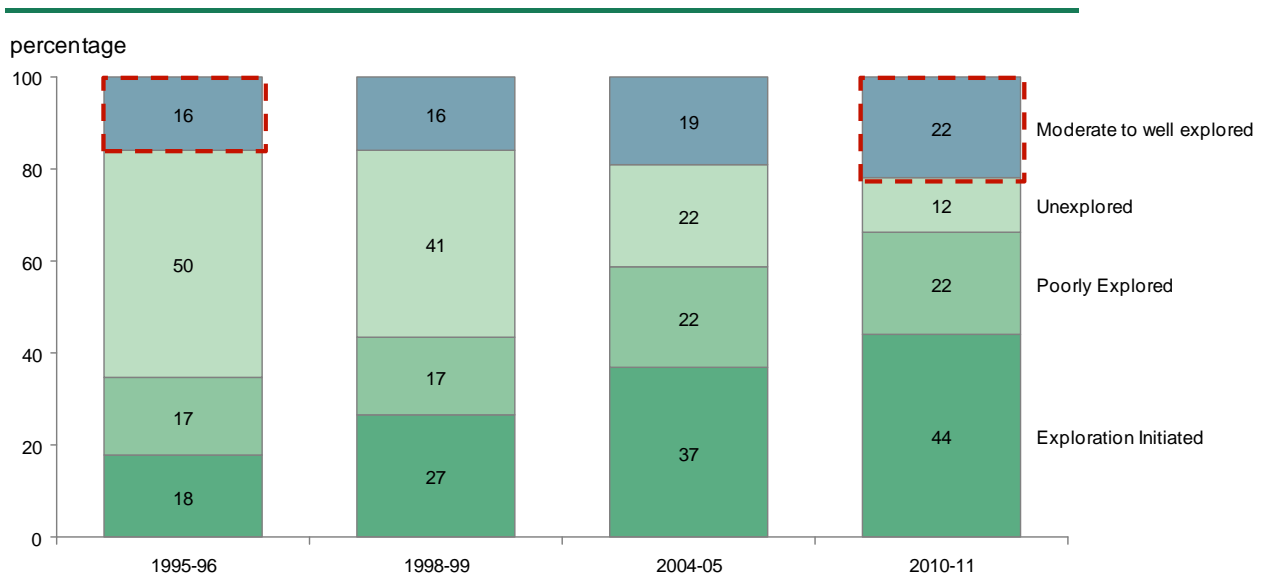
Recommendations:

1. **Create a web-based workflow system to facilitate overall process:** In the interest of efficiency and transparency, it is recommended that an automated workflow system be designed and implemented. This IT system should be used for ensuring smooth functioning of meetings and approvals, and could have features including scheduling of meetings, agenda sharing prior to the meetings, capturing of the meetings' minutes and electronic approvals of the minutes. The system will enable accurate and effective monitoring of the timelines for different activities, and create transparency and reduce scope of conflict on these issues.
2. **Use the IT system for submitting and tracking applications for approvals:** The automation could also facilitate the process of submitting applications for and providing approvals—through implementation of IT-enabled comprehensive “checklists” prior to application submission and structured requests for additional information during approval process and for tracking status post submission.

3.3 Comprehensive strategy for data collection for unexplored basins

DGH, which maintains the National Data Repository (NDR) for India, is responsible for collecting, archiving and sharing the E&P data for the country. As per the Petroleum and Natural Gas (amendment) Rules, 2006, every E&P operator in India is obliged to provide all data elements pertaining to the entire E&P value chain to the government. There are 26 basins in India comprising roughly 3.14 million square kilometer of area and according to the DGH activity report, 2011, only about 22 percent of the basinal area is well explored—up marginally from 16 percent in 1996.

India, Change in Level of Exploration, 1995-2011



Well-explored area has increased marginally from 16% in 1995-96 to 22% in 2010-11

Exhibit 3.2: India's exploration profile

There appears to be a broad consensus that India needs to move toward Open Acreage License Policy (OALP), which is effective in improving the data availability and also attractive for oil companies bidding for blocks. Under OALP, the oil companies would be allowed to choose the blocks for exploration of oil and gas at any time of the year, as opposed to the NELP regime wherein they have to wait for certain blocks to be offered in a bidding round. As the interest in NELP rounds has started declining since NELP VI, oil companies in India have welcomed OALP which was announced as early as 2007 by the DGH. It is widely believed that OALP is not yet feasible due to lack of sufficient data. While there is a gradual move toward digitization and standardization of the data, this may need to be accelerated to enable development of a more effective NDR.

In Colombia, oil companies have successfully used Technical Evaluation Agreement (TEA), which allows them to choose a block and perform exploration on a first-come-first-serve-basis. This was made possible despite the lack of a complete NDR. Colombia used a deliberate strategy to acquire data systematically in parallel with awarding TEAs to the oil companies. This strategy was made possible due to a grant of \$1 billion to National Agency for Hydrocarbons, ANH, to build a state-of-the-art system in a 20 year timeframe. A centralized and robust IT infrastructure and system allows ANH to archive, organize and share the geological data available.



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Recommendations:

1. **Create a comprehensive 10-year strategy for data collection funded by government:**
The government should formulate a comprehensive strategy for capturing data in a sequential manner, given the vast unexplored basins and the urgent need to enrich data for India's basins. The comprehensive exploration strategy should be developed in consultation with top geological institutions in India, in order to include and encourage new methods for data gathering and interpretation.
 - **Adopt a sequential and structured data collection strategy:** The data collection process should start with lower-cost regional data that allows broad interpretation of geology (e.g. remote methods such as gravimetry and magnetometry), and gradually move toward localized data including core sampling. Overall, data may be statistically or geologically sampled in smaller grids, rather than undertaking a full coverage, to optimize the costs and accelerate the collection of preliminary data. The data collection exercise should be outsourced to top oil services companies based on competitive bidding.
 - **Build best-in-class infrastructure for data storage and access:** All existing and new data must be stored in a digital format that is commonly accepted internationally. The data must also be made available for access through a centralized Web-based interface. A fee may be charged to all the oil companies to cover the operating costs of the NDR.
2. **Subsequently, or even simultaneously, launch Open Acreage Licensing Policy (OALP) to encourage operating companies to conduct technical studies and gather geological data**

Based on the experiences of other countries, it is recommended that the government move to OALP even simultaneously. A few general principles for the implementation of the policy are mentioned below:

- **Attract private oil companies for technical evaluation agreements through an attractive regime:** Allow oil companies to select the acreage based on available data at NDR (the data can be shared for a commercial fee), or speculative data. The government should specify the minimum and maximum size of the blocks that can be nominated. MoPNG could form an agreement with the operator, based on a first-come-first-serve basis. The agreement should specify timelines (could be 2 years, extendable by 1 year, subject to delay penalties or commitment of additional work program). On completion of these technical agreements, the government may farm out the blocks on a competitive basis. However, the operator who conducted the technical evaluation may be given the first right of refusal by matching the successful bid.
- **Ensure enrichment of the data repository:** In the interest of the government, the oil company conducting technical evaluation should be required to submit all collected data to DGH.

4 APPENDIX

4.1 Appendix 1: Country selection criteria

In order to ensure that the insights drawn from international examples are pertinent to India, countries having aspects relevant to India's context were selected. The country selection approach took into consideration three criteria:

- Extent to which the country has been able to attract investments in exploration.
- Extent to which the country has had exploration success (indicated by increase in reserves).
- Extent to which the country has been able to increase production.

Countries will be selected based on two distinct factors ...

- A** Relative success in achieving government objectives with policy and fiscal regime
- B** Special cases that are particularly interesting to study
 - Countries that have a "classical" system, representative of a particular regime
 - Countries that have an innovative policy structure and process, with elements of potential interest for India
 - Cases of failure, where the lessons to learn are paramount

For the first factor, countries were ranked based on three distinct measures of success ...

Criterion	Description	Metrics
1 Attracting investments	<ul style="list-style-type: none"> • Extent to which country has been able to attract Capex into exploration, relative to the prospectivity of its resources 	<ul style="list-style-type: none"> • (Total Upstream Capex 2000–2011)/ Yet-to-Find potential
2 Increase reserves	<ul style="list-style-type: none"> • Extent to which country has been able to increase its contingent resources, relative to its historical resource levels 	<ul style="list-style-type: none"> • Addition in Resources (2000–2011)/Resource Base in 2000
3 Increase production	<ul style="list-style-type: none"> • Extent to which country has been able to increase its production levels 	<ul style="list-style-type: none"> • Change in O&G production (2011–2000)/Production levels in 2000

Exhibit 4.1 Country selection framework

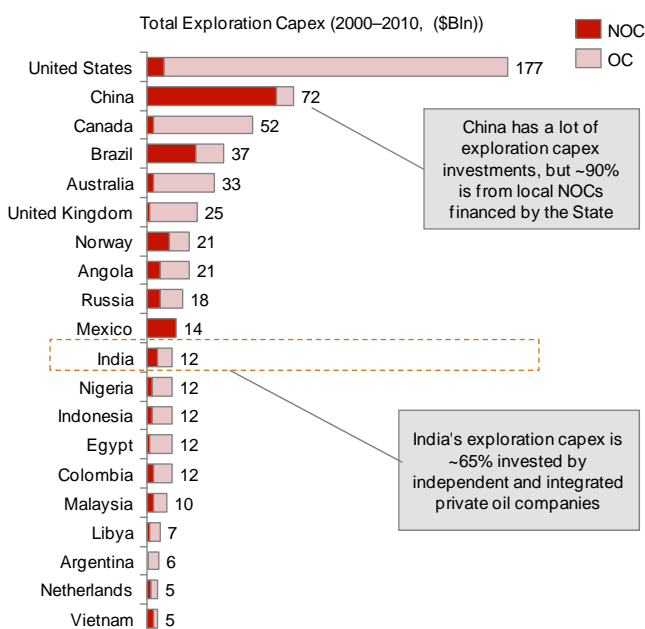
Criterion 1: Attracting investments

The level of exploration-related investments that a country has attracted needs to be put into perspective vis-à-vis its prospectivity. Moreover, it is important to keep in mind that in a number of countries, most of the investment comes from state-owned National Oil Companies; hence the level

of exploration-linked capital expenditure is not fully representative of the extent of success a country has had in attracting private sector investments.

In order to arrive at a more objective measure of a country's relative success in attracting exploration capex, the level of exploration capex from *private* operating companies was normalized relative to the country's level of Yet-to-Find potential. Accordingly, the nations were ranked (Exhibit 4.2).

Invested exploration capex differs widely; in countries like China, Brazil and Mexico mainly driven by NOC spend



In terms of attracting IOC capital investments relative to size of potential reserves in place, UK, Egypt and Colombia have been most successful

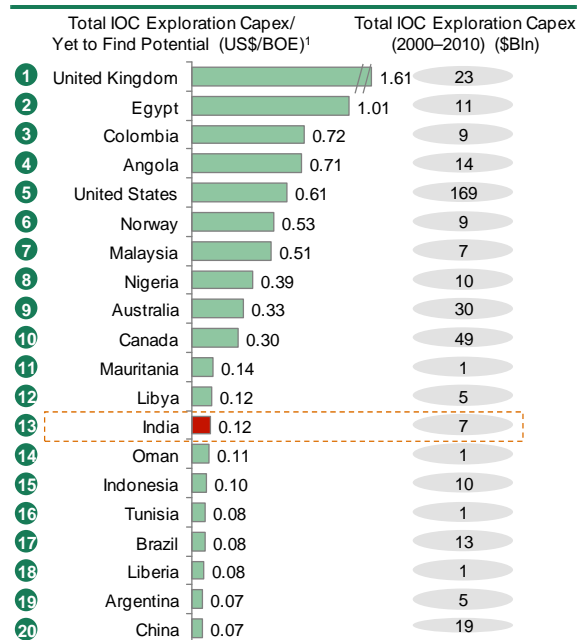
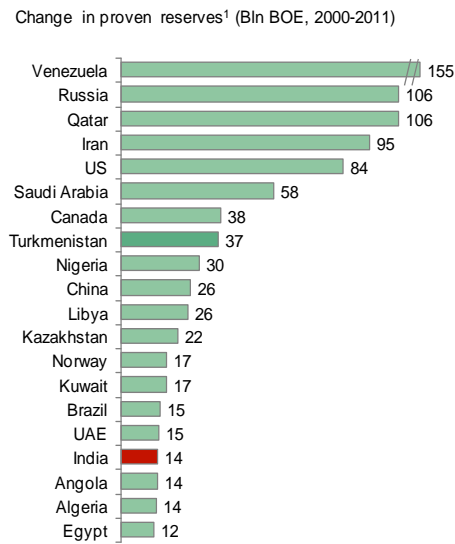


Exhibit 4.2: Top 20 most successful countries in attracting exploration capex

Criterion 2: Increase in reserves

For this criterion, it is important to take into account the ease of reserve discovery in countries with high prospectivity. Hence, our selection of countries was filtered, with the change in proven reserves relative to existing reserves being used as a ranking metric (Exhibit 4.3).

Some of the world's largest reserve holders rank highest in new reserve additions....



... but looking at new additions relative to existing potential places countries like Sudan, Equatorial Guinea and Vietnam as the most successful

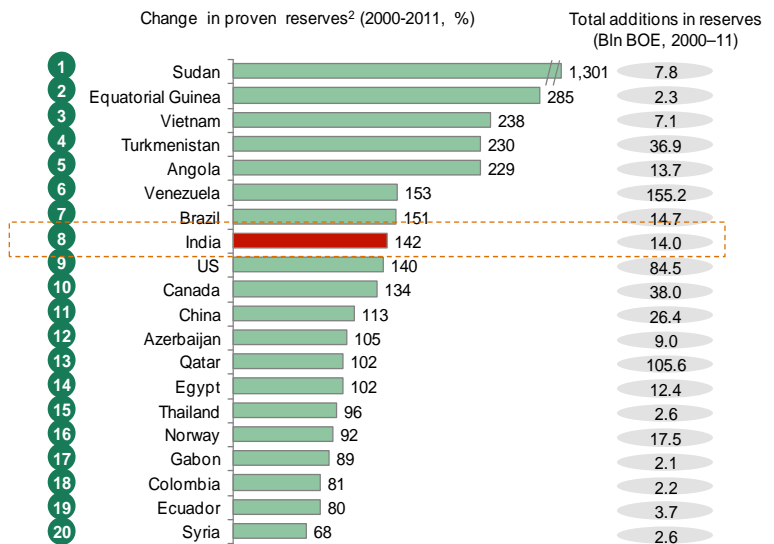


Exhibit 4.3: Top 20 successful countries in increasing hydrocarbon reserves

Criterion 3: Increase in production

Finally, the countries were ranked according to their relative success in expanding production over the past decade. Taking into account their starting base, the nations were rated based on the percentage change in production between 2000 and 2011 (Exhibit 4.4).

Production success

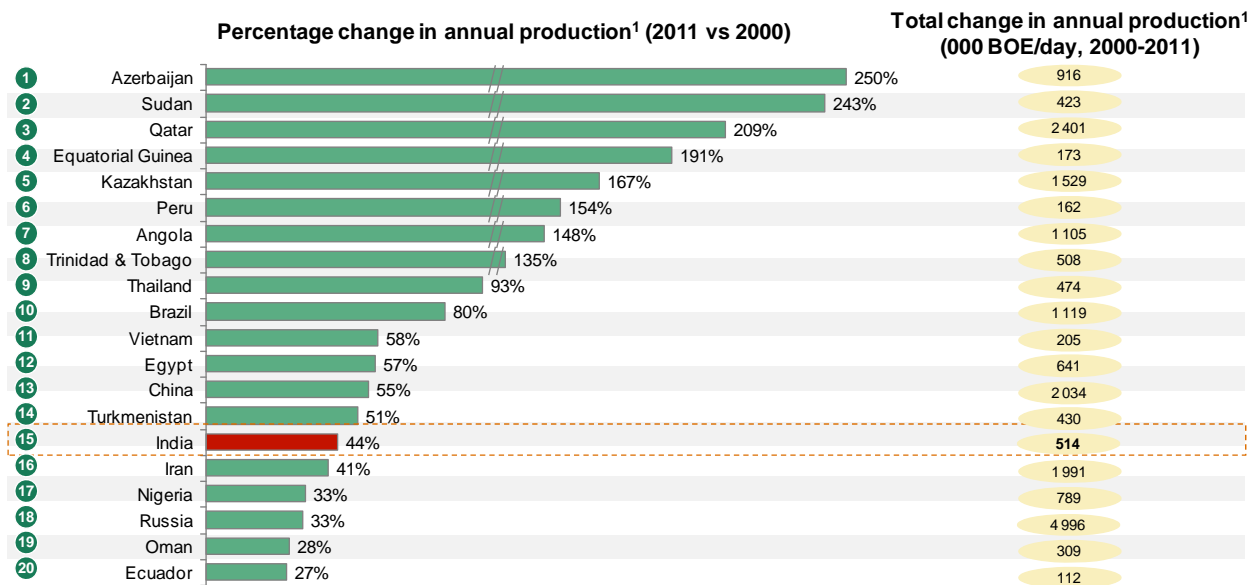


Exhibit 4.4: Top 20 successful countries in increasing production

Finally, the countries were ranked based on the total score across these three criteria, with Angola, Egypt, Nigeria, Brazil and China emerging as the top 5 nations and making it to the shortlist for our comparative exercise.

Selected top 5 successful countries
 Selected special cases

Score Based on Ranking

		Attraction of capex	Addition of reserves	Increase in production	Total score
1	Angola	4	18	7	29
2	Egypt	2	20	12	34
3	Nigeria	8	9	17	34
4	Brazil	17	15	10	42
5	China	20	10	13	43
6	Kazakhstan	26	12	5	43
7	Canada	10	7	28	45
8	India	13	17	15	45
9	Libya	12	11	22	45
10	USA	5	9	34	48
11	Azerbaijan	24	24	1	49
12	Norway	6	13	35	54
13	Malaysia	7	26	21	54
14	Australia	9	23	24	56
15	Oman	14	33	19	66
16	Colombia	3	38	29	70
17	Algeria	23	19	30	72
18	UK	1	28	48	77
19	Indonesia	15	21	41	77
20	Argentina	19	34	39	92

Exhibit 4.5: Final country selection based on aggregate scores across three parameters

Our list also included a select few countries that are either internationally recognized as being 'classical' examples of particular policy regimes (e.g. Indonesia and Malaysia for PSCs, and U.S. and Norway for concessions), or are recognized for their unique or innovative policy features (e.g., Colombia). Moreover, we studied some cases of policy implementation failures to get learnings on policy features which have been challenging to implement.

4.2 Topics covered in the study of regimes in selected countries

An in-depth study was conducted on the regimes prevalent in the afore-mentioned countries to understand the context of their oil & gas sectors, the objectives of respective governments, and the policy frameworks (refer to Appendix 4.3 for details).

4.2.1 Context

The level of macroeconomic data and the prospectivity and dependence of a country on hydrocarbon imports were among the elements examined with regard to the country's oil & gas

sector, since these factors influence the fiscal terms and the policy regime, as well as the strength of oil and gas industry (especially the National Oil Company).

Exhibit 4.6 outlines an overview of the contextual factors for the selected countries (PSC- and Concession-regime based). The next chapters will describe the learnings from a comparison of these countries' individual characteristics and local contexts, leading to their respective policy architectures. The discussion will focus on two important policy choices that each country has had to make—the level of government intake and the chosen oil policy regime.

	Characteristics	Colombia	Norway	Brazil	US-GoM	Angola
Success Parameters	Fiscal Regime	Concession	Concession	Concession and PSC	Concession	Concession, PSC and JV
	Government Take ²	82%	79%	72%	64% ¹	78%
	Exploration Capex ³ (bn USD)	12	21	37	177	21
	Production Rate, 2010 (mm BOE/d)	1.0	3.9	2.4	2.7	1.8
	Change in Production, 2000-2010	0.06	-0.05	1.12	-0.94	1.1
Energy landscape	Actual prospectivity					
	• Total resource base (Bln BOE)	7	35	60	54	18
	• Total yet-to-find potential	12	17	160	12	20
	• Share of offshore resources	7%	100%	94%	100%	90%
	NOC activity					
	• Name of NOC	EcoPetrol	Statoil	Petrobras	-	Sonangol
	• Share of NOCs in investments	27%	55%	65%	-	31%
• Technical and financial strength				-		
Self-sufficiency	Exporter	Exporter	Gas: Importer Oil: Exporter	Importer	Exporter	
Regulatory structure	HC ownership state retained	✓	✗	✗	✗	✓
	Freedom to monetize by OC					
	• Freedom of international sales	✓	✓	✓	✓	✓
	• Free market price	✓	✓	✓	✓	✓

	Characteristics	India	China	Malaysia	Indonesia	Nigeria
Success Parameters	Fiscal Regime	PSC	PSC	PSC	PSC	PSC
	Government Take ¹	56% ³	80%	93%	82%	N/A
	Exploration Capex ² (bn USD)	13	72	10	12	12
	Production Rate, 2010 (mm BOE/d)	1.7	5.7	1.8	0.9	1.1
	Change in Production, 2000-2010	0.51	2.03	0.40	-0.07	0.16
Energy landscape	Actual prospectivity					
	• Total resource base (Bln BOE)	13	71	18	34	50
	• Total yet-to-find potential	56	130	14	103	25
	• Share of offshore resources	72%	90%	100%	71%	53%
	NOC activity		CNPC, Sinopec, CNOOC	Petronas	Pertamina	NNPC
	• Name of NOC	ONGC, OIL				
	• Share of NOCs in investments	64%	91%	30%	17%	33%
• Technical and financial strength						
Self-sufficiency	Importer	Importer	Exporter	Gas: Importer Oil: Exporter	Exporter	
Regulatory structure	HC ownership state retained	✓	✓	✓	✓	✓
	Freedom to monetize by OC					
	• Freedom of international sales	✗	✓	✓ ⁴	✗	✓
	• Free market price	✗ Gas ✓ Oil	✓	✓	✗	✓

Exhibit 4.6: Contextual background of countries selected

4.2.2 Government objectives

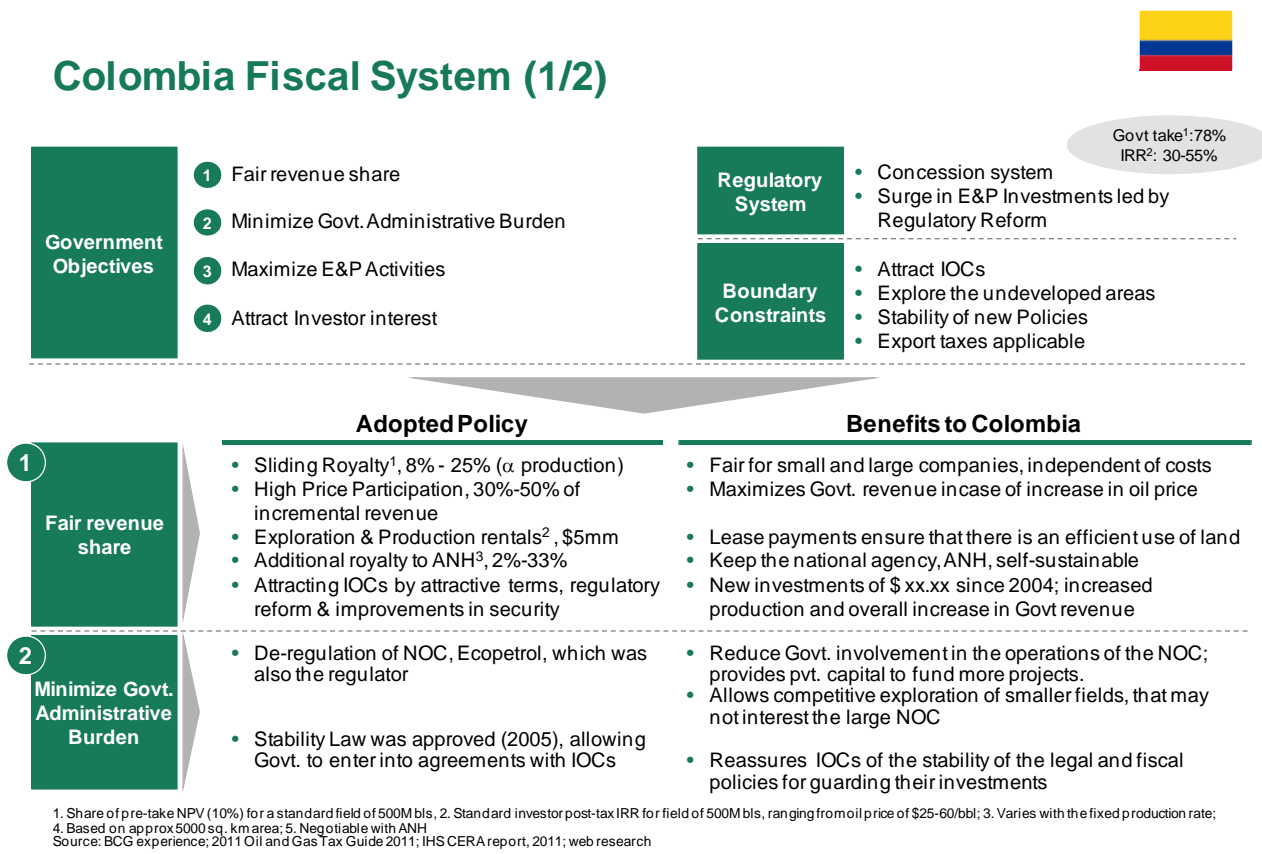
With this contextual background, the objectives of the government in each of the countries were identified. For example, in the case of Columbia, official goals include building national wealth, minimizing government involvement in operations, maximizing acreage utilization, and ensuring self-sufficiency. On the other hand, the objectives for the Malaysian government include ensuring fair investor return, retaining control over production, maximizing production, and encouraging the development of local industry.

4.2.3 Policies adopted

We studied in detail the fiscal regime and specific fiscal terms adopted in contractual agreements across different countries—including the level of royalties, whether sliding-scale or not, the amount of taxation, cost recovery ceiling, investment credit, profit sharing, excess profit payments, cess, etc. In addition to understanding fiscal terms, we looked at other policies aimed at incentivizing E&P activities—e.g. special incentives for small and marginal fields, standards for meeting health and safety requirements, measures to build local industry capabilities (training requirements, mandatory

participation of National Oil Company and so on), and means and processes for government involvement in operational E&P activities (role of government, level of involvement).

As an example, a country profile is attached below.





Colombia Fiscal System (2/2)

	Adopted Policy	Benefits to Colombia
<p>3</p> <p>Maximize E&P Activities</p>	<ul style="list-style-type: none"> New licensing procedure for assignment of blocks: <ul style="list-style-type: none"> Separate licensing for rounds & tenders, relinquished areas and free areas; Selection based only technical capabilities and work proposal; Established new contract schemes for technical evaluation agreement (TEA) Building an advanced NDR system called EPIS with large investments to build a comprehensive and centralized data base 	<ul style="list-style-type: none"> Encourages E&P to maximize recovery. Allocates the fields based on company's technical and financial capability. Set process for relinquished areas ensure a thorough analysis of resource potential in the acreage Selection criteria is not based on the fiscal terms but on the maximal resource extraction. Financial terms are negotiated after the selection Encourages exploration and data gathering at no cost to the Govt. OC gets preferential treatment for the E&P Provides transparent and quick information to all investors to ensure a healthy competition and application of best technology
<p>4</p> <p>Attract Investor Interest</p>	<ul style="list-style-type: none"> Match production to meet the growing consumption needs of the country Incentives for exploration in the undeveloped areas via E&P contracts or TEA 	<ul style="list-style-type: none"> Domestic production diminished the reliance on the petroleum imports; Colombia started to export oil in 2010 Accelerates the creation of database of reserves, which upon finding resources help in making Colombia an attractive destination for more investments Promotes competition by encouraging participation

Source: BCG experience; 2011 Oil and Gas Tax Guide 2011; web research

Exhibit 4.7: Colombia profile

4.3 Appendix 2: Improvements to PSC (Adjusted PSCs)

As discussed in the section 3 of the main report, the preferred option for India, given the current context, is the adjusted concession regime. In each contractual structure, India should implement the foundational enablers discussed in Section 3.2 of the report.

In addition, if the country were to continue with PSC regime, a few changes are needed in contractual structure, terms and provisions of the contract. These include the following:

- Introduce mechanism of graded penalties
- Create provisions to minimize grey areas in the contract structure
- Create provision for some flexibility in completing the work program



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4.3.1 Introduce mechanism of graded penalties

Under the current PSC structure, there are a limited number of penalties for delay or non-completion of work program. In case of non-completion of the Minimum Work Program (MWP) within the exploration period, there is a provision for imposing liquidated damages commensurate with the amount of unfinished work (which amounts to abandoning further exploration and paying penalty to the tune of unfinished work); however this no clear provision for continuing the exploration beyond the exploration period – in case the contractor has reasons to explore further but has got delayed.

Practically, most operators request for extensions at the end of exploration period, if MWP is not completed within the timeframe. While the new extension policy now provides clarity and regulatory framework for operators seeking extensions, there are no deterrents or penalties for seeking extensions.

Looking at other countries for practices relating to delays and penalties, it is observed that escalating area rentals is a common form of imposing penalties if the operator does not complete the work program during the agreed period. This has been used by the regulator in U.S. Gulf of Mexico where the area rentals (varying from \$1,750 to \$7,000 per square kilometer) escalate by 100 percent of the original rent annually after the end of exploration period. Brazil, too, uses a similar approach in case of an extension. The annual rent (which ranges from \$14 to \$62 per square kilometer) escalates to 9 times as much during the production phase, and doubles in case an extension is requested for during any phase.

Recommendations:

1. Introduce graded penalties for delays in completing MWP

It is recommended that a graded penalty provision be introduced to enable an extension of the exploration period, while creating deterrent for delays and minimizing potential of misusing the extensions. The penalties should be high enough to act as a deterrent, but not excessive that can prove fatal for project economics.

In case of non- completion of MWP within the exploration period, if the operator intends to continue exploration, a provision should be created to allow the operator to do so (subject to MC approval) but not without payment of delay penalty (which may be equivalent to a percentage of uncompleted work value). The penalty should, in principle, serve as a deterrent for the operators who may bid unrealistically to win the contract.

Scenario 2: Operator intends to end exploration – Operator must have the option of applying for termination of lease, subject to MC approval, in which case liquidated damages would apply. Following termination, the operator would be required to relinquish all the area and perform restoration of the site.



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2. **Introduce high penalties for HSE (health, safety and environment) damages and violations**

Stricter penalties must be levied on upstream companies for any violations or damages caused by their E&P activities on HSE aspects. A provision should be created to impose fines on the operators in a transparent and consistent manner; and penalties should be increasingly higher for repeat offenders. The specific policy and implementation details will need to be worked out subsequently by the government.

4.3.2 **Create provisions to minimize certain grey areas in the contract**

Some of the terms in the clauses of the PSC are not defined precisely, leaving them open to interpretation. Few examples of areas where there could be different interpretation by the operator and the government include:

1. **Zero Day:** The “zero day” describing the start day for a certain timeline is sometimes not clearly defined. For example, in the PSC model, the contractor is required to submit a comprehensive development plan “within 200 days from the declaration of Discovery as Commercial Discovery.” It is ambiguous as to when the commercial discovery is declared—while some could interpret it as the date of MC review, others might define it as the date of signature of the MC on the minutes after the review.
2. **Pre-development activities:** After the contractor has received the declaration of discovery as a commercial discovery, a comprehensive development plan is required to be submitted with 200 days. This pre-development activity needs to be done before the Mining Lease is obtained. However, there is no provision for the contractor to claim the costs of the work done during this phase.

Recommendations:

In order to minimize the administrative burden on the government for resolving conflicts, the terms of the contract must be specified precisely to the extent possible. Recommendations on a few examples which were brought up in discussions with the operators are given below:

1. **Define precisely the zero day starting point for timelines in the PSC**

The zero day starting point for timelines should be defined specifically and unambiguously (e.g., “Contractor to submit plan within 200 days of the date of the signature of the MC on the minutes of the review meeting”).

2. **Create provision for allowing cost recovery for pre-development activities**

The cost of pre-development activities, which involve all the requisite work prior to submission of the comprehensive development plan, should be clearly stated as recoverable subject to MC approval.

4.3.3 Create provision for some flexibility in completion of MWP

Contractor has to complete the MWP within the duration of the timeframe specified for exploration period. This MWP specifies the number of wells, depth of wells, 2D seismic data and 3D seismic data. In discussions with several operators, they claim DGH has been too rigid in the interpretation of completion of MWPs despite compelling geological evidence suggesting an absence of hydrocarbons in the concerned blocks.

This situation presents a challenge for the government. While it is desirable to allow the operators some flexibility to drill wells according to their best technical expertise in order to maximize chances of discovery, the government also needs to make sure that there is adequate pressure on contractors who won the bids on the basis of MWP commitments, complete the work program (this is important to prevent frivolous bids and ensure expeditious development of the fields).

Recommendations:

It is recommended that the operators be allowed some operational flexibility in completing the MWP in special cases, based on the technical data being presented, while insisting that

1. Create provision to allow contractors to pay the value of unfinished work in case there is strong geological evidence against completing the MWP as defined

In case there is strong geological evidence to suggest that completing the MWP (e.g., digging a well to the depth defined) is not prudent, the government can create a provision to allow the contractor to pay for the unfinished work. The value of the unfinished work can be determined based on the new policy unveiled in 2006 for determining the unfinished work. In case of a disagreement between the operator and DGH on the geological evidence, either party can invoke the sole expert clause to get expert advice on the suitability of drilling up to specific depths.

4.3.4 Incentives for frontier areas

In the current PSC model, a frontier Area is defined as “any area identified, demarcated and so notified by the government or its authorized agency(ies) for the purpose of exploration and exploitation of Oil and Gas, which is logistically and technically difficult and lacks infrastructural and/or marketing facilities, etc.”

In our view, so-called “*logistically challenging frontier areas*”—suffering from inadequate infrastructure or security (due to threat of militants)—should be treated separately from “*technically challenging frontier areas*” that may be ultra deep water, or lack geological data, or require cutting-edge technologies. For instance, the geology of the Ganga basin and the Deccan basin can only be explored using the latest technology that was not available until a few years ago.

Various other regimes offer fiscal incentives to explore in frontier areas. A country can reap several benefits by appropriately incentivizing the development of frontier areas. Apart from increasing



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exploration and production of hydrocarbons, such incentives result in development of advanced capabilities in the industry, and also lead to creation of local jobs in areas which generally are devoid of opportunities. Norway follows a practice of discretionary licenses, wherein operators with the best technical skills are awarded blocks in geologically challenging areas. In other regimes such as Colombia and Indonesia, fiscal terms are made more favorable for the operators bidding for the frontier areas. The regulator in U.S. Gulf of Mexico used to offer a relief in royalty for deepwater and ultra-deepwater exploration before the region was determined to be prospective.

Recommendations:

1. Create special incentive package for “technically challenging frontier areas”

Exploration should be encouraged in “technically challenging frontier areas” by offering special incentives for exploration and development. The blocks in such areas must be offered after adequate evaluation of the technical capabilities of the bidding company. Companies with technically advanced capabilities should be invited for exploration, and offered special fiscal incentives such as tax holidays or discount on royalties on production of crude oil and gas. Exploration period should also be extendable for a fixed duration in order to allow for comprehensive exploration. Extensions for exploration must be considered in special cases, keeping in mind the overall objectives for encouraging exploration in frontier areas. Finally, flexibility in MWP, as discussed earlier, is especially important for frontier areas, and oil companies may be provided the flexibility in exploration activities for such blocks.

To build and develop a mature E&P industry, there should be a greater involvement of DGH in gaining knowledge from the technically advanced operators to enable development of local talent within the local industry and the regulator.

4.3.5 Provision for extension of production beyond production period

An operator secures a Mining Lease (ML), typically for 20 to 25 years, after getting approval for its comprehensive development plan for the discovery area. The PSC model has a provision for extension of the ML for 5 years, based on mutual agreement of all concerned parties. Such extensions are generally requested on the basis of balance recoverable reserve and remaining economic life of the field. In case the field is producing non-associated natural gas, the extensions are granted for a period of 10 years.

In Colombia, the extensions for production are granted automatically for all fields that are producing, subject to increase in the government’s share. However, given that Colombia is a Concessions-based regime, and that India’s PSC set-up allows cost recovery as a means for risk mitigation, the Indian government should be taking a more favorable share beyond the 20 years. In other regimes such as Brazil and Norway, extensions are granted on requests and on demonstration



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of evidence of potentially recoverable reserves. In Egypt, a PSC regime, the contractor must pay an Extension Bonus of at least \$5 million, in case of an extension beyond the initial period.

Recommendations:

1. Create provision for automatic extension of production period subject to pre-determined terms and conditions (decision to be taken 24 months in advance of the expiry of production period)

Automatic extensions may be provided for 5 to 10 years if three conditions are met: continued production over the last 5 years of the original term; continued production over the Enhanced Oil Recovery (EOR) system in place that maximizes recovery; and additional participation of the government. Given that the risks for the operator to extract more hydrocarbons at the end of the production period are negligible, it is appropriate for the government to expect additional participation in case of extension.

Additional participation for the government could be in the form of a onetime signature bonus, or extra royalty. The formula for additional share should be pre-determined and made clear and transparent, and could be calculated according to the production rates and other economic considerations. For a successive extension, government participation could be set to increase by a known amount. Contractor may choose to forego the automatic extension, in exchange for an alternative negotiated agreement 24 months before the expiry of the lease term.

The extension application should be required to be submitted at least 24 months before the expiration of the initial period of the ML. This would allow the operator to plan for continuing production, or for ramping down the operations on expiry of the lease.

In case the operator does not agree to the terms of automatic extension, the government may allow the current ML to terminate and offer the area for competitive bidding. The original operator may be eligible to apply for the bidding process under its preferred terms, with no special consideration or privilege.